

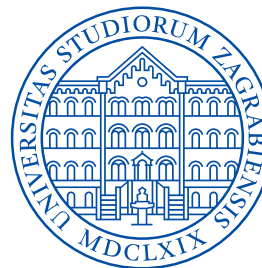


**FACULTY OF VETERINARY MEDICINE**  
**UNIVERSITY OF ZAGREB**  
1919 - 2019





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**UNIVERSITY OF ZAGREB**  
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Zagreb, 2019

# **100 years of Faculty of Veterinary Medicine of University of Zagreb (1919-2019)**

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Professor Eugen Podaubsky initiated the founding of the Veterinary High School in Zagreb. This monument was unveiled on October 17, 1959, on the occasion of the 40<sup>th</sup> anniversary of the school's founding. It is located in the Faculty's patio, between the complex of buildings for the theoretical-experimental departments, and the clinical building. It was sculpted by the sculptor Vanja Radauš.



The main Faculty building at the old location at Savska cesta no. 16. Oil on canvas, Vladimir Kirin, 1960



Kirin  
1960  
Zagrebo-Savska  
Vetovinarški fakultet



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## A word from the Dean



It is with particular pride and pleasure that we present this monograph to you, to mark the 100<sup>th</sup> anniversary of the Faculty of Veterinary Medicine of the University of Zagreb. It was on 13<sup>th</sup> November 1919 that the first classes began at the Veterinary High School, which was renamed five years later as the Faculty of Veterinary Medicine. Since then, and right up to the present day, our institution has been the only institution of higher education in Croatia which has continuously raised up doctors of veterinary medicine, and thereby shaped the history of the veterinary profession and work in this region. This is not just the story of the origins of the central institution of veterinary higher education, but it is also an overview of the course of its development, its importance, and the endeavours of many generations of professors and students. Over the course of time they have confirmed the justification of investment in excellence, so that today we have the leading educational institution for doctors of veterinary medicine, which we are able to serve and develop further. We are particularly proud of the fact that our anniversary coincides with the 350<sup>th</sup> anniversary of the foundation of the University of Zagreb, the cradle of Croatian higher education and science, of which we are proud to be part.

Over the past few years there have been important changes in the national, European and even the global economic and social environment, of which not only the Faculty of Veterinary Medicine, but also the whole University of Zagreb is a part. By joining the European Union, we became part of the European higher education area in the fullest sense, and of the European research area as well, which apart from its obvious advantages, also brings many problems and challenges. It is certain that we are living in an age of constant and increasingly rapid change, resulting mainly from the powerful development of technology, where the exponential nature of that process makes it difficult to foresee the future with any precision, in almost all fields of human endeavour. In such an unstable setting, it is necessary to uphold the decisive role which education and creativity have in the development of society, the economy and the cultural framework of the nation. In this context, it is crucial and of the utmost importance to excel in terms of the quality of the study programme and the quality of research projects, as well in the consistent promotion of academic values, which include honesty, fairness, respect, trust, responsibility and equal opportunities for everyone. The Faculty of Veterinary Medicine University of Zagreb today is the leading scientific educational institution for the veterinary profession in this area, but also one of the leaders in the entire of Southeastern Europe. Doctors of veterinary medicine play a key role in the protection of the health

of both animals and people, animal welfare, food safety, protection of the environment and the sustainable breeding of animals, and have a leading role in combating antimicrobial resistance. We want to and must retain that position in the time to come, through our proactive work, both in the field of the education of doctors of veterinary medicine, and in the field of scientific research, professional work, life-long education and interinstitutional and international cooperation. We will continue to work in keeping with the newly established strategic guidelines so that the Faculty of Veterinary Medicine will have continuity in its work and be recognized both within and beyond the profession. At the same time, we are completely aware of the necessity of continual analysis, revision and alignment of our strategic guidelines with the new age, conditions and environment in which we find ourselves, prepared to meet the new challenges placed before us on both national and international level. The Faculty of Veterinary Medicine is participating in the current trends in higher education and science, efficiently and flexibly, on the level of the leading veterinary institutions in the EU and the world. In the last one hundred years, The Faculty as a whole has demonstrated strength and self-confidence, with the undisputed qualities we own, and it is our obligation to establish that position still further in the time to come. Therefore, let us continue on this journey through time, promoting the fundamental academic values, and with each step we take we will leave our mark in history, without being aware of it in real time. We can look back with pride on how far we made it, and on our successes. We can be particularly proud of the fact that we have accepted the trials of gradual development, and we have agreed to take bold steps and make courageous decisions, which we believed would bring progress. The time we live in is burdened by challenges, constant changes to the environment in which we work and create, and it leaves almost no time for the normal life we all long for. We should not always look for the means to achieve our goals and values beyond ourselves, rather I firmly believe that by delving deeper into our own consciousness, it is possible to find the best way to express the fundamental values of society, such as understanding, tolerance and goodness, values which we know well, but too often forget. Therefore, given the uncontrollable progress of the time in which we live, humanity and community must still be the virtues that adorn us, and of which we can boast, which will be the guarantee of even better results and which will characterise the Faculty of Veterinary Medicine in the future.

Nenad Turk

## A word from the Editor-in-Chief



The one hundred years of the Faculty of Veterinary Medicine as one of the oldest parts of the University of Zagreb, and the only faculty that during this long period has been educating doctors of veterinarian medicine in Croatia, is an opportunity to present the most important events from its rich history up to the latest achievements. Therefore, it was decided to have a monograph in English in addition to the Croatian monograph, all the more so because in the year when the Faculty is celebrating this special jubilee, it has also been given a special honor to be the host of the 32<sup>nd</sup> General Assembly of the European Association of Establishments for Veterinary Education (EAEVE).

The content of this monograph is a summary of the same work in Croatian, and it is based on the Faculty's archived materials (minutes of sessions of administrative bodies, decisions, annual reports on the Deans' work, journals, testimonials and yearbooks), as well as on the data about the Faculty's operation, taken from the Archives of the University in Zagreb (lecture schedules and reports on the University's operation) and the material kept in the Croatian State Archives (legislation within the framework of the founding, organization and operation of the Faculty at different times). It is divided into three sections that are broken into specific thematic areas.

The first part begins with a chronological presentation of the development of the University of Zagreb, which has been operating for a full 350 years. This presentation is followed by the description of the development of the veterinary education in Croatia, with special emphasis on certain events and the most important historical figures that contributed to it.

Then follows the founding and operation of the Veterinary High School, which was located at the premises of the former Farrier School in the western part of Zagreb, was described. The difficulties that followed its organization were outlined briefly: from the lack of material resources and the teaching staff to the lack of space for its uninterrupted work. In the first part, the first complete curriculum of the four-year veterinary medicine study is presented, as well as the CVs of the founders, and first teachers at the high school. Some of them were the rectors until it became the Faculty of Veterinary Medicine.

In the last part of the first section the general history of the Faculty (1924-2004) is described-since its founding, organization, struggle for its survival in Zagreb, the construction of the Faculty's building at the today's location in the eastern part of Zagreb (where it still stands), the role that the Faculty played in the World War II and the Homeland War, the importance of the Faculty for veterinary pharmacology and

establishment of veterinary surgeries, to the chronological order of activities related to teaching, scientific and professional activities, international cooperation and activities of the student associations.

In the second part, the Faculty's recent history is described, from the introduction of the Bologna Process in 2005 to the present day. Namely, the reform of the higher education system in accordance with the Bologna Declaration is the last in the line of major reforms in accordance with which the Faculty operates nowadays, so it was only logical to separate this last period from the rest of the monograph. Furthermore, the Faculty has seen many important changes in this last period; changes that significantly improved its operation. Therefore, this unit is described in more detail and broken down into new subparts, such as quality management.

In the last, third part, the role of each department and clinic in the implementation of the graduate and postgraduate studies of veterinary medicine, as well as the scientific-research activity, and the professional and clinical work of the Faculty as a whole are described. This monograph contains a lot of tables which complete the text, and numerous photographs from different periods of the history of the Faculty, thus showing the creation and development of our institution in pictures as well.

This publication is a testimony to the complex socio-political processes that have taken place in this area since the Faculty was founded, and we should recall with pride the numerous generations of professors and students who have contributed to the present status and reputation of the Faculty in the national and international higher education system. We are honored to belong to the generation of professors at a time when, growing from the rich heritage of the one hundred years of operating, already the third generation of students studies at the integrated undergraduate and graduate veterinary medicine study programme in English, and the international postgraduate study programme is in the process of being constituted. The quality we keep emphasizing throughout this monograph stems from the long-time systematic work, and our efforts in quality improvement in all our activities are a continuous challenge for the Faculty, but we are doing all this so that we can share the European space of higher education and research on an equal footing with the other actors, without neglecting our national position and interests.





The National Farrier School on Savska Street no. 16 at the beginning of the 20<sup>th</sup> century. One of the school principals was Eugen Podaubsky, who in 1918, through the Croatian and Slavonian Veterinary Society, launched the foundation of the first veterinary high school in Croatia. The building was allocated for the needs of the Veterinary High School in 1919. The picture shows students of the Farrier School, with teaching and technical staff (Faculty Archives).



# I. HISTORY





The central facade with the entrance to the main building of the University of Zagreb on today's Republic of Croatia Square, where the Rector's Office and the Faculty of Law are located. In front of the main entrance there is a bronze cast of the History of the Croats, a sculpture by the world famous sculptor Ivan Meštrović, which was set up there in 1970 to mark the 300<sup>th</sup> anniversary of the foundation of the University of Zagreb. According to the multilingual booklet *Meštrovićev znak u Zagrebu* published by Museums Ivan Meštrović (2013) *the seated figure of a woman is dressed in a stylized folk costume originating from the Dalmatian Hinterland and it is thought that her facial characteristics are based on the artist's mother. The female figure is holding a large stone plate in her lap, on which the title of the piece is written in Glagolitic script, and she represents a caring mother and guardian of the national heritage and history.* Two years later, on the basis of a plaster model dating from 1932, a statue in bronze marble was sculpted, which was purchased from Meštrović by the Yugoslav King Aleksandar I. Karadorđević. The statue was set up in the pavilion in the park of the royal court at Dedinje in Belgrade, where it still stands today.



# 1. The University of Zagreb and the Development of Veterinary Education in Croatia

The University of Zagreb (Lat. *Universitas Studiorum Zagrabiensis*) is one of the oldest universities in Europe, which has operated continuously without interruption, on the foundations of the centuries-old educational tradition, since the foundation of the cathedral school in the 14<sup>th</sup> century, established on the model of the medieval Dominican provincial studies (Lat. *Studia Solemnia*). The true beginnings of higher education date back to 1607, with the foundation of the Jesuit public high school (gymnasium) in Zagreb. The school developed quickly, and in 1615 it had 400 students. At that time, the idea arose to found a high school for studies in theology and philosophy, but in 1645 a fire destroyed the Jesuit school building and delayed its foundation. So, the High School of Theology and Philosophy was finally founded in Zagreb on 6<sup>th</sup> November 1662, which was made possible by the basis of voluntary donations. On that day, the study of philosophy was established at the Jesuit High School in Zagreb, which was later to become the birth place of the University of Zagreb.

In 1666 the Jesuits in Zagreb also had an academy, with six high school grades, and the still unrecognised Faculty of Philosophy. They strived for the academy to be granted the rank of university, so the Rector of the Zagreb High School, Filip Kavšić (Kausich) made application to Leopold I of Habsburg, the Holy Roman Emperor and King of Hungary, Croatia and Bohemia.

The date of the formal establishment of the University of Zagreb is taken to be 23<sup>rd</sup> September 1669, when by a privilege issued in the city of Ebersdorff, Leopold I granted the Jesuit Academy (Lat. *Academia Zagrabiensis*) the status and privileges of a university: “*We hereby decide and decree that the foundation of the academy shall be deemed to have been approved, accepted and confirmed, permanently for all future time, for all people, of all stations and positions.*” However, the teaching staff was still exclusively Jesuit, and the teaching plans and curricula were created on the basis of the teaching plans and curricula of other Jesuit academies in the countries of the Austrian Province.

At the request of the Jesuits, the Parliament of the Kingdom of Croatia and Slavonia ratified the privilege granted by Leopold I on

3<sup>rd</sup> November 1671. As a result, the University accepted 1669 as its foundation year and 3<sup>rd</sup> November is marked as the Day of the University (Lat. *Dies Academicus*). From that time on, the study of philosophy in Zagreb was formally established within a public institution of higher education (Lat. *Neoacademia Zagrabiensis*).

The Academy remained under the control of the Jesuits until 1773, when Pope Clement XIV abolished that Jesuit Order at the request of many European rulers. After it had been abolished, Empress and Queen Maria Theresa issued a Decree on 8<sup>th</sup> October 1773 placing all Jesuit academies and schools under the temporary administration of the Diocesan bishops. So the Bishop of Zagreb, Josip Galjuf, following the Queen’s instructions, replaced the Jesuit teachers at the Academy with mainly secular priests. The two-year course in philosophy and the four-year course in theology had separate teaching staff, and in terms of organization were linked to the high school.

One year before the abolition of the Jesuit Order, a course in political science (Lat. *Studium politico-camerale*) had moved in there as the forerunner of the future Faculty of Law. That course was founded by Maria Theresa in 1769 in Varaždin, to provide education for highly professional local administrative clerks. The course was held in the Academy building, but it was not until 1776 that it was included in the organization of the Academy itself.

After the abolition of the Jesuit Order, Empress and Queen Maria Theresa created a School Fund from the confiscated property of the Order in order to finance the reorganization of education in Croatia from its income. By the Queen’s Decree of 5<sup>th</sup> August 1776, the Royal Academy of Science was founded in Zagreb (Lat. *Regia Scientiarum Academia Zagrabiensis*) with three courses, or Faculties: Theology (Lat. *Facultas Theologica*), Philosophy (Lat. *Facultas Philosophica*) and law (Lat. *Facultas Iuridica*), which included the previous *Studium politico-camerale*. The Main High School (gymnasium) in Zagreb also became part of the Academy.

The courses at each faculty lasted two years, but enrolment at the Faculties of Theology and Law was only possible after completing



## I. HISTORY

studies at the Faculty of Philosophy. This brought a crucial period to an end and a new school system was established in the Austrian Empire, of which the Academy was part. The Academy began work on 11<sup>th</sup> October 1776, and up until 1850 it operated as the only institution of higher education in Croatia and Slavonia.

In 1777, Maria Theresa adopted the final regulations on the organization of education in Hungary and Croatia, and they were printed in a comprehensive book, with the abbreviated title *Ratio educationis*. According to those regulations, the whole of the Kingdom of Hungary was divided into five school districts, and each of them had an academy, alongside elementary and high schools. The Kingdom of Croatia, Slavonia and Dalmatia, with the Academy in Zagreb, belonged to the 5<sup>th</sup> District. The Hungarian University in Budim was the only one with a higher status than the Academy. In 1784, the Austrian Emperor Joseph II, in his reforms, separated studies in theology from the Academy and moved them to the Seminary. From then until 1850 the Academy consisted of only two faculties: law and philosophy.

At the end of the 18<sup>th</sup> and in the 19<sup>th</sup> century, Zagreb University was hit by hard times, first of all due to attempts at Magyarization (Hungarization) and then Germanization of our people. The Austrian ministry, as part of the re-organization of education in the entire Monarchy, abolished the Zagreb Academy on 3<sup>rd</sup> October 1850. Consequently, the courses from the former Faculty of Philosophy were transferred to the Main Zagreb High School as its 7<sup>th</sup> and 8<sup>th</sup> grades, while the two-year Faculty of Law was turned into the three-year Royal Law Academy (Lat. *Regia Academia Iuris*). Although it had elements of scientific education, the Law Academy in fact offered a vocational course. From 1850 to 1874 it remained the only institution of higher education in Croatian territory. At that time, the Academy mainly taught Austrian law, because the aim of Bach's absolutist system (the period of the regime between 1850 and 1860 named after the Austrian minister Alexander Bach, who was known for centralization and Germanization in Austro-Hungary at that time, author's note) was to unify law in all the countries of the Monarchy as quickly as possible.

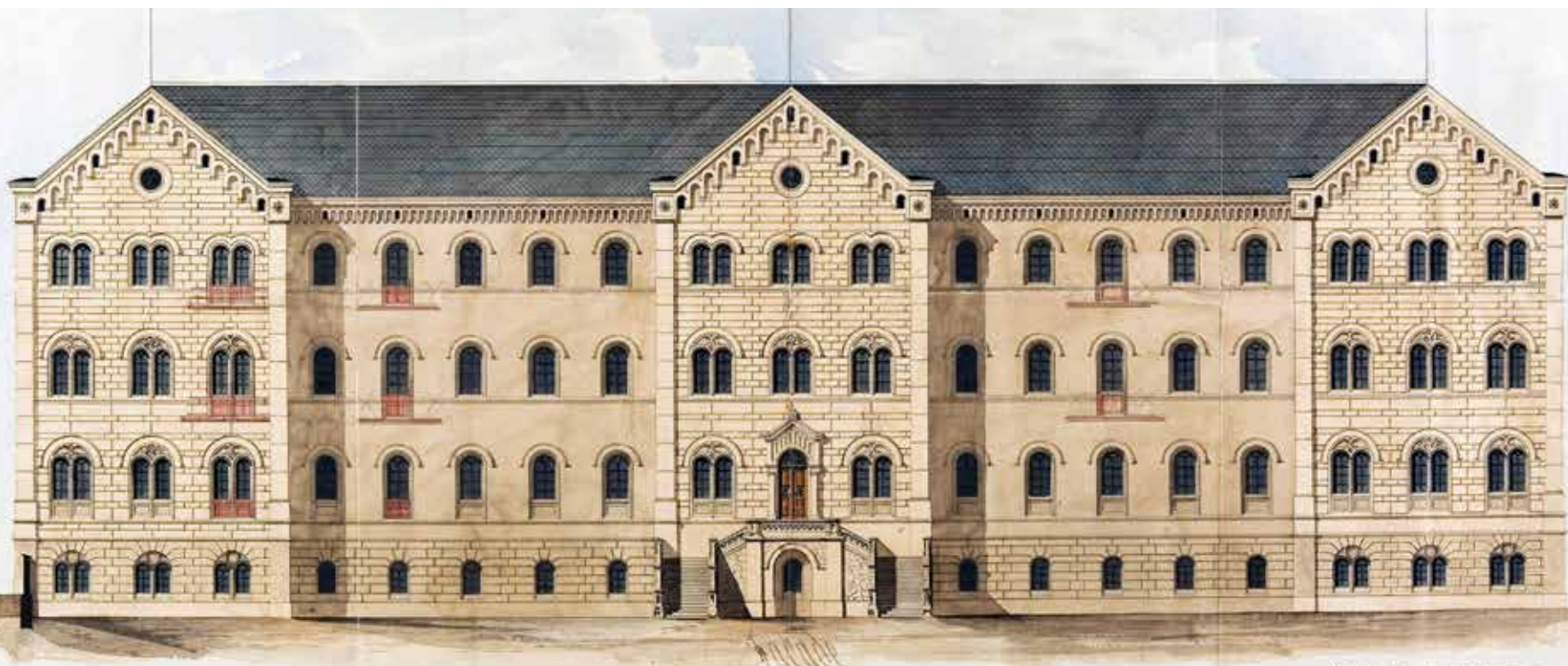
The Law Academy operated in difficult conditions, especially since 1855, when the ministry of education prescribed that all lectures, examinations and administration had to be translated from the previously used Croatian language into German. This situation continued until the fall of Bach's absolutism in 1860, when Croatian

was restored to the teaching and administration of the Law Academy. By the Royal Decree of 30<sup>th</sup> August 1868, the Academy was reorganized into four courses of the university type, along the lines of the law courses at Vienna University, which also marked the beginnings of the foundation of university-style, academic courses in law. However, the law courses at the Law Academy were not completely equivalent to the courses at Austrian universities, amongst other things because it was not possible to award a PhD in law.

In 1861 activities began to found a modern university in Zagreb. On 28<sup>th</sup> September 1861 the Croatian Parliament, prompted by Bishop Josip Juraj Strossmayer, adopted the legal article "On the creation of a Yugoslav university in Zagreb and the costs for it" requesting the foundation of the University, and sent it to the government. In joint action, undertaken upon Strossmayer's initiative and with his participation, the necessary funding was secured for its opening. The article above prescribed that the Law Academy was to be reorganized into a faculty, by the foundation of three more professorships for the Faculty of Law, and three for the Faculty of Philosophy, *as well as the organization of a midwifery and veterinary department* as part of the University. The Croatian Court Chancellery (the Croatian Ministry in Vienna of that time) did not entirely approve this parliamentary proposal, so the midwifery and veterinary institute was not founded. The Parliament sent a new petition to the rulers in 1866 and 1867, but without results. The Croatian Parliament laid again their proposal before Emperor and King Franz Joseph I while he was staying in Zagreb between 8<sup>th</sup> and 11<sup>th</sup> March 1869, and he finally gave his support. Consequently, on 13<sup>th</sup> March 1869 the Parliament passed the legal article on the foundation of the University.

On 8<sup>th</sup> April 1869, Emperor and King Franz Joseph I finally confirmed the article "On the foundation of the university in the capital city of the country, Zagreb", along with the provision that it be named Franz Joseph I University. Thereby the University of Zagreb was formally established. On 21<sup>st</sup> April 1869, the Croatian Viceroy Levin Rauch appointed the Committee to create organizational foundations and the bill of costs for the university. However, a bitter political struggle between the People's Party and the Unionist Party over the implementation of the Croatian-Hungarian Settlement prevented the University from being founded, organized and opened for further five years.

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Today's building of the University of Zagreb, built between 1856 and 1859 for the needs of the general hospital. The hospital never moved into the building once it was completed, so the building was allocated to the University in 1882 by the government's decision. Classes at the University began on 6<sup>th</sup> November 1882 (University of Zagreb Archives).

Handwritten text in the bottom right corner of the image, likely a signature or date related to the architectural drawing.



Josip Juraj Strossmayer (1815-1905), Bishop of Bosnia and Syrmia (Srijem) with seat in Đakovo. One of the best-known Croats in the world, an erudite theologian, politician and fearless protector of the people, the initiator and patron of the most important national cultural, educational and scientific projects in modern Croatian history, he invested all his mental and physical capacities into the welfare and progress of his nation. He donated financial resources to the foundation of the modern university in Zagreb, and the foundation of the Yugoslav Academy of Sciences and Arts (Artist: Josip Franjo Mücke, 1863).

The University was planned to consist of the Faculties of Divinity, Philosophy, Law and Medicine. The legal article, amongst other things, stated that: *“from this time on they must create within the medical faculty teaching chairs of midwifery and veterinary medicine”*. However, the provisions of this article were also not implemented immediately and in full.

The Parliament debated the future of the University at several sessions and finally on 15<sup>th</sup> September 1873 accepted the Draft Act on the organization of the University of Zagreb. The Emperor, due to the advocacy of the Viceroy at the time, Ivan Mažuranić, ratified the article “On the Organization of the Franz Joseph I University in Zagreb” on 5<sup>th</sup> January 1874.

By the law of Emperor and King Franz Joseph I it was prescribed that the Faculties of Divinity, Law and Administration were to be opened in the 1874/1875 academic year. At that time, the Law Faculty had already been established as part of the former Law Academy on Catherine’s Square, and the Faculty of Divinity as part of the Seminary, so they continued work in their full scope. In the same academic year, the Faculty of Philosophy (today the Faculty of Humanities and Social Sciences) was opened and was supposed to be organized gradually over three years. School of Medicine was also to be opened and to begin operations gradually and continually, as soon as the funding had been secured for its organization and maintenance. Pursuant to the University of Zagreb Foundation Act, the medical school was to offer courses on *“the science of animal care and veterinary management”* in the second year.

The University was located in the Upper Town, in the old gymnasium building on Catherine’s Square, to which a second floor was added in 1874. A Committee was immediately appointed to implement the Act, presided by Viceroy Ivan Mažuranić. On 27<sup>th</sup> April 1874 the university professors were appointed. According to the Act Implementation Instructions, the Dean and Vice-Dean were appointed in September, and the teaching staff appointed the Rector Matija Mesić and Vice-Rector Konstantin Vojnović at a joint session on 4<sup>th</sup> October.

Viceroy Ivan Mažuranić, as the royal representative, officially opened the modern University of Zagreb on 19<sup>th</sup> October 1874, but without the medical school. On that occasion, Rector Matija Mesić, also the last

director of the Law Academy, presented the history of higher education in Zagreb in detail. A year after its opening, a special memorial edition was printed with an extensive presentation of the creation of the modern Croatian University.

At that time, there were 205 regular students at the University (seven at the Faculty of Divinity, 175 studying law and 23 at the Faculty of Philosophy). This was the time when Zagreb had about 28,000 inhabitants living in the Upper Town and the strict centre of the Lower Town.

Faculties of Law and Philosophy were moved from the Upper Town to the premises of today’s main building of Zagreb University on Fairground Square (today Republic of Croatia Square), which at that time was on the edge of the Lower Town. The building was opened on 5<sup>th</sup> November 1882.

The Academic Senate of the University of Zagreb sent a petition to the Croatian Parliament on 11<sup>th</sup> May 1888 pleading for a medical school to be established at the University. In the extensive explanation it was requested that the school should include an Institute for infectious diseases of animals and veterinary medicine, which indicates that there was a tendency to link veterinary medicine to medicine. The School of Medicine began work in the 1917/1918 academic year.

With the fall of the Austro-Hungarian Monarchy in the autumn of 1918, the Croatian Parliament declared the country’s secession from the monarchy, and on 1<sup>st</sup> December 1918, the country joined the newly-formed Kingdom of Serbs, Croats and Slovenes (SCS) despite its traditional, cultural and civilizational links with Central Europe, and became part of the Kingdom of Yugoslavia in 1929. In that way the University of Zagreb entered a new period of its operations.

Immediately after the end of the First World War, Zagreb University consisted of four faculties: Divinity, Law, Philosophy and Medicine.

The first new faculty to be founded after the end of the war was the Faculty of Agriculture and Forestry (1919), which came about by the merger of the former Agricultural High School in Križevci and the Forestry Academy in Zagreb. This was followed by the Orthodox Faculty of Divinity (1920), which was quickly abolished (1924) due to the lack of interested students. After that, the Veterinary High School became the Faculty of Veterinary Medicine, and the Technological High School (1918) was reorganized as the Faculty of Technology (1926). So, in the period between the two wars, the number of faculties within the University of Zagreb increased to seven.

Despite all the economic and political difficulties, the University of Zagreb was developing relatively quickly until the 1927/1928 budget year, when many years of stagnation began. At that time the state budget was the main source of funds for meeting the university’s needs. In the 1927/1928 budget year there was a drastic reduction in funding by one third, due to general and stringent savings in the department of state administration, and the extreme anti-inflationary policies of the government of that time. With the foundation of Banovina of Croatia in 1939, there was a significant increase in loans once again.

After the Second World War, the University made further progress, seen in a rise in the number of faculties and an overall improvement in higher education. That trend has continued up to the present day.

Many well-respected scientists, with global reputations, have been raised in the lecture theatres of the University of Zagreb, and have contributed to the recognition of Croatian culture and the spread of knowledge about our homeland throughout the world.

From the 1874/1875 academic year to 2017/2018, a total of 479,846 students graduated from undergraduate, graduate and professional courses at the University of Zagreb. In postgraduate studies, 27,435 students attained master’s degrees, 6,002 specialized degrees, and 20,107 doctorates. This means that in that period a total of 533,390 students completed one or more levels of education at the University of Zagreb. Today the University of Zagreb contains thirty faculties, three academies of arts, and the University Department for Croatian Studies. Since the establishment of the Faculty some teachers contributed to the promotion of the value of the Faculty by performing honourable duties of the Rector (Academician Teodor Varićak) and Vice-Rectors (Academician Teodor Varićak and professors Josip Ivoš, Petar Kraljević, Ljiljana Pinter and Miljenko Šimpraga) of the University of Zagreb.



## I. HISTORY

Regarding the development of veterinary education in Croatia, the first efforts to establish a school of veterinary medicine in Croatia date back to 1806, when, after the arrival of the French authorities in Dalmatia, lower and higher schools were founded, and the first attempt to found a veterinary school was recorded in Zadar. Although the epizootiological situation in Croatia at that time was very similar to that in other European countries, the first veterinary school in Croatia was not founded until the beginning of the 20<sup>th</sup> century, primarily for political reasons.

The activities surrounding the establishment of the first veterinary school in Croatia ran in parallel with the work of the Croatian and Slavonian Agricultural Society. This was founded in 1841 as part of the Illyrian Movement, when the spirit of the time and the national renaissance demanded not only national but also agricultural education and enlightenment. The work of the Society was based on maintaining the health of livestock and improving farming, including also scientific work and narrower veterinary and medical work. In 1842 the Society launched a professional and popular journal entitled *List mesečni* (since 1848 known as *Gospodarski list*) which became the journal of the veterinary profession and science. In addition to this, the question of founding a veterinary high school in Zagreb was already raised in 1844. Veterinary services at the time were provided by doctors who had taken a course in veterinary medicine, and there were only a few veterinarians under medical supervision, so the treatment of livestock was rudimentary and non-professional. It was understandable, therefore, that on 14<sup>th</sup> July 1850 the General Assembly of Physicians of Croatia and Slavonia issued a Proposal for the Improvement of Health Management in the Kingdom of Croatia and Slavonia, according to which every municipality needed to have a doctor, a veterinarian and a midwife. This proposal prescribed the foundation of a *theoretical and practical high school for animal doctors*, where classes would be held in the national language. The proposal was not accepted, but on 7<sup>th</sup> September 1850 Bach's Patent on regulation of health management was imposed in Croatia, and remained in force until 1874. It must be mentioned that there were attempts to open a veterinary school in 1856 as well, made by the magistrate of the Capital City Zagreb, however the Viennese court did not accept those proposals either.

The turning point in the organization and importance of veterinary services in Croatia and Slavonia was certainly the Act on the Organization of Political Administration and Health Care, which came into force on 15<sup>th</sup> November 1874, and thereby marked the beginning of a new period in the development of veterinary medicine. That act for the first time prescribed the position and organization of veterinary services, and pursuant to it, the first eight sub-county "animal doctors" were appointed. However, the law did not resolve the question of combating infectious diseases of livestock, and the veterinary service still operated within the health care service.

One of the efforts to found a veterinary high school, the adoption of the Act on Organization of Veterinary Medicine in the Kingdom of Croatia and Slavonia of 27<sup>th</sup> August 1888, which was the work of the head of the veterinary services in Croatia and Slavonia at the time, Dr. Radoslav Krištof, a physician and qualified veterinarian. This was the first veterinary act whose basic provisions resulted in improving animal husbandry. According to the provisions of the Act, protection from animal infections was the basis of veterinary work. To that end, three basic factors were regulated: the strict organization of the veterinary service, unified measures and procedures for prevention and suppression of infection, and the provision of material resources for the work of the veterinary service as a whole.

Until Act came into force, there was a tendency in Croatia, as in other countries, to link veterinary education with human medicine. On the basis of the new legislation, veterinarians were finally given the honourable title of their profession, and the veterinary service became increasingly independent and removed from human medicine.

On 30<sup>th</sup> June 1891, the national government of the Kingdom of Croatia, Slavonia and Dalmatia issued a decree on the implementation of veterinary practice, prescribing that only graduate veterinarians and healers (*Kurschmiede*) from the old system had the right to perform



Dr. Radoslav Krištof (1842-1904) one of the most prominent and most deserving veterinarians in Croatian history. He was the first national veterinary supervisor of the independent Veterinary Division in the Croatian and Slavonian National Government, and the creator of the first Veterinary Act for Croatia and Slavonia (1888). He is to thank for the foundation of the National Farrier School (1886), the National Bacteriological Institute in Križevci (1901), the Croatian and Slavonian Veterinary Society (1893), and for instituting the Veterinary School in Zagreb (1919). His work laid the foundations of modern civilian veterinary medicine in Croatia (Faculty Archives).

veterinary practice, meaning only those healers who had obtained a certificate from the Veterinary Institute in Vienna by 1858, which in terms of the right to undertake veterinary work was comparable to a veterinary diploma. Civilian and military healers who, on the basis of their discharge papers and certificates, were authorised to shoe horses, did not have the right to perform veterinary practice, nor did farriers who had completed a course in equine hoof care. Performing veterinary practice by these people was deemed to be pseudo-veterinary medicine. At that time the development of veterinary education in Europe moved increasingly towards equalization of veterinary studies with other academic branches. Questions about the courses were discussed at the veterinary congresses in 1867 in Zurich, in 1873 in Frankfurt and in 1883 in Brussels. At the veterinary congress in Zurich a special resolution was adopted which concluded:

*For the study of veterinary medicine the same prior education is necessary as for the study of human medicine and natural sciences. Therefore, it is necessary to ensure that in order to enrol at the veterinary school every candidate has passed the matura examination.*

*The study of veterinary medicine must last for at least three years (according to the conclusions of the Congresses in Frankfurt and Brussels, four years of study were necessary, a.n.).*

*The veterinary school may be an independent institution or it may be joined to a university. In this context, it is necessary to ensure that veterinary medicine develops independently. The organization of individual universities, where a single teacher teaches veterinary medicine and trains future veterinarians, is insufficient and should be rejected.*

So, in the 19<sup>th</sup> century, veterinary schools were reformed, whether they were raised to the level of high schools or became part of a university. A high school leavers' certificate (*matura* or *maturity test*) was needed to enrol, and the course was extended to eight semesters.

The Croatian and Slavonian Agricultural Society, apart from initiating the question of founding a veterinary high school, also contributed to the founding of the Royal Agricultural and Forestry High School in Križevci on 19<sup>th</sup> November 1862. This was the oldest agricultural and forestry high school in south-east Europe, where the first professional

stations and scientific institutes were founded in the field of agriculture, and livestock production on the school farm was accompanied by veterinary medical work.

The Croatian and Slavonian Agricultural Society also contributed to the foundation of the Croatian and Slavonian Veterinary Society in Zagreb, at a meeting held on 27<sup>th</sup> March 1893, and this was mainly thanks to the work of the prominent veterinarians Fran Lisak and Radoslav Krištof, who were also the first secretary and president of the Society. The purpose of the Society was to nurture veterinary science, promote the interests of veterinarians, and to endeavour to promote collegial work to the benefit of the group.

A prominent member of the Croatian and Slavonian Veterinary Society was the veterinarian Eugen Podaubsky, who was appointed head of the National Farrier School in Zagreb on 1<sup>st</sup> January 1899. The school was founded in 1886 with the goal of educating good quality farriers, which was extremely important for preserving and developing horse breeding as an important branch of farming in the country at that time. When the main building was built and the courtyard building added in 1914 to house the National Farrier School, they were designed and built so they could later serve as the first premises of the future Veterinary High School. A large part of the funding for those buildings was provided by Eugen Podaubsky, from revenues of his horse-shoeing and veterinary clinic school.

The Croatian and Slavonian Veterinary Society launched the publication of the professional monthly journal *Veterinarski vijesnik* in 1906, whose editor-in-chief was Eugen Podaubsky. The journal regularly published professional and scientific discussions about veterinary work, and already in the first issue an article by Josip Nessl



Milan Rojc (1855-1946) Croatian lawyer, politician, and member of the Croatian Parliament. He was the head of the Division of Divinity and Teaching (1906-1907, 1917-1919) and commissioner for internal affairs, that is, Deputy Viceroy in the Regional Government in Zagreb (1919-1921). He advocated the foundation of several institutions of higher education, including the Maritime Academy in Bakar, the School of Education, the School of Commerce and Economy the Technical High School in Zagreb, the Academy of Arts in Zagreb, the School of Medicine and the Veterinary High School in Zagreb, as well as scientific institutes, such as the Institute of Ethnology. In 1920 he received an honorary PhD from the University of Zagreb (Faculty Archives).



Detail from the horse-shoeing section of the National Farrier School. The picture was taken in 1910 (Faculty Archives).

was published about the need to found an independent veterinary high school or a faculty in Croatia. The same topic was dealt with on many occasions in other journals as well. However, no veterinary high school was founded, because at that time there was no political will in the ruling circles to develop Croatia to the extent that it would no longer depend on Vienna and Budapest in terms of culture and its economy. With the break-up of the Monarchy, there were no political obstacles to founding a veterinary high school in Croatia, especially because Croatian students, due to the unresolved economic relationship between Austria and the newly established state, the Kingdom of Slovenia, Croatia and Serbia, were no longer able to continue their studies in Vienna. This prompted the members of the Croatian and Slavonian Veterinary Society to act quickly regarding the foundation of a veterinary high school in Zagreb, in order to meet the needs of the newly founded state for veterinary staff. At a session of the Board of the Croatian and Slavonian Veterinary Society, held on 25<sup>th</sup> November 1918, the head of the National Farrier School, Eugen Podaubsky, submitted a proposal for the foundation of a veterinary high school in Zagreb. This proposal was accepted and sent to the National Council of the Parliament of SCS in Zagreb, which had the function of the Croatian government at the time. At the same time, the Board of the Croatian and Slavonian Veterinary Society entrusted Stjepan Plasaj with the task of drawing up draft legislation on the organization of the veterinary high school in the state of SCS. The draft, in terms of content, was equivalent to the statutes of veterinary schools of the time in German speaking countries, since they had the best developed veterinary medicine. This draft was accepted at the Annual General Assembly of the Society on 15<sup>th</sup> December 1918, and sent to the Commission for Education and Religion for a decision. The commissioner for education and religion of that time, Dr. Milan Rojc, personally advocated the administrative implementation of the foundation of the school, and the work was completed in a short period of time. So in August 1919 the College of Veterinary High School was finally founded in Zagreb, whereby the ancient wish and need of the Croatian people to have their own institute of higher veterinary education were finally fulfilled.





The central façade of the main building housing the Veterinary High School (1919-1924) and the High School at the University of Zagreb (1924-1959). Today this is one of three locations housing the Faculty of Chemical Engineering and Technology of the University of Zagreb (Faculty Archives).

## 2. Zagreb Veterinary High School (1919-1924)

Zagreb Veterinary High School began work in the 1919/1920 academic year, pursuant to the *Regulation on the organization of the Veterinary High School in Zagreb, prior to its later organization by means of a Constitution* (Official Gazette of the SCS, no. 93/1919), prescribed on 31<sup>st</sup> August 1919 by the regent, Aleksandar Karadorđević. Those responsible for management were the school Rector and the Academic Board (the board of teaching staff had various titles at different times: the Faculty Council, the Faculty Board, etc.).

By Order of the Regional Administration for Croatia and Slavonia, Commission for Education and Religion, dated 26<sup>th</sup> September 1919, the first semester at Zagreb Veterinary High School began, but due to the shortage of teaching and administrative staff, the administration of the college was entrusted to the Dean of the Faculty of Philosophy, Prof. Dr. Stanko Hondl. Before the Veterinary High School became the Faculty of Veterinary Medicine, there were five changes of Rector and four of Vice-Rector (Table 1). In the first semester, 59 students enrolled from various parts of the country of that time, who were mainly from

the poorer classes of society. The Veterinary High School received the two-storey National Farrier School building and the ground floor of the courtyard premises for the clinic on Savska Street. By Order of the Viceroy of the Kingdom of Croatia, Slavonia and Dalmatia, Ivan Palečak, on 19<sup>th</sup> September 1919 the temporary high school staff were appointed: Eugen Podaubsky and Dr. Petar Gjurić, and on 31<sup>st</sup> October 1919, Jaroslav Sakař. They decided together regarding the tasks within the scope of work of the Academic Board, and the Dean of the Faculty of Philosophy acted as the school Rector.

The first lecture was given on 13<sup>th</sup> November 1919, on anatomy (by Prof. J. Sakař) and on 5<sup>th</sup> November 1979 the Scientific and Teaching Board rendered a decision to declare that day the Day of the Faculty of Veterinary Medicine. Since then, every year in the middle of November a Ceremonial Session of the Board is regularly held and on milestone anniversaries there is a special celebration to mark the foundation of the first, and thus far the only, institute of higher veterinary education in the Republic of Croatia.

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Table 1 The Management of the Veterinary High School from the 1919/1920 academic year to 1924/1925

Academic year	Rector	Vice-Rector
1919/1920	Prof. Dr. Stanko Hondl	-
1920/1921	Prof. Eugen Podaubsky	Prof. Jaroslav Sakař
1921/1922	Prof. Dr. Fran Zavrnik	Prof. Eugen Podaubsky
1922/1923	Prof. Dr. Petar Gjurić	Prof. Dr. Fran Zavrnik
1923/1924	Prof. Dr. Petar Gjurić	Prof. Dr. Fran Zavrnik
1924/1925	Prof. Jaroslav Sakař	Prof. Dr. Petar Gjurić





The main building of the Faculty of Veterinary Medicine of the University of Zagreb on Savska Street no. 16, which was built in 1916. Originally it housed the National Farrier School Faculty Archives).

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After the Veterinary High School was established, a Draft Decree was drawn up to prescribe the temporary organization of the high school, with a list of courses and state examinations to be taken. Although that Draft did not become legislation, the college used it for two academic years, and on the basis of it formed 12 departments, which opened gradually over the years. The course lasted eight semesters, and the curriculum contained chapters taught by full and associate professors, honorary assistant professors and lecturers. Students took exams in the courses they had studied one by one, with three state examinations. When they had passed all their exams, graduates attained the title of a Graduate Veterinarian.

The foundation of the Veterinary High School was accompanied by many problems, from the lack of material resources, including difficulties with accommodating the institutes and clinics that had been created, to the lack of a curriculum and teachers and other staff needed for the high school to function normally. First the Department of Anatomy was founded (1919), followed by the Department of Histology and Embryology (1921), the Department of Physiology (1921), the Department of General Pathology (1921), and the Department of Infectious Diseases (1921). These departments had many problems in organizing their work and teaching due to the shortage of material resources and inappropriate facilities. In order to solve the problem of lacking facilities for the Department of Anatomy, work began immediately to build a small, provisional building in the high school courtyard. That building was completed by the end of February 1920, so that in the 2<sup>nd</sup> semester practical work in anatomy could begin. The Department of Pathological Anatomy had a particularly difficult time. At the beginning of its work, it included general pathology, pathological anatomy and forensic veterinary medicine. Initially the institute was temporarily housed in the premises of the Department of Physiology. The pathological anatomy groups and practice classes for students were held outside the city, in the city slaughter house. In 1922 the most vital items and equipment were procured for practicals and dissection, and the following year a pathological-histological laboratory was equipped. Students of the

Veterinary High School, already in their 1<sup>st</sup> semester, established the Veterinary Students' Club, on 3<sup>rd</sup> December 1919. The club was founded to support its members, both morally and financially. To that end, students applied to veterinarians for material support, which they distributed to poorer students for their needs. They also, they founded a library and printed course notes for students. The Veterinary Students' Club operated under that name until 9<sup>th</sup> May 1923, when the name changed to the Club of Students of Veterinary Medicine.

The Veterinary High School did not have its own Department of Basic and Natural Sciences (the department of that name, which included botany, chemistry, physics and biology, was not founded at the Faculty of Veterinary Medicine until 1939) and the lack of most of the teaching staff was resolved by the Academic Board by engaging lecturers part-time from other faculties (the Faculty of Philosophy, the School of Medicine and the Faculty of Agriculture and Forestry, which was divided in 1959 into the Faculty of Forestry and the Faculty of Agriculture), as well as using other prominent experts. These part-time lecturers gave their lectures to students at their home faculties, meaning that students had to travel to many different locations in the city, which made their studies much more difficult.

Although classes began in November 1919, the first curriculum for the 1<sup>st</sup> and 2<sup>nd</sup> semesters was not written until 12<sup>th</sup> March 1920. By the Decree of Aleksandar Karađorđević of 17<sup>th</sup> June 1920, the following were appointed as full professors: Eugen Podaubsky (surgeon), Dr. Petar Gjurić (physiologist) and Jaroslav Sakař (anatomist). Soon after that, on 19<sup>th</sup> July 1920, Prof. Eugen Podaubsky took over the high school archives from the Dean of the Faculty of Philosophy, and thereby the independent work of the Veterinary High School actually began.

The first constituting session of the Academic Board was held on 22<sup>nd</sup> July 1920. It then adopted the official title of the Royal High School of Veterinary Medicine in Zagreb, and Prof. Eugen Podaubsky was elected the first Rector for the 1920/1921 academic year. The Vice-Rector was Prof. Jaroslav Sakař. Twenty-nine students enrolled in the first semester that year.

On the basis of a Decree by the regent, King Aleksandar Karadorđević, and a proposal by the Academic Board of the Veterinary High School, on 21<sup>st</sup> January 1921, the following were appointed as full professors: Dr. Lovro Bosnić (internist), Dr. Stjepan Plasaj (microbiologist and epizootiologist) and Dr. Fran Zavrnik (histologist and embriologist), on 20<sup>th</sup> November 1921, Ljudevit Jurak (human pathological anatomy) and on 11<sup>th</sup> July 1922 Mile Rajčević (internist for ruminants, pigs and poultry, gynaecologist). Thereby, along with the professors initially appointed, the first generation of teaching staff at Zagreb Veterinary High School was complete.

The teaching staff, apart from their work in class, also had to do all the administrative work, because at first there were no administrative or other staff employed. It was not until 1921 that the Academic Board appointed the first clerks and other auxiliary staff to work in the high school.

After a few years, the Veterinary High School met the conditions to become a Faculty of Veterinary Medicine, as part of the University of Zagreb. So, on 1<sup>st</sup> April 1921 the Academic Board sent a formal request to the Minister of Education asking for the high school to be promoted into the Faculty of Veterinary Medicine of the University of the Kingdom of Serbs, Croats and Slovenes in Zagreb, whereby the professors of the Veterinary High School would become university professors. This transformation was disputed because some of the university staff had proposed the formation of a joint medical and veterinary faculty. Although this proposal was quickly shown to be unfounded, there was resistance for a while longer at some faculties of the University to the transformation of the Veterinary High School into a faculty.

At a session of the Academic Board of 6<sup>th</sup> September 1921, the Department of Education and Religion was asked to approve the conduct of validation, habilitation and doctoral procedures at the high school according to University regulations, and this was how things were done until new regulations were adopted in 1922. Although the

Veterinary High School was not an integral part of the University, it applied the Act on the Organization of the University of Franz Joseph I in Zagreb of 1874 and its amendments from 1894, right up until it ceased to exist, that is, until it was transformed into the Faculty of Veterinary Medicine. Pursuant to that Act, it was prescribed that a person could only a person who, after completing their studies, had passed the strict doctoral examinations in the field of the relevant faculty with good grades could become a doctor. The number of strict examinations and how they were taken was established by a separate Order.

By an Order of the Regional Administration for Croatia and Slavonia, Department of Education and Religion, legislation was adopted on 1<sup>st</sup> September 1922 that regulated teaching and other work at the high school. On the basis of that Order, the first complete curriculum was adopted for a four-year course in veterinary medicine, and already the following year there were amendments to that Order (Table 2).

It is interesting to mention that candidates who did not meet the requirements for regular enrolment could enrol in a program on a part-time basis. For this, they needed proof that they were at least 18 years of age and that they had the knowledge required for successful studies. In their further studies regular and part-time courses were equivalent, apart from some details of the study regime. Part-time students were not obliged to attend lectures, and their diplomas indicated that they had completed their studies as part-time students. They also were not able to take the strict (doctoral) examination and thereby attain a doctorate degree in veterinary medicine. Further, the Order defined the scope of the examination materials for each course at the Veterinary High School. After their final examinations, the students were obliged to undertake practical work under the supervision of the district veterinarian. The Order also included the oath to be taken by graduate veterinarians before they were presented with their diplomas. The text of the diploma was in Croatian.

The original location of the Faculty of Veterinary Medicine of the University of Zagreb on Savska Street no. 16. The main building is in the background, while the roof in the middle belongs to the former Farrier School. Clinics buildings of the Faculty are in the front. (Faculty Archives).





## I. HISTORY

Table 2 The first complete curriculum for veterinary medicine designed in 1922, and amendments made in 1923

	Lectures		Practicals	
	Hours per week			
	1 <sup>st</sup> Semester		2 <sup>nd</sup> Semester	
<b>1<sup>st</sup> Year</b>				
Physics with Practical Classes	5			
Chemistry	5	3	5	3
Biology	4		4	
Botany	2		3	
Botanical Excursion (in the summer semester)				
Systematic Anatomy of Domestic Animals	5	3	5	
Parasitology	2			
The History of Veterinary Medicine			1	
Embryology	2			
<b>2<sup>nd</sup> Year</b>				
Hours per week				
		3 <sup>rd</sup> Semester		4 <sup>th</sup> Semester
Biochemistry	2			
Systematic Anatomy of Domestic Animals	2	5		
Topographic Anatomy of Domestic Animals			1	
Histology	4			
Histology and Embryology Exercises		4		
Physiology	5	3	5	3
Animal Husbandry	5		5	
General Pathology			2	
Animal Husbandry Excursion (in the summer semester)				
Nutrition Science	3		3	
Assessing Livestock Exercises		1		1
Pathological Anatomy			4	
Pharmacology	5	2	5	2
Methods of Internal Clinical Testing of Ungulates and Carnivores with Practical Classes			4	
<b>3<sup>rd</sup> Year</b>				
Hours per week				
		5 <sup>th</sup> Semester		6 <sup>th</sup> Semester
Pathological Anatomy	4	2	4	2
Pathology and Histology Exercises		2		

Microbiology	2	3		
Veterinary Hygiene			2	2
Hygiene of Animal Products (Meat and Milk)			3	3
Special Pathology and Therapy of Internal Diseases of Ungulates and Carnivores with Practical Classes (Medical Clinic)	7.5		7.5	
Aetiology of Infectious Diseases with Exercises on Aetiological Diagnostics			4	
Special Pathology and Therapy (Clinic) of Infectious Diseases with Practical Classes			3	
Surgery with Practical Classes (Surgical Clinic)	7.5		7.5	
Surgical Testing Methods	1			
Operations and Bandages Exercises			1	
Polyclinic Practice				1
Insuring Livestock, Agricultural Cooperatives and Alpine Agriculture (elective)	2			
<b>4<sup>th</sup> Year</b>	<b>Hours per week</b>			
		<b>7<sup>th</sup> Semester</b>	<b>8<sup>th</sup> Semester</b>	
Biology and Pathology of Fish, Crabs, Shellfish and other Molluscs			2	
Biology and Pathology of Bees and Silkworms			2	
Hygiene of Animal Products (Meat and Milk)	4	2	3	3
Special Pathology and Therapy of Internal Diseases of Ungulates and Carnivores with Practical Classes (Medical Clinic)	7			
Methods of Internal Clinical Testing of Ungulates, Pigs and Poultry with Exercises	1			
Special Pathology and Therapy of Internal Diseases of Ungulates, Pigs and Poultry (Buiatrics Clinic)	7		7	
Aetiological Therapy of Infectious Diseases with Exercises (serotherapy, vaccination) and Excursion by Arrangement	4			
Special Pathology and Therapy (Clinic) of Infectious Diseases with Practical Classes	3			
Surgery with Practical Classes (Surgical Clinic)	7.5		7.5	
Obstetrics and Special Pathology and Therapy (Clinic) of Mothers with Practical Classes	5	1	5	1
Forensic Veterinary Medicine			1	
Veterinary Inspection			2	
Polyclinic Practice		6		6
Encyclopaedia of Agriculture (elective)	2		2	
Hoof Care (elective)	1			
Basic Political Economics (elective)	2			



## I. HISTORY



The backyard of the Faculty of Veterinary Medicine of the University of Zagreb on Savska Street no. 16 in 1930s. The building on the left housed the necropsy hall of the Department of Pathological Anatomy. In the front is the building of the Department of Radiology and Physical Therapy (Faculty Archives).



The clinical rooms of the Department of Infectious Diseases (Faculty Archives).

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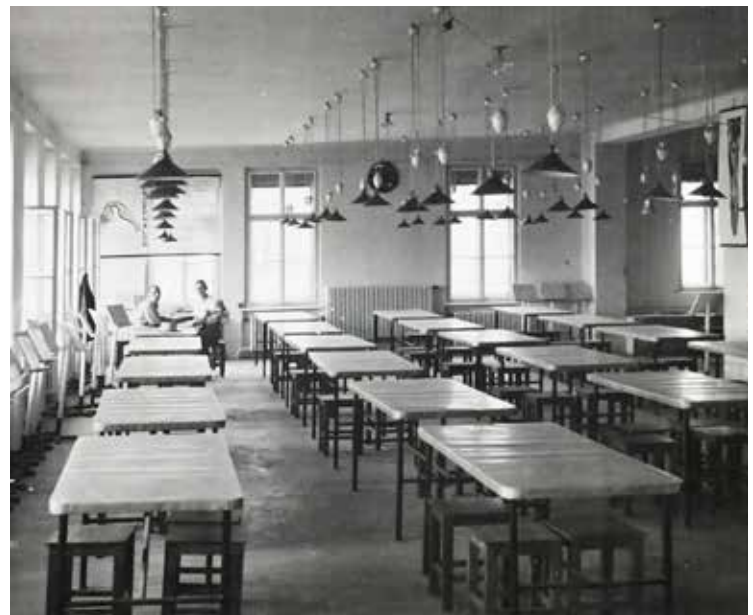
In accordance with this Order, doctorates in veterinary medicine were attained at Zagreb High School on the basis of a valid degree in veterinary medicine, the selected scientific paper (dissertation) and passing a strict (doctoral) examination. In the dissertation and examination the candidates had to show that they were capable of undertaking scientific research in a specific field of veterinary medicine. In the examination the main course within which the dissertation was written was tested, and two related courses. The diploma of a Doctor of Veterinary Medicine was issued in Latin, and its text was printed in the Order.

Finances for the work of the high school were provided from the state budget, with the monthly grant distributed by the budget committee of the Academic Board, according to the current needs of the school. However, the funding from the state budget was insufficient for the school's basic needs, so for that purpose they resorted to taking loans. The first graduation ceremony at Zagreb Veterinary High School was held on 28<sup>th</sup> May 1923, and on that occasion the title of graduate veterinarian was awarded to Dragutin Curilović. He had studied at veterinary school in Vienna, Prague and Brno, where he took two state examinations and graduated. He took only the third state examination at Zagreb Veterinary High School and thereby concluded his studies. In the same year, a graduation ceremony was also held for doctoral graduates. On 27<sup>th</sup> October 1923 the title of Doctor of Veterinary Medicine was awarded to Radoslav Župić, Ivan Poslušny, Rudolf Plach and Vjekoslav Vernik. All four graduated from veterinary schools abroad, but they completed their dissertations at Zagreb Veterinary High School and passed the examination, thereby meeting the requirements to graduate as Doctors of Veterinary Medicine. On the same day, the first honorary doctorates were also awarded to Dr. Milan Rojc, the former Commissioner for Education and Religion of the Regional Administration for Croatia and Slavonia; Antonio Vuković, a prominent veterinarian and deserving social activist in the country of that time, the SCS; and Janko Rajar, a Slovene veterinarian and national representative who, in his public work, contributed to the founding and survival of Zagreb Veterinary High School.

At the end of the 1922/1923 academic year, the high school employed the first research assistant, Ivan Poslušny, and the following year, more research assistants were employed, including Rudolf Plach, Dragutin Curilović, Dinko Pavičić, Vjekoslav Vernik, etc. Most of

these assistants worked for a short time at the Veterinary High School, usually until they completed their doctoral dissertations, and then they left for other duties.

After the Veterinary High School was founded, it began very soon to work together with other veterinary high schools in the surrounding area. This cooperation meant that the first members of the teaching staff could go away on short or longer study visits in order to receive training abroad. So for example, at the beginning of the 1920/1921 academic year, the Teachers' Council of the Veterinary High School rendered a decision to send Prof. Dr. Petar Gjurić to Prague, for specialist training at the Physiological Institute of the Medical Faculty there under Prof. Dr. Armin von Tschernak-Seysenegg, in the field of physiology. At that time some of the lecturers from the Veterinary High School went on short trips for training through the veterinary



The practical hall of the Department of Anatomy (Faculty Archives).



Practical class in histology at the old location of the Faculty in Savska Street (Faculty Archives).

service. In April 1921, Prof. Dr. Stjepan Plasaj was sent to Berlin in order to learn about contemporary methods of immunization against foot and mouth disease and dural immuno-diagnostics. In May the same year he attended a conference in Paris on combating epizooties, as a representative of Yugoslavia.

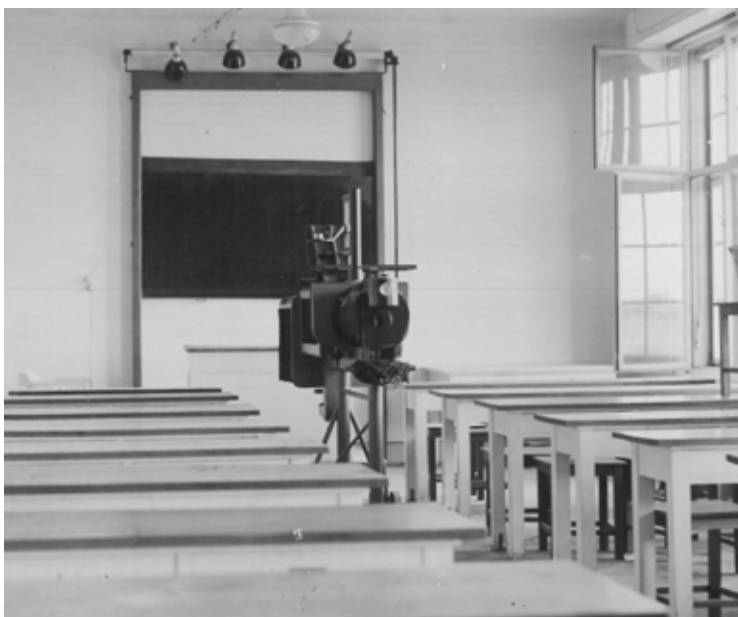
In the beginnings, the teaching staff of the Veterinary High School were mainly busy organizing the work of the departments and clinics, and drawing up and implementing the curriculum, so they did not have time to be involved in scientific activities. So the scientific research work at the high school was based on the doctoral dissertations of the assistant staff. The conditions for systematic research were not favourable, due to the lack of research equipment and appropriate literature. Therefore, more complex research work at that time was based on the enthusiasm of individual professors. The work of Prof.

Dr. Stjepan Plasaj should be pointed out here, as already during the time of the Veterinary High School, he made an original contribution to veterinary science, publishing about twenty scientific papers in the field of microbiology and epizootiology. Although he died young (1932), he laid the foundation for the research work of his successors. The professional work of the Veterinary High School was closely linked with the foundation and work of the departments and clinics, and the beginning of diagnostic and outpatient work. One of the first departments which began scientific work immediately after its foundation was the Department of Pathological Anatomy. After it was founded at the end of 1921, its activities, apart from teaching, were also aimed at patho-anatomic and histological diagnostics for the area of the City of Zagreb, and soon also for the needs of the whole of Yugoslavia, which is understandable since the Department was the only one of its kind in the country. Work in the dissection hall was very modest at first. Gradually over the years increasing quantities of material came in for dissection, so on average about 1500 dissection of carcasses were performed each year. Simultaneously with as dissections, histological work began at the Department.

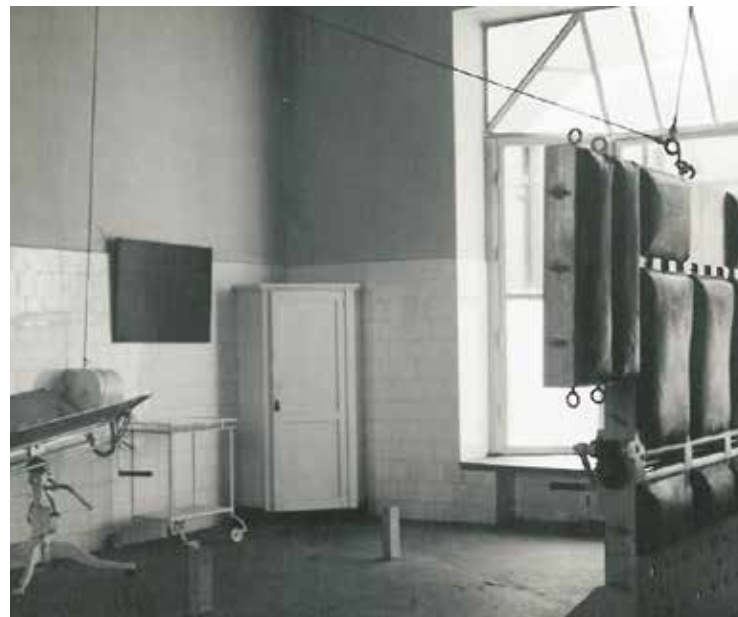
The beginning of the work of the clinic was linked to the establishment of a place for the treatment of diseases of domesticated animals, the so-called polyclinic, which was founded in 1922 and operated as part of the Surgical Clinic. The head of the Surgical Clinic, Prof. Eugen Podaubsky, was at one time also the head of the polyclinic, and the staff of the Surgical Clinic also worked in the polyclinic.

The polyclinic was founded to *treat domestic animals and to screen material necessary for clinical observations by students and to introduce them to practical work, with the distribution of sick animals to individual clinics*. So, the polyclinic, until it was closed (1929), was a kind of reception department for all the clinics. All the animals coming in were first processed there, and then referred to the relevant clinic according to their illness.

With the establishment of the polyclinic at the Veterinary High School the actual work began of organizing and establishing the Surgical Clinic, which began to receive its first patients on 16<sup>th</sup> October 1922. The Medical Clinic also began work in October 1922, and horses were the most frequent patients. At that time, horses held a very important place in the economy, agriculture and transport, and as they were used so intensively they also suffered most often from a variety of ailments.



The lecture theatre of the Department of Pathological Anatomy (Faculty Archives).



The operating theatre of the Surgical Clinic (Faculty Archives).



# I. HISTORY

51

I Zimski semestar škol. god. 1926./1927.  
Ljetn

U koju se godinu odnosno semestar upisuje? (rimskim brojem neka označe bogoslovi i pravnici godinu, a svi ostali semestar) **I.** Fakultet: **veternarski**

Dan upisa **29. septembra 1926.** Je li slušač redoviti ili izvanredni: **redoviti**

Platio: Upisnina dinara, št. Pristojbu za knjižnicu Din. 2-50, " " akad. bolest. zakladu Din. 5-- " " akademičke menze ukupno Din. 250

Naukovina: **NACIJONAL**

Ime i prezime slušača: **Teodor Varičak**

Kada se rodio, kojega dana, mjeseca i godine? **30. aprila 1907.**

Gdje se rodio, u kojem mjestu, kotaru, županiji, zemlji? **Koprivnica, osječka oblast**

Gdje je zavičajan, u kojoj općini, kotaru, županiji, zemlji? **Koprivnica, osječka oblast**

Koje je vjeroispovijesti? **srpsko-pravoslavne**

Koji mu je materinski jezik? **srpsko-hrvatski**

Ime oca (eventualno i pokojnoga) odnosno majke, ako otac ne živi **Dušan**

Zvanje i zanimanje **šet. vr. posebnog uredu**

Prebivalište **Koprivnica**

Ako otac ne živi, ime, stališ i prebivalište skrbnika?

Stan slušača (ulica i broj kuće): **Vodovodna pl. 3.**

Na kojem je učilištu bio prošli semestar: **obšt. real. gimnazija, Koprivnica sa latinskim nastavkom redoviti br. 15. nastava 20 juna 1926 u Koprivnici**

Dokazala, iz kojih izvodi pravo na upis (svjedodžba, zrelost, diploma, indeks, št.; od koje su školske oblasti izdane te svjedodžbe, kojega dana, mjeseca, godine, i pod kojim brojem): **nema**

Ima li stipendiju ili potporu, iz koje zaklade, od koga, u kojem iznosu, te dan, mjesec, godina i broj dužnice odlike, kojim je podijeljena?

Kolegiji za koje se prijavio	Broj sati u kojima se predaje	Ime docenta	Potvrda polaska kolegija (i ime bilješka)
Fizička	5	V. Glauko Kralj	
Botanika	2	V. Stjepan Gjurčin	
Biologija	4	V. Zvonimir	
Parazitologija	3/1	V. Vukobratović	
Kemija	5	V. Franjo Zubanić	
Anališka kemija	3	V. Franjo Zubanić	
Sistematska anatomija	5	Jovan Jukić	
Novel u veterinarski studij	1	V. F. J. Zavrnić	
Vrste u parazitologiji	2	V. V. Mavčević	

Potvrđuje se valjanost semestra. U Zagrebu, 17. VII. 1927. JARVI

Dopušta se upis: **JARVI**

Vlastoručni potpis slušača: **Teodor Varičak**

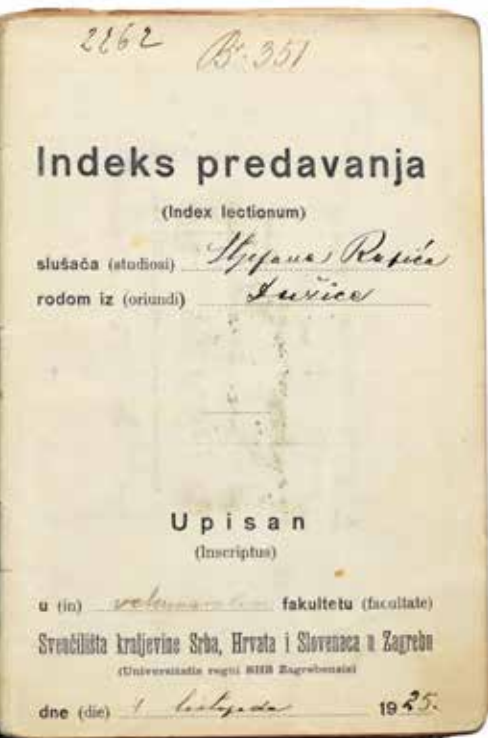


II Zimsko (hiberno) poljeće Ljetn (aestivo) (semestri)

Predavanja i imena učitelja (Index scholarum et nomina magistrorum)	Koliko ura na nedjelju (Quot per hebdomadam scholarum habitas sicut)	Potvrda kvistorova o naukovini (Indicium scholarum aut instructorum legitime comprobata indicat quantum)
Botanika dr. Stjepan Gjurčin	4	Platio 25. 11. 1926
Botanika dr. Stjepan Gjurčin	4	
Biologija dr. Zvonimir	5	KR. SVEL...
Kemija dr. Franjo Zubanić	5	
Anališka kemija dr. Franjo Zubanić	3	Potpis: Stjepan Rapit
Sistematska anatomija Jovan Jukić	5	
Anatomija vrste - anatomija parvula i sicut	3	Potpis: Stjepan Rapit
Vegetacija	1	

National Teodor Varičak since the academic year 1926/1927. Teodor Varičak was a University Professor (1934-1977), Head of the Department of Anatomy and Histology (1934-1977), Dean (1947/1948; 1951/1952) and Vice-Dean of the Faculty of Veterinary Medicine of the University of Zagreb (1948/1949). In the history of the Faculty of Veterinary Medicine to date he was the only Rector of the University (1952/1953) and also held the office of Vice-Rector (1953/1954). On the basis of his important scientific work in histology and embryology of animals, he was elected in 1955 as a corresponding member, and in 1958 as a full member of the Yugoslav Academy of Sciences and Arts in the Department of Natural Sciences (Faculty Archives).

The Index lectionum (Student Record Book) of Stjepan Rapit was a University Professor (1934-1974) and Head of the Department of Veterinary Medicine (1949/1950-1950/1951) and founder of the Department of Veterinary Medicine of the University of Zagreb. Alongside his teaching career he also taught Pathological Anatomy, Physiology of Introduction to Veterinary Medicine and Radiobiology. The Department of Veterinary Medicine was founded at the Faculty of Veterinary Medicine by Stjepan Rapit and other founders of the Faculty. He was the editor-in-chief of the Index lectionum for the 25th anniversary of the Faculty (Faculty Archives).



Stjepan Rapić at the time of the Kingdom of Yugoslavia. Stjepan Rapić was a University Professor (1941-1945; 1947-1981), Head of the Department of Radiology and Physical Therapy (1940-1974), and Director of the Ambulatory Care Clinic (1952) of the Faculty of Veterinary Medicine. He performed his duties at his home Department, throughout his university career. He was the author of the book "History of Domestic Animals, the History of Veterinary Medicine, and the History of Veterinary Medicine in Croatia". Thanks to his initiative a museum of the history of veterinary medicine was established in Zagreb, and he was to thank for the erection of memorials and the establishment of the Department of Veterinary Medicine. He was the chief of the Monograph published in 1969 to mark the 50<sup>th</sup> anniversary of the Faculty of Veterinary Medicine.

The diploma of the Faculty of Veterinary Medicine awarded to Eugen Topolnik in the Kingdom of Yugoslavia in 1935. Eugen Topolnik was a University Professor (1941-1945; 1947-1981), Head of the Department of Microbiology and Infectious Diseases (1954-1976), Dean (1956/1957; 1957/1958; 1964/1965-1965/1966) and Vice-Dean of the Faculty of Veterinary Medicine of the University of Zagreb (1955/1956; 1958/1959; 1966/1967-1967/1968; 1968/1969-1969/1970). On the basis of his scientific contribution to research into bacterial, viral and fungal infections in animals, he was elected in 1963 as an extraordinary, and in 1979 as a full member of the Yugoslav Academy of Sciences and Arts in the Department of Medical Sciences. He lived to a great old age and died in 2014 at the age of 102 (Faculty Archives).



# The first Rector of the Veterinary High School

## Prof. Dr. Stanko Hondl

Prof. Dr. Stanko Hondl was born on 22<sup>nd</sup> October 1873 in Zagreb. After completing four years of elementary school he enrolled in the high school *Royal Grand Gymnasium* at Catherine's Square in Zagreb, and passed his maturity test (*matura*) in 1891. In the same year he helped his peer, Stjepan Radić, by giving him private lessons in physics and mathematics, to pass the maturity test privately, at the gymnasium in Rakovica.

When he graduated from high school he enrolled to study physics at the Faculty of Philosophy (in Croatian: *Mudroslovni fakultet*, from 1928 *Filozofski fakultet*) of the University of Zagreb, and completed his studies in 1896 by passing all the final examinations. In the same year he was appointed as a substitute teacher at the gymnasium in Vinkovci, but already after a few months he was transferred to the newly founded *Royal Grand Gymnasium* in Zagreb's Lower Town. He attained his PhD in 1898 in Zagreb in theory of spherical functions. He spent the following school year at the German universities in Berlin and Göttingen to continue his scientific training.

It is obvious from Stanko Hondl's *Personality* available from the Zagreb State Archives that Hondl started to work as a part-time stenographer in 1882 at the Parliament's notary office, the position that he held for eighteen years during his graduate and doctoral study as well as his work at the high schools in Zagreb and he was appointed a shift manager in 1901. He left Parliament notary's position in 1910.

In the summer semester of the 1902/1903 academic year he began his university teaching career as a private assistant professor teaching the course Basic Theory of Potentials at the Mathematics and Natural Sciences Division of the Faculty of Philosophy of the University of Zagreb. He was appointed associate professor in 1911, and full professor in 1915. He was the first teacher of physics in higher education for students at the School of Medicine (1917-1934), the Veterinary High School (1919-1924) and the Faculty of Veterinary Medicine of the University of Zagreb (1924-1934). He was the Head of the Chair of Physics, later the Department of Physics (1911-1945), and the Dean of the Faculty of Philosophy (*Mudroslovni fakultet* (1919-1920), *Filozofski fakultet* (1932/1933)). During his first term as Dean he was appointed Rector of the Veterinary High School in Zagreb, before the school became independent by the Regulation of Regent Aleksandar on 31<sup>st</sup> August 1919.

Since the number of students taking classes in physics was constantly rising, Prof. Dr. Stanko Hondl requested the education authorities to build a new building for the Department of Physics. The construction of the building was prevented by the outbreak of the First World War. In 1925, construction of the building was approved once again, but it was not completed until 1937, at Marulić Square 19. Hondl's friend, Stjepan Radić, who was the Minister of Education in the Kingdom of Serbs, Croats and Slovenes in 1926, was especially credited for the beginning of its construction. Up until 1946 the Department of Physics was part of the Faculty of Philosophy, and then it was joined to the newly founded Faculty of Science. Physics classes were held there up to 1991.



Prof. Dr. Stanko Hondl held the post of Vice-President of the Society of High School Teachers and was a co-editor of the journal *Nastavni vjesnik* (1908-1910). He was elected a corresponding member of the Yugoslav Academy of Sciences and Arts in 1908, and a full member in 1923, and was its vice-president (1933-1941). From 25<sup>th</sup> November 1943 he worked as the head, as it was at that time (now the secretary), of the Mathematics and Natural Sciences class of the Academy. During the time of the Independent State of Croatia (NDH) the Academy was known as the Croatian Academy of Sciences and Arts. The temporary committee of the newly founded Yugoslav Academy of Sciences and Arts confirmed and selected new members on 11<sup>th</sup> February 1947, but Stanko Hondl was not one of them, so he was no longer a member.

He was the president of the Croatian Science Society (1934-1936) which, alongside the Academy, played

a major role in creating the Croatian scientific environment. In addition, he was the Rector of the University of Zagreb (1935/1936, 1936/1937), advocating for the construction of separate buildings for the needs of the University. In his requests he indicated precisely which buildings were needed for each faculty. However, his requests were only successful in relation to the Faculty of Veterinary Medicine, the Technical (Engineering) Faculty and the Faculty of the Agriculture and Forestry.

During his working life he worked in theoretical and experimental physics, and the history of physics and philosophical questions of science. His works on Markantun de Dominis and Ruđer Josip Bošković are of importance for the history of physics. He wrote a comprehensive high school physics textbook entitled *Physics for Higher Grades of High School* (1922), which was later printed in three editions and had a significant impact on the education of many generations of Croatian physicists. Through his lectures at the People's University, accompanied by experiments, and his articles in the journal *Priroda*, he contributed to the popularization of science.

Prof. Dr. Stanko Hondl retired for the first time in March 1945, on the basis of a decision by the Ministry of National Education in the Independent State of Croatia, but already in July of that same year he was reinstated to active service by a decision of the commissioner of the Faculty of Philosophy. He finally retired by a decision of the minister of education of the People's Republic of Croatia in February 1946. He died on 9<sup>th</sup> April 1971 in Zagreb.

In the organization of the Department of Mathematics, Physics and Chemistry of the Croatian Academy of Sciences and Arts (HAZU) in Zagreb, a scientific meeting was held on 3<sup>rd</sup> December 2013 on the occasion of the 140<sup>th</sup> anniversary of Stanko Hondl's birth, where his scientific and professional opus and human values that he left to the Croatian science, especially to the generations of Croatian physicists and to the City of Zagreb, was presented. On the occasion of this event, the scientific book *Stanko Hondl, Life and Work (1873-1971)* was also published in the edition of the mentioned Department of HAZU.

# The first professors at the Veterinary High School

## Prof. Eugen Podaubsky

Prof. Eugen Podaubsky was born on 26<sup>th</sup> May 1869 in the Slavonian village of Pleternica where his father was the manager of an estate. He attended elementary school in the village, and high school in Požega and Zagreb. He enrolled to study veterinary medicine in 1891 at the Military Veterinary Institute in Vienna, and graduated on 17<sup>th</sup> November 1894. At first he worked as a military veterinarian at the Nagy Dàad-Sàri stables in Hungary (1895-1896). In 1897 he was appointed district veterinarian in Vojnić, and the following year he was transferred to the National Farrier School in Zagreb, and was its head (1899-1919).

Already at the end of his studies, he decided to concentrate on onychology (the science of hooves and horseshoes, author's note), which was at that time one of the most important veterinary disciplines. In order to learn as much as possible about hooves and horse-shoeing, in 1895 he went to Budapest where he completed the farrier school hiding from the teachers and students that he was a graduate veterinarian. He developed a high level of activity during his time at the National Farrier School, and while he headed it, it achieved European standards. Apart from onychological and orthopaedic procedures, Eugen Podaubsky opened a veterinary outpatient clinic at the school for the area of Zagreb and its local area. On the basis of the income from blacksmith work and treating animals, work began on the construction of a new, larger building for the future Veterinary High School, which was completed in 1916. He was an advisor of the national government for the area of horse breeding and he travelled to Switzerland, Austria, Germany, the Netherlands, France and Italy for many years as an expert, to procure donors for breeding. On these many journeys, Eugen Podaubsky visited veterinary and livestock institutions, became acquainted with the organization of veterinary services, and especially veterinary schools and faculties, and acquired the necessary experience for organizing the future veterinary high school in Zagreb.

In 1899 Eugen Podaubsky was elected, as a young expert, to the Board of the Croatian and Slavonian Veterinary Society, where he developed intensive work. He was the founder and editor-in-chief of the professional journal *Veterinarski vjesnik* (1906-1911) and President of that Society (1909-1918). On the basis of his proposal, which was accepted by this Society, and confirmed at government level, the Veterinary High School was founded in Zagreb in 1919.

Eugen Podaubsky was appointed substitute lecturer and then public full professor. He held classes in surgery and, as the Head of the Surgical Clinic, organized the work of that institution. He was the first elected Rector of the school (1920/1921). In that function he gave his full attention to its organization within the building of the Farrier School, in order to equip the departments and clinics as soon as possible with full staff and so they could begin work. He was also Vice-Rector of the high school for one term (1921/1922).

Alongside his regular duties at his mother institution, he was also a part-time teacher of plastic anatomy at the arts school in Zagreb



of that time (1913-1934) and a part-time lecturer of Anatomy of Domestic Animals and Veterinary Medicine at the Faculty of Agriculture and Forestry in Zagreb (1920-1934). He wrote a total of six papers, of which three were related to the Veterinary High School or the Faculty of Veterinary Medicine in Zagreb.

When, by royal decree in 1924, the Veterinary High School became part of the University and became the Faculty of Veterinary Medicine, Prof. Eugen Podaubski was given the honorary duty of registrar and elected first Dean of the Faculty (1925/1926).

Prof. Eugen Podaubsky did not only concentrate on his obligations at the High School, and then the Faculty, but he also continued to work to advance the veterinary profession through active involvement in the professional association. In 1920 work began to unite the Croatian and Serbian veterinary societies, and Slovene veterinarians into the Yugoslav

Veterinary Society. In this, Prof. Podaubsky participated in drawing up the rules of the society. Due to his reputation and authority in veterinary circles, he was elected President of the first general assembly of the joint association, held in 1921 in Belgrade. The Yugoslav Veterinary Society elected him in 1932 as its honorary member.

As well as his work in the professional society, in 1921 he was appointed by the Ministry of Agriculture and Water Resources of that time to be a member of the Veterinary Council, of which he was the president, and from 1923 he was also involved in the work of the Society of Agronomists as a corresponding member. On 3<sup>rd</sup> October 1923 he was elected as a member of the society of "The Brethren of the Croatian Dragon" choosing the dragon name Dragon Klikunski.

Prof. Eugen Podaubsky was retired due to bad health in December 1934. After retirement he was nominated at the Faculty Council Assembly for the award of honorary university doctorate, however, the proposal did not get the required number of professor votes.

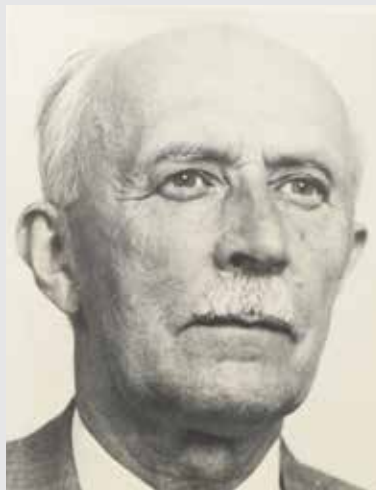
Prof. Eugen Podaubsky died on 25<sup>th</sup> October 1935 in Zagreb. During his life, on the 10<sup>th</sup> anniversary of the foundation of the Club of Students of Veterinary Medicine (1930), a memorial plaque was set up at the Faculty to his honor. Except this as a mark of appreciation for everything he had done in founding the Veterinary High School, his bust was set up in the Faculty council chamber, and on the 40<sup>th</sup> anniversary of the foundation of the Veterinary High School in Zagreb (1959) his statue was unveiled in the Faculty park. By a decision of the city administration of the City of Zagreb, the street next to the Faculty was named after him. A street which is a part of the road Pleternica-Ruševo in Pleternica was also named after this famous Croatian veterinary expert.

In 2013 the Faculty of Veterinary Medicine in Zagreb adopted the Eugen Podaubsky Charter as the highest award for special services and contributions to advancing scientific, teaching and professional work, and for exceptional contributions to veterinary science and cooperation with industry in this country and the world. The Charter is presented to prominent scientists and teaching staff at the Faculty for their lifetime and professional achievements.



## Prof. Jaroslav Sakař

Prof. Jaroslav Sakař was born on 30<sup>th</sup> March 1883 in Budejovici (Czech Republic). He came from a bourgeois family that moved to Sisak after he was born, where Jaroslav Sakař attended elementary school. He finished high school in 1901 in Zagreb and enrolled in the Veterinary High School in Vienna with a scholarship from the Croatian government. He graduated on 10<sup>th</sup> March 1906. After completing his veterinary education he worked for a short time at the Piberg stables in Styria, and then as a district veterinarian in Brinje, Donji Miholjac and Donja Stubica (1906-1910). At the beginning of June 1910, he was appointed as city veterinarian in Zagreb. He proved to be a good practician in practical surgery, treatment of internal diseases and obstetrics, and achieved great popularity for his success in preventing infectious diseases.



He wrote about his experiences in the journal *Veterinarski vjesnik* in which in 1919 his article on follicular inflammation of the vagina was published and then a description of puerperal paresis. Working as a town veterinarian he had a good practice so he also wrote articles on the Contagious Equine Pleuropneumonia and the rabies. He was involved in the work of the Croatian and Slavonian Veterinary Society and, upon encouragement from Eugen Podaubsky, he took part in the preparations for founding the Veterinary High School in Zagreb. In 1917 he enrolled as one of the first students at the newly-founded School of Medicine in Zagreb, as a student of anatomy under Prof. Dr. Drago Perović. This helped him later in organizing classes at the newly founded Veterinary High School, because he renewed his knowledge of anatomy from Vienna, and prepared new preparations for classes in veterinary anatomy.

After being appointed as a substitute teacher, he began teaching classes in anatomy, and as the head of the Department of Anatomy, he organized the work of the department right up until he retired (1951). He became a full professor at the National Veterinary High School in Zagreb, and spent time in Austria and Czechoslovakia (1920), where he managed to procure anatomic models and the latest teaching materials and books, which the department used in anatomy classes for a long time.

Since there were no teachers of Meat and Milk Hygiene at the Veterinary High School, and later at the Faculty of Veterinary

Medicine, Prof. Jaroslav Sakař as an experienced, former city veterinarian, taught that course (1924-1932), and during that time he was the head of the Department of Hygiene of Livestock Production (meat and dairy). Alongside his teaching duties at his home institution, he also taught comparative anatomy for students at the Academy of Arts in Zagreb (1935-1939).

Prof. Jaroslav Sakař was Vice-Rector for one term (1920/1921) and Rector (1924/1925) of the Veterinary High School and Dean for two terms (1926/1927) and seven times Vice-Dean (1927/1928, 1930/1931 and 1932/1933, 1934/1935 and 1936/1937) of the Faculty of Veterinary Medicine. After the National Veterinary Foundation was handed over to the Faculty (1929), he was to thank for the fact that its assets were invested in real property and, by sensible management, he increased its assets (income from rent, +), which served to finance some of the Faculty's

needs. He was president of the Croatian Section of the Yugoslav Veterinary Society (1930-1937) where he advocated the promotion of veterinary medicine in the advance of livestock breeding. He also held the position of President of the Croatian Society of University Professors (1938-1940).

Already in old age (1947), he translated the textbook *Anatomy of Domestic Animals* by the Russian author, Prof. Dr. Aleksandar Petrovič Klimov, which students used for the following 15 years, until a book of the same title by Prof. Dr. Septimus Sisson (1962) was translated. He was an associate for the *Croatian Encyclopaedia* (Volumes I-V) where he wrote articles on the veterinary profession (1941-1945).

At the First Congress of Veterinarians of Yugoslavia, held in Zagreb (1953), Prof. Jaroslav Sakař was awarded an honorary degree by the Association of Societies of Veterinarians of the Federative People's Republic of Yugoslavia, to pay him the highest recognition and honor, and make him an example to the younger generations. A memorial plaque was set up to Prof. Jaroslav Sakař in the Department of Anatomy, Histology and Embryology (1956).

Prof. Jaroslav Sakař was awarded the Order of Labour, First Class, of Yugoslavia of that time (1957). He died on 1<sup>st</sup> April 1963 in Zagreb.

## Prof. Dr. Petar Gjurić

Prof. Dr. Petar Gjurić was born on 24<sup>th</sup> July 1887 in Krnjak near Vojnić, where his father was working as a teacher at that time. He attended elementary school in Slunj and Krapina, and high school in Karlovac where he passed the maturity test in 1905. When he finished high school he enlisted as a military cadet in the Veterinary High School in Vienna, where he graduated on 18<sup>th</sup> March, 1910. During his studies he was noticed by the well-known Prof. Dr. Armin von Tschermak-Seysenegg, who encouraged him to devote himself to physiology. In 1913 the Austrian army sent him to work in the physiology department with Prof. Dr. Tschermak-Seysenegg, who was running the physiology institute at the Faculty of Medicine in Prague at that time. Under him he wrote his dissertation in the field of the physiology of digestive organs and attained his PhD on 11<sup>th</sup> July 1914 with the thesis “Über

*den Einfluss von Säuren und Alkalien auf die Magenleerung*” (On the influence of acids and alkalis on gastric emptying).

As a military cadet he was obliged to be the military veterinarian in the Austro-Hungarian army. At the end of the First World War he was on the Italian front, and after that he was sent to the Command of the Horse-breeding Institute for Croatia and Slavonia in Zagreb. After the foundation of the Veterinary High School in Zagreb, he left military service and was first appointed substitute teacher, and then public full-time lecturer at the newly-founded high school.

When he returned from his specialized course in Prague, he began to organize the work of the Department of Physiology of the Veterinary High School in Zagreb, and began to teach classes in the Physiology of Domestic Animals (1921). He was an excellent teacher, whose lectures

were characterised by simplicity, clarity and his clear diction. In 1929 his demonstrators composed printed lecture notes on the basis of the notes they had written and these were some of the first printed study notes at the Faculty of Veterinary Medicine.

Prof. Dr. Petar Gjurić, alongside his regular teaching commitments, also took an active part in organizing the work of the young institution of higher education, and was its Rector for two terms (1922/1923 and 1923/1924) and Vice-Rector once (1924/1925). After the transformation of the Veterinary High School into a Faculty, he was its registrar and also Vice-Dean for one term (1925/1926).

In the period between the two world wars, he also taught classes in the Physiology of Domestic Animals for students of the Faculty of Agriculture and Forestry in Zagreb, and after the Second World War (1948-1954) classes in Physiology of Animals for students in the Biology Department of the Faculty of Science in Zagreb.

Prof. Dr. Petar Gjurić published two scientific papers. He worked on the physiology of muscle tissue, especially heart muscle irritation, and the effect of infra-red light on the transverse striated muscle. He also worked in the field of digestion and blood clotting. He only published high-quality research in renowned international journals (*Pflügers Archiv der gesamte Physiologie, Radiologica* and others) thus his publications quoted highly.



In 1941 he was briefly arrested and that same year hid with relatives in Belgrade fearing the Ustashe authorities. He worked there until the end of the war as a teacher of Hygiene of Rearing, Breeding and Feeding Domestic Animals in the Veterinary Division of the Faculty of Medicine (the Faculty of Veterinary Medicine in Belgrade during the Second World War was part of the Medical Faculty there, author's note). After "liberation", at the invitation of the Faculty, he returned as a teacher and head of the Department of Physiology, and worked there until he retired in 1952. At that time he was active at the Faculty Council, Veterinary Section of the Yugoslav Academy of Science and Art and other institutions. In 1955 he moved to his sister's in Belgrade and worked there for a while as an honorary professor at the Faculty of Veterinary Medicine.

Prof. Dr. Petar Gjurić was awarded the Order of Labour, First Class, for his many years' successful work training veterinary experts (1957). In the same year, a memorial plaque was set up to him at the Department of Physiology of the Faculty of Veterinary Medicine in Zagreb. He died on 30<sup>th</sup> July 1962 in Belgrade. After his death, money was collected to set up a memorial, which at the suggestion of his family was used to found the Prof. Dr. Petar Gjurić Fund (1964). The fund was used up to the beginning of the 1970s to present awards for the best student papers in the field of physiology.

## Prof. Dr. Stjepan Plasaj

Prof. Dr. Stjepan Plasaj was born on 3<sup>rd</sup> May 1886 in St. Petar Orehovec near Križevci to an officer's family. Having finished high school (*gymnasium*) in Varaždin, he enrolled in the Veterinary High School in Vienna, from where he graduated on 30<sup>th</sup> March 1911. In the same year he was appointed district veterinarian in Donji Lapac, and in 1914 he was transferred to Ivanec near Varaždin. Over the following few years he worked as a substitute vet in Jastrebarsko, Karlovac, Pregrada and Klanjac. As a result of his outstanding work, in 1918 he was given a substitute post in the Veterinary Department of the National Government in Zagreb, and at the end of the same year he was entrusted with the office of infectious diseases. In his official work, Plasaj was constantly training, systematically monitoring foreign professional and scientific veterinary literature. In 1919, he went for further training to Vienna, where he worked in the Department of Pathological Histology and Bacteriology, and at the Department of Pathological Anatomy of the Veterinary High School and in the State Serotherapeutic Department. He attained his PhD on 31<sup>st</sup> March 1920 on the theme, "*Über die Eigenbewegung und Begeißelung des Bacterium septicaemiae haemorrhagicae Hüppe*" (On the characteristics and isolation of the *Bacteria septicaemiae haemorrhagicae* by Hüppe). After this he returned to Zagreb, where he was offered a teaching post at the newly founded Veterinary High School.

Having been appointed full professor in infectious diseases, he was given the headship of the Department of Infectious Diseases. As well as teaching about infectious diseases, he also held classes in microbiology



and veterinary hygiene. However, his health soon deteriorated due to advanced tuberculosis, and already in 1924 he went on sick leave. His illness however did not prevent him developing his wide activities at the department and taking on prominent functions. For instance, as a representative of Yugoslavia he attended congresses of Balkan states on the prevention of epizootia in Constantinople (1925) and Bucharest (1929), and an International Veterinary Congress in London (1930).

He was the Dean of the Faculty for one term (1930/1931) but due to his failing health he was not able to discharge that function, but went away for treatment. Despite this, his work in the department did not wane, and he regularly dealt with the incoming post, gave written instructions for the department's work, and wrote scientific papers.

The period of his scientific work was relatively short, lasting only about ten years (1921-1932). In

that time, Prof. Dr. Stjepan Plasaj led the department and developed intensive scientific and professional work. While he was head of the Department, on the basis of an agreement with the Ministry of Agriculture, he began to provide the services of a diagnostics station and, with the help of the ministry, a laboratory was founded at the Department for research into infectious diseases of bees (1927). In the following year nosemosis disease of bees was diagnosed in that laboratory for the first time in this country. At that time the research at the department was particularly focused on pathology of poultry, epizootic abortions and sterility, and forms of immunization against sheep pox.



Although the working conditions at the department at that time were modest, Prof. Dr. Stjepan Plasaj, whether independently or in cooperation with numerous associates, wrote about 110 scientific and professional papers for national and international journals, mainly in the field of microbiology. He began this work at the time of his training in Vienna, where his involvement began in the morphology of bacteria from the group of haemorrhagic septicaemia, and especially with *B. pseudotuberculosis*. He also wrote about the occurrence of African Maleus, immunization i.e. immune therapy of foot-and-mouth, treatment of cattle liver fluke disease, the action of olive oil on bacteria at intraperitoneal infection, rabies immunoprophylaxis in dogs, and others. A major part of his work was dedicated to studying the resistance of various microbes to chemical and physical factors. He paid particular attention to the chlorine preparation caporit, which was then being introduced to veterinary medicine as a disinfectant. He published scientific papers in the scientific journal *Zentralblatt für Bakteriologie* and is therefore considered to be one of the first teachers of the Faculty who presented scientific research on an international scale.

As a prominent public scientific and professional worker, he worked on the popularization of the science and the profession, and wrote a booklet on infectious diseases of domestic animals (1929) aimed at livestock farmers. In a variety of journals (*Veterinarski vjesnik*, *Jugoslavenski veterinarski glasnik*, *Pčela*, *Poljoprivredni glasnik*) he wrote popular articles about equine mange, swine plague, fowl cholera, bee diseases and other infectious diseases of domestic animals common at that time. Prof. Dr. Stjepan Plasaj, during his short scientific work, educated many veterinarians, who wrote their doctoral dissertations under his mentorship and who were in that way trained and introduced to scientific work. A large number of bacteriologists and epizootiologists were raised under the leadership of Stjepan Plasaj, who continued their careers at other institutions in this country, and some remained at the Faculty and later became teachers.

Prof. Dr. Stjepan Plasaj died on 1<sup>st</sup> June 1932 in Zagreb. In the same year he received the Order of St. Sava, Third Class. As a mark of recognition and gratitude, on 1<sup>st</sup> June 1957, to mark the 25<sup>th</sup> anniversary of the death of Prof. Dr. Stjepan Plasaj, the Faculty of Veterinary Medicine in Zagreb set up his bust in its council chamber.

## Prof. Dr. Fran Zavrnik

Prof. Dr. Fran Zavrnik was born on 12<sup>th</sup> November 1888, in Oberwellitschen, Styria, Austria. His parents were smaller landowners. He finished elementary school in Korena and his father was encouraged to continue with his education based on the observed giftedness. He attended gymnasium in Maribor and Novo Mesto where he passed the maturity test in 1906. In the same year he enrolled to study veterinary medicine at the Veterinary High School in Vienna and graduated on 11<sup>th</sup> April 1913. Already during his studies he started work in histology and embryology as a demonstrator at the Department of Prof. Dr. Siegmund Marienfrid von Schumacher. He wrote a dissertation there in the field of histology, and attained his doctoral degree on 11<sup>th</sup> July 1914 on the theme of “*Beiträge zum histologischen Bau der Pferdeaorta*” (Studies of the histological construction of horses’ aorta).



After completing his studies he found work as a state veterinarian in Vransko in Savinjska dolina, where he was mobilized to fight in the Austro-Hungarian army. During the First World War he was first on the Russian front and then fought in Italy. After the collapse of the Austro-Hungarian Monarchy, managed to evade capture by the Italians, and took on the duties of a military veterinarian in Rače near Maribor. At the beginning of 1919 he transferred to civilian service and became a district veterinarian in Ptuj. In the same year, he was invited by Prof. Eugen Podaubsky to take up a post as professor at the Veterinary High School in Zagreb. In the meantime he was transferred to the civilian commission for Prekomurje, in Murska Sobota, where it was necessary to organize the veterinary service, and he remained there until the beginning of 1921.

After being appointed full professor, he became Head of the Department of Histology and Embryology (1921-1941). Apart from the regular course of Histology and Embryology, he also taught the elective course in Theory and Use of the Microscope and was the first teacher of the History of Veterinary Medicine (1921-1941). For a short time he also taught Veterinary Management (1925/1926) and from the same academic year he began teaching the course in Advanced Histological and Embryological Practice. Since 1936/1937 academic

year he also worked part time, teaching the elective course in Introduction to Veterinary Medicine. He wrote a large number of notes for students (1924-1940) and translated the textbook *Embryology of Domestic Animals*, by the German author Prof. Dr. Otto Zietzschmann (1937).

While he was working at the Faculty of Veterinary Medicine in Zagreb he published almost 50 papers. He worked in scientific research, where he was particularly outstanding in the field of haematology, and is said to be one of the founders of veterinary haematology in Yugoslavia. He also worked on the biometric calculation of the duration of pregnancy. He was the person who initiated the first attempts to present the complete history of veterinary medicine in this country.

He was Rector of the Veterinary High School for one term (1921/1922), Dean for two terms (1931/1932 and 1932/1933) and Vice-Dean of the Faculty of Veterinary Medicine once (1933/1934). He resigned half way through his term as Vice-Dean.

He established a *Slovene Library and Reading Room* in 1929 in Zagreb which changed the name to the *National Library and Reading Room* after the declaration of dictatorship by King Aleksandar Karadjordjevic. He was also its first president (1930-1933). The library later developed to the *Cultural and Educational Society Slovenian Home*.

In 1931 he proposed the foundation of the Faculty’s scientific journal *Veterinarski arhiv* and he was its first editor (1931-1934). He was also the editor of the lexicon edition *Veterinarski kalendar* (1930 and 1936). In addition, Prof. Dr. Fran Zavrnik reported on all the scientific literature related to veterinary medicine published in the territory of Yugoslavia in the *Jahresbericht der Veterinärmedizin* (Veterinary Medicine Annual Report) (1922-1941). He took early retirement in August 1941 and was arrested soon after that and imprisoned in the concentration camp at Stara Gradiška. He was released in June 1942 and worked until the end of the war in the department of foreign literature in the Čelap library in Zagreb.

After the “liberation” he was invited to Slovenia to help organize the veterinary service. In April 1946 he was appointed the first director of

the newly founded Veterinary Scientific Institute of Slovenia, where he set up the haematology division. In November 1947 he left the Institute and became a full professor at the Faculty of Agronomy and Forestry in Ljubljana, taking on the Chair of Physiology with anatomy, histology and embryology. From 1947 to 1951 he was also a teacher at the Veterinary High School in Ljubljana. In 1953 he was appointed registrar of the Faculty for Agronomy, Forestry and Veterinary Medicine. He was the Dean (1954/1955-1955/1956) and Vice-Dean (1956/1957) of that Faculty. During the rest of his

veterinary career in Slovenia he wrote several study notes for students on anatomy, physiology, histology and embryology (1947-1961). From 1956 he worked actively in the commission for Slovene medical terminology and was the chairman of the medicine-veterinary group of that commission at the Slovene Academy of Sciences and Arts (1959-1963).

Prof. Dr. Fran Zavrnik was awarded the Order of Labour with a Gold Wreath (1961). He died on 17<sup>th</sup> February 1963 in Ljubljana.

## Prof. Dr. Lovro Bosnić

Prof. Dr. Lovro Bosnić was born on 21<sup>st</sup> January 1886 on the island of Korčula. He attended elementary school in his home village, and classical high school (*gymnasium*) in Dubrovnik where he passed maturity test in 1905. When he had graduated from high school he enrolled at the Veterinary High School in Vienna, and graduated from there on 5<sup>th</sup> March 1910. During schooling he was always among the best. Rare diligence and ultimate self-criticism were his qualities during his whole life. He attained his doctoral degree from the same college on 29<sup>th</sup> March 1919, on the theme “*Über die Sarkoptesräude und ihre toxische Wirkung*” (On itch mites and their toxic effects).

When he completed his studies he worked in the Austro-Hungarian army as a military veterinarian in Varaždin, Zagreb and Mostar (1910-1918) and then in the Yugoslav army in Kranj and Ljubljana (1918-1921).

After he was appointed public full professor of the Veterinary High School in Zagreb, he took on classes in Special Pathology and Therapy of Internal Diseases of Ungulates and Carnivores, and the headship of the newly founded Medical Clinic (1921-1951). In order to ensure that he organized classes and scientific work, and equipped the clinic in the best possible way and in a contemporary spirit, Prof. Dr. Lovro Bosnić visited similar clinics in Austria, Czechoslovakia and East Germany. Through his efforts, the clinic was equipped with a rich professional library and the necessary apparatus.

Prof. Dr. Lovro Bosnić was mainly to thank for the development and progress of the Faculty as a whole. In the campaign to return the National Veterinary Foundation from Belgrade to Zagreb, he wrote a historical debate in 1928 about that Foundation, which was published in the journals *Jugoslavenski veterinarski glasnik* and *Obzor*, and printed in a separate brochure. His article had a strong impact so that the Foundation, which had been taken to Belgrade, was returned to Zagreb the following year, allocated to the Faculty of Veterinary Medicine, and contributed to its development.

He was also responsible for founding the Department of Radiology and Physical Therapy (1930), which is one of the oldest departments of this type in the world. At one time he was the head of that department (1933-1940). In addition, in his work in basic classes, he noticed very early that the knowledge gained in pathological anatomy was not sufficient for students to work in the clinic, so at his suggestion the Department of Pathological Physiology was founded (1936) as one of the first institutions of its type at any veterinary faculty in Europe.

He was a prominent theoretician, and a great expert in internal diseases of domestic animals, as well as an excellent lecturer. It was mainly thanks to him that he did not allow classes and the work of the clinic to be reduced to the empirical, and that it was all immediately



founded on a contemporary medical basis. In this way he set high criteria in clinical teaching and enabled students to acquire strong knowledge of internal diseases. It would be hard to find any internist at any European veterinary school who required so much knowledge from his students as Prof. Dr. Lovro Bosnić, for which his students were later very grateful. It should be mentioned that his high academic criteria in the education of future veterinary experts also affected other first generation teachers at the college. Due to the shortage of teaching staff, Prof. Dr. Lovro Bosnić also taught the courses in Pharmacology with Toxicology (1927-1929), Internal Clinical Propedeutics (1921-1934) and Pathological Physiology (1938-1942).

During his headship of the Medical Clinic, a new nasal probe for horses was introduced into wide practice, and this was one of the first places in the world to begin using digital percussion successfully in large

domestic animals, and on the eve of the Second World War a prototype was made of a mobile gas chamber, which was used during the war to treat mange in many horses. He published about 20 scientific papers. In his scientific work, he dealt with the pathogenesis and treatment of tetanus, equine infectious anaemia, equine chest infection, the specific characteristics of breath sounds in pleuro-pneumonia in horses, and Adams-Stokes disease in horses. For the extraordinary effort he invested in the advancement of the Faculty, he was elected Dean as many as seven times (1928/1929, 1934/1935-1936/1937, 1941/1942-1942/1943, 1944-1945) and thanks to his authoritative organizational and communication skills, with his closest associates, he made sure the Faculty survived through the most difficult pre-war and war years in this region. He was also the Vice-Dean of the Faculty for two terms (1929/1930, 1937/1938). He was a member of the Veterinary Council of Banovina Croatia, and a permanent reviewer of the journal *Wiener tierärztliche Monatsschrift*. He worked on the *Veterinarski vjesnik* (1944) and the *Croatian Encyclopaedia* (vol. I-V) for which he was the editor for the veterinary profession (1941-1945).

He is considered to be the most influential professor of the Faculty of Veterinary Medicine of his time. He gave a tone to life and work at this institution, and guided its movement until the end of the Second World War. There is no doubt that his merit in a certain extent was that the Faculty in Zagreb at that time had already gained a prestigious reputation.

Prof. Dr. Lovro Bosnić retired in 1951 but continued to teach pathological physiology part-time at the Faculty of Veterinary Medicine in Sarajevo (from the October 1952 to the July 1953). He died on 26<sup>th</sup> July 1969 in his native Korčula. A bust was set up in the Faculty council chamber in his memory, for his many achievements in advancing the work of the Faculty, on 15<sup>th</sup> July 1971.



## Prof. Ljudevit Jurak

Prof. Ljudevit Jurak was born on 6<sup>th</sup> October 1881 in Zaslug near Hum na Sutli. He attended elementary school in Sv. Križ and Prišlin, and he completed his high school education in the classical high school (*gymnasium*) in Zagreb in 1902. In the same year he enrolled at the Medical University of Innsbruck, from where, after he had passed their strict examinations, he received a degree as a doctor of general medicine on 19<sup>th</sup> October 1910.

Having finished his degree, he worked as a volunteer at the Department of Pathological Anatomy of the Medical University of Innsbruck, and on 1<sup>st</sup> January 1911 he was appointed city doctor by the City of Innsbruck and designated as assistant at the Department of Pathological Anatomy of the Medical University of Innsbruck.

During the time he was working at the Medical University of Innsbruck, he worked in research into the atrioventricular conduction system in the heart under normal and pathological conditions in embryos, children and adults of different ages (*Wiener klinische Wochenschrift*, no. 23, 1914) and cases of Adams-Stokes syndrome symptoms (*Zentralblatt für Herz-Gefäßkrankheiten*, no. 3 and 4, 1915) which he was the first to describe, but his contribution to this syndrome is unjustly overlooked. In addition he worked in research into changes to arteries, brain meninges, and the aorta caused by syphilis.

By a Decree of the Croatian and Slavonian National Government, the Department of Internal Affairs in Zagreb, he was appointed on 23<sup>rd</sup> November 1913 the county physicist (a body that monitored health at the level of the country, author's note). After his notice period of three months in his work in Innsbruck he took up this post on 1<sup>st</sup> March 1914, and he was appointed head of dissection at the newly founded dissection service of the Institute of Public Health in Zagreb. On 18<sup>th</sup> March he was appointed permanent court expert of the Royal Judicial Bench in Zagreb. From 1915 to 1919 he was in the army and alongside his civil service he also performed the work of an assistant physician and head of wartime pathology in the military hospital in Zagreb. He was also a part-time associate of the laboratory of the railway workers' clinic in Zagreb.

Right up to 1920 he was involved in professional and scientific work in the field of pathological anatomy, and over those six years he wrote a large number of professional and scientific papers, which were published in the journal of the Croatian Medical Association. In that way he laid the foundations for human pathological anatomy even before the foundation of the School of Medicine in Zagreb.

In the autumn of 1920 he received an invitation from the Council of the Veterinary High School in Zagreb to take over the Department of General Pathology and Pathological Anatomy at that school. He responded to the invitation by asking to be given the opportunity before his appointment to study research methods in pathological anatomy of domestic animals, and especially to study pathological processes in infectious diseases of domestic animals at foreign institutions of higher education. He was granted this opportunity, and from May to August 1921 he spent time at departments of pathological anatomy of the Veterinary High Schools in Vienna (under Prof. Dr. Rudolf Hartl) and Dresden (Prof. Dr. Ernst Joest).

After his appointment as public full professor at the Veterinary High School, he was the Head of the Department of Pathological Anatomy and taught the entire course in general and special pathological anatomy and histology (1922-1945). Since 1938/1939 academic year,



together with Prof. Dr. Lovro Bosnić, he taught classes in Pathological Physiology. Due to the lack of teaching staff, he also taught Pathological Anatomy (1921/1922) and Forensic Medicine (1923-1932) at the Faculty of Medical of the University of Zagreb. He was Dean of the Faculty twice (1929/1930 and 1937/1938) and Vice-Dean once (1938-1939). During that period, with the help of his associates, he fought for the survival of the Faculty in Zagreb, and worked tirelessly to improve its teaching, scientific and professional work. In his first term as Dean, due to the domination at that time of a group of Yugoslav professors on the Council, who did not agree with the way he ran the Faculty, he received a vote of no-confidence, and as a result he took sick leave. Despite all the problems that he encountered during his work at the Faculty, he contributed a great deal through his work to the affirmation of veterinary pathological anatomy, and the reputation of the

Faculty of Veterinary Medicine in Zagreb, because he trained young experts who later successfully performed work in pathological anatomy at veterinary faculties or other veterinary institutions in Yugoslavia. The fact that 18 dissertations were written at the department while he was working there demonstrates this fact. He continued to publish in the *Liječnički vjesnik* and in 1928 he published the article *Intravenous Injection of Quinine as the Forensic Expertise* then in 1942 the article *Polyomyositis Primaria non Purulenta* and in 1943 he described the unusual course of disease and postmortem finding of the acute human Malleus. He was the founder of the patho-anatomic collection at the Faculty of Veterinary Medicine, which is one of the richest in Europe. He also worked with the *Croatian Encyclopaedia* (1941-1945).

In July 1943, as a renowned expert, he was one of eleven members of the International Commission of the Red Cross who researched mass graves discovered in western Ukraine near the town of Vinnytsia. Establishing the cause of death (a shot to the back of the head) and the time of death (1938), using exclusively scientific methods and working completely impartially, the Commission concluded without a doubt that the Soviets had massacred almost 2000 Ukraine villagers and workers there. Prof. Ljudevit Jurak wrote an article about this, entitled, *The Mass Grave in Vinnytsia* (*Hrvatski narod*, no. 790, of 25<sup>th</sup> July 1943). In the article among other things he wrote "All corpses had gunshot injuries predominantly in the hindhead fired by a 5.6 mm caliber shotgun. Without the exception the bullets were lead and shellless (long rifle). On most of the corpses signs of shot from the small distance could be identified, mainly it was a stuck shot."

Jurak wrote in the article that corpses almost entirely belonged to simple workers or peasants in older age judging by their clothes. He also wrote that a lot of people, mostly peasant women, were on the burial graves already during the investigation, rolling over, searching and recognizing the clothing items which were removed from the burial graves and hoisted on the ropes in the orchard and the town garden.

When the communist authorities came to power, and by order of the Russian People's Commissariat for Internal Affairs (in Russian: *Narodnyj Kommissariat Vnutrennih Del-NKVD*) he was arrested on 22<sup>nd</sup> May 1945 in his flat on Gundelićeva Street in Zagreb. He was offered freedom if he withdrew his signature on the report by the International Commission and stated that he had signed it under duress. When he refused to do so, he was found guilty by the Military Court of the Command of the City of Zagreb of "consciously and maliciously

spreading propaganda against the friendly state of Soviet Russia,” and on 9<sup>th</sup> June 1945 he was condemned to death by firing squad, with the removal of all his civil rights. According to some sources he was murdered even before the court reached its verdict. A full 45 years after the massacre of Ukraine people, the Soviet authorities admitted the crime by the NKVD in Vinnytsia.

On 23<sup>rd</sup> May 1990 the Scientific and Teaching Council of the Faculty of Veterinary Medicine confirmed the proposal of Prof. Dr. Mato Winterhalter, Prof. Dr. Slavko Cvetnić and Prof. Dr. Berislav Jukić for the commemoration and erection of the bust of Prof. Ljudevit Jurak. At the session of the University Senate on 15<sup>th</sup> September 1991 in Zagreb, Prof. Ljudevit Jurak was rehabilitated and, according to the

earlier decision by the Faculty Council, a memorial bust was unveiled in the Faculty council chamber. From that year, Prof. Ljudevit Jurak Department of Clinical Pathology at the Sisters of Mercy Clinical Hospital, and the Department of Veterinary Pathology of the Faculty of Veterinary Medicine in Zagreb, have organized Prof. Ljudevit Jurak International Symposium of Comparative Pathology in his honour, as the best example of cooperation and research in the field of human and veterinary pathology. In 1998, in memory of Prof. Ljudevit Jurak and his contribution to medicine, forensic medicine and veterinary science, the “Ljudevit Jurak” Award for Comparative Pathology was set up.

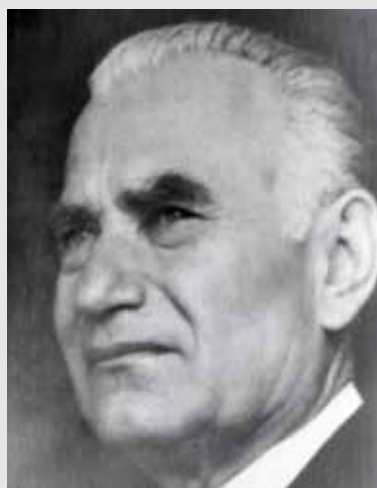
## Prof. Mile Rajčević

Prof. Mile Rajčević was born on 24<sup>th</sup> October 1878 in Divoselo in the municipality of Gospić. He completed elementary school education in his home village, and high school in Gospić, where he passed the maturity test in 1897. He then enrolled in the Veterinary High School in Vienna, from where he graduated on 7<sup>th</sup> May 1902. After completing his studies he worked as a veterinarian in Vojnić, Irig, Krapina, Bjelovar, Novi Marof and Slovenska Bistrica. As a prominent veterinary expert he moved to Belgrade after the First World War and served for a time as a veterinary inspector in the Veterinary Department of the Ministry of Agriculture of the Kingdom of Serbs, Croats and Slovenes. When the Veterinary High School was being founded in Zagreb, they counted on Mile Rajčević as a top quality practitioner and after long negotiations, he decided to accept a teaching post.

After being appointed as a public full professor, he took on the responsibility as head of the Clinic of Special Pathology and Therapy of Internal Diseases of Ruminants, Pigs and Poultry (Buiatrics Clinic), and a full-time teacher of the same course (1922-1938). He was also appointed to run the Clinic for Obstetrics and held classes in that course (1922-1935). He was one of the three registrars and served for one term as Dean (1927/1928) and Vice-Dean (1928/1929) of the Faculty of Veterinary Medicine in Zagreb.

Prof. Mile Rajčević had the desire to create a single clinic for cattle, as organized at that time at some faculties, where the clinics were formed according to the type of animal, and not according to the characteristics of the disease, as it was at the Faculty of Veterinary Medicine in Zagreb. This desire of Prof. Mile Rajčević was expressed in the scope of work of the so-called Buiatrics Clinic of that time, because its field of work in this country included internal, skin and invasive diseases of cattle, as well as sterility and diseases of the udders, and also some infectious diseases and surgical procedure related to these domestic animals. The idea of Prof. Mile Rajčević to organize the faculty clinics according to the type of animal could not be fulfilled, because it was not in line with the regulations of that time on the organization of the Faculty of Veterinary Medicine, nor the intentions of the other faculty clinics and departments.

The clinics founded did not have suitable premises for their work for the first few years, so by the advocacy of Prof. Mile Rajčević, sufficient funds were collected to build a building, which was completed in 1926 and met the needs of the teaching and clinical work of both clinics. Until that year classes in buiatrics and obstetrics were held using livestock from the farm belonging to the Faculty of Agriculture and Forestry in Zagreb.



After the building was built, it was necessary to provide a sufficient number of animals in order to hold normal classes in buiatrics and obstetrics, so on the basis of a proposal by Prof. Rajčević, in November 1926 the Faculty Council agreed for examination and treatment of animals to be undertaken free of charge at those clinics. For the normal financial business of the clinics, the Buiatrics Clinic fund was very important, which was founded by Prof. Mile Rajčević in 1927. That fund was founded from gifts and contributions for experiments performed (for example from the Kaštel drugs factory of that time) and was supplemented by voluntary contributions for examinations and treatment of animals. The fund was used to procure experimental animals used for research.

Prof. Mile Rajčević was an exemplary teacher who took care of the education of young staff.

During his work at the Faculty of Veterinary Medicine in Zagreb he wrote notes on *Birthing Domestic Animals* (1926) and about 10 scientific papers. In his scientific work as a buiatrician he primarily dealt with some questions of the spread of fasciolosis through hay, and as an obstetrician some infections of the birth canal, such as the first diagnosis of bovine genital trichomoniasis in this country. At that time his scientific papers were published in the internationally recognized journal *Deutsche tierärztliche Wochenschrift* and in the national scientific journal *Veterinarski arhiv*. He published professional papers in the journal *Jugoslavenski veterinarski glasnik*. He also wrote two expert books: *Breeding and Feeding of Swines in our Conditions with the Addition of the most important Swine Diseases* (1926) and *About Liver Fluke, Liver Fluke's disease and its Prevention and Treatment* (1927).

In September 1938, Prof. Mile Rajčević was appointed a full professor at the Faculty of Veterinary Medicine in Belgrade, and left the Faculty of Veterinary Medicine in Zagreb. At the Faculty in Belgrade he took on the responsibility of manager of the Buiatrics-Obstetrics Clinic and teacher of the courses in Internal Diseases of Ruminants, Pigs and Poultry, and Veterinary Obstetrics. He made use of his many years' experience, gained during his work at the Faculty of Veterinary Medicine in Zagreb, to organize the Belgrade Faculty, which had only just begun its work. He was Dean of that Faculty for two consecutive terms (1938/1939, 1939/1940). He is to thank for the Faculty of Veterinary Medicine in Belgrade being built at its current location. He died whilst still actively working, on 3<sup>rd</sup> September 1941 in Belgrade.





The main building of the Faculty of Veterinary Medicine of the University of Zagreb in Heinzelova Street (Faculty Archive).

## 3. The Faculty of Veterinary Medicine of the University of Zagreb (1924-2004)

### 3.1. Establishment and activities of the Faculty in different social systems

By a Decree of King Aleksandar of 7<sup>th</sup> December 1924, the Veterinary High School was transformed into the Faculty of Veterinary Medicine of the University of the Kingdom of Serbs, Croats and Slovenes in Zagreb. The Faculty of Veterinary Medicine thereby also became the fifth integral unit of the University of Zagreb, and acquired the right to participate equally in the Academic Senate of the University.

By a Decree of 8<sup>th</sup> May 1925 the following were appointed as registrars: Prof. Eugen Podaubsky, Prof. Dr. Petar Gjurić and Prof. Mile Rajčević. After its foundation, there were no significant changes to the internal organization of the Faculty in comparison with the Veterinary High School. The Regulations on its organization still prescribed the Faculty Board as the collective management body. The first session of the Faculty Board of the Faculty of Veterinary Medicine was held on 16<sup>th</sup> May 1925. It was concluded at that session that the previous professors of the Veterinary High School: Prof. Jaroslav Sakař, Prof. Dr. Lovro Bosnić, Prof. Dr. Stjepan Plasaj, Prof. Dr. Fran Zavrnik and Prof. Ljudevit Jurak, would be re-appointed as full professors of the newly founded Faculty, and their appointment followed on 11<sup>th</sup> June 1925. In line with the regulations relating to faculties within the University, all the work of the previous Rector of the Veterinary High School was to be taken over by the Dean of the Faculty. The first Dean to be elected was Prof. Eugen Podaubsky, and the Vice-Dean was Prof. Dr. Petar Gjurić. In its history, the Faculty had a total of 35 deans, one female dean and one dean-officer in charge. According to the law, until the academic year 1959/1960 deans were elected for one year. From then on, deans were elected for two academic years, and from the academic year 2007/2008 for three academic years (Table 3).

The Faculty began work in the 1925/1926 academic year, and 59 students enrolled in the first semester. At that time there were eight full professors at the Faculty, nine part-time teaching staff and eight assistant teachers. There were 22 compulsory courses in the study programme that year, with a total of 200 hours of lectures and 64 hours of practical classes. In that year the Faculty had 13 departments and clinics, along with the Polyclinic and the Central Department Library.

In the five years of work of the Veterinary High School, the professors had acquired valuable experience in educating students according to the contemporary curriculum of that time, applying high standards in their evaluation. The professors appointed for vocational courses were trained in teaching and scientific work at the Viennese Veterinary High School, so it may be said that the Veterinary High School and later the Faculty of Veterinary Medicine of the University of Zagreb were for a while still organized according to the Viennese model of veterinary education. The graduate veterinarians therefore were equal in terms of the knowledge they had gained to their colleagues who had graduated from recognized schools in other countries. However, the conditions of work at the site of the former National Farrier School were poor, mainly because of the restricted space. Using modest resources, the existing buildings were continuously extended, reconstructed, and adapted, however this met only the most urgent needs of the work of the departments and clinics. Work on the shared building of the Clinic for Specialized Pathology and Treatment of Ruminants, Pigs and Poultry (Clinic of Buiatrics), and the Midwifery Clinic (later the Clinic for Obstetrics and Reproduction) began in 1925, and was completed the following year. Other smaller buildings were also built for the work of the clinics on the land around the former Farrier School (in 1926 the clinical premises of the Department of the Science of Infectious Diseases, in 1928 a small outpatient Medical Clinic and the extended Department of Anatomy, in 1932 the Department of Radiology and Physical Therapy, in 1934 the clinical building was extended of the Department of the Science of Infectious Diseases, etc.) but none of the buildings was completely suited to its purpose. The courtyard space, due to the variety of new buildings and extensions, was so cramped that it no longer met the hygiene regulations, and there was barely room for animals at the clinics to pass through. With the foundation of new Faculty departments, even more problems with space arose, so on 29<sup>th</sup> April 1933 the Board accepted a proposal to rent premises in the building of the First Croatian Savings Bank, opposite the Faculty, on Savska Street no. 23.



## I. HISTORY

Table 3 Previous administration of the Faculty of Veterinary Medicine

Academic year	Deans	Vice-Deans
1925/1926	Prof. Eugen Podaubsky	Prof. Dr. Petar Gjurić
1926/1927, 1933/1934	Prof. Jaroslav Sakař	Prof. Eugen Podaubsky
1927/1928	Prof. Mile Rajčević	Prof. Jaroslav Sakař
1928/1929	Prof. Dr. Lovro Bosnić	Prof. Mile Rajčević
1929/1930	Prof. Ljudevit Jurak	Prof. Dr. Lovro Bosnić
1930/1931	Prof. Dr. Stjepan Plasaj	Prof. Jaroslav Sakař
1931/1932, 1932/1933	Prof. Dr. Fran Zavrnik	Prof. Jaroslav Sakař
1933/1934	Prof. Jaroslav Sakař	Prof. Dr. Fran Zavrnik
1934/1935-1936/1937	Prof. Dr. Lovro Bosnić	Prof. Jaroslav Sakař
1937/1938	Prof. Ljudevit Jurak	Prof. Dr. Lovro Bosnić
1938/1939-1940/1941	Prof. Dr. Ivo Babić	Prof. Ljudevit Jurak (1938/1939), Prof. Dr. Andrija Hupbauer (1939/1940, 1940/1941)
1941/1942, 1942/1943	Prof. Dr. Lovro Bosnić (Prof. Dr. Zdravko Lorković)	Prof. Dr. Ivo Babić (Prof. Dr. Stjepan Horvatić)
1943/1944	Prof. Dr. Zdravko Lorković	Prof. Dr. Stjepan Horvatić
1944/1945	Prof. Dr. Lovro Bosnić	Prof. Dr. Zdravko Lorković
1945/1946	Prof. Dr. Ivo Tomašec	Prof. Dr. Adolf Režek
1946/1947	Prof. Dr. Božidar Oklješa	Prof. Dr. Ivo Tomašec
1947/1948	Prof. Dr. Teodor Varićak	Prof. Dr. Božidar Oklješa
1948/1949	Prof. Dr. Ing. Otto Köster	Prof. Dr. Teodor Varićak
1949/1950, 1950/1951	Prof. Dr. Ivo Tomašec	Prof. Dr. Stjepan Rapić
1951/1952	Prof. Dr. Teodor Varićak	Prof. Dr. Ivo Tomašec
1952/1953	Prof. Dr. Adolf Režek	Prof. Dr. Ivo Tomašec
1953/1954	Prof. Dr. Aleksandar Sutlić	Prof. Dr. Adolf Režek
1954/1955, 1955/1956	Prof. Dr. Mirko Francetić	Prof. Dr. Aleksandar Sutlić (Prof. Dr. Eugen Topolnik)
1956/1957, 1957/1958 1964/1965, 1965/1966	Prof. Dr. Eugen Topolnik	Prof. Dr. Mirko Francetić
1958/1959	Prof. Dr. Mato Winterhalter	Prof. Dr. Eugen Topolnik
1959/1960-1961/1962	Prof. Dr. Ivo Tomašec	Prof. Dr. Mato Winterhalter
1962/1963, 1963/1964	Prof. Dr. Josip Ivoš	Prof. Dr. Ivo Tomašec
1964/1965, 1965/1966	Prof. Dr. Eugen Topolnik	Prof. Dr. Josip Ivoš
1966/1967, 1967/1968	Prof. Dr. Slavko Krvavica	Prof. Dr. Eugen Topolnik
1968/1969, 1969/1970	Prof. Dr. Sergej Forenbacher	Prof. Dr. Eugen Topolnik

1970/1971, 1971/1972	Prof. Dr. Eduard Vukelić	Prof. Dr. Berislav Maržan
1972/1973, 1973/1974	Prof. Dr. Berislav Maržan	Prof. Dr. Mirko Findrik
1974/1975, 1975/1976	Prof. Dr. Mirko Findrik	Prof. Dr. Vladimir Mitin Prof. Dr. Marijan Sviben
1976/1977-1979/1980	Prof. Dr. Vladimir Mitin	Prof. Dr. Miroslav Herak (1976/1977, 1977/1978) Prof. Dr. Vjekoslav Srebočan (1976/1977-1979/1980) Prof. Dr. Marijan Kalivoda (1978/1979, 1979/1980)
1980/1981, 1981/1982	Prof. Dr. Srđan Rižnar	Prof. Dr. Nikola Fijan Prof. Dr. Mladen Zobundžija
1982/1983	Prof. Dr. Mladen Zobundžija	Prof. Dr. Tomo Martinčić Prof. Dr. Zvonimir Vinovrški
1983/1984-1986/1987	Prof. Dr. Zvonimir Vinovrški	Prof. Dr. Križan Čuljak (1983/1984, 1984/1985) Prof. Dr. Marko Tadić (1985/1986, 1986/1987)
1987/1988-1990/1991	Prof. Dr. Tomo Martinčić	Prof. Dr. Berislav Jukić
1991/1992, 1992/1993	Prof. Dr. Vladimir Mitin	Prof. Dr. Hrvoje Mazija Prof. Dr. Marija Vučemilo
1993/1994, 1994/1995	Prof. Dr. Tomo Martinčić	Prof. Dr. Zdenko Biđin
1995/1996-1998/1999	Prof. Dr. Zdenko Biđin	Prof. Dr. Zdenko Makek Prof. Dr. Josip Madić
1999/2000-2002/2003	Prof. Dr. Zdenko Makek	Prof. Dr. Josip Kos Prof. Dr. Ljiljana Pinter Prof. Dr. Zdenko Biđin
2003/2004-2005/2006	Prof. Dr. Ljiljana Pinter	Prof. Dr. Albert Marinculić (2003/2004, 2004/2005) Prof. Dr. Velimir Sušić (2005/2006) Prof. Dr. Lidija Kozačinski (2005/2006) Prof. Dr. Zdravko Petrincec Prof. Dr. Josip Madić
2006/2007	Prof. Dr. Josip Madić*	Prof. Dr. Lidija Kozačinski Prof. Dr. Zdravko Petrincec Prof. Dr. Velimir Sušić
2007/2008-2009/2010	Prof. Dr. Velimir Sušić	Prof. Dr. Lidija Kozačinski Prof. Dr. Marijan Cergolj Prof. Dr. Dražen Matičić Prof. Dr. Željko Pavičić
2010/2011-2015/2016	Prof. Dr. Tomislav Dobranić	Prof. Dr. Ksenija Vlahović Prof. Dr. Josip Kos Prof. Dr. Alen Slavica Prof. Dr. Nenad Turk
2016/2017-2018/2019	Prof. Dr. Nenad Turk	Prof. Dr. Ljubo Barbić Assoc. Prof. Dr. Dean Konjević Assoc. Prof. Dr. Danijela Horvatek Tomić (since 25 <sup>th</sup> April 2018) Prof. Dr. Juraj Grizelj (since 25 <sup>th</sup> April 2018) Prof. Dr. Ksenija Vlahović (until 27 <sup>th</sup> March 2019) Prof. Dr. Tomislav Dobranić (until 27 <sup>th</sup> March 2019) Assoc. Prof. Dr. Andrea Gudan Kurilj (since 27 <sup>th</sup> March 2019) Assoc. Prof. Dr. Ivana Tlak Gajger (since 27 <sup>th</sup> March 2019)



## I. HISTORY

In the development of the Faculty an important role was placed in the National Veterinary Foundation of Croatia and Slavonia. It was founded by the Act on the Organization of Veterinary Medicine in the Kingdom of Croatia and Slavonia of 27<sup>th</sup> August 1888. The Foundation was funded by monetary fines paid for veterinary misdemeanours, and proceeds from confiscated animals, and in the years that followed large amounts of money were collected, intended for the future veterinary high school.

Soon after the beginning of the work of the Faculty a dispute arose over the National Veterinary Foundation in Zagreb. The Veterinary Foundation by a decision of the Ministry of Agriculture and Water Resources of 1<sup>st</sup> April 1925, was transferred to Belgrade, and its funds were spent on other things, contrary to its basic purpose, which provoked a well-justified outcry from veterinary circles in Croatia. After the Faculty had asked many times for the Foundation to be returned to Zagreb, and through the specific advocacy of some individuals in the press (Prof. Dr. Lovro Bosnić), finally by the Act on Banking Administration of 7<sup>th</sup> November 1929, the administration of the National Veterinary Foundation was transferred to the Banking Administration in Zagreb, and by a Decision of the Ministry of Agriculture and Water Resources of 23<sup>rd</sup> December 1929, the remaining assets of the Foundation were returned from Belgrade to the Banking Administration on Savska cesta, Zagreb. The Viceroy, Dr. Josip Šilović handed the Foundation over to the Faculty and, by the same Decision, renamed it the Faculty of Veterinary Medicine Foundation. Its assets were successfully invested by the Faculty in real property. From its income the faculty journal *Veterinarski arhiv* (1931) was founded and published, complete equipment was purchased for the Department of Radiology, along with various pieces of equipment and literature for other departments, support was given for research and specializations, and agricultural property was procured for the Department of Livestock (1940). After 1945 income from the Foundation was small and was mainly used to support *Veterinarski arhiv*. By the Act on Nationalization of Rented Buildings and Construction Land, which came into force on 26<sup>th</sup> December 1958, the Faculty lost all the foundation's real property for good. All that was left was the agricultural land which the Faculty, due to its inability to maintain it, first leased out and then sold in 1970, and used the proceeds to update its courses.

Since 1927, when Zagreb University began to stagnate, the Faculty Board, due to the policies of the governing regime in Belgrade, which were supported by some individuals from the Faculty, fought for the survival of the Faculty in Zagreb. At first it was planned for the Faculty of Veterinary Medicine to be separated from the University of Zagreb and to be turned back into a Veterinary High School to cut the costs, and then the inclination strengthened for it to be transferred to Belgrade, allegedly for the sake of better financing and development. During this difficult time for the Faculty, the students were also involved in the fight for its survival and they expressed their opposition to the move to Belgrade by going on strike. The question of the move to Belgrade was still on the table right up to 1936, when another Faculty of Veterinary Medicine was founded in Yugoslavia, this time in Belgrade.

In the same year when the Faculty of Veterinary Medicine was founded in Belgrade, the Ministry of Education adopted new regulations relating to both faculties. According to them, the veterinary medicine was extended to ten semesters. In line with that extension, some of the existing courses were divided and some new ones introduced, so the number of compulsory courses increased to 38, and elective courses to as many as 11. These regulations introduced pathological physiology, nutrition, livestock hygiene, and radiology and medical physics to veterinary studies. Veterinarians who wished to study for a PhD had to work for at least two semesters after they graduated in the department of the scientific branch in which they wanted to do their PhD. Before registering their PhD dissertations they took an oral examination, and after completing their dissertation they had to defend it at a viva voce. In this way attaining a PhD was made more difficult, and it was accessible mainly to experts from the Faculty and institutes outside the Faculty.



The fair on Heinzlova Street in 1938. In the background is the construction site of the Faculty of Veterinary Medicine (Faculty Archives).

An increasing number of students were studying at the Faculty each year so there was a need to build new facilities due to the limited spatial capacity of the old location. In 1936 there were plans for the Faculty facilities to be built on land in Maksimir belonging to the Faculty of Agriculture and Forestry. Other locations in Zagreb were also considered.

On the basis of a request by the Faculty Board, in 1938 the City Administration allocated five hectares of land on Heinzlova Street to the Faculty for the new location, opposite the city slaughter house and market. Funds for building the faculty complex were not immediately available, so a partial solution was found, to build in phases, which, of course, made the construction of later installations more expensive (e.g. the decentralized central heating).

The construction of the faculty complex was in three phases, and it was financed from the state budget. The Faculty was designed by the architect Prof. Dr. Ing. Zvonimir Vrkljan from the Technical Faculty of that time, on the basis of a proposal by the heads of the departments and clinics and the plans, pictures and descriptions of many veterinary faculties in other countries. A construction committee was established consisting of older members of the Faculty and the architect himself.

In the first phase, from 1938 to 1940, the main Faculty building was built, and in the first half of 1941 it was finally equipped and furnished. It housed the Deanery, the main lecture theatre, the central library and four departments. At the same time, a park was created around the building, the basis for a small botanical garden was formed, and a fence was set up along the surrounding streets.

In 1938, a visit was made by the architect Zvonimir Vrkljan and Prof. Jaroslav Sakař to the Veterinary High School in Brno, and then the Faculty of Veterinary Medicine in Leipzig, in order to draw up study documents for the second phase of construction of the theoretical and experimental departments of the Faculty. The architect Zvonimir Vrkljan and teaching staff from the Faculty travelled again later, when planning the third phase, the construction of the clinics.

The second phase of construction of the complex of buildings for the theoretical-experimental departments began in 1940 but, due to the war, it was halted in the spring of 1942. At that time the building for experimental animals was completed, built in the spirit of traditional rural architecture. Later that building was reallocated for the needs of the clinic within of the Department of Microbiology and Infectious Diseases.

Construction work resumed on the building in 1946, and was completed in 1952. The work on that building also included the amphitheatre lecture hall of the Department of Anatomy, Histology and Embryology. That same year a large number of the Faculty institutions were moved into the new buildings on Heinzelova Street, and the question of the move of the remainder of the Faculty became imminent. At the old location on Savska cesta only the clinics and the departments closely linked with them remained (the Department of Pathological Anatomy, and the Department of Infectious Diseases with Clinic), meaning that classes in clinical courses were still held in the old buildings of the former National Farrier School. This was not a long-term solution, in view of the number of students, the quality of the teaching and the fact that the students still attended classes in two places relatively distant from one another. Therefore, the Faculty Board began to take the already agreed and necessary steps to complete the construction of the Faculty as soon as possible, which was not at all an easy task.

In the spring of 1955, the architect Zvonimir Vrkljan visited the veterinary faculties in Munich and Giessen and examined the newly built clinics there. In the same year, a group of teachers visited the veterinary faculties in Munich, London, Cambridge, Edinburgh and Glasgow. During those study trips, they gained an insight into the specific needs, function, equipment and design of the premises of those foreign clinical buildings at veterinary institutions of higher education. Their consultations with foreign teachers, and the spatial and financial capacities and needs of the Faculty of Veterinary Medicine in Zagreb, formed the basis and direction of the continued construction of the pavilion complex of the Faculty on Heinzelova Street.

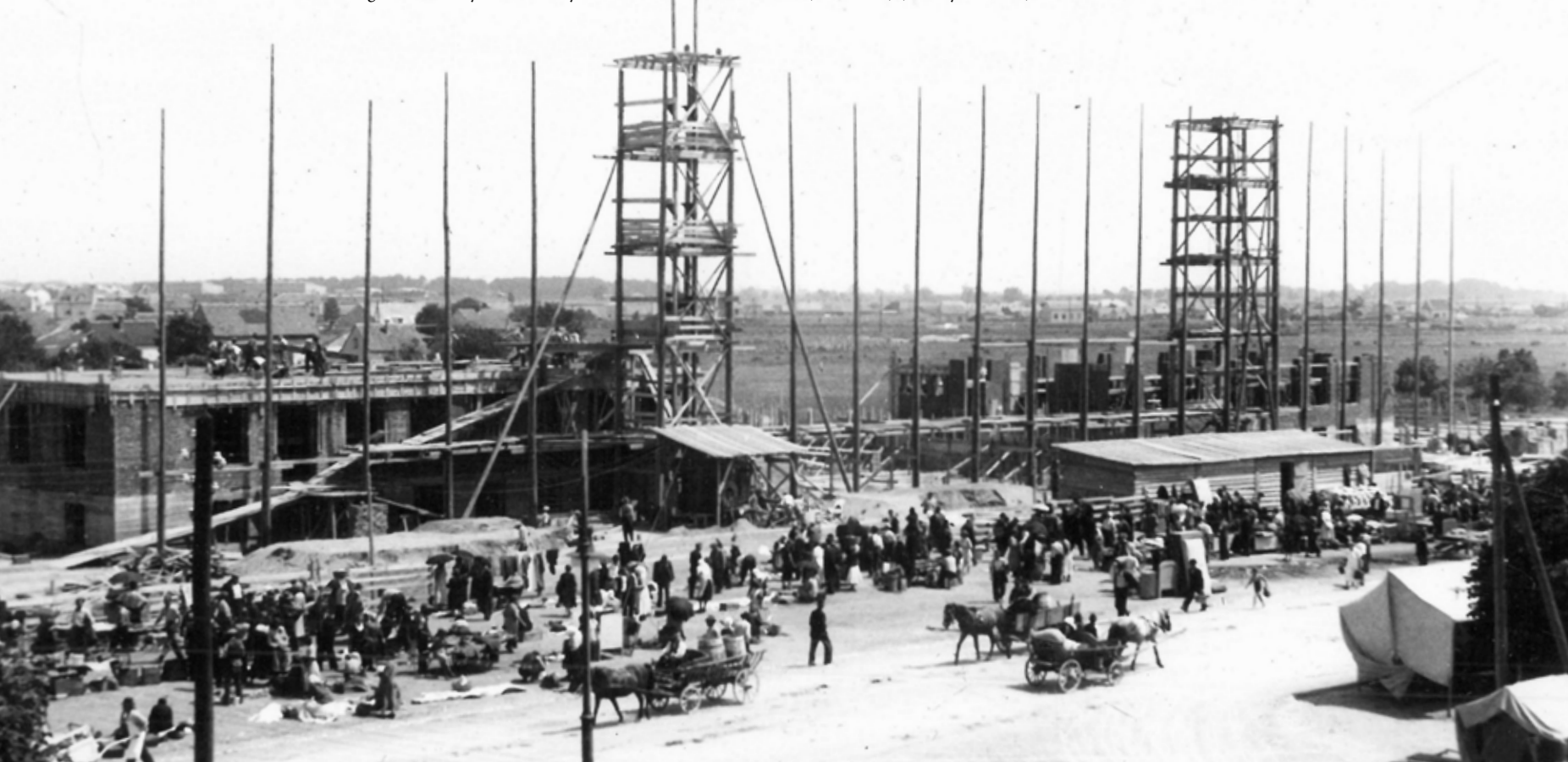
The third phase of construction of the clinics of the Faculty of Veterinary Medicine began in 1956, and was mostly completed by 1959. In the middle of the same year, the remaining organizational units of the Faculty moved into the clinical buildings that had been built. Only the Department of Radiology and Physical Therapy remained for two more years at the old location of the Faculty, because the building on Heinzelova Street had not been completed or equipped with new apparatus.



Academician Zvonimir Vrkljan (1902-1999) Croatian architect, University Professor at the Faculty of Technical Studies (1924-1972), he was distinguished designer of the educational buildings: Business Academy at the Petar Krešimir IV Square (1931-1935, today the Ministry of Defence), Female Gymnasium of the Charity Sisters at the Savska Cesta (1937-1940, today the Faculty of Teacher Education and XI. Gymnasium) and the complex of the buildings of the Faculty of Veterinary Medicine of the University of Zagreb (1936-1962) achieving the paradigm of modern scientific and educational institutes in our country (Faculty Archives).

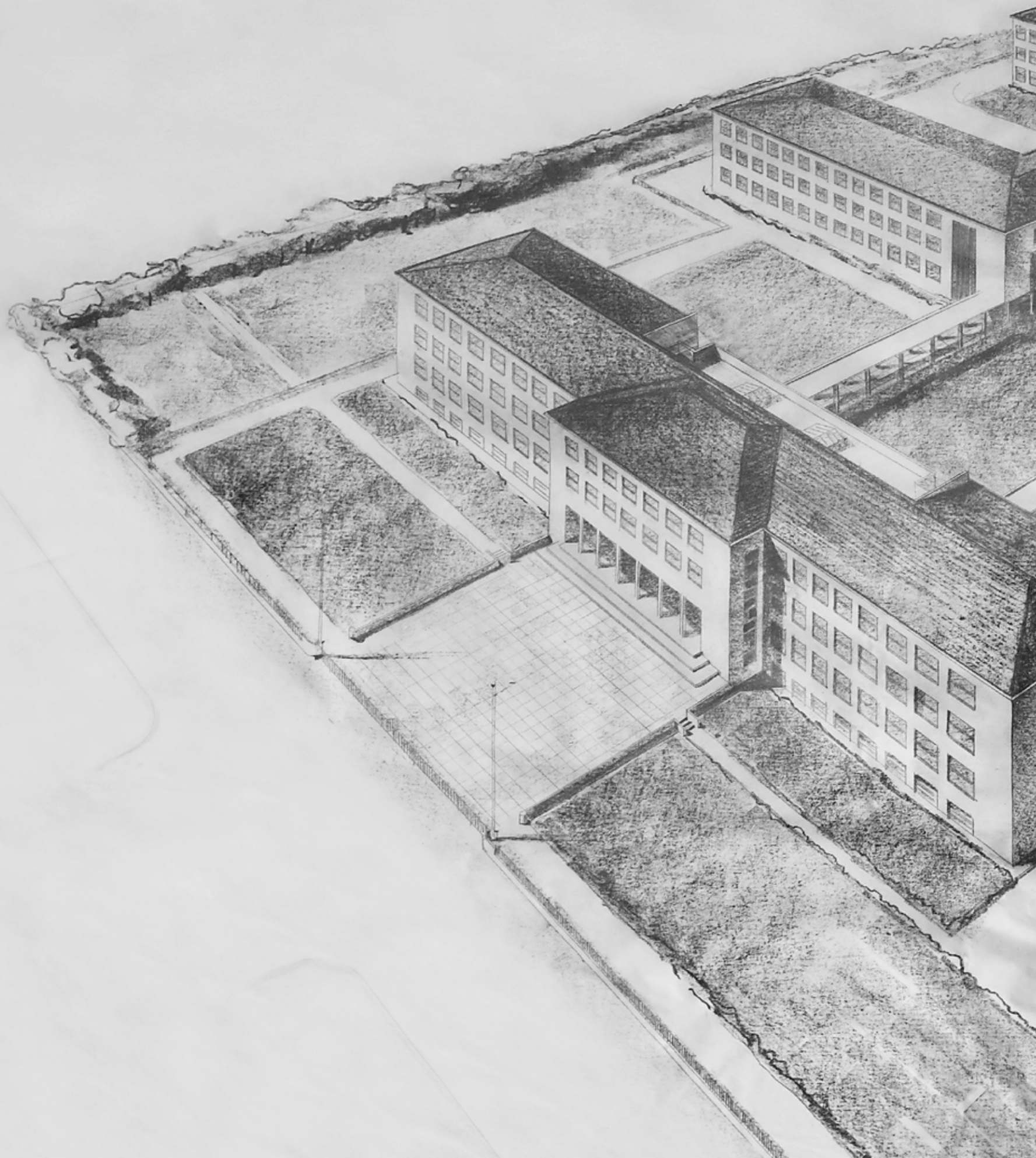
During the construction it became obvious that the plot for the construction of the faculty complex was not large enough, due to the development of the veterinary profession, for all clinics and department buildings (Clinic for Internal Diseases, Ambulatory Care Clinic, Department for Infectious Diseases and Department of Pathological Anatomy). It was also planned to build a student hall

Construction of the main building of the Faculty of Veterinary Medicine on Heinzelova Street (1938-1940) (Faculty Archives).





The preliminary design of the main Faculty complex, created by architect Zvonimir Vrkljan, is made up of the main building, the complex of buildings for the theoretical-experimental departments, and premises for experimental animals (Faculty Archives).







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Completed main building of the Faculty of Veterinary Medicine with a built fence on the corner of Heinzelova and Planinska Street in 1940 (Faculty Archives).

of residence with a restaurant. Therefore, in 1956 it was planned to extend the Faculty plot to the south and east. Unfortunately the faculty did not succeed in purchasing the originally intended private plots on Stara Peščenica Street, and thereby obtain land of the planned dimensions. Therefore the most vital faculty facilities were built on a significantly smaller scale, within the existing plot. Thereby, in fact, the Faculty of Veterinary Medicine complex, under these circumstances, was never built in the originally planned extended version.

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Since the plot of land planned for the Faculty of Veterinary Medicine proved unobtainable, two smaller buildings were built on the eastern part of the original plot, as part of the Faculty. In the far south-eastern

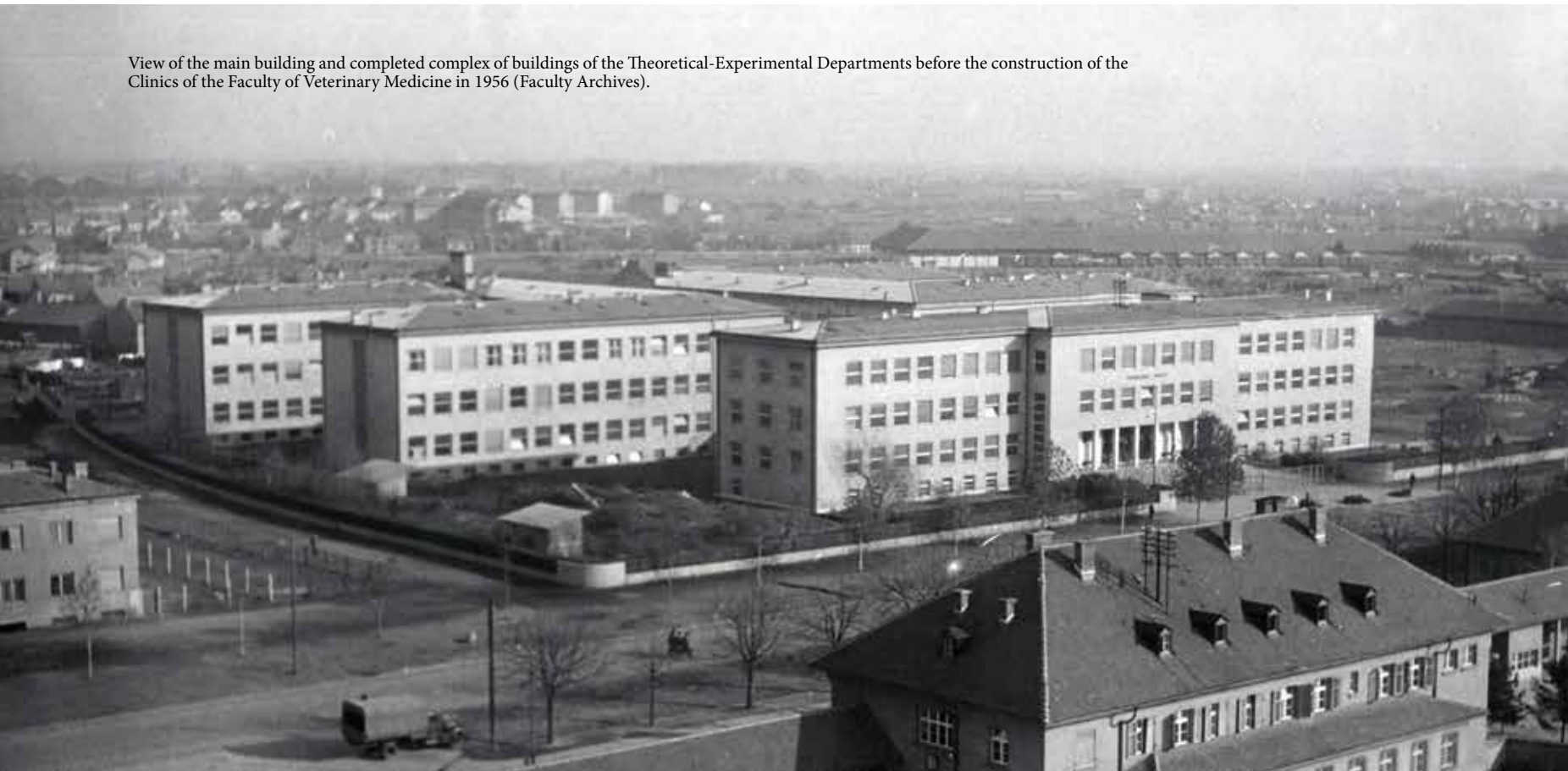
corner of the plot, two halls were built for dissection work (1958-1961) and a garage building for faculty vehicles (1960-1962). The buildings are similar in design, in terms of their floor plan and spatial arrangement. The larger halls and the garage are surrounded to the north by smaller secondary buildings. The last to be completed was the small building for experimental animals (1960-1961), to the south of the first building used for that purpose.

The basic concept of the main complex grows out of the central entrance axis, along which are the main buildings, the complex of theoretical and experimental departments, the amphitheatre lecture hall of the Department of Anatomy, Histology and Embryology, and the atrium halls. The main building of the Faculty is a longitudinal, two-storey building, with a symmetrical floor plan and design, standing parallel to Heinzelova Street. The striking symmetrical design stresses the importance of the national university building. The ground-floor entrance porch to the building is flanked by staircases, which extend into long porches, linking the main complex together.

The complex of buildings of the theoretical and experimental departments consists of four, two-storey wings, located to the east of the main building. These wings are linked together by passage ways. Inside there are lecture theatres and labs for practical work, and in this way the teaching premises are separated from the departments. There are only a few smaller lecture theatres interposed within the line of departments. Departments dealing in related areas of research are located in the same wing, for the sake of the rational use of the shared premises and lecture theatres. The eastern wings are linked by a joining passage, including an amphitheatre lecture hall. The central zone of the faculty complex consists of two atriums and a covered passage with columns, which is also the main passage way along the length of the wings of the departments and the main building. Immediately behind the main faculty complex, the original building for experimental animals is located.

The first department building built after the war, with clinics, is located to the south of the theoretical and experimental complex of the Faculty. Since it brings together several different functions, it is divided in terms of function and space. The northern wing of the departments is dedicated to scientific and teaching work, and has an interactive relationship with the application of knowledge in practice,

View of the main building and completed complex of buildings of the Theoretical-Experimental Departments before the construction of the Clinics of the Faculty of Veterinary Medicine in 1956 (Faculty Archives).







Detail of the completion of the construction of the Clinical building of the Faculty with the adaptation of the access road in 1959 (Faculty Archives).

which is achieved in the relevant clinics to the south, intended for treating and accommodating animals. The building, with a “π” shaped floor plan, is designed symmetrically, with an axis linking the atrium of the theoretical and experimental departments to the central entrance to the department building. The front wing of the departments faces the northern complex. Its length is emphasized by the horizontal structure of the lines of windows along the entire length. The three entrance porches express the three-way division not only of the building but also of the entire complex. Alongside the three facing staircase annexes, stretches the central, trapezoid clinical lecture theatre, and to the side the two wide, extended single-storey wings of

the Clinic for Surgery, Orthopaedics and Ophthalmology with Clinic for Obstetrics and Reproduction. The wings of the clinics, with their double sided floor plan, include an in-patient facility for animals, and an operating theatre. The broad central line is defined to the north from where it joins the department building, and to the south by the operating theatres, and it is emphasized by the line of overhead lights. The southern operating theatres are distinguished by their transverse floor plan layout, strictly south facing, and their exterior design (reinforced concrete shades, striking in terms of sculpture and colour) The façades of the clinics are characterised by horizontal lines of lighting and high parapets. The rustic figure of a hawk, up by the high windows, stretches up to the level of the parapet. The complex design of the façade is accented by a porch providing shade in the area of the roof above the entrance, and the prominent outline of the southern halls. Unfortunately, while they were being built the façades were simplified and stripped of ornamentation.

The second building within the clinical part is the building of the Department of Radiology and Physical Therapy. It is located to the north of the department and clinic buildings, whose basic “π” shaped ground plan is repeated in a much reduced scale and with more modest design. To the south of the department building, there is two-sided wing at the back, for accommodation and registration of animals. The central area of the porch, serving as a waiting area for animals, is low enough to allow light to reach the higher rooms of the side wings used for examination of animals, on both sides.

The complex of the Faculty of Veterinary Medicine is unique within the University of Zagreb as a faculty pavilion complex, and a rare example of an integrated design by a single architect, the academician Zvonimir Vrkljan, who devised and completed this large scale complex in its entirety, from the urban building complex to the details of its furnishings and equipment. Today, the Faculty of Veterinary Medicine complex, thanks to the unique character of its design by academician Zvonimir Vrkljan, is a protected cultural asset of the City of Zagreb. Since 1996 restoration work has been going on intensively on the faculty buildings, whereby the clinics, departments, laboratories and lecture theatres are being systematically refurbished. As part of this restoration work, contemporary equipment has been procured for teaching, scientific and clinical work, so the Faculty has attained

View of the campus of the Faculty of Veterinary Medicine in the southwest-northeast direction. On the right are the Clinics and on the left are the main building and the complex of Theoretical-Experimental Departments of the Faculty (Faculty Archives).





## I. HISTORY

the same level of quality as more renowned veterinary schools, as confirmed by its achievement in 2003 when it was included in the list of positively assessed faculties of the European Association of Establishments for Veterinary Education, EAEVE.

From as early as 1935 the Faculty of Veterinary Medicine was considered a left-wing faculty. That is to say, a left-wing group began to be organized at the Faculty, led by assistant professors, increasing support from other teachers, assistant teaching staff and students. With the approach of the Second World War there was an increasing left-wing force at the Faculty amongst the students and teaching staff. Very heated public debates were held on the need for socialization of veterinary production and the veterinary service. Day trips were organized for students to the villages east of Zagreb, where they treated livestock free of charge, whilst spreading political propaganda amongst the villagers. At that time there were about thirty people active in the group. The work of the group was well-known to the administration of the Faculty, but they did not interfere with it. At the time when this country was occupied in 1941, the left-wing forces formed a strong revolutionary organization, which had a major influence on the Faculty and many veterinarians in Croatia. Immediately after the occupation, the work of that faculty group was aimed at providing support to the People's Liberation Movement. People involved in illegal activities at the Faculty were removed and prosecuted by the Ustasha police. Some of the departments however became storehouses for medication, arms and other materials for the People's Liberation War, which were collected in various ways.

After the foundation of the Independent State of Croatia, the Legislative Provisions on Croatian Universities came into force, by



Jaroslav Hvala (1916-1941), a student of veterinary medicine (in the academic year 1936/1937), a distinguished member of the League of Communist Youth of Yugoslavia, the president of the Students' Veterinary Club and one of the first killed students of veterinary medicine in the Second World War. His words, "We want a unity in the struggle for student interests, the unity in the struggle for freedom protection with desire for greater gathering of all students in the country" had become the motto of the Club which carried his name in the post-war period (1946-1951) (Faculty Archives).



The monument to fallen veterinarians and students of veterinary medicine in the People's Liberation War. The monument is located in the atrium of the Faculty in front of the Amphitheater lecture hall of the Department of Anatomy, Histology and Embryology. The monument was ceremoniously presented on 25<sup>th</sup> May 1953 and it was made by the academic sculptor Antun Augustinčić (Faculty Archives).

which the choice of professors was within the competence of the Head of State, Ante Pavelić, and the rest of the teaching staff were appointed by the Minister of Education. The Legislative Provisions on Croatian Universities were already amended in November 1941 so that the Head of State was given the right to appoint the Rector for a period of two years. Apart from the Rector, the Head of State also appointed the deans. Through these measures the Ustasha regime completely stamped out the autonomy of the Croatian university. At that time the student group devoted to the new Ustasha regime strengthened, and at the beginning of 1943 this led the Head of State to replace the Dean, Prof. Dr. Lovro Bosnić, just because he did not hang the Head of State's picture in all the Faculty rooms, at their request. It is interesting to mention that the Head of State, according to the will of the Faculty Board, re-appointed Prof. Dr. Lovro Bosnić as Dean in the 1944/1945 academic year.

The difficult circumstances of the war affected scientific and scholarly work at the Faculty, which almost completely died out during the occupation. During the war the occupying army was also housed at the Faculty, having taken over part of the premises in the new building on Heinzelova Street. Classes were held in difficult conditions, and the number of students fell continuously, until there were only about one hundred students just before the liberation.

Towards the end of the occupation, the left-wing organization accounted for 80% of the Faculty staff. Their work, despite being conspiratorial, could not go unnoticed. Several members of the teaching staff ended up in prison, and five of them were taken to an Ustasha concentration camp. Seven teachers and many students fought in Partisan units. More than 60 students of veterinary medicine and veterinarians who graduated from the Faculty of Veterinary Medicine were killed in the People's Liberation War. After the liberation of the country, the Faculty raised a monument to them, made by the well-known sculptor, Antun Augustinčić.

Immediately after the end of the war, the Board, Unions and the Students' Union began work. The new national authority repealed all regulations adopted during the occupation of the country. As a result, all the university and faculty bodies that had been appointed by the

Croatian State Government during the occupation ceased work and the Ministry of Education of Federal Croatia, as a body of the new national authority, appointed its own commissioners at the faculties, with the task of constituting faculty boards as soon as possible, which would elect the deans and take over management.

The appointed commissioner of the Faculty was Prof. Dr. Adolf Režek, and he held this position until the election of the first post-war dean. The elected dean was Prof. Dr. Ivo Tomašec, who took up his duties at the beginning of the 1945/1946 academic year. At the same time, many teachers, employees and students returned to their positions. Due to their collaboration with the occupying forces, five teachers, a few assistant professors and some students had to leave the Faculty.

The Faculty Board worked hard to organize classes, the curriculum and syllabus. Moreover, it was also necessary to resolve the issue of the lack of teaching staff and assistant teaching staff, to equip the departments and continue with construction work at the Faculty. A great deal of discussion went on at that time about the veterinary practice needed by veterinary experts in the new working conditions. Particular attention in teaching needed to be given to nutrition, livestock, infectious diseases, parasitology, zoohygiene, and meat and milk hygiene.

In the post-war period a policy was implemented whereby individual faculties in the state came under specifically related ministries so that they would be linked in the best possible way with the professional branches for which they were educating experts and in whose field they were scientifically active. Therefore, since 1945 the Faculty of Veterinary Medicine was within the competence of the Ministry of Agriculture and Forestry. In that period, this ministry financed the regular work of the Faculty from its budget, appointed veterinarians and allocated them to work in specific departments and clinics, appointed university assistants, rendered decisions on appointment of assistant professors, following proposals by the Faculty, entrusted classes in specific courses to part-time professors, confirmed the appointment of the Dean, issued orders to the Ministry of Finance for payment of a monthly grant from the budget for repair and maintenance of the buildings, utility bills (heating fuel, lighting, water and gas), and the professional needs of the organizational units etc. The Faculty was formally within the competence of the Ministry of Agriculture and Forestry until 20<sup>th</sup> August 1947 when, by an Order of the Government of the People's Republic (PR) of Croatia, the Committee for Scientific Institutions, Universities and High Schools was founded, and it provided funds from its budget for the work of the Faculty. In the time that followed, the names of the state bodies competent for higher education in the state changed (the Council for Education, Science and Culture; the Republic Community for Financing Education and Vocational Training, etc.) where the primary work of the Faculty was financed from the state budget.

Immediately after the Second World War, in July 1945, a debate took place at our Faculty about the need to found an animal husbandry faculty to educate highly qualified livestock experts, following the example of the Soviet Union. However, the Faculty of Agriculture and Forestry opposed this, believing that agronomists were in themselves already educated livestock experts. Later, the agricultural faculties in our country set out along that road, creating separate animal husbandry departments within their faculties, and the Faculty of Veterinary Medicine in Belgrade formed that kind of division at the end of the 1960s.

Social management, according to the socialist executive political model, was introduced to the university community in 1954, on the basis of the federal General Act on Universities. That Act brought significant democratization of higher education. Universities and faculties became independent institutions, founded on the principles of social management, and the operational involvement of state bodies in their work was abolished, specifically of the Council for Education, Science and Culture of the government of the PR of Croatia. The faculties were authorized to undertake a great many tasks within their own competence, without the interference of higher

administrative authorities. This Act treated the University for the first time as a community of faculties, and, alongside the Board and the Dean, the Faculty Council was introduced as the body for the social management of the work and business of the faculties. In this way, the management competencies of the former faculty bodies, the Dean and the Board, were restricted.

The Faculty Council consisted of elected experts from the veterinary and agricultural professions and, together with representatives of the Faculty Board, faculty associates and students, they discussed and rendered decisions on all important questions at the Faculty of Veterinary Medicine.

Up to the end of the 1950s, the Council invested a great deal of effort in organizing classes, and scientific and professional clinical work. At that time the University introduced the possibility of re-election of teachers and assistant teaching staff. Associate professors and assistant professors were elected every five years, and teaching or research assistants and professional associates every three years. During re-election, the scientific work of the candidates was assessed, amongst other things. The re-election of full professors was introduced in the Higher Education Act of 1971.

In line with the Universities Act of the PR of Croatia of 1957, on 3<sup>rd</sup> July 1958 the Faculty Council adopted the first complete Constitution (Statute) of the Faculty of Veterinary Medicine, and pursuant to the provisions of the Act, it was ratified by the Parliament of the PR of Croatia. It prescribed the new organization of the Faculty as a scientific, teaching and assistant institution. According to the basic provisions of the Statute of the Faculty of Veterinary Medicine of the University of Zagreb, it was a scientific and the highest teaching institution for veterinary medicine in the PR of Croatia. The Faculty, right up to the introduction of the Bologna Process (2005) had a total of 9 Statutes, and 11 amendments and supplements, most of which were to align it with changing legislation in the field of higher education and scientific research work.

The Constitutions of the Socialist Federative Republic of Yugoslavia and the Socialist Republic of Croatia, adopted in 1963, brought significant changes to the social management of the economy. The principle of self-management was introduced, and there were changes in the system of management of all work organizations, including faculties. In line with this, in 1964 the Workers' Assembly was introduced as the highest self-managing body at the Faculty. All the working people at the Faculty and student representatives took part in the Assembly, and they decided on all matters of importance for the Faculty, such as adoption of the Statute, the final accounts and the financial plan. In that period the Dean ran and organized the work of the Faculty Board, and was responsible for the finances and business results of the Faculty. The competence of the Board included election procedures for teaching staff and assistants, implementation of the procedure for attainment of PhD degrees, habilitation procedures and recognition of foreign qualifications. This so-called self-management system remained in place right up until Croatia became independent, until in 1993 the Act on Institutions was adopted which abolished the faculty Councils and the Workers' Assemblies. The Dean took over the management of the Faculty, representation of the Faculty, and the Faculty Board, as in its earlier history, again became the professional body which debates and renders all decisions within the scope of work of the Faculty. This form of management of the Faculty is still in place today.

At the beginning of the 1990s the Faculty of Veterinary Medicine went through a difficult period of shortages, due to Croatia becoming independent from Yugoslavia and the beginning of the Greater-Serbian aggression against our country. In order to give a general overview of that period and its effect on the work of the Faculty, it is necessary to recall some historical facts.

The year 1990 will be remembered in the history of Croatia for the first multi-party and democratic elections after many years of communism in the socialist republic as part of the Socialist Federative Republic of Yugoslavia. In May that year the first multi-party Parliament was



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Collecting and care of abandoned pigs in the village of Markovac (Daruvar municipality), January 1992 (from the *Monograph: Animal Victims in the Homeland War 1990-1992*).

constituted, but only a few months later trouble began with the rebellion in Knin, and the so-called “Tree-Trunk Revolution”. On 22<sup>nd</sup> December 1990 Croatia proclaimed the first, democratic Constitution of the Republic of Croatia, and on the same day the rebels in Knin declared the so-called Serbian Autonomous Region of Krajina.

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In the attempt to establish public order and peace in the area of the Plitvice Lakes in March 1991 the policeman Josip Jović was killed as the first Croatian casualty of the Homeland War. On 19<sup>th</sup> May in the same year a referendum was held in Croatia, supported by 70% of all voters, of whom 94% voted for the sovereignty and independence of the Republic of Croatia.

Serbian terrorism, supported by the Yugoslav National Army (JNA), raged throughout our homeland from Topusko, Tenja, Vukovar, Glina, Sarvaš, Erdut and Vinkovci to Kostajnica, Kozibrod, Čelije, Dalj, Aljmaš and Kijevo. The Yugoslav Army (JA) destroyed Petrinja, shelled Vukovar, Gospić, Lovinac, and Osijek, and occupied Baranja. The Faculty of Veterinary Medicine adjusted its work to the conditions of war. In May 1991 a teaching board was appointed to organize a continuous security service, and students were invited to register for voluntary units to work in the security service at the Faculty. In July that year, according to the instructions of Prof. Dr. Vlatko Pavletić, the Minister of Education and Culture at the time, and also Prof. Dr. Miroslav Šunjić, the Rector of the University of Zagreb, an order went out to organize duty rotas in university buildings, to place a watch on laboratories with dangerous materials, to increase supervision of visitors, and to organize internal and external tours of inspection of buildings every hour, etc. In August the Dean, upon the University's orders, founded a crisis council and an evaluation was made of the situation at the Faculty. 24-hour duties were introduced and the shelters were activated. A student platoon completed training at the Faculty and quickly grew into a troop. The crisis council also launched a campaign, sending an appeal for peace to similar institutions in the world. The appeal was sent to more than 300 addresses, and they received replies from Vienna, Košic and Stara Zagora. In the same month the Dean informed the staff about the measures and procedures which should be taken at the Faculty in the case of an air raid or other forms of alert, and in September all annual leave was cancelled and all employees were ordered to return immediately to their places of work. In the same month Faculty employees expressed by their signatures their unconditional support for the efforts being taken by the Parliament, the Government and the President of the Republic

in their struggle against the Greater-Serbian aggression, and showed their readiness to undertake every task to contribute to liberating their homeland and preserving democracy in the Republic of Croatia.

At a session of the Scientific-Teaching Council on 11<sup>th</sup> October 1991, the Dean Prof. Dr. Vladimir Mitin reported that the University of Zagreb had issued its decision to withdraw the University of Zagreb from the Community of Universities of Yugoslavia. He also reported that by a Decision of the Government of the Croatia, the Faculty of Veterinary Medicine had been designated as an institution of special importance for the defence of the Croatia.

At that same time, the Faculty showed its solidarity with casualties of the Homeland War, and all its employees gave one daily wage to a fund to help victims of the war. Employees and students of the Faculty of Veterinary Medicine were actively involved in the National Defence troops, the Croatian Police (MUP) and the Croatian Army (HV). At the beginning of the aggression against Croatia, a Voluntary Company of veterinary students was founded, and its first commander was Prof. Dr. Berislav Jukić. In the areas affected by the war, wounded and abandoned animals were cared for and the land was cleared, with the collection and removal of dead livestock.

In the period of the Homeland War classes were interrupted during air raid alerts and extramural work was held at the Faculty. In addition, shorter classes were prepared, but it was not necessary to implement them. For mobilized students a different study regime was provided, with the transfer of the examinations they had not taken to later years of study, in line with the instructions issued by the University Senate and in agreement with the Ministry of Education and Culture of the Republic of Croatia.

Unfortunately, students from the Faculty of Veterinary Medicine were among the casualties of the Homeland War. During the period of aggression against Croatia three students were killed, two were wounded, and another two were captured and spent time in Serbian concentration camps.

In 1993 the Faculty published a bi-lingual publication by the editor-in-chief Prof. Dr. Petar Kraljević, entitled *Animal Victims of the Croatian Homeland War 1990-1992*. The book was included in the *Veterinary Bulletin* in 1995.



Excavated carcasses of the Lipizzaner horses from the mass grave in Filipovac near Lipik and members of the International Commission on determining the cause of death on 6<sup>th</sup> February 1992. Prof. Dr. Petar Džaja, Department of Forensic and State Veterinary Medicine, is in the middle on the left and Prof. Dr. Željko Grabarević, Department of Pathological Anatomy (today the Department of Veterinary Pathology) of the Faculty of Veterinary Medicine of the University of Zagreb, is on the right (from the *Monograph: Animal Victims in the Homeland War 1990-1992*).

## 3.2. The Faculty's influence on the development of veterinary service, and interinstitutional cooperation

In the 1930s two important activities began at the Faculty, which characterised veterinary activities in this region. One was undoubtedly the foundation of the Veterinary Experimental Station, which produced veterinary drugs and vaccinations, and the other was the initiative to found veterinary outpatient clinics.

Through cooperation between the Department of Microbiology and Hygiene of the Faculty of Veterinary Medicine and the Ministry of Agriculture in Belgrade, on 30<sup>th</sup> January 1933 the Veterinary Experimental Station of the Ministry of Agriculture, Zagreb, was founded. This was particularly thanks to the efforts of Prof. Dr. Josip Ježić, who, in his capacity as head, wanted to expand the field of work of the Department in order to show the advantages of the state funded production of biological, chemical and pharmaceutical preparations over private production. Prof. Dr. Ježić's extraordinary achievements made an experimental station at that time one of the greatest happenings for practical veterinary in ex-Yugoslavia. On the basis of the premise that farmers could not pay for medicine at the prices asked by private producers, the experimental station placed its medicines and vaccines on the market at cost price, that is, many times cheaper than those of private producers. So medicines became more accessible to poorer farmers.



Academician Josip Ježić (1899-1981), Croatian veterinarian, microbiologist, immunologist and epizootiologist. Teacher at the Faculty of Veterinary Medicine of the University of Zagreb (1925-1940), the founder and the first Head of the Veterinary Experimental Station of the Ministry of Agriculture in Zagreb (1933-1940), Director of the State Institute for Production of Veterinary Vaccines and Medications in Zemun (1940-1942), an expert at the Serum Institute in Kalinovica (1942-1943), the founder and the Head of the Veterinary Laboratory on the liberated territory near Glina (1943-1945), Director of the Institute for Production of Veterinary Vaccines and Medications-Veterum in Belgrade (1945-1947), an expert at the Diagnostic Station Split (1947-1949), the founder of the Veterinary Institute in Sarajevo (1949), University Professor at the Faculty of Veterinary Medicine in Sarajevo (1950-1969), the founder and the editor of the journal Veterinaria from Sarajevo (1951-1962), and the member of the Academy of Sciences and Arts of Bosnia and Herzegovina (1966-1981). He published approximately 350 scientific and professional discussions and several books (Croatian Veterinary Institute Archives).



Employees of the Veterinary Experimental Station with Prof. Dr. Josip Ježić (third from the left) in the area of the former Department of the Science of Infectious Diseases of the Faculty of Veterinary Medicine in the mid-thirties of the 20<sup>th</sup> century (Faculty Archives).

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At first, the experimental station was joined to the Faculty and located in the Department of Microbiology and Hygiene. It made vaccines against sheep pox, anthrax and rabies. The vaccines provided good and long-lasting immunity and, alongside the vaccine, insurance was also introduced against vaccine injuries and immunity failure. Alongside these vaccines, the experimental station also began to produce anti-parasitics (anti-liver fluke for cattle, sheep and goats, Lugol solution against lungworms in sheep, and dewormers to treat stomach and intestine parasites in horses). Moreover, the value was tested of the substances used at that time to combat rats and mice (zinc phosphide, thallium sulphate, sodium fluoride etc.), and research was done into the possibilities of disinfection in cases of pox (caporite and formalin), and phenol was found to be the most reliable antiseptic. Attention was also paid to removal of animal carcasses (disposal pit), and a model for transport of carcasses was devised. In 1939 our first vaccine was created against foot and mouth disease, and the first field tests were undertaken using it. The value of diagnostic methods was also tested separately, for proof of brucellosis, and the first foundations were laid for typing of species of salmonella, the causes of tuberculosis etc.

When Prof. Dr. Josip Ježić left in 1940, to go to the newly founded State Institute for Production of Veterinary Vaccines and Medications in Zemun near Belgrade, the experimental station was reorganized outside the scope of the Ministry of Agriculture and it was separated from the premises of the Faculty of Veterinary Medicine. In its history it has been subject to reorganization and changes of its title many times, and since 28<sup>th</sup> July 1995 it has been operating under the title of the Croatian Veterinary Institute, as a public institute of which the Republic of Croatia has founder's rights.



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In the 1930s the idea arose at the Faculty to found animal health care centres in this country, promoted by Prof. Dr. Ing. Otto Köster. At that time the clinics at the Faculty of Veterinary Medicine were the only veterinary institutions in Croatia, and veterinary services were still not available to most owners of livestock in the villages. Prof. Dr. Ing. Otto Köster was educated as a forestry engineer, a doctor of veterinary medicine and an agricultural engineer, and from the beginning of his work at the Clinic for Surgery at the Faculty of Veterinary Medicine (1926) he developed productive work, which, alongside veterinary surgery, also included other problems in veterinary medicine and livestock breeding. He was a deeply socially aware person, and also showed a great affinity for practical work in the field. So for many years he provided free professional assistance to impoverished villagers in his native area in Gornja Posavina. In so doing he sought ways to organize the work of veterinarians in the field, to work as well and efficiently as possible, and to be as accessible as possible to the impoverished farmers. In that time the Head of the Veterinary Department of Savska Banovina was Dragutin Pozajić who sought to modernize veterinary service in Croatia. With this aim in 1935 he visited Bulgaria with a larger group of Yugoslavian veterinarians where he positively rated the “lečebnica” health care system of Prof. Georgia Pavlov. After returning from Bulgaria, cooperating with the Faculty, he sent Prof. Dr. Ing. Otto Köster to study the organization of Bulgarian “lečebnica” and its architecture. Next year Otto Köster as an enthusiast of Pavlov’s “lečebnog dela” begins to build the first animal health care centre in Yugoslavia (Oborovo) and Dragutin Pozajić as the Head of Veterinary Medicine in Croatia managed to ensure funds in the amount of 400,000 dinars entitled “Assistance for arranging and maintaining the veterinary outpatient clinics” in the budget of the Banovina Veterinary Foundation of Savska Banovina for year 1936/1937. It was a clever move of Dragutin Pozaj, especially at the time when the Veterinary Department of the Ministry of Agriculture and the Veterinary



The first veterinary outpatient clinic in Oborovo. Until 1952 it was an independent institution under the state veterinary administration, and then it became an integral part of the Veterinary Station Dugo Selo. It has been preserved and in the mid-1990s it was restored in its original form and today is a cultural monument (Faculty Archives).

Directorates in other regions were opposed to the introduction of an outpatient system. In 1936 with the presence of the Bulgarian veterinary delegation the foundations of the first veterinary outpatient clinic were laid.

The first employed graduate veterinarian in Oborovo was Marko Pećina (born on 18<sup>th</sup> August 1906 in Klanac, Lika, graduated on 26<sup>th</sup> March 1935 at the Faculty of Veterinary Medicine of the University of Zagreb, author’s note) who remained there for full twelve years (1936-1948). Construction of the outpatient clinic was completed on 1<sup>st</sup> April 1938 and a laborant was employed along with the graduate veterinarian.

The salary for the veterinarian came from the Banovina budget, and the laborant was paid by the municipalities Oborovo and Orle in accordance with the agreement on financing the work of the outpatient clinic. With this Köster’s outpatient clinic in his hometown Oborovo the foundations of the veterinary service organization were laid. The system reached its full expression in Socialist Yugoslavia after the Second World War.

The Faculty of Veterinary Medicine in Belgrade was founded in 1936 and some of its first teaching staff were trained at the Faculty of Veterinary Medicine in Zagreb. In this regard, it is necessary to mention Prof. Mile Rajčević, who, as one of the eight initial staff of our faculty, moved to the Belgrade Faculty in 1938 and through his many years’ experience gained working at the Faculty of Veterinary Medicine in Zagreb, contributed to the development of the faculty in Belgrade (in the 1938/1939 and 1939/1940 academic years he was the Dean of the Faculty of Veterinary Medicine in Belgrade, author’s note). A total of 18 students, who had graduated from our Faculty, were the founders of individual teaching units, their heads, or members of the board and university teaching staff at the Belgrade Faculty (Dr. Jovan Dimić, Dr. Mirko Šipka, Dr. Uroš Bratanović, Dr. Petar Drača, Dr. Milivoj Čoporda, etc.).

Our Faculty and its teaching staff, apart from the Belgrade Faculty, also contributed to the development of the Faculty of Veterinary Medicine in Sarajevo, which was founded in 1949, and officially opened on 16<sup>th</sup> October 1950. About ten young scientists (Dr. Milan Bevandić, Dr. Eduard Gavez, Dr. Stjepan Matuka, Dr. Ladislav Ožegović, Dr. Zvonimir Smrček, etc.), on the basis of their knowledge and experience in the teaching process acquired at the Zagreb



Prof. Dr. Ing. Otto Köster (1896-1954), University Professor (1926-1954), the Head of the Surgery Clinic (1934-1954), the Head of the Faculty Agricultural Goods (1939-1954), the Head of the Department of Animal Husbandry (1939-1940 and 1945-1948) and the Dean of the Faculty (1948/1949). He introduced modern principles of asepsis, anesthesia and narcosis into the work of a veterinary surgeon, and his scientific works influenced on the advancement of surgical diagnostics and surgical techniques. He was a good connoisseur of the livestock production but also of damages caused by disagreements between agronomists and veterinarians about the so-called competence in livestock production. He invested a lot of effort in this to find a common language for the benefit of our livestock production. He argued that veterinary and agronomic studies should be complemented by certain disciplines for better knowledge of livestock production issues. In the post-war period, he particularly put efforts for the establishment of the separate Faculty of Livestock Production (Faculty Archives).





The Faculty of Veterinary Medicine of the University of Belgrade, Serbia (Photo courtesy of Prof. dr. Vlado Teodorović).



The Faculty of Veterinary Medicine of the University of Sarajevo, Bosnia and Herzegovina (Photo courtesy of Prof. dr. Nihad Fejzić).

Faculty, organized and conducted almost the entire teaching work at the Faculty of Veterinary Medicine in Sarajevo, and thereby laid the foundations of its development as the third veterinary institution of higher education in Yugoslavia. The founders of the Faculty in Sarajevo were largely former teachers or students from the Faculty of Veterinary Medicine in Zagreb (Dr. Vaso Butozan, Dr. Edhem Čamo and Dr. Ekrem Maglajić).

It is also necessary to point out the role of the teachers of our Faculty in the foundation and development of the Faculty of Veterinary Medicine in Ljubljana. A significant contribution was made by the retired lecturer from the Zagreb Faculty, Prof. Dr. Fran Zavrnik, who was appointed on 9<sup>th</sup> June 1954 as one of the registrars of the Veterinary Department of the Faculty of Agronomy, Forestry and Veterinary Medicine in Ljubljana (*Fakulteto za agronomijo, gozdarstvo in veterinarstvo*). We should also mention Tvrтко Švob, an assistant teacher at the Department of Biology, and Dr. Srećko Vatovac,

assistant professor at the Department of Physiology, who in 1955 and 1956 moved to the Ljubljana Faculty. The study in veterinary medicine began in Ljubljana on 3<sup>rd</sup> November 1956. When the Faculty of Agronomy, Forestry and Veterinary Medicine was renamed the Bio-technical Faculty (*Biotehniško fakulteto*) in the summer of 1961, the Veterinary Department of the Bio-technical Faculty was founded. From the summer of 1990 the Faculty of Veterinary Medicine has operated as an independent unit of the University of Ljubljana.

The last veterinary faculty to be founded in Yugoslavia was the Faculty of Veterinary Medicine in Skopje. It was founded by a Decision of the Ministry of Education and Sport of 1<sup>st</sup> November 1991 as a department of the Agricultural Faculty in Skopje. The Scientific-Teaching Board adopted a decision on 28<sup>th</sup> April 1992 for the Faculty in Skopje to be sent the teaching plan and programme of our Faculty, in order to help it prepare its own curriculum in veterinary medicine. The Education and Science Board of the Faculty of Agriculture in Skopje rendered a

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The Faculty of Veterinary Medicine of the University of Ljubljana, Slovenia (Photo courtesy of Prof. dr. Andrej Kirbiš).



The Faculty of Veterinary Medicine of the Cyril and Methodius University in Skopje, Macedonia (Photo courtesy of Prof. dr. Lazo Pendovski).



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decision on 30<sup>th</sup> September 1993 to separate the veterinary department, to form a separate Faculty of Veterinary Medicine, and on 20<sup>th</sup> April 1994 the Ministry of Education and Sport confirmed the foundation and work of the Faculty of Veterinary Medicine in the Republic of Macedonia. The foundation and development of that faculty was thanks to the work of the teaching staff, who were also students at our Faculty (Dr. Toni Dovenski, Dr. Vlatko Ilieski, Dr. Plamen Trojačanec, Dr. Igor Ulčar, Dr. Roman Velev, etc.).

Inter-faculty cooperation with other bodies of the University of Zagreb initially began by in running graduate studies soon after the foundation of the Veterinary High School, with the appointment of teaching staff from the faculties of that time: Philosophy (Štanko Hondl and Stjepan Gjurašin), Medicine (Fran Bubanović, Boris Zarnik and Miroslav Mikuličić), and Agriculture and Forestry (Sava Ulmansky), as part-time teachers of courses which the high school's own staff could not offer. This form of cooperation, with the involvement of part-time teachers for individual courses, lasted until the beginning of the 1940s, when the Faculty finally formed its own teaching staff. It must be emphasized here that the first full professors at the Veterinary High School were also part-time teachers at other faculties, such as Prof. Eugen Podaubsky, who was the first lecturer in Anatomy of Domesticated Animals and Veterinary Medicine at the Agriculture and Forestry Faculty in Zagreb (1920-1934). In the same period, Prof. Dr. Petar Gjurčić held classes in Physiology of Domesticated Animals for students of that Faculty.

Also, in 1927 Prof. Dr. Zdravko Lorković was appointed assistant teacher at the Department of Morphology and Biology at the School of Medicine, and taught there continuously, alongside Prof. Dr. Boris Zarnik. In 1940 he was appointed associate professor teaching biology at the Faculty of Veterinary Medicine and continued to work in parallel at the School of Medicine. Working at the Faculty of Veterinary Medicine, he raised up his own successor, Prof. Dr. Ivo Ehrlich, whilst the School of Medicine did not have its own permanent teacher. As a result, he decided in 1951 to transfer to a permanent position at the School of Medicine, where he worked until he retired in 1970.

Prof. Dr. Zdravko Lorković was a biologist, entomologist, geneticist, evolutionist and ecologist. He was particularly well-known for his scientific work in many fields of lepidopterology. He developed methods for the artificial mating of butterflies, thereby excluding the sexual isolation mechanisms which otherwise prevent the mixing of the inherited characteristics of different species. Four living species of butterflies were named after him, one type of fossil, and also a genus of beetles. Since 1965 he was a full member of the Yugoslav Academy of Sciences and Arts.

Of the other teachers from the Faculty who taught part-time at other faculties, we must also mention Prof. Dr. Božo Metzger. In 1942 he was appointed assistant professor in the Department of Physics of the Faculty of Veterinary Medicine, where he also taught physics. From 15<sup>th</sup> October 1945 he took over the position of part-time teacher of physics for students at the School of Medicine. Due to the lack of teaching staff, from 1951/1952 academic year until 1954/1955 he was also a part-time lecturer at the Faculty of Pharmacy. The Department of Physics of the School of Medicine (since 1948, and the Department of Physics and Mathematics of the Faculty of Pharmacy since 1957) were part of the Department of Physics of the Faculty of Veterinary Medicine, right from their foundation.

Assist. Prof. Dr. Božo Metzger, with significant material support from the Dean of the Medical Faculty at that time, Prof. Dr. Andrija Štampar, succeeded in the 1953/1954 academic year in setting up joint practical experience for students from the Veterinary, Medical and Pharmacy Faculties. By a decision of the Executive Board of the People's Republic of Croatia of 13<sup>th</sup> July 1954, the institutes for physics of these faculties merged into a joint Department of Physical Therapy of the University, with Assist. Prof. Dr. Božo Metzger as its head. This institute existed right up to 1962, when these three departments once again returned to their own faculties. The related faculties cooperated in holding physics classes at the Faculty of Veterinary Medicine throughout this period, and since 1966/1967 academic year classes for students at the

Faculty of Dentistry were held at the Department of Physics of the Faculty of Veterinary Medicine. Clearly this large number of students created an excessive burden on the premises and teaching staff, which made teaching work in the Department more difficult. Other faculties used the Department of Physics of the Faculty of Veterinary Medicine right up to 1981, when the Department was finally able to use its own premises independently.

In order to rationalize scientific research work at the University, from 1959 to 1960 seven university natural science institutes were founded. So in 1960 the Institute of Biology of the University was founded by the merger of the Zoology Department of the Faculty of Science, the Department of Biology of the Faculty of Veterinary Medicine and the Ornithological Department of the Zoological Museum in Zagreb, and later the Department of Physics of the Veterinary, Medical and Pharmacy Faculties. The seat of the Institute of Biology of the University was at the Faculty of Veterinary Medicine, and the acting director was Prof. Dr. Ivo Ehrlich, from the earlier Department of Biology of the Faculty of Veterinary Medicine. The scientific activities of University of Zagreb the scientific activities of the Institute of Biology were conducted as part of the Department for Experimental Parasitology (the head being Prof. Dr. Ivo Ehrlich) and the scientific work of the Institute of Physics as part of the Department of Biophysics (headed by Assist. Prof. Dr. Božo Metzger). The Institute of Biology of the University existed right up to the second half of the 1970s, when some of the previous scientific work of the Institute continued within the faculty departments of biology and physics.

As part of the Faculty's cooperation with other faculties of the University of Zagreb, it is important to mention Academician Andrija Štampar, who, after the end of the Second World War, was a professor of hygiene and social medicine at the School of Medicine of Zagreb University, and managed the hygiene and sanitation services in Croatia and Yugoslavia. During his involvement in this work, he noticed that many zoonoses threatened the health of people, and that it was not possible to prevent them without the combined efforts of the medical and veterinary professions. As a result, he founded veterinary



Prof. Dr. Božo Metzger (1913-2012) a founder of physics within biomedical sciences in Croatia. He was the first Head of the Department of Physics and the University Professor of the Faculty of Veterinary Medicine (1942-1963), the founder and the University Professor of the Department of Physics of the School of Medicine of the University of Zagreb (1948-1979), the Head of the joint Department of Medical Physics of the Faculties of Pharmacy, Medicine and Veterinary Medicine (1954-1962) and the Head of the Department of Radiology and Nuclear Medicine of the Clinical Hospital "Dr. Mladen Stojanović" in Zagreb (1963-1979). His *Physics Script for the Students of the Faculties of Veterinary Medicine and Medicine* (1947) is considered as the first complete textbook in that area in Croatia (Faculty Archives).

departments in his hygiene institutes, and in general showed a special interest in veterinary medicine. Since 1947 until his death in 1958, he was the president of the Yugoslav Academy of Sciences and Arts, and advocated the merger of research work in the field of human and veterinary medicine. Thanks to his international recognition, in the work of the World Health Organization (he was its president), he procured several scholarships for the Faculty of Veterinary Medicine for the scientific education of young experts abroad. Thus, at a session of the Board on 17<sup>th</sup> March 1949, the Dean, Prof. Dr. Ing. Otto Köster, informed the members, on the basis of a report by Prof. Dr. Andrija Štampar, that the United Fund for Aid to Yugoslavia had approved a scholarship to Dr. Eugen Topolnik and Dr. Slavko Krvavica. They, according to his recommendations, went to study under prominent experts in human medicine institutions and acquired applicable knowledge, which they used at the Faculty upon their return. Dr. Eugen Topolnik studied virology at the medical faculties in Zurich and Bern, and Dr. Slavko Krvavica undertook specialised education at the institutes of physiological chemistry of the medical faculties in Bern and Basel (1949-1950). With the advocacy of Prof. Dr. Andrija Štampar, specialised education was also made possible for the zoohygiene assistant Dr. Josip Ivoš at the School of Public Health (1949). His assistance in training young experts in disciplines that link both professions had a significance influence, meaning that the Faculty of Veterinary Medicine grew into an internationally recognized scientific research institution in the country and the wider region.

Academician Andrija Štampar had an important role in founding the Veterinary Division of the Department of Medical Science of the Yugoslav Academy of Sciences and Arts. As the president of that Academy and with his knowledge of the role of veterinary medicine in zootecnics and prevention of zoonoses, he believed it was necessary for the Academy to include a separate Veterinary Division, and it was founded in 1949.

At the suggestion of Academician Andrija Štampar, the Department of Natural and Medical Sciences founded a Centre for Leptospirosis on 16<sup>th</sup> March 1950, with the task of researching leptospirosis in Croatia. The laboratory and veterinary clinical part were set up in the Department and Clinic for Infectious Diseases of the Faculty of Veterinary Medicine, the human medicine part in the Clinic for Infectious Diseases of the School of Medicine, and the field epidemiological research was conducted by researchers from the Faculty of Veterinary Medicine and the Hospital for Infectious Diseases. The Centre began work on 14<sup>th</sup> April 1950, and it was run by Assist. Prof. Dr. Ivan Zaharija. In the following year, the Centre for Leptospirosis was transferred for administrative purposes to the Institute for Medical Research of the Yugoslav Academy of Sciences and Arts. It is interesting to mention that the veterinarians at the Centre took part in teaching doctors about leptospirosis. In the minutes of a session of the Faculty Board of 26<sup>th</sup> February 1953 it was recorded that the Head of the Department and Clinic for Infectious Diseases, Assist. Prof. Dr. Ivan Zaharija, reported that a lecture had been held at the Department on the epidemiology and laboratory diagnostics of leptospirosis, with demonstrations for 12 doctors, heads of public health centres, who had been undergoing training in Zagreb. In 1953, by a Decision of the Presidency of the Yugoslav Academy of Sciences and Arts, the Centre for Leptospirosis was handed over, with all its equipment, to the competence of the Faculty of Veterinary Medicine, where it still is today.

An important factor at the Faculty is scientific cooperation in biomedicine and health care, which particularly came to the fore from the middle of the 1970s. At the beginning of 1975, the Head of the Clinic for Surgery, Prof. Dr. Eduard Vukelić, proposed to the Board an agreement on merger of operations into a Centre for Experimental Surgery of the University of Zagreb, with the aim of gathering together experts in surgery and other related scientific disciplines, so that technical achievements, tried and scientifically proven methods and results of experiments could be applied in human medicine, and in that way to implement correctly the ethical principles of the medical vocation and maintain human dignity to the end of life. A agreement on a business association in the form of the Centre for Experimental



Academician Andrija Štampar (1888-1958), Croatian doctor and specialist in social medicine and hygiene. He was the founder (1926) and the Director of the National Health School in Zagreb (1946-1958), the Dean of the School of Medicine (1940/1941, 1952/1953-1956/1957), the Rector of the University of Zagreb (1945/1946), the President of the Yugoslav Academy of Science and Arts (1947-1958), the founder of the Institute of Industrial Hygiene (1948) and one of the initiators and founders of the World Health Organization (WHO) in Geneva and the President of the First WHO Assembly (1948). He put efforts for widespread medical enlightenment of people believing that this could effectively suppress the occurrence of many diseases. His definition of health as a state of complete physical, mental and social well-being and not just as the absence of disease is being respected today (Faculty Archives).

Surgery was constituted at the founding assembly at the Clinic for Surgery of the Faculty of Veterinary Medicine of the University of Zagreb on 7<sup>th</sup> November 1975. In the extract from the court register of organizations of associated labour of 2<sup>nd</sup> March 1976 it may be seen that the agreement on the business association of the Centre for Experimental Surgery defined its duration as indefinite, and that the signatories were the Faculty of Veterinary Medicine, the Medical Faculty, the Faculty of Dentistry, the Clinical Hospital Centre, Zagreb, the Dr. Mladen Stojanović Clinical Hospital, Zagreb Military Hospital, the Dr. Ozren Novosel Clinical Hospital, Zagreb-surgical ward, the Dr. Josip Kajfež General Hospital-surgical ward, the Central Institute for Tumours and Similar Diseases, and Zagreb Traumatology Hospital. By registration at the District Commercial Court, Prof. Dr. Eduard Vukelić became the authorized person who represented the Centre, and his deputies, with a restricted mandate to sign documents, were members of staff from the Clinic for Surgery, Prof. Dr. Franjo Sanković and Assist. Prof. Dr. Mirko Peitel-the future heads of the Clinic.

In 1978 an agreement was signed with the School of Medicine-Basic Medical Sciences of the University of Zagreb, and the Clinical Hospital Centre for Science and Diagnostic Research on Animals, on the premises of the Faculty of Veterinary Medicine.

In 1982 an agreement was concluded on professional cooperation in scientific research work with the Centre for Medical Sciences of the Clinical Hospital Centre in Zagreb, and the Faculty of Veterinary Medicine, for a period of five years. The Centre was located for the period of the agreement on the premises of the Department of Anatomy, Histology and Embryology.

The scientific cooperation between the Faculty of Veterinary Medicine and other related faculties continued in recent history, primarily with the Medical and Dentistry Faculties, with which cooperation intensified from the middle of the 1990s in work on several national scientific projects. The cooperation of the Faculty and other institutions should be mentioned in particular in running scientific conferences, such as the Prof. Ljudevit Jurak International Symposium of Comparative Pathology already mentioned.



## I. HISTORY

In the 1960s several centres were created at the Faculty, according to narrower interests in different fields, in order to intensify cooperation between experts at the Faculty and industry, throughout the whole of Yugoslavia. These centres gathered together experts in narrow fields (for instance: zoohygiene, nutrition, raising livestock, infectious diseases, animal reproduction, etc.) in team work on questions related to poultry, pig and beef production, and in the field of reproduction of domesticated animals and the hygiene of food of animal origin.

The centres operated outside the state budget system, that is, they were self-financed. They concluded contracts with business entities in designing buildings for livestock and food production, monitoring health, implementation of prophylactic measures in order to prevent diseases in intensive production, introduction of new technologies in contemporary livestock production, improvement of reproductive capacities, and more efficient feeding of animals to increase production etc. This kind of cooperation was of mutual benefit. On the one hand the experts from the Faculty increased their income, which affected the growth of the Faculty, and at the same time they raised the Faculty's reputation in helping to resolve some of the most complex issues, using their expertise. On the other hand, the industry improved its production, which affected the quantity and quality of end products, and increased profit and competitiveness on the national and international markets.

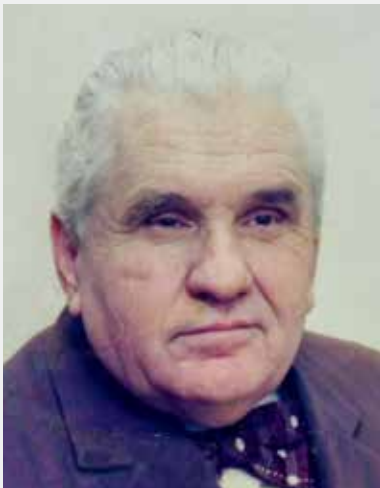
The first to be founded was the Centre for Poultry (1963), and then the Centre for Pig Farming (1966), the Centre for Reproduction (1969), the Centre for Animal Feed Technology (1973), and the Cattle Rearing Centre (1974). The conceptual initiators of the centers were Prof. Dr. Milan Kralj (Poultry breeding), Prof. Dr. Marijan Sviben (Pig breeding), Prof. Dr. Miroslav Herak (Reproduction), Prof. Dr. Josip Živković (Technology of Foodstuffs of Animal Origin) and Prof. Dr. Marijan Kalivoda (Cattle Breeding). At the end of the 1980s, due to the overall economic situation in Yugoslavia, the interest shown by industry in the work of the centres fell, and they began working at a loss. As a result the Faculty had to co-finance the centres, and since, due to the general state of the country, there were not enough

resources for its primary operations, this co-financing could not be long-term. This led to the abolition of all the centres, except the Centre for Poultry, which separated itself from the Faculty in 1993 and became a subsidiary of the Croatian Veterinary Institute (the Centre for Polutry).



Experts of the Pig Breeding Center with employees of the Pig Farm Sljeme in 1980s. Prof. Dr. Zvonko Modrić (first from the left in the lower row), Dr. Ivica Valpotić (first from the left in the upper row), Prof. Dr. Hrvoje Gomerčić (third from the left in the upper row) (Photo courtesy of Prof. Dr. Ivica Valpotić).

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Prof. Dr. Milan Kralj (1921-1994), University Professor (1947-1987), the founder and the Head of the Poultry Center (1966-1982) and the founder and the Head of the Department of Poultry Diseases in Breeding and Production (1969-1984). In 1962 he founded and was the leader of postgraduate study in Poultry Production, Hygiene and Pathology which completed more than 100 participants until his retirement. With his knowledge, expertise and management skills he connected the scientists from the Faculty with the experts in poultry production significantly influencing on the improvement of poultry production in Croatia and in the whole former Yugoslavia. He has published more than 300 scientific and professional papers receiving over 40 different awards for his longtime work (Faculty Archives).



Prof. Dr. Marijan Sviben (1932-2019), University Professor (1962-1997) and the Head of the Department of Animal Husbandry (1975-1978, 1984-1986) and the Vice-Dean of the Faculty (1974/1975, 1975/1976). He is one of the founders of the Pig Production Center and his Head for the long time (1966-1978). He established this Center as the center of research and application of pig science (hiology), and methods in pig production (hiotechnology), and as the part of veterinary medicine studying pigs (hiojiatrics). He was elected in 1978 for the honorary vice-president of the International Pig Veterinary Society (IPVS) on the basis of remarkable results in scientific work and their applications in pig production (Faculty Archives).

### 3.3. Teaching activity

In the post-war life of the Faculty, students worked increasingly closely with teaching staff and had an increasing role in the development, and especially in the organization of classes and social events at this, the oldest institution of higher veterinary education in Yugoslavia.

Immediately after the Second World War, classes were still held according to the Decree of 1936 and, with minor amendments to the curriculum, this continued until 1948. That year, courses at the Faculty of Veterinary Medicine of the University of Zagreb were regulated by the Regulations on Teaching and the Curriculum, issued by the Committee for Scientific Institutions, Universities and High Schools of the Government of the People's Republic of Croatia. These Regulations, due to the influence of Russian politics, introduced the compulsory courses in Basic Marxism and Leninism, Russian language and Military Training. How far the curriculum at that time was determined by the regime is shown by the fact that Military Training was taught at first throughout all ten semesters, and then since 1954/1955 academic year for six semesters, and since 1960/1961 for four semesters.

There was a move away from Russian politics and more changes to the curriculum. Since 1951/1952 the compulsory Basic Marxism and Leninism was abolished and Russian was no longer compulsory. In its place the choice of one major language (English, French, German or Russian) was introduced as compulsory. It is interesting that a Marxist course returned, under the title Basic Marxism, in 1977/1978 in the curriculum of the first year of study, and remained until the Republic of Croatia became independent in 1990, when it was finally removed from the study programme. Military Training had a similar fate. In 1970/1971 it was renamed Basic Civil Defence, and this course remained in the curriculum of the first and second years of the course right up to 1990.

Students lacked practical training in clinical courses, especially field working conditions. Therefore, in 1952/1953 the Ambulatory Care Clinic was opened as a useful supplement to their practical classes in the in-patient clinics. Fourth and fifth year students went with their teachers by bus to these clinics in veterinary stations around Zagreb, where they were acquainted in a practical way with the issues of field work. This way of organizing the Ambulatory Care Clinic and practical lessons has remained to the present day, with minor alterations.

In 1954 the students protested against the regime of the course due to the over-strict requirements for enrolment in later semesters. Work was launched to amend the curriculum, the syllabus and study regime, so the Parliamentary Executive Council appointed a Commission in April of the same year, to draw up a draft curriculum for the Faculty of Veterinary Medicine, comprised of teaching staff and representatives of the veterinary services in Croatia. On the basis of the proposal by the Parliamentary Executive Council of the Parliament of the PR of Croatia, on 7<sup>th</sup> July 1954, the Decision on Organization of Courses at the Faculty of Veterinary Medicine of the University of Zagreb was adopted. An important feature of that Decision was that clinical classes were expanded. The pre-clinical courses began already in the third semester, and preparatory courses were shortened (biology to one semester) or abolished (physics). Anatomy classes were shortened and practicals extended. So-called "year councils" were introduced, consisting of all teaching staff and assistants, and student representatives from each year. These councils discussed problems related to the classes in that year. They met several times a year with all the students in the year, and so worked to resolve weaknesses in the study courses. This form of cooperation between teaching staff and students has remained until the present day, with certain changes.

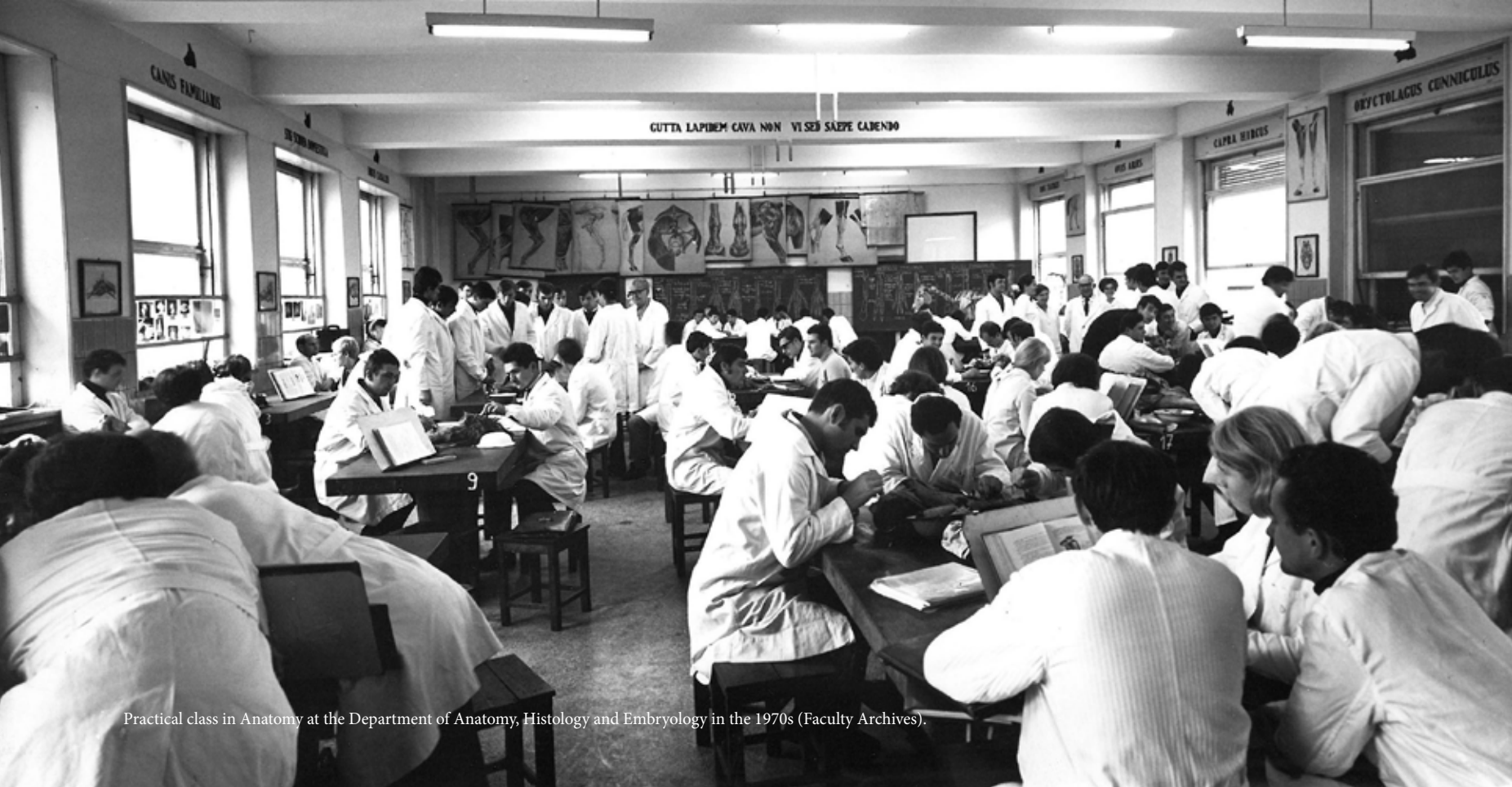
The following year classes were held according to the provisions of this decision, but the Board considered its weaknesses on several occasions and prepared the first Statute with a new curriculum and



Anatomy teacher Prof. Dr. Tomislav Ciliga's lecture in the amphitheater lecture hall of the Department of Anatomy, Histology and Embryology in the 1960s (Faculty Archives).

study regime, which was adopted in 1958, when it was also applied for the first time to teaching. According to this curriculum, a compulsory course in physics was returned to the first semester. Some courses, such as Animal Husbandry, were spread over several semesters, and others, such as Pathological Anatomy and Pharmacology and Toxicology, were taught for only two semesters from that time on, and not three as before. Some clinical courses, such as Internal Diseases and Obstetrics, were reduced from four to three semesters of classes. After this curriculum had been adopted, very soon discussion arose about revising it as a single course in veterinary medicine. In this regard, the question was raised of the future competence of veterinarians in terms of their role and work in livestock production. It was concluded that veterinarians must be very actively involved in the process of livestock production from the very beginning, and not just intervene in medical procedures. This approach to the unified organization of studies in veterinary medicine aimed at raising veterinarians with a general education profile. Therefore it was necessary to include in the curriculum more zoo-technical courses (Animal Husbandry, Nutrition and Zoo-hygiene), which was expressed in the Statutory





Practical class in Anatomy at the Department of Anatomy, Histology and Embryology in the 1970s (Faculty Archives).

Decision on the Organization of Classes, the Curriculum, and Rules of Study at the Faculty of Veterinary Medicine. The Decision was rendered at the level of the Faculty in June 1961, and it increased the number of teaching hours for these courses. In 1963/1964 a course was introduced entitled "The Economics of Animal Husbandry". In this way the process of educating general veterinarians was also completed, so they mastered the issues involved in livestock production alongside the appropriate medical knowledge, through zoo-technical courses (Animal Husbandry, Nutrition and Zoo-hygiene), and the Economics of Animal Husbandry.

In the years that followed, slight amendments were made to the curriculum in 1966, when the clinical courses Obstetrics, Surgery and Infectious Diseases, which had previously been taught over three semesters, were taught for only two, although the number of hours of classes remained mostly the same as before. Amendments to the curriculum were also made in 1967, and one of the important features was that Biology and Physics were again taught over two semesters.

At the beginning of the 1970s work continued on amendments to the curriculum and syllabus. The basic features of these amendments were based on a change to the title, schedule and arrangement of individual courses, and the introduction of new courses to the curriculum. Since 1970/1971 the compulsory course Pathology in Poultry Breeding and Production was introduced. This course was introduced to the teaching process in line with the curricula of other European faculties (Giessen, Brno, Munich), and the needs of the industry related to intensive poultry production at that time in this country. In this way the field of poultry diseases was separated from the existing course Infectious Diseases. For the needs of that time, and for civil defence purposes, the compulsory course Radiobiology was introduced to the curriculum in 1971/1972.

At that time the courses Tropical Parasitological Diseases and Tropical Infectious Diseases were introduced, which were compulsory for foreign students, but elective for Croatian students. The initiative for these courses arose as far back as 1962/1963, when there were discussions at the Faculty about studying the problems of animal husbandry in Asian and African countries. On that occasion it was said that the Faculty had to take account of those problems, because

foreign students studied at our Faculty, where up until that time all of them were from Africa (Yugoslavia was at that time one of the leading states in the Non-aligned Movement, which worked together in various ways in the development of those countries, including financing the education of students from individual African and Asian countries, author's note). It was concluded that foreign students, for their future practice, should be offered the appropriate education in animal pathology from their regions. At the same time, it was taken into consideration that our experts were also going to those countries, upon invitation, and they also had to be acquainted with the issues related to the field of veterinary medicine in those countries. Students from African and Asian countries were initially financed by the Republic Community for Financing Training and Vocational Education, however in 1972 it no longer provided resources for students enrolled in the first year. At that time tuition fees were introduced, which rose each year, so since 1983/1984 there was almost no interest shown in our courses by foreign students from developing countries. According to the records of graduating students, a total of 85 foreign students from 14 African and Asian countries graduated from the Faculty of Veterinary Medicine. The first student graduated on 29<sup>th</sup> October 1963 (A. Demise, Ethiopia), and the last on 12<sup>th</sup> October 1995 (P. H. Y. Dwamena, Ghana). The largest number of such students graduated in the 1970s and the beginning of the 1980s.

In 1973 there was discussion at the Faculty about the difficulties of running courses, which meant that only 15% of students graduated within the prescribed time. It was found that the schedule of courses according to the curriculum of that time caused the most difficulties. As a result, a commission of teaching staff was created, to consider the problem of the teaching process, and they drew up a proposal for amendments to the schedule. When implementing the reform of classes, the commission took as their starting point the fact that all the years of the course must have an equal burden as far as possible, so that the course matter should be distributed as evenly as possible over all the semesters. An analysis of the previous curriculum showed that the second year of the course was excessively light. In contrast, the fourth year was over-burdened because, along with the clinical courses, it

also included the courses of Animal Husbandry and the Economics of Animal Husbandry. Therefore, amendments to the curriculum in 1974 and 1975 for the first and second years of the course rearranged some courses in terms of semesters, Bio-chemistry was separated from Chemistry as a separate course, and Physics was once again cut back to a single semester. English language was introduced as a compulsory course in the first and second semesters.

Continuing the process of reform, the Commission for the Curriculum and Syllabus prepared a proposal for revision of the curriculum for the third and fourth years of the course, which was accepted in 1976 and 1977. Some of the most important amendments were to the earlier course of General Pathology, in that Pathological Morphology was taken as a separate course, the course Applied Anatomy was introduced, and the course Radiology and Medical Physics was separated into two separate courses.

In 1985 a new curriculum was adopted, whereby the main changes related to the introduction of the compulsory courses Basic Statistics, and Cybernetics in Veterinary Medicine in the first semester. The previously compulsory course Hygiene and Animal Food Technology was divided into two compulsory courses, Hygiene and Meat and Fish Technology, and Hygiene and Milk Technology. Of the other important changes, the introduction of professional practice for individual pre-clinical, zootechnical and clinical courses was of importance.

In 1990, some amendments to the curriculum and syllabus of the graduate study in veterinary medicine were adopted. The compulsory courses in the first year, Cybernetics in Veterinary Medicine and Basic Statistics, were abolished. The field of immunology was separated from the course of General Microbiology to form a separate course entitled Veterinary Immunology.

In 1993 there were further amendments to the curriculum and a list of elective courses was drawn up, with changes to the position of certain courses in terms of semester. The number of hours of theoretical classes was reduced, especially specialist courses, and the number of practical hours increased, the schedule of enrolment in some courses, in terms of year, was changed, and the total number of elective courses was increased.

The last curriculum for graduate studies before the Bologna reform was adopted in 1995 (Table 4). When this curriculum was being created an effort was made for the course to include as much medicine as possible and less technical courses, so that students would be able, after completing their studies, to work independently in a general

veterinary medical service. The backbone of the curriculum were the recommendations of the world and European veterinary associations: The World Veterinary Association (WVA) and the European Association of Establishments for Veterinary Education (EAEVE) or the curricula of related faculties in Utrecht, Giessen and Vienna, with an effort to preserve the traditions of our own faculty.

With respect to the criteria of the University of Zagreb, the Scientific and Teaching Council of the Faculty of Veterinary Medicine agreed on the following: The Faculty of Veterinary Medicine educates doctors of veterinary medicine who, after completing their studies must be capable of performing the work of a general medical veterinary practice, in the sense of protection of the health of animals and people. In order to complete that task, the course is created over ten semesters around the backbone of medical education through the following courses: Anatomy, Histology and Embryology, Physiology, General Pathology and Pathological Morphology, Pathological Physiology, Internal Diseases of Domesticated Animals, Surgery, Orthopaedics and Ophthalmology, Obstetrics of Domesticated Animals, and Infectious Diseases of Domesticated Animals. This medical education is supplemented by Microbiology, Veterinary Immunology, Pharmacology and Toxicology, and Parasitology and Invasive Diseases, and these were joined by Radiobiology, General and Clinical Radiology, and Medical Physics Methods and Diagnostics.

This medical education was founded on knowledge from pre-medical classes provided through Biology, Physics and Bio-physics for Veterinarians, Chemistry, and Biochemistry.

During the pre-clinical courses, chapters were added that specifically provided students with knowledge where they learn in detail about the object of their work and the aetiological factors of the occurrence of diseases. These were: the Technology of Production and Breeding of Animals, the Physiology and Pathology of Food Animals and Animal Hygiene, the Environment and Ethology. Finally, on the foundation of the medical knowledge acquired and mastered, and medical logic, specific knowledge is built about Poultry Diseases, Biology and Pathology of Fish, Biology and Pathology of Bees, Breeding and Pathology of Game Animals, and Food Hygiene and Technology.

The study of veterinary medicine ends by mastering the content of the courses in Economics of Veterinary Medicine, Forensic Veterinary Medicine and Administrative Veterinary Medicine, which have the task of acquainting students with what they need to know for financial operations and the work of state administration.



Practical class in Meat Hygiene at the old Department of Hygiene and Technology of Animal Foodstuff (Department of Hygiene, Technology and Food Safety since 2010) (Faculty Archives).



Practical class in Parasitology at the Department of Pharmacology and Toxicology (Faculty Archives).



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Table 4 The curriculum of the undergraduate study in veterinary medicine for 1995

COURSE	L*	S*	P*	PCW*	L*	S*	P*	PCW*	Total
	Hours per week								
1 <sup>st</sup> YEAR	1 <sup>st</sup> Semester				2 <sup>nd</sup> Semester				
Physics and Biophysics for Veterinarians	2		2						60
Chemistry	2		2						60
Biology	2	1	2		2		2	2	165
Anatomy, Histology and Embryology	2		9		3		9	2	375
Biochemistry					3	1	2	2	120
Physical and Health Education			2				2		60
Elective courses**									
Sociology of the Veterinary Profession	1	1							30
Introduction to Veterinary Medicine	1		1						30
Selected Courses of Botany									
Anatomy of Ornamental Birds	1								15
English for Veterinarians I	1								15
German for Veterinarians I	1		1						30
Statistics	1		1						30
Introduction to Scientific Work					1				15
Rural Sociology					1		1		30
The Ecological Importance of Predators					1				30
Cybernetics					1				15
Selected Courses of Molecular Biology					1				15
English for Veterinarians II					1				15
German for Veterinarians II					1		1		30
2 <sup>nd</sup> YEAR	3 <sup>rd</sup> Semester				4 <sup>th</sup> Semester				
Veterinary Immunology	1	1							30
Technology of Animal Production and Breeding	3	1	2		3		2	4	225
Microbiology	2		2		2		2		120
Physiology and Pathology of Animal Feeding	2		2		2		2	3	165
Physiology	2	2	3		2	2	4		225
Anatomy, Histology and Embryology	1		2						45
General Pathology and Pathological Morphology					2		4		90
Physical and Health Education			2				2		60
Elective courses**									
Laboratory Preparation for Electronic Microscopes	1								15
The Locomotion System of Horses	1								15
Anatomy of Game Animals	1								15

Comparative Anatomy of the Bone Systems of Mammals and Birds	1	1							30
The History of Veterinary Medicine								1	15
The Organization and Economics of Animal Husbandry								1	15
Ecology								1	15
Optional courses									
English for Veterinarians III	1	1							30
German for Veterinarians III	1	1							30
English for Veterinarians IV	1	1							30
German for Veterinarians IV	1	1							30
<b>3<sup>rd</sup> YEAR</b>									
<b>5<sup>th</sup> Semester</b>									
<b>6<sup>th</sup> Semester</b>									
General Pathology and Pathological Morphology	4	2	4						150
Pathological Physiology	2	2	1	2	1	1	1		150
Parasitology and Invasive Diseases	2	1	1	1	1	1	2		135
Pharmacology and Toxicology	2		2	3	1	2			150
Animal Hygiene, the Environment and Ethology	1		2	2	1	2	3		165
Radiobiology					1		2		45
Internal Diseases of Domesticated Animals					3		4		105
Elective courses**									
Physiology of Birds	1								15
Physiology of Reptiles and Amphibians	1								15
Information Technology	1								15
Clinical Anatomy	1		1						30
Anatomy of Laboratory Animals	1		1						30
Breeding and Production of Fur Animals					1		1		30
Basic Physics for Diagnostic Methods					1		1		30
Optional courses:									
English for Veterinarians V			2						30
German for Veterinarians V			2						30
<b>4<sup>th</sup> YEAR</b>									
<b>7<sup>th</sup> Semester</b>									
<b>8<sup>th</sup> Semester</b>									
Internal Diseases of Domesticated Animals	4	1	4	2	2	1	4	2	300
Surgery, Orthopaedics and Ophthalmology	2		4		2		6		210
Obstetrics for Domesticated Animals	2	1	4		3	1	3		210
General and Clinical Radiology	1		2						45
Infectious Diseases of Domesticated Animals					1	1	2	1	75
Medical Physics Methods and Diagnostics					1		1		30
Elective courses**									
Basic Molecular Pathology and Histology of Tumours and Metastases	1		1						30



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Pathology of Laboratory Animals	1	1					30
Pathophysiology of Feeding Ruminants	1	1					30
Parasitology in Public Health	1	1					30
Tropical Parasitic Diseases	1						15
The Biological Effects of Ionised Radiation	1						15
Cytology					1	1	30
Veterinary Nuclear Medicine					1		15
Pigeon Keeping					1		15
5 <sup>th</sup> YEAR	9 <sup>th</sup> semester				10 <sup>th</sup> semester		
Infectious Diseases of Domesticated Animals	4	3	2	1			150
Surgery, Orthopaedics and Ophthalmology	2		2	4			120
Obstetrics for Domesticated Animals	1	1	2	4			120
Food Hygiene and Technology	3		3		4	5	225
Biology and Pathology of Fish	1		1	2			60
Administrative Veterinary Medicine	2	1					45
Biology and Pathology of Bees					1	1	30
Breeding and Pathology of Game Animals					1	1	30
Poultry Diseases					2	2	90
Economics of Veterinary Medicine					1	1	45
Forensic Veterinary Medicine					2	4	90
Ambulatory Care Clinic							240
	Elective courses**						
Zoonoses	1						15
Selected Courses on Theriogenology	1		1				30
Tropical Infectious Disease of Domesticated Animals and Game Animals	1						15
Hunting and Nature Protection					1	1	30
Food Hygiene and Veterinary Public Health					1	1	30
Selected Courses on Aquaculture					1	1	30
Management and Marketing of Veterinary Practice					1	1	30
Veterinary Inspection and Veterinary Public Health					1		15
Pathological Morphology and Forensics					1	1	30
Diseases of Caged Birds and Feathered game					1	1	30
Radioecology and Radioactive Hygiene					1		15
Application of Histomorphological Procedures in Animal Food Technology					1		15

Key:

\* L-lectures; S-seminars; P-practicals; PCW-professional clinical work

\*\* Students must enrol in the following number of hours of these elective courses : 1<sup>st</sup> semester: 90 hours; 2<sup>nd</sup> semester: 120 hours; 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> semesters: 30 hours; 7<sup>th</sup> semester: 75 hours, and 10<sup>th</sup> semester: 60 hours.



One of the first students' field work after the establishment of the Ambulatory Care Clinic in the mid-1950s (Faculty Archives)

As the University criteria dictate, students could have a total burden of 4500 hours classes over ten semesters. That number was meant to include 70-90% compulsory courses (3150-5050 hours), 10-25% elective courses (450-900 hours), and up to 5% optional courses, with a total of 225 hours. Following those instructions, the Faculty of Veterinary Medicine prepared a programme consisting of 86.6% (3900 hours) of compulsory courses, 10.4% of elective and 3% optional courses.

The curriculum was also updated with new content. For example, the course in Biology includes a course on molecular biology, necessary for understanding immunology and vaccination, and to Animal Hygiene, the Environment and Ethology, the fields of ecology and animal behaviour have been added.

The teaching process was changed with the re-structuring of some lectures into seminars and practicals, respecting the students' need for active participation in classes, and practical work. Beyond the prescribed time table, 780 hours of professional-clinical work was introduced, for better and more complete practical learning, spread out over all ten semesters.

The new curriculum offered students more than 50 elective courses, for which, in order to expand their basic knowledge in different areas of course matter, they could enrol according to their own free choice. With the improvements to the teaching process, the schedule of classes was changed, so practical classes were held from 8 to 10 in the morning, when there were most patients in the Outpatients' Clinics, and were followed by seminars and lectures. Moreover, the clinics were all occupied by the required number of large animals as in-patients (horses, cows and pigs), which had been lacking in clinical classes, and which had been particularly unfavourable for the classes on internal diseases, obstetrics and surgery.

Afternoon duties were introduced at the clinics, and since 1997 compulsory night duty for fourth and fifth year students, so that they would have the most contact possible with clients and patients during their studies, and the appropriate reports and protocols were kept in this regard. Alongside the on-duty students, in each clinic an assistant

or an assistant professor was at the clinic at the same time and, when necessary, a professor (for more serious clinical cases). If there were no patients, the students were able to watch video cassettes in the appropriately equipped clinical lecture theatre, showing specialist surgical and obstetric operations, and other veterinary medical procedures.

Permanent professional cooperation was established with veterinary entities in the liberated areas (Banovina and the Lika-Senj County) and as part of their field work, alongside the regular Ambulatory Care Clinic in the field, the students were able to become acquainted with the problems of livestock production in rural areas.

In order to cover three shifts in these practical classes, with the participation of students in clinical work over the 24-hour period, these classes were concentrated at the end of the course, over three semesters. The first year of enrolment in this curriculum was 1997/1998, after it had been accepted by the National Council for Higher Education of the Croatia and the Senate of Zagreb University.

From the information presented here, it may be seen that the curriculum of the Faculty of Veterinary Medicine changed many times over the course of history, primarily in the effort to follow contemporary trends in the education of students of veterinary medicine, and for the course to be distributed equally over the years, to enable average students to master the course matter successfully.

Postgraduate classes, as part of the regular work of the Faculty, were introduced in 1961/1962, regulated by the Act of 1960. At first, students, having attended the classes, passed the examinations and written an independent paper, could acquire the right to the academic title of Master. The first to be organized were the postgraduate studies in Hygiene and Technology of Food of Animal Origin, and Microbiology and Epizootiology, and the first call for candidates for these studies was published during that academic year. The curricula were created so that students would master theory and practice in the relevant fields as well as possible. Students were introduced to





Garage and buses used for field work in Ambulatory Care Clinic in 1960s. At the garage's place a modern Clinic for Infectious Diseases with an isolation unit was built in 2016. On the right side is the necropsy hall of the old Department of Pathological Anatomy (the Department of Veterinary Pathology since 2008) (Faculty Archives).

independent scientific work, and to that end they were given tasks that they resolved under the guidance of the teaching staff. Classes in Hygiene and Technology of Food of Animal Origin at first lasted for two semesters (one year) and Microbiology and Epizootiology for three semesters (one and a half years). Each candidate was obliged to write an independent written paper. Candidates who passed all the prescribed examinations and wrote the independent paper with a positive grade, were issued diplomas granting them the title of Master in the specialization they had studied.

In line with the needs of practice and the capacity of the Faculty, the curricula were drawn up on the basis of the same principles for other programmes in postgraduate studies, in the 1962/1963 academic year, the following programmes were introduced: General Microbiology and Mycology, Aquaculture and Fish Diseases, and Physiology, Breeding, Hygiene and Pathology of Poultry in Intensive Production. Some of these were reorganized over time, such as Aquaculture and Fish Diseases, which in 1966/1967 was run under the title Aquaculture and abolished soon after that.

Since 1963/1964 none of the studies lasted for less than three semesters. In the same academic year, programmes were introduced in Histology and Embryology, and Zoohygiene, and in 1964/65 programmes in Pathological Anatomy, Parasitology and Physiology and Pathology of Food Ruminants and Pigs. Already in the following year the Histology and Embryology study was re-named Anatomy, Histology and Embryology, and extended from three to four semesters.

Our Faculty went a step further in its organization of postgraduate studies, and in 1965 the administrative bodies of the Faculty approved cooperation with the Agricultural Faculty in Zagreb in the joint organization of a postgraduate study in Nutrition of Livestock and Technology of Livestock Production.

In 1966/1967 the studies in Physiology and Pathology of Pig Production and in 1967/1968 Physiology and Pathology of Cattle with Artificial Insemination were accepted. In the same academic year some programmes continued with extension of the postgraduate studies to four semesters, whereby a clear separation was de facto made between Master of Science and specialized Master's degrees. In the period that followed students who completed postgraduate studies lasting four semesters (scientific postgraduate studies) were awarded

the academic title of Master of Science, and those who completed postgraduate studies lasting three semesters (specialist postgraduate studies) were awarded the academic title of Master, with an indication of the field of specialization.

Each study was organized in agreement with the Administration for Veterinary Medicine of the Secretariat for Agriculture of the Socialist Republic of Croatia (SRC), and the Society of Veterinarians and Veterinary Technicians of the SRC, and was run in line with the



A group of students on the field work in the Ambulatory Care Clinic in the academic year 1978/1979. Snježana Vuković who achieved her university career at the Department of Anatomy, Histology and Embryology is second from the left in the first row and Željko Grabarević a University Professor at the Department of Veterinary Pathology of the Faculty of Veterinary Medicine of the University of Zagreb is second from the left in the second row (Faculty Archives).

decision of the Faculty Council on the organization of each individual postgraduate study. The financial resources for running all these studies were collected from tuition fees paid by the students personally or by their work organization.

In the following years other postgraduate studies were developed, so in 1970/1971 the postgraduate study for scientific education in Fish Diseases was introduced, in 1971/1972 the postgraduate master's studies for specialization in Internal Diseases of Domestic Animals, Diseases of Domestic Carnivores, and Breeding and Pathology of Poultry, in 1973/1974 the postgraduate master's study for specialization in Insurance against Damages and Health Care of Animals, and in 1976/1977 the postgraduate master's study for specialization in Sanitation in Veterinary Medicine.

In 1978/1979 the syllabus was accepted for the postgraduate study for scientific education in Bee Diseases, and for specialization in the fields of Health Care of Fish, Clinical Pharmacology, and Hygiene and Technology of Animal Foods. In 1980/1981 the study programme was accepted for specialization in Health Care of Bees.

All these postgraduate studies were renewed over the years, following the latest scientific and professional insights in individual areas of veterinary medicine. In 1986 agreement was given by the competent bodies for 13 renewed and new programmes for scientific education in:

- Anatomy, Histology and Embryology
- Physiology
- Surgery, Orthopaedics and Ophthalmology
- Pathological Anatomy
- Parasitology
- Radiobiology in Veterinary Medicine
- Internal Diseases
- Microbiology and Immunology
- Zoohygiene
- Biology and Pathology of Bees
- Biology and Pathology of Fish
- Physiology and Pathology of Poultry and Game Birds
- Physiology and Pathology of Cattle with Artificial Insemination

Agreement was also given for 11 programmes for specialised education in:

- Organization and Economics of Veterinary Services
- Insurance Against Damages and Health Insurance
- Pathology and Treatment of Domesticated Animals
- Diseases and Breeding of Domestic Carnivores
- Sanitation
- Breeding and Pathology of Laboratory Animals
- Biology and Pathology of Bees
- Biology and Pathology of Fish
- Biology, Breeding and Pathology of Game, Rabbits and Fur Animals
- Veterinary Sanitary Control of Animal Foodstuffs
- Poultry Production

In 1997 one more agreement was given for the reformed postgraduate study for scientific education in Hygiene and Veterinary Technology in the Production of Food of Animal Origin. In the 1989/1990 academic year, the teaching committee of the University accepted the curriculum for specialised education in Protection of the Health of Pigs, and the first generation of students enrolled in that postgraduate study already the following academic year. These postgraduate studies enrolled students according to those programmes until the 1993/1994 academic year.

With the adoption of the new Act on Institutions of Higher Education in 1993, a new approach to postgraduate studies was prescribed, and at the Board meeting in November 1994 a decision was rendered to revise the postgraduate study curricula. The new curricula were drawn up in 1995 and refined at the beginning of 1996. At that time, by a decision of the University, the renewed postgraduate curricula for scientific education in veterinary medicine were accepted, with 13



Detail from the postgraduate specialist study Diseases of Domestic Carnivores at the Obstetrics Clinic in the 1970s (Faculty Archives).

programmes (later approval was given for Theriogenology). They were organized as two-year master's or three-year doctoral studies. In view of the specific nature of the veterinary profession, the different forms of veterinary work and the different scientific interests of individual branches of veterinary medicine, the new studies were organized on the following programmes:

- Anatomy, Histology and Embryology
- Animal Hygiene, the Environment and Ethology
- Biology and Pathology of Bees
- Veterinary Economics
- Physiology of Domestic Animals
- Physiology and Pathology of Poultry and Game Birds
- Hygiene and Technology of Food of Animal Origin
- Ichtiopathology
- Surgery, Orthopaedics and Ophthalmology with Radiology and Ultrasound Diagnostics
- Microbiology and Epizootiology
- Parasitology
- Pathological Anatomy
- Internal Diseases of Domesticated Animals
- Theriogenology

The decision by the University mentioned also accepted the renewed curricula of nine postgraduate professional studies (later approval was given for the study in Veterinary and Sanitary Control of Animal Foods). They were organized as three-semester or four-semester studies. Studies leading to a master's degree were organized for the following programmes:

- Theriogenology of Domesticated Mammals
- Microbiology and Epizootiology
- Pathology and Treatment of Domesticated Ungulates and Equidae
- Pathology and Breeding of Domesticated Carnivores
- Production and Protection of the Health of Pigs
- Sanitation
- Biology and Pathology of Game Animals
- Internal Diseases of Domesticated Animals
- Breeding and Pathology of Laboratory Animals
- Veterinary Sanitary Control of Animal Foodstuffs



## I. HISTORY

Within the scientific postgraduate study, classes were taught through compulsory and elective courses. The elective courses allowed the course to be adjusted to the needs of each student. Students enrolled in elective courses in consultation with their mentors, taking into account the content of their master's or doctoral thesis.

Postgraduate scientific studies, in terms of content and scope, enabled students who completed them to be included in scientific work and to undertake tasks in scientific projects. As part of these studies, students learned methods and techniques needed for scientific work and acquired knowledge of the application of contemporary scientific knowledge. They became actively involved in work on individual scientific projects and made a contribution to scientific achievements in a specific scientific field.

Postgraduate scientific studies, according to the renewed curricula, were organized to attain the degree and academic title of Master of Science or Doctor of Science, in the area of biomedicine and health, and the scientific field of veterinary medicine. On postgraduate professional studies the students were trained for a narrow, specialised area. In terms of content and in the way they studies were run, they were taught to master the practical skills needed for work in veterinary practice. These postgraduate studies were available for enrolment from 1995/1996 to 2003/2004 when, pursuant to the Act on Scientific Work and Higher Education of 2003, the reorganization began of postgraduate studies, according to the Bologna Process.

An important aspect of the professional activities of the Faculty is the implementation of permanent education of veterinarians, organized according to current topics of interest in the field of veterinary practice. It should be pointed out that the Faculty of Veterinary Medicine became involved very early on in organizing and running courses for the professional training of veterinarians. The first three-day course was held in March 1929 at the incentive of the regional veterinary departments and with the financial support of the Ministry of Agriculture. It was organized in the field of diagnostics, treatment and prevention of infectious diseases, and almost all the district veterinarians attended. Through this course the participants, amongst other things, were trained in using a microscope, which one year previously had become part of the standard equipment of the district authorities. In that way the Faculty began to provide professional education of veterinarians in an organized manner through courses, and in the 1930s three-day courses were organized to cover several fields of veterinary medicine, with the participation of the Surgical, Medical and Buiatric Clinic, the Department for Infectious Science, and the Department for Hygiene of Livestock Production (meat and milk).

The courses were interrupted by the Second World War, but continued immediately after the liberation, and since then they have been run intensively in various fields of veterinary work. In 1945, at the incentive of the Veterinary Administration of the PR of Croatia, courses began in various units aimed at the quickest possible restoration of the numbers of livestock. The first courses of this kind were held at production locations, and dealt with the issue of infertility in cattle. As the Faculty developed, these courses gradually spread to other fields and were repeated according to the needs of the practice and the capacities of the Faculty. So, for example, courses on cattle infertility were expanded in 1952 to artificial insemination. This course was held at the Faculty of Veterinary Medicine and lasted a full four months, continuing in the following years.

From the middle of the fifties, organization of courses was taken over by experts from the Ambulatory Care Clinic who had good cooperation with the newly organized veterinary service in the field. As a result, since 1954 courses were organized twice a year within the Ambulatory Care Clinic, which were general in nature, consisting of theoretical and practical parts, lasting four or five weeks. In the theoretical part, selected topics from practice were presented, and the practical part took place using interesting cases in the veterinary stations, and sometimes at livestock farms, slaughter houses etc. By the end of the 1950s, alongside the previous courses, courses were also organized in parasitology and invasive diseases, and with the



Participants and teachers of the first general course organized by the Ambulance Care Clinic, held from 1<sup>st</sup> to 30<sup>th</sup> September 1954 (Photo courtesy of Prof. Dr. Srđan Rižnar; Faculty Archives).



Participants and teachers of the training course for veterinarians, held from 3<sup>rd</sup> to 30<sup>th</sup> June 1959 (Photo courtesy of Prof. Dr. Srđan Rižnar; Faculty Archives).

intensification of livestock production, courses in production of cattle and pigs. The activities involved in organizing the courses were particularly visible in 1959, when more courses were organized than in previous years, related to various fields of veterinary medicine. Two courses in the veterinary health inspection of foodstuffs, a course in parasitology and pest diseases, three courses in the field of artificial insemination and prevention of sterility, and one general course for training the field veterinarians. A total of 130 veterinarians attended these courses for training in various fields of veterinary medicine, and they were held according to curricula drawn up in agreement with the Veterinary Administration of the PR of Croatia.

Up to the end of the 1960s the courses were expanded to include other courses in veterinary medicine, so courses were held in pathology and prevention in beef production, and special courses on mastitis in cattle, breeding and pathology of poultry, veterinary sanitary inspection, carp fisheries, chemical analysis of animal feed, and discovering impurities in food of animal origin from radioactive precipitation.

After completing the courses, the students received certificates of their successful studies. Some of these courses, in terms of duration and

Table 5 Courses held within the World Bank project from 1997 to 2000

No.	Lecturer	Course
1	Josip Živković	The principles of application of HACCP (Hazard Analysis and Critical Control Point) in production and transport of food of animal origin
2	Miroslav Herak	Artificial insemination and fertility management and management of reproduction using a computer
3	Mirza Hadžiosmanović	Improving the hygiene and quality of milk during production on a family farm and in small business facilities for production of milk products
4	Berislav Jukić	Protection of animals from the most important infectious diseases (TB, brucellosis of sheep and goats, enzootic bovine leukosis, classic swine plague, trichinellosis, foot and mouth, infectious limp in sheep, viral arthritis/encephalitis of goats, and salmonellosis infection in poultry)
5	Boris Krsnik	Hygiene of accommodation and the environment-animal health and well-being
6	Albert Marinculić	Veterinary diagnosis of trichinellosis
7	Mario Bauer	Prevention and treatment of metabolic diseases in milk cattle
8	Albert Marinculić	Prevention and eradication of the economically most important diseases of sheep and goats
9	Bela Njari	Veterinary public health and veterinary health examinations and control
10	Darko Sakar	Application and control of the use of medication for use in veterinary medicine
11	Josip Perić	Aspects of veterinary-health examinations and control in trade in products of animal origin (including cross-border trade)

content, were almost identical to specializations. This was primarily true of the courses in sterility and artificial insemination of cattle, veterinary sanitary inspection, chemical analysis of animal feed, the general course for training veterinarians, and breeding and pathology of poultry. These courses also marked the transition from this form of training to postgraduate classes in various courses, which lasted several semesters, were completed with a written paper, and gave the students the title of Master. Students on these courses were mainly veterinarians, with a smaller number of veterinary technicians, agronomists, chemists, fishing experts, and livestock farmers.

In the 1970s there were most general courses to train veterinarians in organization of outpatients clinics and courses in artificial insemination and prevention of sterility in cattle, organized by the Clinic for Obstetrics. In that period specialized weekly courses were introduced in cattle and pig production, in cooperation with the Department of Physiology and Pathology of Animal Production, or the centres for cattle and pig breeding. The first course of this kind on cattle breeding with the subject of Production, Health and Economic Problems in Fattening Calves and Heifers was held in June 1972, and the first course in pig breeding with the subject of Exploitation and Improvement of Reproductive Factors in Pigs in October 1973.

In 1975 the curriculum of the courses was accepted for graduate veterinarians and veterinary technicians in applied disinfection and pest control. Courses were organized at that time as part of the Programmes for training workers to manage or perform the work of sanitary protection in veterinary medicine. These courses are still organized today in cooperation with the Croatian Veterinary Chamber and the Department of Animal Hygiene, Behaviour and Welfare.

During the 1980s other courses were held alongside this professional training, such as a course on post-mortem diagnosis of trichinellosis and other tissue parasites, a course on artificial insemination of sheep and a course in epizootiology etc. In 1987, after the Chernobyl disaster, workers at the Department of Physiology and Radiobiology, in cooperation with the Republic Community for Health Care of Livestock of that time, held a course in radio biology.

In the 1990s there were several thematic courses for professional training of veterinarians, first of all a course in artificial insemination and reproductive control of cows, and a course to educate veterinarian officers, veterinary staff within the Croatian Army. Courses were held in cooperation with the Croatian Veterinary Chamber and the Health Administration of the Ministry of Defence of the Republic of Croatia. At that time courses began to be run as part of the project under the World Bank loan entitled, "Development of services for support of family agricultural businesses". The first course was organized in July 1997 at the Faculty of Veterinary Medicine in Zagreb (The principles of the application of HACCP in production and transport of food of animal origin, run by Prof. Dr. Josip Živković). In total 11 thematic courses were run from 1997 to 2000 (Table 5).

Within this project, courses for teachers to introduce new methodological areas into the teaching work at the Faculty were also organised in 1999-2000. As a part of this project the program *Herd Health and Production Management* was implemented for which the Ministry of Agriculture-Veterinary Directorate approved the purchase of a completed software application and one field vehicle to the Faculty.

Implementation of the project *Development of services for support of family agricultural businesses* prompted more intense cooperation between the Croatian Veterinary Chamber and the Faculty of Veterinary Medicine, in the form of organization of the long-term education of veterinarians. Courses were not then organized only as part of these projects, but they were also extended to other current topics. So, for example, in March 2002 the first course was organized for professional training of those accompanying animals in transport. Students on this course were mainly lorry drivers, that is people who did not have the necessary knowledge for this work. The number of courses increased gradually each year, so from 1997/1998 to 2002/2003 about 140 courses were organized, and more than 1300 students completed them successfully.



### 3.4. Scientific research work

Scientific research work at the Faculty developed gradually from its beginnings in 1924 to the beginning of the Second World War, in line with the formation of individual departments and clinics, the existing staff structure, the available research equipment, professional literature and financial resources in general. From the time of the work of the Veterinary High School, there had been centres of research work focussing on the fields of parasitology, microbiology, epizootiology and infectious diseases. In other areas of veterinary medicine, research work was more modest up to the 1930s.

Since 1930 to the beginning of the Second World War was much more fertile in terms of scientific research work, which spread to the remaining branches of veterinary medicine. A larger number of papers were published, and the research became more systematic in character.

The situation during the Second World War made scientific research work difficult, and towards the end of the occupation it was almost impossible. However, in some areas of veterinary medicine the research continued in a reduced scope (research in the area of parasitology and infectious diseases) and in some areas new work (biochemical research in the field of enzymology, the histochemistry of endocrine glands, improvement of some diagnostic and therapeutic methods in clinics, the use of medical physics, etc.).

Scientific research work at the Faculty immediately after the Second World War was still mainly individual in character, that is, it took place according to the affinities of individuals and scientific interests within the departments and clinics. The resources for this were modest and approved from the Faculty's available income. At the University at that time there were no separate institutional forms of scientific work through which teaching staff in related scientific disciplines, or even scientific workers of different professions, could be included in scientific research work.

Although these facts had a negative effect on the scientific research work at the Faculty overall, it is important to emphasize that individual members of the teaching staff at that time were particularly outstanding in terms of their scientific work. For instance in 1950 Prof. Dr. Ivo Tomašec and Prof. Dr. Adolf Režek received an award from the Government of the PR of Croatia for their scientific research work.

The conditions for scientific work at the Faculty were more favourable after this time, when the University was approved funding for that purpose from the Republic's budget for 1953. The funding was allocated for individual subjects on the basis of individual requests by the Faculty staff and a reasoned proposal by the Faculty.

At that time the cooperation between the Faculty institutions and clinics and individual Faculty experts with institutions and organizations outside the Faculty was increasing fruitful. That cooperation encompassed the resolution of many problems that were of interest for animal husbandry and agriculture, where professional assistance was provided through consultation and direct participation by individual Faculty experts in resolving specific problems. Their acquaintance with the issues of veterinary medicine in the field was reflected in an increase in the number and quality of scientific and professional discussions. For instance, in the annual report by the Board on the work of the Faculty for the 1957/1958 academic year, it states that at the Faculty departments and clinics 70 scientific research papers and 60 professional discussions had been undertaken.

In 1959/1960 the scientific research work at the Faculty was still financed from the University budget, after which a new mode of financing was introduced from the appropriate funds.

The foundation of research institutes, encompassing related departments and clinics at the Faculty, made a particular contribution to the development of scientific work. In line with the Act on

Universities mentioned above, and the first Statute of the Faculty of Veterinary Medicine, in 1960 four institutes were founded (the Institute for Morphology and Physiology, the Institute for Infectious and Invasive Diseases, the Institute for Zootechnics and Hygiene, and the Institute for Pathology and Therapy), as independent establishments for specific fields of scientific research. These institutes concluded agreements for financing the specific scientific research tasks.

After the foundation of these institutes, teams of researchers were created to work on approved scientific research topics. The institutes acquired the resources for their work on the basis of agreements with federal and republic funds for scientific work, on the basis of the agreed topics, and for work on scientific research tasks with some branches of industry. Some of the researches were financed from the institutes' own funds earned on the market (agreements on business and technical cooperation with industry), and funding was also given as support to assistants for drawing up their qualification papers.

Apart from the four institutes founded, there was a laboratory for the use of radioisotopes in veterinary medicine at the Faculty, whose work was financed by the Federal Commission for Nuclear Energy and the Republic Fund for Scientific Work. Many pieces of research by scientists at the Faculty were financed by the Yugoslav Academy of Sciences and Arts.

The institutes in this period produced significant results, both in practical solutions for current problems and in fundamental scientific research, but they did not receive the appropriate funding for their work. While all the teaching staff and scientists took part in scientific research work, the financing of their scientific work had not been resolved in an appropriate manner, so payment of scientific workers could also not be resolved fairly. Moreover, from the funding received it was only possible to procure small quantities of equipment, so the institutes mainly used Faculty equipment for their work.

It must be pointed out that according to the new approach to financing scientific research, individual scientific work was marginalized, because the administrative bodies who managed the funds for financing scientific research work dictated the subjects of the scientific areas of research. This form of guided research work did not prove to be very useful for the advance of science, because this approach set narrow boundaries for research. Already at that time it was thought that scientific work should be managed by scientific institutions, primarily the faculties, as centres that gathered together the best experts from specific fields, and scientific work should be financed directly from industry.

In 1965 the existing institutes at the Faculty were reorganized into a single Institute for Morphology and Physiology, which was renamed one year later to the Institute of Physiology and Pathology of Animal Products. This reorganization was undertaken to avoid the problems of continuing to finance scientific work, which had previously been divided between four institutes.

The newly founded Institute also took on the scientific research work on topics from the previous institutes, and according to the results of tenders, agreed new topics with federal and republic funds for scientific work. A group of scientists worked on these approved topics, according to their narrow scientific interest. The resources were received in phases, depending on the results of the scientific research work. On this basis the Institute used the existing premises and capacities of the Faculty, and in return, according to its own capacity, it gave part of the money it earned (10-17%) to the Faculty to cover material costs. The Faculty and the Institute concluded an agreement on mutual cooperation each year, whereby the Faculty provided administrative and accountancy services to the Institute.

The Institute also arranged work with various commercial organizations, agricultural entities and other institutions, and the

Table 6 Scientific research projects financed by the USA, 1967-1979

Beneficiary of financing	Title, responsible person and project duration	Source of financing
Institute for Physiology and Pathology of Animal Production	Detoxification of free ammonia in the ruminal mucosa, Slavko Krvavica, 1967-1970	US Department of Agriculture
	Investigations in the influence of the pesticidal chlorinated hydrocarbons upon the adaptation mechanisms in poultry, Vjekoslav Srebočan, 1968-1972, 1974-1979	
	Research on the development of diagnostic method for detecting the equine infectious anemia, Davor Petrović, 1970-1973	
	The relation of the function of the liver and some endocrine glands to sterility in cattle, Srđan Rižnar, 1969-1974	
	Vaccination of cattle against cysticercoosis ( <i>C. bovis</i> ), Teodor Wikerhauser, 1972-1975	
	Immune response of carp to the virus of the so-called acute infectious dropsy, Nikola Fijan, 1973-1977	

work involved in this cooperation was conducted through the foundation of centres. This cooperation between scientists of the Institute, that is, experts and associates from these centres, with industry was extended over time to the shared issue of basic and applied research. In parallel with this, the financing of scientific work from commercial organizations increased, and funding from the state budget decreased. With the launching of cooperation with industry, the work of the Institute in scientific research work increased, and this had an positive effect on the number and quality of scientific studies. From the funding received for individual topics of research, the Institute gradually procured the equipment needed for scientific research.

Some of the research after 1967 was still financed by the Ministry of Agriculture of the USA, or other clients from abroad, who found an interest in our scientists resolving specific scientific problems for them (Table 6). The evaluation of the results of this research was very strict and continuation of each piece of research was recognition of a job well done. Scientific research work by students had already developed, and those who showed an interest, according to their affinities for specific scientific fields, were introduced to the issues and methods of scientific work. After graduating, veterinarians had the opportunity to do scientific work as part of a postgraduate study to attain the title of Master and later to do a PhD dissertation.

In line with its scientific research work, the Institute began to organize scientific conferences, and the first such conference entitled *The Physiology and Pathology of Animal Production* was held on 29<sup>th</sup> March 1973.

In order to merge and consolidate smaller teaching units into larger ones, as well as responding to the changed needs of society, the Institute for Physiology and Pathology of Animal Production was integrated with the Faculty in 1976.

From 1976 to 1980 the Institute for Physiology and Pathology of Animal Production began work and the Faculty of Veterinary Medicine continued to be responsible for the scientific research project entitled *Biology, Pathology, Therapy and Prevention in Intensive Animal Production*, which was financed by the competent state body for scientific work, the University of Zagreb, and a certain number of interested organizations of associated labour in the field of livestock production, animal foods processing, veterinary inspection and pharmaceutical work. That project included eight sub-projects (Intensification and Rationalization of Production of Beef;

Development and Organization of Milk Production; Research in the Field of Physiology and Pathology, Breeding and Nutrition of Pigs; The Latest Problems in Preventive Work and Production in Poultry Farming; Physiological and Biochemical Bases of Animal Production; Diagnostics, Therapy and Prophylaxis in Livestock Production; Protection of Hygiene and Production, Processing and Trade in Animal Products; Health Care of Fish and Improvements in Beekeeping), with



Prof. Emeritus Nikola Fijan (1931-2009), University Professor (1958-1992), Head of the Department for Biology and Pathology of Fish and Bees (1974-1980, 1982-1983) and Vice-Dean of the Faculty (1982/1983, 1983/1984). As a world famous scientist he was the leader of several national and international projects including the FAO's projects he led in India and Brazil and the project funded by the U.S. Department of Agriculture. During his career he made numerous investment projects for fishery needs in our country and abroad. He also established two diagnostic laboratories for fish diseases in the United States and one in India (Faculty Archives).



## I. HISTORY

Table 7 Scientific research projects financed by the USA from 1985-1988

No.	Project head	Project name
1	Miroslav Herak	Embryo transplantation and conservation, and the possibility of infectious disease transmission by embryo transfer in pigs
2	Hrvoje Mazija	Pathogenesis of <i>Escherichia coli</i> and other microbes in the turkey respiratory disease complex
3	Damir Rapić	Vaccination against <i>Trichinellosis</i> in pigs
4	Ivan Vrbanac	Pig pathology monitoring study

a total of 57 topics on which practically all the staff of the Faculty of Veterinary Medicine in scientific teaching posts worked, with about seventy associates from various veterinary, medical, agricultural and other organizations. There was also a scientific research project under the auspices of the Faculty of Agriculture entitled *The Economics and Organization of Agriculture*. In that project teachers from our Faculty were responsible for three topics.

In 1980 a new five-year programme of research began. Most of the research topics were included in the project *Research into Biological, Technical and Health Factors in Contemporary Production and Processing in Animal Husbandry*, and the sub-project *Biology, Pathology, Therapy and Preventive Work in Intensive Animal Production*. The sub-project included 77 topics, grouped in six thematic programmes (Research into new technological procedures in industrial production of meat and milk and evaluation of breeding and production values, and use of new breeding procedures in breeding domesticated animals; Improvement of fertility by health and hormonal control, and artificial insemination of domestic mammals and poultry; Improvement and application of new technological solutions in production, transport and storage of animal feed, and feeding domesticated animals; Production, processing and evaluation of the quality of meat and meat products; Research into the incidence of diseases of domesticated and wild animals, fish and bees, with development of therapies and preventive measures, and Research into the interaction of mineral ingredients, hormones and enzymes in health protection in contemporary breeding and nutrition of domesticated animals). The topics covered all fields of veterinary medicine, in terms of medicine, zootechnics and technology, that is, they covered veterinary medicine and bio-technology. The Faculty was involved in the project *Research, Protection and Improvement of the Human Environment in the Continental Areas of the PR Croatia (Man and the Biosphere)*, and the project *National Defence and Social Self-Defence*. All the scientists at the Faculty were included in work on those projects with a large number of associates from other organizations. Research in these projects ended in 1986.

In 1985 funding was approved by the USA for four topics for the following three-year periods (Table 7). The costs of the research topics were distributed so that the American side gave one half, and the other half was given by the republic community for scientific work and the Faculty, as part of its overhead costs of 10%. The project entitled *Pig Pathology Monitoring Study* continued under the title *Monitoring Study on Pig Diseases on Large Farms* (1989-1990).

The research project of the International Atomic Energy Agency entitled *Irridation of Food to Control Infectivity of Toxoplasmosis* (1987-1991, leader Prof. Dr. Teodor Wikerhauser) has also started in this period. At the end of the period USA scientific and research project entitled *Immune Suppression of Chicken by Fungal Toxins* (1988-1990, leader Prof. Dr. Hrvoje Mazija) has started.

In 1987 a new planned period began of scientific research work, in which scientists from the Faculty worked within four basic research subjects: Food, Biology, the Environment and National Defence and Social Self-Protection. The basic subject Food included the project *Research into Biological, Technical and Health Factors in Contemporary Production and Processing in Animal Husbandry*,

*Fishing and Beekeeping*, and it was divided into two sub-projects. In the first sub-project, entitled *Health Aspects of Intensive Livestock Production*, researchers from the Faculty had 15 topics, and in the second, one topic was entitled *Research into the Scientific Foundations of Formation and Industrial Exploitation of Domesticated Animals, Fish and Bees, and Processing of Animal Products*. Within the basic course in Biology and the project *Ecological Research into Flora and Fauna of the PR of Croatia*, the subject the Environment and the project *Anthropogenic Influence on the Adriatic Sea* and the subject *National Defence and Social Self-Defence*, researchers from the Faculty of Veterinary Medicine had one topic each.

The increased scientific activity resulted in a further increase in publishing work, and from 1969 to 1989, 2114 scientific discussions or notifications were published, of which 1425 titles were listed in *Bibliography 1969-1979* published to mark the sixtieth anniversary of the Faculty. The largest number of scientific papers were published in national scientific journals, with a smaller number in foreign journals or proceedings. Apart from scientific papers, over this twenty-year period the Faculty staff also drew up or published more than 600 papers, 82 encyclopaedia articles and a large number of teaching texts, books, reports studies and popular articles, and held many public lectures.



The stay and work of Prof. Dr. Ivica Valpotić specialist of the Pig Breeding Center at the Laboratory for Bacteriology, Immunology and Pathology at the National Animal Disease Center, Ames, Iowa, USA (1988-1989), on the detection of the expression of the specific receptors on the small intestinal mucosa enterocytes for adhesion of enterobacteria, pathogens of intestinal infections in weaned pigs using classical microscopic adhesion test and new, more sensitive and more specific immunoenzyme tests (Photo courtesy of Prof. Dr. Ivica Valpotić).

Table 8 International projects approved in the period from 1990 to 1996 (listed alphabetically according to the name of the project head)

No.	Project head	Project name
1	Đuro Huber	Brown bears in Croatia
2	Đuro Huber	Conservation of brown bears in Croatia
3	Đuro Huber	Study of wolves in Croatia
4	Albert Marinculić	Entomopathogenic nematodes
5	Albert Marinculić	Vaccination against Trichinelosis in pigs
6	Hrvoje Mazija	Avian thymic hormone and its receptor
7	Hrvoje Mazija	Respiratory disease complex in turkeys
8	Krešimir Mikulec	Breeding and pathology of dairy sheep for the Mediterranean area
9	Tomo Naglić	Ruminants mycoplasmoses
10	Ljiljana Pinter	Typization of dermatophytes using monoclonal antibodies
11	Ivica Valpotić	Gut immunity in swine colidiarrhea
12	Ivica Valpotić	Postweaning colibacillosis in swine: mucosal immunology and vaccine potential
13	Ivica Valpotić	Cellular immune response of pigs to K88-positive enterotoxigenic strains of <i>Escherichia coli</i>
14	Ivan Vrbanac	Monitoring study on the pathology of pigs II
15	Teodor Wikerhauser	Irridation of food to control infectivity of Toxoplasmosis

Scientific research work has been an important element of the activities of the Faculty of Veterinary Medicine of the University of Zagreb since the Republic of Croatia became independent. Therefore, since the beginning of the 1990s there has been continuous scientific work at the Faculty as part of national and international projects.

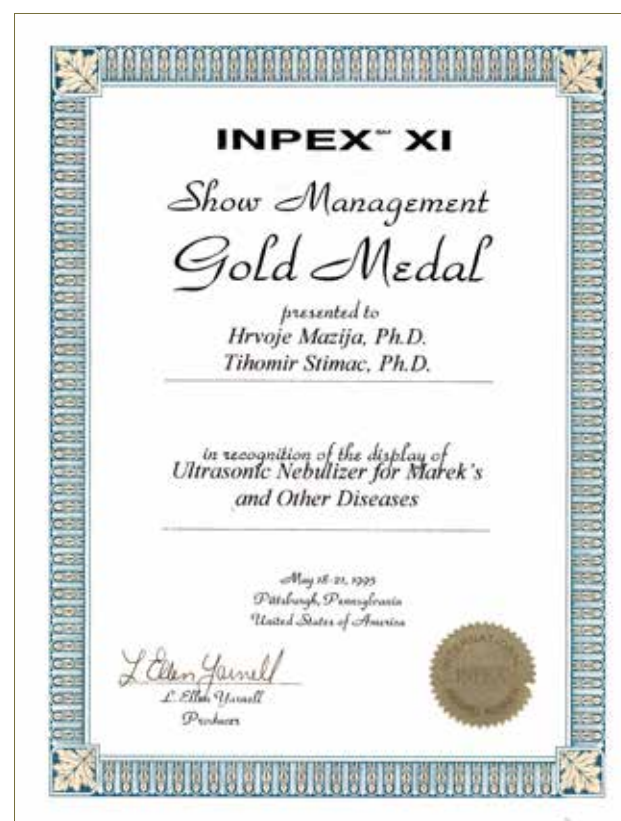
Scientific work within national projects has mostly been undertaken through projects lasting several years, supported financially by the Ministry of Science and Technology (MST) and, from the middle of the 1990's, by the Ministry of Agriculture and Forestry (MAF), as part of the projects of the Council for Agricultural Research (CAR).

In January 1991 a new series of projects began, supported financially by the MST. At first 35 new projects were approved, and up to the end of the 1995/1996 academic year, a further 16 projects.

In the 1990s Faculty staff, amongst other things, were included in work in international research, mainly relating to cooperation with scientists from the USA, through the Joint Research Fund (Table 8).

In this period our scientists achieved notable results in scientific research work in an innovative field. At the 41<sup>st</sup> World Salon for Inventiveness, Research and Industrial Innovation, EUREKA '92 (European Research Coordination Agency), held in Brussels in November 1992, the paper entitled *The Development of a Vaccine Against Aujeszky Disease (Pseudorabies) in Pigs* received a golden plaque award. Along with the pharmaceutical company Pliva, the Faculty of Veterinary Medicine is also mentioned as an institution where the awarded study was undertaken in part. Prof. Dr. Slavko Cvetnić is mentioned as a co-author.

Prof. Dr. Hrvoje Mazija and Dr. Estella Prukner-Radović took part at the 10<sup>th</sup> World Congress of Poultry Veterinarians held from 16<sup>th</sup> to 19<sup>th</sup> August 1993 in Sidney. At that conference of the most eminent experts in the field of poultry veterinary medicine from more than 30 countries, Prof. Dr. Hrvoje Mazija presented a new vaccine produced by the Department of Pathology of Poultry in Breeding and Production at the Faculty of Veterinary Medicine of the University of Zagreb. It was a new vaccine against Marek's disease, at the time the only vaccine in the world. It could be used without a separate solvent-



Prof. Dr. Hrvoje Mazija and his associates' exhibit entitled "Ultrasonic Nebulizer for Marek's and Other Diseases" at the INPEX Innovation exhibition held from 18<sup>th</sup> to 21<sup>st</sup> May 1995 in Pittsburgh, Pennsylvania, USA won the gold medal (Courtesy of Prof. Dr. Hrvoje Mazija).



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it was sufficient to dissolve it before use in ordinary distilled water. This was only one of a series of successes by the teaching staff and researchers of our Faculty, which was the leading veterinary faculty in terms of poultry farming in South-East Europe. In the same year the exhibit *A New Vaccine Against Marek's Disease* received a gold medal at the 42<sup>nd</sup> World Salon, EUREKA '93, held in Brussels in November 1993.

Scientific research work in that period was also involved in organizing scientific and professional symposiums. It is necessary to mention in this context the congress "Veterinary Science and Profession" held from 24<sup>th</sup> to 25<sup>th</sup> June 1993 at the Faculty of Veterinary Medicine. This was the first congress of that title at the Faculty, and today it has become a traditional gathering of experts from this country and abroad related to current topics in the field of veterinary medicine, and promotes the international recognition of our Faculty in that field. From 1997 to 2002 a number of registered projects and scientific research projects whose financing was approved by the MST, fell through. This was the result, amongst other things of the out-dated and inadequate equipment. As a result, scientists from various institutions turned more to team work, whereby, at least in part, they eased this problem.

In the 1996/1997 academic year the MST approved 28 scientific projects at the Faculty. Up until the 2000/2001 academic year the number of new projects increased, so that by the end of this period the MST had financed a total of 44 projects.

Applications and approval by the MST for a new series of projects were based mainly on the continuation of research from the previous financial period, where the proposed research comprehensibly covered almost an entire area of veterinary work. In terms of the



The brown bear in Gorski kotar marked with a necklace for satellite (GPS) monitoring and GSM message transmission within the projects: *Karst Ecosystem Conservation* (KEC, Global Environmental Fund), *Conservation genetics of large carnivores in Croatia* (ALIS, United Kingdom) and *Improving Coexistence of Large Carnivores and Agriculture in S Europe* (LIFE, Italy), project leader Prof. Dr. Đuro Huber (Photo courtesy of Prof. Emeritus Đuro Huber).

Detail from the project *Save the Last Adriatic Dolphins* (NGO project-Germany), project leader Prof. Dr. Hrvoje Gomerčić (Photo courtesy of Prof. Dr. Martina Đuras).



Table 9 International projects listed in the alphabetical according to the name of the project head, 2002-2006

No.	Project head	Project name
1	Hrvoje Gomerčić	Save the last Adriatic dolphins (NGO project-Germany)
2	Hrvoje Gomerčić	INTEREG III Adria Watch-Adria Save (Italy)
3	Željko Grabarević	Heliobacteria in wild rodents (Slovenia)
4	Mirza Hadžiosmanović	Safety of traditional fermented sausages: research into protective cultures and bacteriocins (INCO-PROJECT) (FP5)
5	Đuro Huber	Conservation genetics of large carnivores in Croatia (ALIS-United Kingdom)
6	Đuro Huber	Karst Ecosystem Conservation (KEC-Global Environmental Fund)
7	Đuro Huber	Conservation and management of wolves in Croatia (Monitoring of wolves population and management activities) (LIFE III-EU)
8	Đuro Huber	Improving the coexistence of large carnivores and agriculture in S. Europe-COEX (LIFE project-Italy)
9	Đuro Huber	Building capacities to meet the challenges of multi-level democracy: the case of conserving species with transborder populations (Norway)
10	Đuro Huber	Gaining and maintaining public acceptance of brown bears in Croatia (BBI MATRA-the Netherlands)
11	Ljiljana Pinter	Research into keratinolytic activities of dermatophytes in various hosts and habitats (Slovenia)
12	Estella Prukner-Radovčić	Foodborn zoonoses: a coordinated foodchain approach (MoU:266/01) COST Action 920
13	Estella Prukner-Radovčić	Animal chlamydioses and the zoonotic implications (MoU:241/02) COST Action 855
14	Ivica Valpotić	Live oral non-GMO vaccines for prevention of oedema disease and postweaning diarrhoea of weaned pigs (Hungary-the United Kingdom-USA)
15	Željko Župančić	Epidemiological research into Chlamydomyces psittaci in domestic and wild animals and the reliability of diagnostic procedures for proving antibodies and antigens, isolation of pathogens and serotyping of the use of PCR and RFLP-PCR procedures (Slovenia).

area of research, the projects were conceived to cover the fields of fundamental, pre-clinical and clinical disciplines, animal production, and the hygiene and technology of animal foods. Some of the research was multi-disciplinary in character.

In this period of time, scientific VIP projects were approved for the first time, where by the end of 2001 eight such projects were financed at the Faculty. Most of them were on topics from animal production and only one project was from the clinical field and hygiene and technology of animal foods.

The scientific teaching staff of the Faculty also started scientific research work from 1996 to 2001 as part of the international projects and bilateral cooperation with countries in the narrower and wider region, such as the Croatian-Slovenian project *Research into the Immuno-Reactivity of Domesticated Animals to Fungal Antigens* (the responsible person for this scientific work was Assist. Prof. Dr. Ljiljana Pinter). Faculty employees continued to work on international projects from the previous period, such as the Croatian-American project *Monitoring the Pathology of Pigs in Intensive Pig Production, III* (the person responsible for scientific work was Dr. Ivan Vrbanac). In December 2000, Prof. Dr. Hrvoje Mazija, Dr. Estella Prukner-Radovčić, Mr. Sc. Irena Ciglar-Grozdanić and their associates received the annual Eduard Slavoljub Penkala prize, which the Association of Inventors of Zagreb awarded for the best Zagreb innovation entitled *Inducing Immune Response to Newcastle Disease using an Ultrasound Atomizer*. At the end of the same year, Prof. Dr. Hrvoje Mazija registered

his invention *Immunization of Chicks against Newcastle Disease in the Hatchery* with the State Department for Intellectual Property of the Croatia. The invention related to the procedure of immunization of chicks, originating from immune parents, against Newcastle Disease (ND) in the hatchery, by inhalation of the vaccine created from strains of ND (such as La Sota, B1, Ulster 2C, Queensland V4, etc.), using an ultrasound atomizer (such as the SONOVAC apparatus, etc.) in the form of a fine spray, with droplets 2-5 µm in diameter. In February 2001, Prof. Dr. Hrvoje Mazija and his associates received a prestigious award from the Croatian Chamber of Commerce, the *Golden Marten*, for the best innovation in Croatia in 2000, entitled, *Promoting the Long-Term Specific Protection of Recently Hatched Chicks against very Pathogenic Viruses*. This was the crown of the many years' work by the experts of the Department of Pathology of Poultry in Breeding and Production to improve immuno-prophylaxis for important poultry diseases.

The scientific research work of employees of the Faculty of Veterinary Medicine in the period from 2002 to 2005 still mainly included projects supported by the Ministry of Science, Education and Sport (MSES). When we compare this period with the previous one, we may conclude that scientific work was on the rise, both in terms of the number of national projects and new international projects.

In 2002 the MSES approved a new series of financing for 39 projects and, by the end of that period, 10 more projects. Therefore, the number of 44 projects from the previous period increased to 49 projects in the



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2004/2005 academic year Here, some of the approved projects had the same title as in the previous financial period, which means that in the new series the continuation of research had in fact been approved.

Most of the new projects were related in topic to clinical fields, and the remainder were projects in pre-clinical fields, animal production, and hygiene and technology of animal foods. Some of the research, as in the earlier period, was multi-discipline in character.

In addition to scientific projects of the MSES, Faculty staff have also implemented other projects. After eight projects were approved in the first round by the Council for Agricultural Research, in the second round of financing five more VIP projects were approved at the Faculty from 2002 to 2006.

At the same time, Faculty staff were also awarded two technological research and development projects with the support of the MSES. These were the projects *Breeding Frogs in Non-Natural Conditions* (head researcher: Prof. Dr. Zvonko Stojević) and *Production of Lamb with the Designation Ecological Product of Croatia* (head researcher: Prof. Dr. Miljenko Šimpraga), which resulted in the foundation of a spin-off company.

In addition to this, two projects were implemented which were financed by the Ministry of Agriculture. One project related to the protocol for monitoring and preventing the parasite *Fascioloides magna* (head researcher: Prof. Dr. Zdravko Janicki), and the other to analysis and creation of a genetic map of the brown bear population in Croatia (head researcher: Prof. Dr. Đuro Huber). Two projects were also realized with financing from the State Department for Nature Protection, related to activities to implement the plan to manage wolves and lynx in Croatia. The project entitled *Monitoring the Use of Wildlife Crossings on the Zagreb-Split Motorway* was supported by Croatian Motorways (head researchers in this project: Prof. Dr. Đ. Huber and Assist. Prof. Dr. J. Kusak).

The scientific work of Faculty staff in international projects was also on the rise, where activities were recorded on 15 projects in total as part of bilateral cooperation with Slovenia (3), the United Kingdom (1), the EU (4), Germany (1), Italy (2), Norway (1) and the Netherlands (1), multilateral cooperation with the United Kingdom, Hungary and the USA (1) and Global Environmental Fund (1). The projects were co-financed by the MSES and the Ministry of the Environment and Energy, and EU funds (Table 9).

On the basis of their success in their scientific field, some members of the Faculty at the beginning of the 1950s were elected to the Yugoslav Academy of Sciences and Arts. The Veterinary Science Division of the Academy was founded by the Department for Natural Medical Sciences at a session of the Departmental Council held on 1<sup>st</sup> March 1949. At that session, Prof. Dr. Ivo Babić was elected as the first corresponding member from the field of veterinary medicine. Already a year later he was elected as a full member of the Academy and was responsible for the development of the Veterinary Science Division, which was very quickly filled by the election of new members from the Faculty of Veterinary Medicine. In the same year a proposal was received to found a separate Department of Medical Sciences, which included the Veterinary Science Division, until it ceased work in 1968. Veterinary members, according to their narrow field of scientific work, continued to work in the Department of Medical Sciences and the Department of Natural Sciences, which later, like the other Departments, were re-organized into classes.

With the establishment of the independent and democratic Republic of Croatia, the Academy, as the first successor of the Yugoslav Academy of Medical Sciences continued its work under the title the Croatian Academy of Sciences and Arts. It consists of three classes, which are responsible for the tasks of the Academy. In the Department of Medical Sciences prominent scientists are represented from medicine, dentistry and veterinary medicine. So far many scientists have emerged from the Faculty of Veterinary Medicine of the University of Zagreb, whose results and achievements in the field of science, in terms of their high value, have received general recognition and evaluation by their membership in the Academy. Full members of the Academy, with the first Academician, Ivo Babić (1950-1977) were

Academicians: Božidar Oklješa (1958-1983), Teodor Varićak (1958-1977), Ivo Tomašec (1960-1981), Sergej Forenbacher (1975-2010), Eugen Topolnik (1979-2014), Slavko Krvavica (1991-2003), Slavko Cvetnić (1991-2016) and Teodor Wikerhauser (1991-2018). Today the full members of the Croatian Academy of Sciences and Arts are Academicians Josip Madić (2012) and Dražen Matičić (2018).

Associate members of the Academy from the Faculty of Veterinary Medicine were Prof. Dr. Dubravko Timet (1977-2007), Prof. Dr. Mladen Hajsig (1975-1996) and Prof. Dr. Hrvoje Gomerčić (1990-2010).

The Croatian Veterinary Institute as one of the leading scientific institutions in the field of veterinary medicine in the country also has its representative in the Croatian Academy of Sciences and Arts, Academician Željko Cvetnić (2016).



Awarding the lifetime achievement award to academics on the occasion of the 90<sup>th</sup> anniversary of the Faculty of Veterinary Medicine of the University of Zagreb (2009). From left to right: Academician Slavko Cvetnić, Academician Teodor Wikerhauser, Dean Prof. Dr. Velimir Sušić and Academician Sergej Forenbacher (Faculty Archives).



Academicians Dražen Matičić and Josip Madić in front of the Baška Tablet, one of the most precious Croatian monuments (Croatian Glagolitic Inscription, made around 1100), in the hall of the Croatian Academy of Sciences and Arts in Zagreb.

## 3.5. Professional activities at the Faculty

The professional activities of the Faculty continued within the existing Institute of Pathological Anatomy and Surgical and Medical Clinics, and in time spread to the other departments and clinics that were founded.

Over the years, increasing quantities of material arrived at the Department of Pathological Anatomy, and, apart from domesticated animals, increasingly dissections were performed of a large number of other species coming from the wild or the zoo. As a result the professional activities of the Department, relating to patho-anatomic and histological diagnostics increased significantly over its history.

As the City of Zagreb spread and the number of motorized vehicles in transport increased, there was a rise in the number of dogs as patients at the Clinic for Surgery, with traumatic injuries to the soft tissues and broken bones. Pigs were increasingly received as surgical patients during and immediately after the Second World War, which was a reflection of the difficulties experienced in providing enough food for the people. When life returned to normal the number fell once again. Cattle began to appear more often as surgical patients at the beginning of the 1950s. As livestock production began to intensify, problems arose in relation to cattle pathologies. This was a reason for the increased development of cattle surgery as a new branch, as part of the work of the Clinic for Surgery.

After the Polyclinic was abolished, animals suffering from internal and some infectious diseases (diseases of foals and puppies, equine infectious anaemia etc.), whether they were treated as out- or in-patients, were taken over by the Medical Clinic. At that time horses and dogs were the most frequent patients at the Medical Clinic. It is interesting to mention that at that time it was enthusiasts who developed other activities within the work of the clinic. In this context Prof. Dr. Aleksandar Sutlić should be mentioned in particular. He had a hygiene institution built as part of the outpatient Medical Clinic, for grooming and bathing dogs along the lines of a similar institution in Graz. That institution began work in the summer of 1931 and brought significant income to the Faculty of Veterinary Medicine.

In 1935 the Department of Internal Clinical Propaedeutics broke away from the Medical Clinic and gained the space to develop further. The Medical Clinic changed its name to Internal Clinic I, and the Buiatrics Clinic to Internal Clinic II. The final and formal merger of both Internal Clinics with the Department of Internal Clinical Propaedeutics to become the Clinic for Internal Diseases followed in 1951, and was the result of the more mature view of the unity of clinical physiology and pathology of domesticated animals in teaching, scientific and professional work. In 1952 a Haematology Laboratory was founded within the Clinic, which later grew into the Central Clinical Laboratory, and developed into a well-organized veterinary haematology centre. At that time it was the only laboratory of its kind in the country. The range of professional and later also scientific work of the laboratory went beyond the bounds of haematology, reaching into the field of clinical cytological diagnosis.

The clinical part of the Department of the Science of Infections (since 1944 the Department of Infectious Diseases with Clinic) began work in the 1924/1925 academic year, and was very modest in the beginning. Most often small animals (poultry, dogs, pigs) were brought in for treatment, and more rarely a few larger animals (horses, cattle). Almost all the work of that Department took place at first in the bacteriology laboratory, which was founded in 1921 and received test materials from animals that had died from infectious diseases. In this context it is necessary to mention that at the beginning of the 20<sup>th</sup> century in Croatia there were no state institutions that carried out diagnostic procedures for the veterinary profession, so the newly-founded bacteriology laboratory at the Department was forced to take on some of that work, and under an agreement with the Ministry of



Placement of a bandage on the horse's hoof within the professional and clinical work of the Clinic for Surgery in 1950s (Faculty Archives).

Agriculture the Institute became the diagnostic base. In 1927, with the help of the Ministry of Agriculture, a laboratory was founded in the Institute for research into infectious diseases of bees.

The professional activities of that Department grew continuously, and at one time reached a level that required a different approach to organizing diagnostic services for the needs of veterinary practice. Therefore in 1933 a Veterinary Research Station was founded at the Institute, as a separate unit. Its activities increased constantly and as a result in 1940 it separated to become a Department in its own right, in 1942 it moved to the premises of the former Farrier School on Savska Street, and later grew to become the Croatian Veterinary Institute (see the Foundation of the Veterinary Experimental Station). The number of patients at the Clinic for Infectious Diseases increased, especially during and immediately after the Second World War. At that time, the number of animals in the city and the surrounding area increased significantly, and inadequate veterinary sanitation measures led to a rise in the number of various infectious diseases (swine plague, swine erysipelas, fowl cholera, rabies, glanders disease, etc.) At that time the Department of Infectious Diseases with Clinic and the Department of Microbiology and Hygiene (since 1948 the Department of Microbiology and Immunology) were a single department in two separate premises at the old location of the Faculty on Savska Street. In 1947 the Department of Microbiology and Hygiene moved temporarily to the new Faculty building on Heinzelova Street, and the Department and Clinic for Infectious Diseases remained in the old premises on Savska Street right up until 1959.

From 1946 to 1954 clinical work improved more rapidly with the introduction of contemporary clinical methods in veterinary infectology: hematograms, chemical tests, X-ray diagnostics, and surgical methods in treatment of some infections, and an objective diagnosis was always insisted on. Apart from its continual bacteriological and clinical work, the Department of Infectious Diseases with Clinic also helped the federal and republic veterinary services at that time to resolve problematic diagnoses and in the prophylaxis of individual infectious diseases, especially glanders



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Detail of the work in the microbiological laboratory of the Department of Microbiology and Infectious Diseases with Clinic in 1970s (Faculty Archives).

disease and equine infectious anaemia. It assisted the production departments and veterinary service in the Yugoslav National Army, and also worked with the human epidemiological service. It has already been mentioned that in 1953, by a decision of the presidency of the Yugoslav Academy of Sciences and Arts, the Centre for Leptospirosis was handed over to the Faculty, and it merged with the Department of Infectious Diseases with Clinic. In 1954, from the merger of the Department for Microbiology and Immunology and the Department of Infectious Diseases with Clinic, the single Department of Microbiology, Immunology and Infectious Diseases was founded. The previous Centre for Leptospirosis continued work as a separate section within the newly-formed Department.

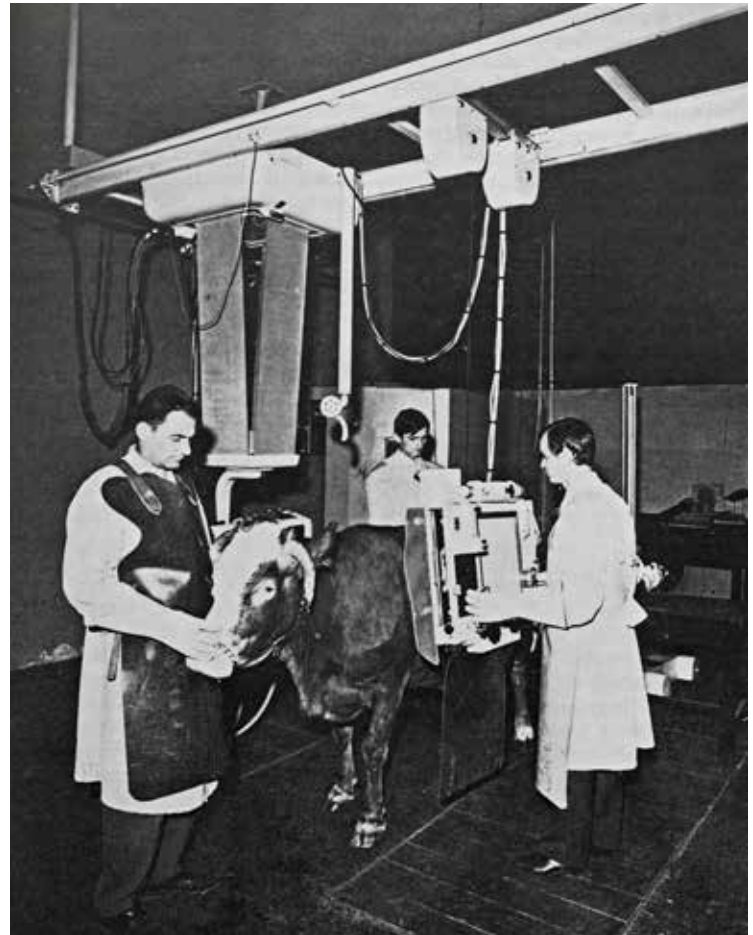
The economic circumstances in the state, especially in agriculture, had a significant effect on the professional activities of the Department. As animal husbandry and the veterinary profession developed in Croatia, the range of professional work at the Department also increased, which resulted in the foundation of new laboratories and the constant improvement of the existing ones. So, within the Department, in 1956/1957 a mycology laboratory began to develop, with two sections, one for yeasts and the other for moulds. In 1959 the Department was given new premises within the complex of buildings of the theoretical and experimental departments, on the first floor of the south wing of the building on Heinzelova Street, and the old building for experimental animals was adapted for the Clinic for Infectious Diseases. In the same year an independent Institute for infectious and invasive diseases was founded within the Faculty of Veterinary Medicine, after which, alongside the existing bacteriology laboratory, the Division for Leptospirosis and the mycology laboratory, a virology laboratory also developed. Previously, the diagnostics of viruses and viral diseases was undertaken until 1960 in the bacteriology laboratory, because the Department did not have a separately equipped virology laboratory. Only when the Faculty moved into the new building was it possible to set up that kind of laboratory. There was insufficient space at the department to set up a virology laboratory, and as a result it was located in the premises of the Department of Hygiene of Food of Animal Origin, which gave up three rooms for that purpose.

In the mycology laboratory diagnostics of fungal infections of animals were regularly performed, and the professional activities of the virology laboratory related to the production and sale of several viral

vaccines for respiratory diseases of cattle and horses, and diagnostics of viral diseases of dogs and cats. The foundation of the laboratory for equine infectious anaemia in 1972 was a very important step for the Department because it meant the conditions were met to take over from the Ministry of Agriculture the task of regular routine diagnostics of equine infective anaemia, which is still continuing successfully today. Since the laboratory for equine infectious anaemia was one of the first laboratories in the world to use serological diagnostics of the disease, it very quickly became the centre for diagnostics for the area of the former Yugoslavia and neighbouring countries.

The activities of the Clinic for Infectious Diseases developed significantly right up to the 1970s, when as a result of the staffing situation at the Department there was a fall in the number of patients. Since 1986 gradually an increasing number of patients were being treated, and since 1997 the Clinic for Infectious Diseases again took over a full load of teaching and professional obligations. By a decision of the Ministry of Agriculture in 2004 it was given state authority to undertake immuno-prophylaxis of rabies in dogs, which led to a rapid rise in the number of animals dealt with at the Clinic.

The Buiatrics Clinic began work in October 1926, when the first patient was recorded in the register of sick animals. It should be pointed out that the Buiatrics Clinic and the Obstetrics Clinic worked together at first, so that clinical and outpatient animals were recorded in a joint register of sick animals. The name of the Buiatrics Clinic was taken from some foreign schools at which these clinics were actually formed and organized according to the type of animal, and not as they are here, where from the beginning most clinical practitioners had the tendency to organize clinics according to the type of disease, which



Radiology diagnostics within the professional and clinical work of the Department of Radiology and Physical Therapy (today the Department of Radiology, Ultrasound Diagnostics and Physical Therapy). Prof. Dr. Mensur Šehić, a longtime Head of the Department is on the right (Photo courtesy of Prof. Emeritus Mensur Šehić).

was implemented consistently. The name of the clinic remained for quite a long time, and it was even used officially, that is, in Faculty regulations and teaching plans from the earlier period. The connection between the Buiatrics and the Obstetrics Clinics lasted right up until 1938 when their work was separated, so professional and auxiliary staff were gradually employed for each clinic separately. Despite this, both clinics were still a single working unit right up until the 1948/1949 academic year, when their premises were separated.

For a long time the boundaries of competences in the field of obstetrics at our Faculty were not precisely defined. Whilst gynaecological diseases (infertility, diseases of the milk glands etc.) of ruminants and pigs were treated at the Buiatrics Clinic, for gynaecological diseases of ungulates and carnivores, the situation was different. In 1927 the council rendered a conclusion that the clinical treatment of genitals and milk glands in ungulates and carnivores should be taken over by the Clinic for Surgery. The question of the allocation of gynaecological diseases was resolved in 1935 when all genital diseases of ungulates and carnivores were assigned to the Obstetrics Clinic, and in 1938 this was also the case for all genital diseases of ruminants, pigs, rabbits and poultry.

The Department of Parasitology and Invasive Diseases began diagnostic work in 1932, when the parasitological laboratory was founded. That work at first consisted mainly of coprological tests and determination of endoparasites and ectoparasites. Some organs or parasites themselves were sent to the Department of Pathological Anatomy for parasitology testing and identification and also to other institutions or field veterinarians. Samples for coprological testing were sent by all the clinics, field veterinarian services and the farmers themselves. This work by the Department provided significant assistance to these institutions and individuals, and it gained an overview of the movements and intensity of the individual parasitological invasions and species of parasites which appear in this country. In most cases the Department did not only make a diagnosis but also issued instructions for treating and combating individual invasions. In this diagnostic work, the participation of experts should be mentioned in the campaigns organized in the 1950s and 60s by the Faculty of Veterinary Medicine to establish pathologies in domesticated animals in Posavina, Lonjsko polje and Kordun. The participation of experts from the Department was also important in the so-called Poultry Groups, and later in the Poultry Centre at the Faculty, taking part in assisting our poultry farmers in diagnosing and combating some parasitoses, primarily coccidiosis. In the 70s and 80s, apart from the field visits and taking various samples for parasitology testing in the field, the professional clinical work within the Faculty, that is, parasitological diagnostics, especially for small animals (dogs and cats) was undertaken by experts from the Department visiting the Faculty clinics. Since 1980s patients were admitted to and examined at the Department, and since 1997, when the Parasitology and Dermatology Outpatient Clinic was opened, right up to the present day, samples have been taken, patients clinically processed and diagnosed, medication administered, and the owners given instructions on treating parasites, in the Outpatient Clinic. Since the 70s there has been a serology laboratory alongside the parasitology laboratory, where various immuno-diagnostic and serological tests are undertaken. Since the year 2000 that laboratory has been divided into two separate units: Animal Serology-where various kinds of tests are undertaken of serum and tissue from domesticated and wild animals, and Human Serology-where serological tests are undertaken on human blood samples suspected of various forms of parasitosis (echinococcosis, cysticercosis, trichinellosis, toxocariasis and leishmaniosis). Since the 1970s diagnostic methods have been used at the Department (trichinelloscopy and artificial digestion) for pork meat, and in 2009 a laboratory for diagnostics of trichinellosis was founded.

The Department of Radiology and Physical Therapy began work in 1935, after the first X-ray machine was procured. Radiological diagnostics were used on animals sent by the Faculty's clinics and veterinary stations, and Outpatient Clinics from the area around Zagreb. At first very few animals came to the Department for



Clinical examination of a bee community within the professional work of the Department for Biology and Pathology of Fish and Bees in 1970s (Faculty Archives).

examination. These were mainly horses, dogs and goats, in order to determine pregnancy. Although at that time the Department was also equipped with apparatus for physics treatment methods, they were used much less than the X-ray diagnostics. Ultraviolet light rays were used relatively often for various forms of dermatosis and rickets, and short-wave diathermy, especially for various inflammations. In terms of thermo-therapy, the clinics conducted hydrotherapy entirely on their own, so that alongside diathermy, they most often used other electronic sources of heat (a variety of lamps).

The Department for Biology and Pathology of Fish and Bees was founded in 1936 and a large part of its work right from the beginning was dedicated to the laboratory diagnostics of samples of bees and fish from the field, which, apart from for the needs of teaching and scientific work, provided support to the bee and fishing industries. Due to the nature of things, this was particularly important for diseases of bees, because the problems that arose could often be resolved simply by determining the cause of death. If we add that the staff of the Department, after undertaking tests, did not only report the diagnosis but in most cases also gave instructions for treatment and combating the disease, it is clear that this work was important for the beekeeping industry. Therefore, from its very foundation the Department endeavoured to undertake and expand its professional activities. It succeeded in this in particular in the field of diseases of bees, so that at the end of the 1960s the Administration for Veterinary Medicine of the PR of Croatia gave annual support, so the entire work in the field of bee diseases was undertaken free of charge. Since 1970s laboratory diagnostics of fish diseases was extremely important because in many cases it was a significant complement to the diagnostic work in the field conditions within the framework of cooperation between Department experts and fisheries. It should be noted that along with the bacteriological, diagnosis of the viral fish diseases has been conducted in the Department laboratory for many years as one of the first such diagnostic laboratories in the southeastern part of the Europe.

The Department of Zoohygiene was founded in 1948. At first its professional work was modest, but after affirmation of that field in the production process, since 1958 its professional work intensified. Up to the end of 1968 a large number of different reports were drawn up dealing with the problems of zoohygiene in cattle, pig and



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Detail of the professional work in the laboratory of the Department of Zoohygiene (today the Department of Animal Hygiene, Behaviour and Welfare). From left to right: the technical associate Vinka Penović-Dragelejević, Assist. Dr. Ljubomir Marjanović and Assist. Dr. Hania Ciszek (Faculty Archives).

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poultry production. Members of the Department were engaged in acute problems in practice, primarily within the centres for poultry and pig breeding. In the last fifty years, with the modernization of intensive livestock production through new technologies for housing and accommodation, the interest of the industry in professional work in the field of zoohygiene gradually decreased, primarily relating to drawing up studies and hygiene evaluations of buildings, including complex microclimate measurements. As a result, from the beginning of the 1990s its professional work was reduced to hygiene evaluations of water quality, which is undertaken today solely for teaching purposes. The reason for this is the need for accreditation of the laboratory for conducting tests on the hygienic quality of water, which, in view of the number of tests undertaken each year and the existence of other accredited laboratories (the Institute of Public Health of the City of Zagreb, etc.) has never been undertaken.

The Ambulatory Care Clinic had an important role for the Faculty since 1950s, due to its cooperation with veterinary ambulance. Through this form of cooperation, students acquired clinical experience and practical work in the profession, which could not be provided to such an extent during the teaching process at the Faculty itself. Cooperation of the Ambulatory Care Clinic in the field made it possible to diagnose some forms of clinical pathologies with infectious aetiology and apply in practice some procedures (rumenotomy) which field veterinarians did not know sufficiently well. Experts from the Ambulatory Care Clinic worked with farmers and so, for instance, were amongst the first to point out the importance of care of cloven hoofs, that is, the damage that is caused by poor care and hoof diseases in dairy cows. This form of cooperation by the Ambulatory Care Clinic in the field in the Zagreb area is still going on today.

The Department of Pathology of Poultry in Breeding and Production, after the separation of the Poultry Centre from the Faculty of Veterinary Medicine in 1993, founded its own virology and bacteriology laboratory, and in 2002 a Laboratory for molecular diagnostics. Diagnostics of microbic diseases were undertaken there, primarily related to poultry diseases, but also of other birds arriving from poultry production, and also from clinical samples from the field and from other Faculty clinics. The Department has continued this tradition and works on acute problems in practice and concludes

agreements with poultry organizations, to whom it provides expert assistance, services of tests on dead animals, diagnostics, creates vaccines and gives instructions for treatment and prevention of poultry diseases. In the bacteriology laboratory since 2016, due to the acute epizootiological situation related to infections of poultry with *E. coli* pathogenic bacteria, it has also been producing vaccines (monovalent and polyvalent bacterial vaccine) for various poultry farms. In 2001 the Department was expanded to an additional location, where it equipped new premises and the outpatient Bird Clinic was officially opened in 2002. With the opening of this outpatient clinic and the expansion of the laboratory space, the Department also officially changed its name, so from October 2005 it has been known as the Department of Poultry Diseases with Clinic. Since 2009 the Bird Clinic expanded its activities to reptiles and other exotic pets. Cooperation was also established with the Ministry of Culture, so since 2016 the Bird Clinic has been authorized to tag strictly protected birds and animals with a microchip, and register tagged animals in a database of protected birds and animals. In 2017 the Department was also given permission to work as a centre for convalescence of exotic wild animals. The Chlamydia Laboratory (ChlamLab) was founded in 2006 by a decision of the Ministry of Agriculture, and is the only such laboratory with authorization in the Republic of Croatia. In 2010 the same laboratory was authorized to become the reference laboratory of Croatia.

From the very foundation of the clinical institutions a clinical protocol (medical history) is kept for every sick animal, which is stored with all the test results and important information in the clinical archives. According to the data from the protocol it is visible that the number of patients at the Veterinary Faculty's clinics has changed significantly over history. Until the middle of the 1950s, the number of clinical and outpatient patients rose gradually, and then began to fall. That is to say, at one time the clinics within the Faculty were almost the only therapeutic institutions in the City of Zagreb and the surrounding area, but in time many veterinary stations and clinics were opened, who dealt with curative treatments, not only in the surrounding area but also in the narrow area of the city. The other reason for the fall in the number of livestock as clinical patients was the intensification of livestock production, and producers, becoming almost industrial in scope, founded their own veterinary, preventive and curative institutions within their own facilities. From 1960 to



Vaginal examination of a mare with Polansky Speculum within the professional and clinical work of the Ambulatory Care Clinic in 1950s (Faculty Archives).

1964 the inflow of sick animals decreased even further. Apart from the reasons mentioned, it should also be pointed out that at that time the Secretariat for Internal Affairs of the City of Zagreb rendered a decision to forbid the movement of animals about the city and keeping them in the city area, apart from carnivores. Due to the strict enforcement of this decision and the rapid development of motorization, visits by ungulates to the clinic were significantly reduced. At the same time the number of carnivore patients also fell, due to the foundation of a city veterinary clinic and a special institution for accommodation and care of dogs in the immediate vicinity of the Faculty of Veterinary Medicine. From the beginning of 1965 the number of patients at the clinics slowly began to rise again, thanks to the organized delivery of sick large animals using a special faculty lorry. This faculty lorry resolved the crisis of supplying the clinic with patients, which after the clinic moved from Savska Street to the new buildings on Hainzelova Street became more acute and came to a head after the prohibition of movement of large animals about the city streets. This lorry was used upon request by other veterinary clinics which were located outside Zagreb. Patients also came to the Faculty from the area where classes were held in outpatient clinics, if they could not be treated in the field. In this way, students were able to monitor patients at the Faculty, having undertaken the initial examination in the field.

At the beginning of the Homeland War, and with the foundation of the independent Republic of Croatia, there was a significant fall in the number of large animals as clinical patients, and that trend has continued until the present day. The reasons for this should be sought in the overall significant reduction in the quantity of livestock in the Republic of Croatia, and the unfavourable ratio of the costs of clinical treatment of farm animals in relation to their economic value, so that today the patients at the clinics are predominantly pets.

Other organizational units of the Faculty were or still are involved in intensive professional activities, such as the Department of Hygiene, Technology and Food Safety, which conducts analytical work to assess the health and quality of food. It was founded as the Department of Hygiene of Livestock Production (meat and milk) in 1922; it began work in 1933 and became one of the first institutions for evaluation of health and quality of food in this part of Europe. The members of the Department took part in the development and processing of food products, especially meat, sausages and dairy production, and they were also active in drawing up regulations within the scope of work of veterinary health inspection and standardization of product quality. In this work, the Department nurtured cooperation with state administration bodies, accreditation agencies and professional associations. In that sense, the laboratories of the Department were issued decisions by the Ministry of Health and the Ministry of Agriculture on authorization to undertake analyses and super-analyses of food, which they undertook through administrative procedures (official samples), agreed work with industry, and many professional projects. Experts from the Department have also taken part in drawing up projects for the construction and upgrading of food production facilities.

The professional work of the Faculty is reflected in the effect of the results obtained from projects to improve livestock production. So, for example, in 2000 a pilot-project was conducted by the Faculty of Veterinary Medicine and the Administrative Department for Agriculture of the Bjelovar-Bilogora County entitled *Support to Family Farm Businesses in the Bjelovar-Bilogorje County*. The project covered selected milk producers who were visited by experts from the Faculty of Veterinary Medicine. On that occasion, the main problems were established which had a negative effect on milk production (unsuitable accommodation of animals, reproduction disturbances, inappropriate milking, mastitis, inappropriate feeding etc.). On this basis the Faculty organized topical seminars on improving milk production on family farms for farmers included in the pilot project and all other interested farmers and veterinarians in the field, and agricultural services. At the end of the project it was planned to determine the resulting situation, that is, how far the training had resulted in an increase in milk production, its quality and hygiene, and the financial effects. The



Prof. Dr. Križan Čuljak during pathohistological examination in the laboratory of the Department of Pathological Anatomy (today the Department of Veterinary Pathology) (Faculty Archives).

other projects run by experts from the Faculty of Veterinary Medicine related to the application of research in rural areas, with its effects on the rural village economy, and the social and economic indicators of rural development in general. The projects financed by bodies of local administration (the City of Zagreb and Zagreb County) related to the field of reproduction of domesticated animals, veterinary public health, public health and environment protection. The ideas for some of the projects were initiated by farmers and/or producers of local and traditional products, so they participated with scientists in protection of the original form, geographic origin or traditional appearance of products of animal origin. In that way, some brands, such as Samobor salami, found their place on the market.

The professional work of the organizational units of the Faculty in the past also involved publication of scholarly deliberations in fields of particular interest for practice. Scholarly papers were published in journals including *Veterinarski vjesnik*, *Gospodarski list*, *Stočarstvo*, *Jugoslavenski veterinarski glasnik*, *Vetserum*, *Praxis veterinaria*, *Mljekarski list*, *Veterinarska stanica*, *Krmiva* and *Mljekarstvo*, and there was particularly fruitful cooperation with pharmaceutical companies, livestock farms, stables, state-owned property, centres for artificial insemination, meat industries, and veterinary organizations, aimed at improving individual branches of livestock production.

Teaching staff from the Faculty, alongside their professional work through these centres, also took part in the work of the veterinary high school, which was located on Faculty premises for two periods of time (1947-1953; and 1977-1990) and over the course of history, according to the political circumstances in this region, they made a significant contribution to the work of the following professional associations: The Croatian-Slavonian Veterinary Society (1893-1921), the Yugoslav Veterinary Association (JVU; 1921-1939), the Croatian Veterinary Society (1939-1945), the Society of Veterinarians and Veterinary Technicians of the People's/Socialist Republic of Croatia (1948-1991), the Federation of Associations of Veterinarians and Veterinary Technicians of the Republic of Croatia (1991-1992), the Croatian Veterinary Chamber (since 1992), with the aim of promoting veterinary workers and in general promoting veterinary medicine in society.



## 3.6. International cooperation

At the beginning of the work of the Faculty of Veterinary Medicine, international cooperation, as during the time of the Veterinary High School, was limited to individual visits by our teaching staff to other countries for training. So, for example, in 1929 the then assistant professor in the Clinic for Surgery, Dr. Otto Köster went to Giessen for specialized training, and then to Hanover. On that occasion he visited almost all the best-known veterinary colleges and faculties in the west. After he returned to the Faculty, he passed on his rich experience gained from these foreign clinics, and set our veterinary surgery on more modern foundations. At that time some teaching staff from the so-called theoretical-experimental departments spent time in training, for instance the assistant professor of that time at the Department of Anatomy, Dr. Teodor Varićak, who with a scholarship from the Humboldt Foundation, stayed from 1936 to 1938 at the Department of Anatomy of the Faculty of Medicine in Würzburg, and the Department of Anatomy of the Faculty of Veterinary Medicine in Leipzig.

In 1938 one of the first study visits of foreign experts to our institution was recorded, with the visit to the Clinic for Surgery of our Faculty by Prof. Dr. Walther Bolz, director of the clinic of the same name of the Faculty of Veterinary Medicine in Giessen.

During the Second World War study visits by foreign experts were more frequent, so in November 1942 the Faculty was visited by Prof. Dr. Telesforo Bonadonna from the Faculty of Veterinary Medicine of the University of Milan, and he held a lecture on artificial insemination.

In October 1943 Prof. Dr. Valentin von Stang from the Faculty of Agriculture and Veterinary Medicine in Berlin held a lecture on the role of veterinarians in improving animal husbandry. Our teachers also went on short study trips at that time (Assist. Prof. Dr. Dragan Ilačić, 1943, Berlin; Prof. Dr. Rudolf Ganslmayer, 1944, Berlin) or they went for longer specialized training (Milan Šlezić, 1940-1941, Hanover, Munich, Giessen, Berlin, Leipzig and Vienna; Dr. Josip Spalatin and Dr. Eduard Vukelić, 1942-1944, Giessen; Dr. Zvonimir Dinter, 1942-1945, Berlin-Dahlem). At the turn of the 1940s and 50s, some assistant professors from the Faculty of Veterinary Medicine, through the interest of Academician Andrija Štampar from the School of Medicine of the University of Zagreb who was then the president of the World Health Organization, went for training to medical faculties in Switzerland, where they gained experience, and when they returned they used those insights at the Faculty (see cooperation between the Faculty and other faculties of the University of Zagreb).

From the middle of the 1950s Faculty employees increasingly went on short or longer study visits abroad (Assist. Prof. Dr. Milan Kralj, Germany; Assist. Prof. Dr. Ivo Drežančić, Australia; Prof. Dr. Ivo Ehrlich, England; Dr. Davor Petrović, France; Dr. Josip Gorišek, Germany; Prof. Dr. Mirko Francetić, USA; Assist. Prof. Dr. Josip Marolt, Austria; Dr. Mladen Hajsig, The Netherlands; Prof. Dr. Sergej Forenbacher, The Netherlands And Denmark; Prof. Dr. Stjepan Rapić, The Soviet Union, etc.) and used the experience they gained in scientific work in their home departments and clinics. The Faculty also received an increasing number of recognized international experts from other faculties and institutions (Prof. Dr. Otto Übereiter, Vienna; Prof. Dr. Dietrich Küst, Giessen; Prof. Dr. Kjeld Wamberg, Copenhagen, Prof. Dr. Martin Seelemann, Kiel; Prof. Dr. Alexander Robertson, Edinburgh, etc.), who shared their knowledge and professional experience with our staff. Teaching and auxiliary staff at that time also organized group visits abroad. In that context from 10<sup>th</sup> July to 2<sup>nd</sup> August 1955 a professional trip to England was organized, to visit the veterinary faculties and other veterinary institutions there. Twenty-three employees of the Faculty took part in the trip, with three representatives of veterinary production institutes and veterinary stations.



Photo from the veterinary training course in Vienna in September 1954. From left to right: Assist. Srđan Rižnar; Assist. Dr. Velimir Benko; Prof. Dr. Antonin Klobouk, University of Veterinary Sciences, Brno, Czechoslovakia; Prof. Dr. Emil Přibyl, University of Veterinary Sciences, Brno, Czechoslovakia; Assist. Dr. Davor Petrović and Assist. Prof. Milan Kralj (Faculty Archives).



The Head of the Giessen's Ambulatory Care and Obstetrics Clinics, Prof. Dr. Dietrich Küst's stay in the beginning of October 1955. From left to right: Assist. Prof. Zvonimir Sestinski, Prof. Dr. Dietrich Küst, Prof. Dr. Božidar Oklješa and Assist. Prof. Milan Kralj (Faculty Archives).

Within the context of international cooperation, it is also necessary to mention the visits by our professors as lecturers to institutions of higher education abroad, and their work as experts in international organizations. In 1966 Prof. Dr. Sergej Forenbacher, at the invitation of the Veterinary High School in Hanover, taught the course in metabolic diseases as a guest professor. In 1970, for his services in establishing and advancing scientific cooperation between the Faculty of Veterinary Medicine of the University of Zagreb and the Veterinary High School in Hanover, he was declared to be an honorary



The title of Honorary Citizen awarded to Prof. Dr. Sergej Forenbacher from the Clinic for Internal Diseases of the Faculty of Veterinary Medicine of the University of Zagreb in 1970 in Hanover, Germany (Faculty Archives).

citizen of Hanover. Prof. Dr. Nikola Fijan spent more than nine years abroad during his university career, of which seven were spent as guest professor at two universities in the United States of America: Auburn University (1966-1968), and University of Arkansas (1992-1996). As an expert in illnesses of fish and aquaculture of the Food and Agriculture Organization of the UN (FAO) he spent two years in Brazil (1983-1985). In the time that followed, other professors from the Faculty also taught at institutions of higher education abroad, including Prof. Dr. Vladimir Mitin and Prof. Dr. Mirza Hadžiosmanović who spent time in 1986 and 1987, on the basis of international technical cooperation, as professors of physiology and food hygiene and technology at the Faculty of Veterinary Medicine of Al-Fateh University of Tripoli, Libya.

In the past, teaching staff from the Faculty took part in many international congresses, symposia and conferences on various areas of veterinary medicine, which became particularly intense at the beginning of the 1960s, when financing was increased for scientific research work through the relevant funds. This form of international cooperation gradually developed right up to 1991, to the beginning of the aggression against the Republic of Croatia. Then the lack of material resources had a negative effect on international activities, so in the following years there was much less participation by Faculty's employees at congresses and conferences in other countries.

In 1993 international activities of the Faculty's staff increased, reflected in the presentation of papers at international congresses (Australia, Denmark, the United Kingdom, Germany, Poland, Hungary and Slovenia). So, in terms of the Croatian poultry science and profession, at the 10<sup>th</sup> International Congress of the World Veterinary Poultry Association held from 16<sup>th</sup> to 19<sup>th</sup> September 1993 in Sydney, the Croatian branch of the World Veterinary Poultry Association was particularly well-received.

In the period from 24<sup>th</sup> to 25<sup>th</sup> June 1993 an international scientific conference was held at the Faculty of Veterinary Medicine, entitled the "Veterinary Science and Profession". This was the first conference of its type organized by the Faculty of Veterinary Medicine, and there were more than 190 papers registered. In the same year the Faculty of Veterinary Medicine organized the First Croatian International Symposium on Hygiene and Sanitation (DDD).

To mark the 325<sup>th</sup> anniversary of the University of Zagreb, the 120<sup>th</sup> anniversary of the modern organization of the University of Zagreb, and the 75<sup>th</sup> anniversary of our Faculty, on 11<sup>th</sup> April 1994 an international scientific meeting was held entitled Veterinary Medicine in Croatia and Germany. In the same year, the University of Zagreb signed an agreement with the Ludwig Maximilian University of Munich on the exchange of scientific and teaching staff. As part of that exchange, Assist. Prof. Dr. Branimir Kampl spent time at the Faculty of Veterinary Medicine in Munich in June 1994.

In the 1995/1996 academic year the Faculty of Veterinary Medicine worked very successfully with veterinary faculties in Munich, Minnesota, San Antonio, Ankara, Budapest, Vienna and Ljubljana. So as part of the cooperation with the Faculty of Veterinary Medicine of the University of Ljubljana, our professors held undergraduate classes in Biology and Pathology of Fish, Biology and Pathology of Bees, and the Economics of Animal Husbandry.

In cooperation with the Ministry of Science and Technology of the Croatia, a delegation spent time at the Faculty from the Volcani Center, Bet-Dagen, Israel, during which many programmes of cooperation were arranged. Cooperation with the Institut National de la Recherche Agronomique (INRA) in France led to a donation of computer equipment for the central library and a program for coding and cataloguing, and a visit by experts who, when they saw the situation in the central library and the departments libraries, suggested basic guidelines for their reorganization and updating.

At the World Congress on Food Hygiene held in The Hague, The Netherlands, the Department of Hygiene, Technology and Food Safety of the Faculty of Veterinary Medicine, as a result of the advocacy of the head at that time, Prof. Dr. Josip Živković, became a member of the European Consortium for Continuing Education in Advanced Meat Science and Technology (ECCEAMST), based in Utrecht, The Netherlands.

Representatives of our Faculty stayed at the Ruminants Clinic at the Faculty of Veterinary Medicine of the University of Ljubljana. The visit was organized to learn about the organization and work of the Slovenian Association of Buiatrics, and the possibility of founding a similar association in Croatia, and to attend the 5<sup>th</sup> Congress of the Mediterranean Federation for the Health and Production of Ruminants. In the 1997/1998 academic year, a visit was organized of our representatives to the University of Veterinary Medicine, Vienna, at that time one of the largest and best equipped veterinary schools in Europe. While they were there, they arranged the possibility of study stays of two to three weeks by our young experts as part of a precisely defined programme.

In the 1998/1999 academic year the Faculty of Veterinary Medicine was visited by a three-man delegation led by Prof. Dr. Josef Leibetsederom, at that time the Rector of the University of Veterinary Medicine, Vienna. On that occasion, information was shared on the study programmes of both faculties, and further cooperation was arranged for specialised education of our employees in surgery and reproduction of domesticated animals.

Since 1999/2000 international cooperation at the Faculty of Veterinary Medicine has been given particular importance, and for the first time



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Former Rector of the University of Veterinary Medicine, Vienna, Prof. Dr. Josef Liebeteseder visited the Department of Nutrition of Domestic Animals (today the Department of Animal Nutrition and Dietetics) during his visit to the Faculty in February 2002. From left to right: Prof. Dr. Vlasta Šerman, Prof. Dr. Josef Liebeteseder, Vice-Dean Prof. Dr. Ljiljana Pinter, Assist. Prof. Dr. Nora Mas, Research Fellow Tomislav Mašek, DVM, and Assist. Zvonimir Poljak, DVM (Photo courtesy of Prof. Dr. Nora Mas).

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this area was raised to the level of the responsibility of a Vice-Dean (Prof. Dr. Ljiljana Pinter). In the same academic year, the Faculty of Veterinary Medicine was involved in the European organization of institutions of higher education, acting under the title the European Centre for Strategic Management of Universities (ESMU), and became a full member of the programme called *The Dean's Network* which brings together activities related to planning, development and education of the management structures of faculties and universities, to ensure the best possible management of higher education.

The strengthening of the international cooperation of our Faculty particularly came to the fore since 1999/2000 academic year, with the organization of short visits by researchers of various profiles from individual fields of veterinary medicine, who held about ten lectures up to the end of 2004. Some of the lectures were organized as part of the work of the Alumni and Friends Society of the Faculty of Veterinary Medicine of the University of Zagreb.

In the 2002/2003 academic year the University of Zagreb initiated activities related to foundation of an Office for International Cooperation. Due to the events related to integration at European universities, there was an increasing need for systematic monitoring and planning of international cooperation. This Office was already working in an organized manner at the Faculty of Veterinary Medicine at this time, so in time it needed to be upgraded in an organizational and operational sense.

From 2000/2001 to 2004/2005 there were frequent visits by deans and other members of university communities to the Faculty of Veterinary Medicine in Zagreb (from Ljubljana, Georgia, Lisbon, Brno, Udine, Ithaca, Giessen, Tripoli, Sarajevo, etc.), and employees of the Faculty visited faculties in the region and further afield, in order to promote the development of bilateral and multilateral cooperation. In addition, the departments and clinics were visited by increasing numbers of experts from the whole world, for the sake of individual cooperation in teaching, scientific and professional work. In that period, and up to the end of 2004, a total of forty visits were undertaken. There was also an increasing number of visits by experts from abroad for training at the Faculty, whilst at the same time employees of the Faculty were going more and more for specialized training at renowned veterinary colleges around the world. The development of our Faculty in terms of

international cooperation was encouraged by its inclusion in European integration, the designation of significant funding for organization and equipping of the Faculty with contemporary equipment, investment in the training of younger teaching staff, and intensification of the organization of international conferences and congresses, with the active participation of a large number of foreign experts. These experts, by staying at our Faculty, also became promoters of our institution and its recognition, primarily within Europe.

In 1989, the Faculty of Veterinary Medicine of the University of Zagreb became a member of the European Association of Establishments for Veterinary Education (EAEVE), which was founded in 1987 in Alfort, France in order to promote, align and improve teaching programmes at European colleges of veterinary medicine.

EAEVE's work is organised on a regional basis and out of the 110 veterinary education institutions in Europe, 95 have membership in this association of which 84 institutions have full membership and 11 institutions are in the status of so-called joined members. Our Faculty participated for the first time in the work of the EAEVE Assembly held in Utrecht in 1996. Until 1998 it was classified into the region of the Balkan Veterinary Schools and at the Assembly held in Naples, Italy in that year it joined a group of schools from Poland, the Czech Republic, Slovakia, Hungary and Slovenia.

Since the Faculty of Veterinary Medicine of the University of Zagreb, due to a variety of factors, having joined EAEVE, was not able to apply for evaluation, its preliminary evaluation was conducted from 27<sup>th</sup> to 29<sup>th</sup> April 1998. The evaluation was conducted by Mr. S.T. Allman, coordinator of the EAEVE visitation systems. The preliminary evaluation resulted in reports on the extremely unsatisfactory equipment and premises not suitable for their purpose, especially in clinical work with animals, and the lack of practical education in the area of herd health. As a result, it was concluded that the rough date for evaluation in 2000 was too ambitious, in view of the exceptional effort needed to resolve the failings noted.

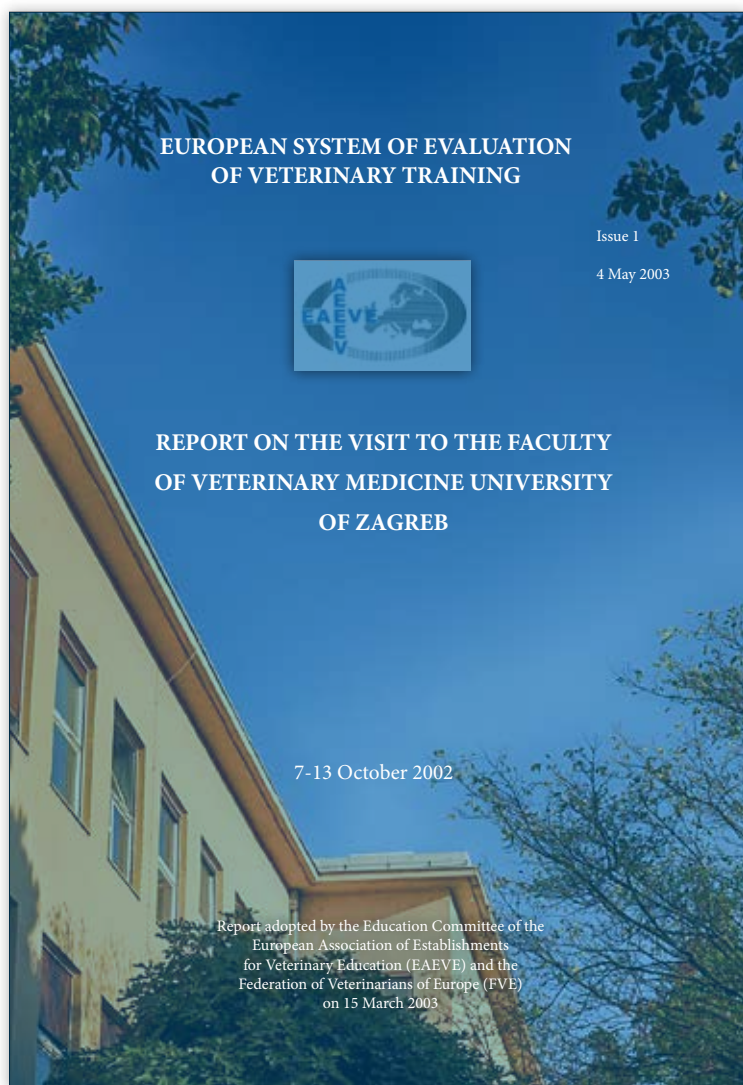
It should be pointed out that in 1998 the Faculty of Veterinary Medicine was one of the first units of the University of Zagreb to be subjected to this kind of evaluation, and in this way clearly showed that it wanted to operate in line with the European standards that apply to veterinary work. Moreover, in order to achieve the level of the best veterinary colleges in Europe as quickly as possible, in the 1995/1996 academic year work began on the systematic refurbishing of the clinics, departments and laboratories. Therefore, it was only necessary to continue in that direction, although the goals set depended greatly on the material resources at the Faculty's disposal.

At the 13<sup>th</sup> EAEVE annual conference held on 18<sup>th</sup> May 2000 in Vienna, the intention was expressed that we would accept a visitation in 2002, whose positive outcome would enhance our Faculty's reputation.

On 19<sup>th</sup> May 2000, a one-day EAEVE symposium was held on the European evaluation system at veterinary faculties, and the possibilities of achieving the level of education of the desired profile of veterinarians by the year 2000. On that occasion contacts were made with the Rector of the University of Veterinary Medicine, Vienna, Prof. Dr. Josef Liebeteseder and the Dean of the University of Veterinary Medicine, Budapest, Prof. Dr. Laszlo Solti, and it was suggested to them, and they agreed, that they could help us in the process of preparing for the visitation.

After the constituting session of the Commission for preparations for the EAEVE visitation, held on 15<sup>th</sup> January 2001, preparations were intensified for a more detailed analysis of the Faculty, which was to be prepared as the fundamental document on the current state of affairs. Meetings were held on 19<sup>th</sup> January and 12<sup>th</sup> February 2001, at which work in working groups was launched, headed up by coordinators, who were responsible for direct cooperation with the heads of the departments/clinics, and, when necessary, with all the staff.

In the same year, alterations and alignment were completed of the premises and teaching equipment, according to the EAEVE guidelines, and a large number of contacts were made with most of veterinary faculties, which, like our Faculty, belong to the EAEVE Central



as soon as possible. The Clinic was divided into two separate parts: the outpatient clinic and the isolation unit for some species of animals. A written statement, with photographic evidence on the thorough reconstruction of the Clinic for Infectious Diseases, was sent to the Education Committee of EAEVE at the beginning of October 2003. This statement was accepted at a meeting of the Education Committee on 31<sup>st</sup> October 2003, and a final decision was rendered to include the Faculty in the list of positively evaluated veterinary colleges. This was an historical event for the Faculty, especially because no institution of higher education in Croatia had ever passed that form of evaluation before. By this historical event, the Faculty of Veterinary Medicine of the University of Zagreb became one of the European faculties that meet the European standards, which means that a degree attained at our Faculty is in principle equal, for example, to one from Vienna, Hanover, Gent or Copenhagen. In other words, this meant that in higher education in the field of veterinary medicine, Croatia had already joined Europe in one sense, which was yet to happen for many other fields of work, and the state of Croatia as a whole. This was shown to be the case during the pre-accession talks with the EU. That is to say, when considering the curricula of our faculties as part of the so-called “regulated professions”, it was taken into consideration that the Faculty of Veterinary Medicine of the University of Zagreb was already on the list of the positively evaluated faculties. Therefore we did not need to participate in the meetings in Brussels where many other faculties were invited to present the alignment of their curricula with EU Directives.

In the subsequent period, representatives from the Faculty regularly took part in the work of the EAEVE Annual Assembly. In 2004 the Dean, Prof. Dr. Ljiljana Pinter, and the Vice-Dean for Science and International Cooperation, Prof. Dr. Josip Madić, took part in the work of the 17<sup>th</sup> Annual Assembly of EAEVE held from 26<sup>th</sup> to 29<sup>th</sup> May in Lugo, Spain. EAEVE at that time comprised 94 faculties from 35 countries. From the reports and discussion at the Assembly we should point out in particular the report by the coordinator of the EAEVE evaluation system, Dr. David Max Allman, who emphasised that the final reports on completed visitations, and the visitation procedure and evaluation of veterinary colleges in new member states of the European Union were sent regularly to the European Commission. So information on the faculties that had passed the visitation procedure were available to all the EU bodies and were used in talks on accession to membership of the EU, as it was, as we have already mentioned, in our case.

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European bloc. In this way information was obtained of priceless value for the visitation which was planned for 2002.

In October 2001 our Faculty was visited by the then president of EAEVE, Prof. Dr. Tito Fernandes (Lisbon, Portugal), and in February 2002 by the former Rector of the University of Veterinary Medicine, Vienna, Prof. Dr. Josef Leibetseder. Both visits were very useful as support in achieving the conditions necessary to join the group of faculties to which EAEVE had given a positive evaluation.

The visitation took place from 7<sup>th</sup> to 13<sup>th</sup> October 2002 and it was concluded at the meeting of the Education Committee in Brussels in March 2003. The outcome was generally positive, although a significant shortfall was found relating to the non-existence of a suitable isolation unit at the Clinic for Infectious Diseases of Domesticated Animals. Finally the EAEVE report on the Faculty (*Report on the visit to the Faculty of Veterinary Medicine Zagreb adopted by the Education Committee of the European Association of Establishments for Veterinary Education (EAEVE) and the Federation of Veterinarians of Europe (FVE) on 15 March 2003*, author's note) was adopted by the Education Committee and the Federation of Veterinarians of Europe. In this way the procedure of evaluation of the Faculty was completed which, with a generally positive evaluation, pointed out a weakness which was not in line with Directive 78/1027/EC (*EU Veterinary Training Directives*, author's note) and its supplements.

After a review of the preliminary report by the EAEVE experts, work began immediately to reconstruct and reorganize the premises of the Clinic for Infectious Diseases in order to resolve the 1<sup>st</sup> category failings

The regional association of European veterinary faculties (The Veterinary Network of European Student and Staff Transfer, VetNEST) was founded in 1993 to develop and maintain student and staff exchanges between the association's members, on the basis of the standards set by EAEVE. The association at first comprised five full members, that is, the veterinary faculties from Austria, Slovakia, the Czech Republic, Hungary and Slovenia, and since 1999/2000 academic year, the Faculty of Veterinary Medicine of the University of Zagreb had the status of observer. That is to say, the first step to full membership is an application for observer status. In this regard it was necessary to present the entire curriculum of the Faculty of Veterinary Medicine to VetNEST, supplemented with data from the first self-analysis (1995-1998) and a summarized review with supplements for 1999, and the related documentation. This documentation needed to show that we had accepted the proposals of the EAEVE visitation group, and also the results of the re-visitations published in the letter sent on 2<sup>nd</sup> May 1998 by the then EAEVE coordinator, Mr. S.T. Allman. It was necessary to wait for full membership, because according to the VetNEST Statute it could only be attained after EAEVE had given the Faculty a positive evaluation.

Even observer status made it possible to expand inter-faculty cooperation in terms of preparations for the visitation procedure, receiving information on the activities of the regular members in relation to the use of ECTS, and work on programmes of inter-university cooperation in European countries with partner countries in the regions of the Western Balkans, Eastern Europe, Central Asia,



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North Africa and the Middle East, which support reform of higher education (The Trans-European Mobility Scheme for University Studies, TEMPUS), exchanges of teaching staff and students through CEEPUS, and events of interest in the field of the development of the profile of veterinarians and the veterinary profession, as part of the Vet 2020 programme. Of the full members of the association, the first cooperation was initiated with the Faculty of Veterinary Medicine of the University of Ljubljana, and later it was extended to cooperation with the universities in Vienna, Brno and some other members. In this, our colleagues in Ljubljana offered support in preparation for the visitation, and with colleagues from Vienna, in addition, cooperation was agreed in principle regarding the possibility of training for our assistant professors and scientists at the University of Vienna.

At the VetNEST annual assembly, held from 4<sup>th</sup> to 6<sup>th</sup> December 2003 in Lipica, Slovenia, the Faculty of Veterinary Medicine from Zagreb and the Faculty of Veterinary Medicine from Wrocław, after the reports on the EAEVE evaluation, were received into full membership of VetNEST by a unanimous public vote. In this way the association VetNEST grew in size by two full members. On that occasion, the Deans signed bilateral international agreements between the Faculty of Veterinary Medicine of the University of Zagreb and the Faculty of Veterinary Medicine of the University of Veterinary and Pharmaceutical Sciences Brno and the Faculty of Veterinary Medicine of the University of Ljubljana.

The leadership of VetNEST is elected every two years by rotation from amongst the full members. At the assemblies delegates submit their annual reports on current activities at individual faculties (the organization of the faculty, improvements in study programmes, preparations for visitation procedures etc.) and there is discussion of exchanges of teaching staff and students as part of the CEEPUS programme. At the assemblies there is also discussion of other current issues related to the study programmes, proposals are presented for improving cooperation between members of VetNEST, and other faculties are presented as candidates for membership of VetNEST. The annual assembly of VetNEST in 2004 was held at the University of Veterinary Medicine and Pharmacy in Košice, from 10<sup>th</sup> to 11<sup>th</sup> September. At that assembly the discussion was mainly about the organization of classes in line with the Bologna Declaration. It was shown that colleges have different attitudes and approaches to the Bologna Process. At the assembly there was a notable presentation by our Vice-Dean Prof. Dr. Albert Marinculić on the organization of the lifelong education of veterinarians on the level of VetNEST.

The Central European Exchange Programme for University Studies (CEEPUS) is a programme for establishing and development of traditional academic cooperation, that is, exchanges of students and teaching staff between signatory countries. The governments who have signed the agreement undertake to cover the costs of the exchanges. The beneficiaries of this funding are colleges within the signatory countries. The programme came into effect on 1<sup>st</sup> December 1994 and the founding countries of the programme were Austria, Bulgaria, Hungary, Poland, Slovakia and Slovenia. Croatia joined the CEEPUS programme in 1995, and the programme now has 14 members (the countries listed above were later joined by The Czech Republic, Romania, Albania, Bosnia and Herzegovina, Montenegro, Macedonia and Serbia).

The Faculty of Veterinary Medicine joined the programme thanks to its membership in the network of veterinary high schools and universities, VetNEST, in which, there are also faculties from Austria (Vienna), The Czech Republic (Brno), Hungary (Budapest), Poland (Wrocław), Slovakia (Košice) and Slovenia (Ljubljana).

The programme organizes the stay of students and academic staff at veterinary colleges, in order to create better inter-faculty connections. At the annual assemblies of VetNEST the number is determined of students and teaching staff who will take part in exchanges through CEEPUS.

The first exchanges of students and teaching staff at faculties through CEEPUS took place in the summer semester of the 2001/2002

academic year, within the veterinary faculties who were members of VetNEST. At first, the scholarships for the stay of our teaching staff and students at foreign faculties as part of VetNEST were for one month (short-term scholarships), and after the Faculty of Veterinary Medicine of the University of Zagreb had been successfully evaluated by EAEVE, its efforts to extend the stays by our teaching staff and students to a full semester (long-term scholarships) were realized.

As part of CEEPUS from 2001/2002 to 2004/2005 a total of nine scholarships for teaching staff and 23 for students of the Faculty of Veterinary Medicine were granted for stays at foreign faculties, as part of membership of VetNEST. In the same period a total of three scholarships were granted for teaching staff and 16 for students from foreign faculties, members of VetNEST for stays at the Faculty of Veterinary Medicine.

The TEMPUS (Trans-European Mobility Scheme for University Studies) programme is aimed at inter-university cooperation between European Union countries and partners in the Western Balkans, Eastern Europe, Central Asia, North Africa and the Middle East, to assist reform of higher education. The programme was founded in 1990 and is financed within the PHARE programme. The PHARE programme is one of three pre-accession financial instruments of the European Union to help candidate countries in Central and Eastern Europe in their preparations to join the EU. (It was originally planned in 1989 as: Poland and Hungary, Assistance for Restructuring Their Economies (PHARE), author's note). The TEMPUS programme went through various changes as TEMPUS II, TEMPUS II bis and TEMPUS III. The Republic of Croatia joined the third phase of the TEMPUS programme in 2000. In 2004 the Projects Committee of the Commission for Scientific Research Work and International Cooperation of Faculties organized and coordinated activities to prepare a proposal for a TEMPUS project, for reorganization and improvement of classes in line with the recommendations of EAEVE and the Bologna Declaration.

The coordinator of the project was the Faculty of Veterinary Medicine of the University of Zagreb, and the regional partners were the Faculty of Veterinary Medicine of the University of Sarajevo and the Faculty of Veterinary Medicine of the University of Skopje. The project was commissioned by the University of Veterinary Medicine, Vienna, and the EU member of the project consortium was the Faculty of Veterinary Medicine of the University of Ljubljana.

The project was proposed to the EU Commission in December 2004 under the title *New Veterinary Curriculum-Development and Implementation*. Unfortunately, by a decision of the European Commission, the project never received financial support.

In the period from 1991 to 2004 the Faculty of Veterinary Medicine was the organizer or co-organizer of many other international and national congresses, symposia and conferences in the field of veterinary medicine, and other related professions, held all over Croatia, of which the following deserve a special mention: "1<sup>st</sup> to 3<sup>rd</sup> Croatian Veterinary Congresses" (1996, 2000, 2004), "Veterinary Days" (1992-2004), the "1<sup>st</sup> and 2<sup>nd</sup> Croatian Symposia on Trichinella", with international participation (1999, 2001) the "1<sup>st</sup> to 11<sup>th</sup> International Conferences on Animal Feed" (1993-2004), the "1<sup>st</sup> to 5<sup>th</sup> Scientific and Professional Symposium-Poultry Days", with international participation (1994-2003), the "1<sup>st</sup> to 5<sup>th</sup> Scientific and Professional Conferences on Disinfection and Pest Control", with international participation (1993, 1995, 1998, 2001, 2004), the "4<sup>th</sup> Central European Buiatrics Congress" (2003), etc. At these conferences employees of the Faculty of Veterinary Medicine took an active part, primarily through presentation of scientific papers in all areas of veterinary medicine. This was also an opportunity to present the scientific production of the Faculty, which was in step with world trends in the selection of areas of research work (projects). A large number of meetings were also in the form of traditional gatherings of veterinary experts, which promised the continuity of the international recognition of the Faculty in scientific and professional work in this region.

## 3.7. Student activities

After the Faculty of Veterinary Medicine was founded, the veterinary medicine students, continued their activities through the Veterinary Students' Association (KSVM).

The KSVM aimed its activities at that time at defending the survival of the University and the Faculty. Thus, together with other students, it organized protest meetings against the moves to abolish the University of Zagreb. Protecting the interests of the Faculty, they organized a protest meeting on 27<sup>th</sup> July 1928 requesting that the property of the National Veterinary Foundation be returned to Zagreb from Belgrade, and used for the purpose of developing the Faculty. One year later the Foundation was returned to Zagreb and used for that purpose.

With the beginning of Fascism, political relationships between students became tense, so the KSVM was polarized into two groups, the pro-Fascists and the anti-Fascists. The latter consisted of students who were supporters of the Communist Party of Youth of Yugoslavia (SKOJ), through a group of left-wing students. Members of SKOJ were increasingly accepted by other students, because they were fighting for their general interests.

At the beginning of the war, the SKOJ students at the University of Zagreb were the first to get arrested. Jaroslav Hvala, president of the KSVM, was arrested and taken to the Kerestinec camp, and after escaping he was captured and shot on 5<sup>th</sup> August 1941 in the Maksimir forest. After that, SKOJ at the Faculty began to organize resistance groups and it undertook various political activities in support of the National Liberation Movement.

In the post-war period the students continued their activities at the Faculty through the newly founded student organization, "Jaroslav Hvala". The organization was founded on 17<sup>th</sup> January 1946, aimed at ideological and political work on socialist principles. Its founders, as part of the National Student Youth (NSO) movement, were left-wing students and SKOJ members, who had been part of the KSVM before the war, and some later became university teaching staff at the Faculty (Slavko Krvavica and Sergej Forenbacher).

The political activities of this new student organization went on in small groups, debate evenings, and courses, teaching political economics and Marxist theory. One of the most important activities of the student organization at our Faculty was its significant involvement in the reconstruction of the country. The "Jaroslav Hvala" youth work brigade took part in many work projects (the People's Youth Railway Projects-Brčko-Banovići and Šamac-Sarajevo, building New Belgrade, the Brotherhood and Unity Highway, Vinodol hydroelectric power station) and thereby made a significant contribution to the post-war construction. Apart from these activities, the students worked increasingly on professional issues at the Faculty. At the end of 1946 and the beginning of 1947 the NSO, at its own initiative and expense, issued two sets of course notes for the first two years of study, and many for later years too. Furthermore, students were included in reform of classes and took an active part with the teaching staff. In return, teaching staff took an active part in the work of the student organization, wrote articles for student papers and took part together with students in building the People's Youth Railway Project, the Šamac-Sarajevo railway line.

In the 1948/1949 academic year the Slavko Komar Sports Society was founded at the Faculty, aimed at encouraging physical education. The society had several sections, and achieved the most success at the University in handball, football and skiing.

In April 1951 the organization known as the National Union of Yugoslav Students was founded, so the NSO changed its name to the Association of Students of Veterinary Medicine, Zagreb. It began cooperation as part of the International Veterinary Students' Association, the IVSA, which was founded in 1953 in the German city of Giessen. The first time our students participated in this was in 1954 at the 2<sup>nd</sup> IVSA Congress



The Veterinariade participants in Lepenski Vir, Serbia (1980). In the first lower row second from the left is the former student Nora Mas, who later achieved a University career at the Department for Nutrition of Domestic Animals (today the Department of Animal Nutrition and Dietetics) (Photo courtesy of Prof. Dr. Nora Mas).

in Paris, and already in July 1958 they hosted the 6<sup>th</sup> IVSA Congress in Zagreb. Through the IVSA, international contacts were promoted, which, amongst other things were realized through exchanges of our students with their colleagues abroad. For example, in 1953, students from the veterinary schools in Toulouse, France, visited Zagreb and the Faculty, and our final year students returned the visit on a study excursion. In 1955 our students successfully organized an exchange of students with the Veterinary High School in Vienna. On that occasion, 20 veterinary students from Vienna visited our Faculty, and an equal number of our students returned the visit. In 1959 a group of 30 students from the Veterinary High School in Alfort stayed in Zagreb as guests of the Faculty of Veterinary Medicine. Student exchanges were organized successfully in the following decades as well.

In 1955, the Association of Veterinary Medicine Students changed its name to the Union of Veterinary Medicine Students. Special attention was dedicated to the issues of learning, taking exams and improving the study curriculum.

The Union founded two clubs at the Faculty, which dealt with certain issues. The professional club organised printing of scripts and textbooks, writing and publishing the best professional papers of its members, and gathered demonstrators to help other students in mastering the practical program. The scripts were printed in the student scriptwriter on an old roto-machine with the financial assistance of the Faculty and the Veterinary Directorate of the National Republic of Croatia. Usually, 100 to 300 copies *per* title were printed. Part of the printed scripts was assigned to the Student Library in the amount of the financial assistance of the Faculty while the remaining part was sold, and earnings were used to prepare new titles. To connect with the village, the Student's Club organised practical work and introduction to the conditions and the way of life at family farms. Occasionally, the members of the Club went out to the field in groups where they organised lectures on livestock promotion. Younger teachers at the Faculty helped a lot in this. The Union of Veterinary Medicine Students founded a photo club, a tamburitza section and a student sport organisation. The Union cooperated closely with student organizations of the remaining three Veterinary Faculties in Yugoslavia, and they founded joint coordinating committee in academic year 1953/1954 in Zagreb, which later became



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the National Committee of Students of Veterinary Medicine of Yugoslavia. The Committee organised the entire socio-political activity of students from all four Veterinary Faculties in the country. In that sense, the Week of the Yugoslav Veterinary Medicine Students was held in Sarajevo in 1956 which later became a traditional gathering and represented the festival of the whole social, cultural, professional and sport activity of all veterinary medicine students. The Committee changed the name to the Yugoslav Committee of Yugoslav Veterinary Medicine Students in 1956. The Committee met every two years, it represented the veterinary medicine students in the country and abroad, and it was a member of the IVSA.

In 1970, students from our Faculty were the hosts of the Veterinary Medicine Students' May Festival. This was a form of interfaculty meetings of students of veterinary medicine in Yugoslavia at that time, held as a display of student solidarity. These student meetings, or the so-called "Veterinijada" were held traditionally every four years until the beginning of the 1990's, and they included various competitions of a scientific, cultural, artistic and sporting nature.

Apart from the manifestation "Veterinijada", the manifestation "Partizanski marševi" was also organised, where the students symbolically crossed over the historical places related to the events in the Second World War. This evoked memories among the young people on the success of the national liberation struggle under the leadership of Josip Broz Tito.

In 1982, a Club for Students and Employees of the Faculty of Veterinary Medicine was founded, within which special student activities took place and social and cultural events were held. Since 1993 students were active within the Union of Veterinary Medicine Students (USVM) *Equus*, wishing to resume the publishing of the student journal *Veterinar*, working on improving the study conditions, and representing all interests and rights of the students.

The founders of the USVM *Equus* were: Marko Premzl (President), Perica Tucak (Secretary), Mladen Pavić (Head of the Publishing Section) and Ivan Križek (Head of the Entertainment Section). In the beginning new members joined with their ideas and support to the student Union: Hrvoje Cicvarić, Marinko Vilić, Tomislav Flikač and Kristijan Srebrenjak. They did not have any knowledge on the legal procedures for founding the Union but they found out that some students from the Faculty of Electrical Engineering and the Faculty of Transport and Traffic Sciences were also founding a student association. Marko Premzl contacted them to gain insight into the Statute of their association which was adapted to the *Equus* association. The Founding Assembly was held in the classrooms of the then Department of Pathological Anatomy in 1993. After the Founding Assembly, the Union registered and started with activities. They sought the return of the premises used by the previous association but they only got two completely abandoned basement premises under the Department of Pathological Anatomy which they arranged for weekly gatherings.

The Publishing Section's plan was relaunching of the *Veterinar*, the oldest veterinary medicine students' journal in Europe, which required certain funds. Since they did not have the appropriate support from the Faculty of Veterinary Medicine, with the help of Božidar Premzl (Marko Premzl's Father), the journal was entirely published thanks to the cofinancing of the Livestock Reproduction Centre of Croatia Ltd., and printed in early 1995. Marko Premzl was the editor-in-chief of the journal *Veterinar*, and all the others who wrote articles were associates: Hrvoje Cicvarić, Goran Csik, Tomislav Flikač, Tomislav Gomerčić, Andrej Grgić, Alen Hrastnik, Ivan Križek, Emina Mavrinac, Mladen Pavić, Jakša Petrić and Kristijan Srebrenjak.

The entertainment section program referred to the organisation of the cultural and entertainment events at the Faculty of Veterinary Medicine, and Freshmen Parties. Frequent cultural and entertainment events were held in the basement under the Department of Pathological Anatomy. Organisations of different events are remembered: a literary evening featuring a collection of poems *Mravi* written by the undergraduate ABD of veterinary medicine Tomislav Filipan, a performance by Prof. Dr. Zvonko Modrić as a solo trumpeter with a jazz guitarist, a performance by the two guitarists



Founders of the *Equus* and their guests at the Founding Assembly in 1993. Sitting on the left: Perica Tucak (secretary), Marko Premzl (president), Radovan Zečić (guest), Mladen Pavić (head of the Publishing Section), Tomislav Flikač (member). Standing on the left: Kristijan Srebrenjak (member), Ivan Križek (Head of the Entertaining Section), Petar Čumandra (guest), Assistant Dr. Damir Zubčić (guest), Hrvoje Cicvarić (member) (Photo courtesy of Assoc. Prof. Dr. Marinko Vilić).

Hrvoje Cicvarić (who is today a guitarist in the *Los Caballeros*) and Ivan Križek, a costume ball and other events. Students organised everything by themselves, worked in a bar and cleaned it. Certainly the largest organisation and the challenge was the Freshman Party of the Faculty of Veterinary Medicine in 1994, at which Josipa Lisac and the rock band *Film* performed.

A senior student Igor Štoković joined the *Equus* later. He founded the Sport Section, and was appointed as its leader. He trained basketball and had a team of Faculty members (Tomislav Marušić, Marino Mirčeta, Mile Mikulić, Nikša Sirotković, Ljubo Barbić, Zdenko Lopac, Duje Penić, Krešimir Pavlović, Ivan Vujeva, Tomislav Rukavina and others), all gathered by Assoc. Prof. Dr. Marijan Catinelli from the Ambulatory Care Clinic who was a successful basketball coach. Štoković's friend Hrvoje Starčević (a dental medicine student) had his basketball team at the Faculty of Dental Medicine, so they began to think about competing with each other. Thus they came up with an idea to organise a sport games event called "Humanijada" which included the faculties of biomedical sciences: the Faculty of Veterinary Medicine, the School of Dental Medicine, the Faculty of Pharmacy and Biochemistry, and the School of Medicine in Zagreb. The first "Humanijada" was held in the Rovinjsko selo in 1995 where volleyball, football and basketball were played, and the first "Humanijada" organisation was supported by the then Dean Prof. Dr. Zdenko Bidin.

The USVM *Equus* made a program of extramural activities of the students of the Faculty of Veterinary Medicine on 3<sup>rd</sup> July 1995, referring to the previous results achieved in the sport (Student Championships of the University of Zagreb, "Humanijada" 1995). They also expressed the wish to continue publishing the journal *Veterinar*, the oldest student journal in this area. For this, regular resources had to be provided, and those could no longer be obtained through the sponsor because of the economic situation in the country. Therefore, at the Scientific and Teaching Council on 11<sup>th</sup> July it was concluded that students are obliged to pay 35.00 HRK for the realisation of the USVM *Equus* program for the purpose of cofinancing sport and publishing activities when enrolled in each semester. Subsequently, the work of the Union was considerably facilitated.

As student societies have been established parallelly on other faculties, the student associations began to negotiate about the supreme student organisation which was founded in 1996 as the Student Council of the University of Zagreb. This is a reason why the *Equus* can be considered as one of its creators. Today, students are representatives at the Faculty Council, at the University Senate and in the professional councils of the University divisions, Universities of Applied Sciences and high



shools, and we can consider that all from the members of the student associations of the University of Zagreb who were active in the early 1990s gave theoretical foundations.

After they became undergraduate ABDsin 1996, they decided to resign and give all functions in the USVM *Equus* to the younger members who were the most active: Goran Csick (new president and editor of the journal *Veterinar*), Vlatka Sremac, Relja Beck, Ana Barbić (today Beck), Tomislav Šantek and others.

In 1997, the Union made a request to the Dean for the establishment of a committee for the professional literature which was required for the preparation of the exams, as well as for the reduction of student number in the groups for clinical practicals. Moreover, the Union received new premises beside the Office of Student Affairs, and purchased a personal computer and equipment for the student rock group Živoderi. The group performed at the two Freshman Parties organised by the student Union. For a short period of time the Union ran the horse club with a riding school. Unfortunately, that club, which was supposed to be the founder of the Academy Equestrian Club of the University of Zagreb, was suddenly shut down. Apart from the *Veterinar*, the Union published several numbers of the *Anamneza*, a fun-filled journal.

In the same period, the number of members of IVSA increased, so in the academic year 1996/1997 almost 50 veterinary students from our Faculty were a part of that international organization. With financial support from the Faculty, they went on the annual symposia, where they promoted the assets of the Republic of Croatia and the characteristics of our Faculty in the education of veterinary experts.

One of the main activities of the USVM *Equus* just before the Bologna Process was established, was the organisation of the “First Congress of Veterinary Medicine Students” with international participation, which was held from 14<sup>th</sup> to 19<sup>th</sup> June 2005 at the Faculty. According to the Book of Abstracts, 41 authors participated in this congress, with 25 papers in total.

At the initiative of the Student Society, and with the understanding of the then Dean Prof. Dr. Mirko Francetić, and the assistance of the International University Service (WUS), a cafeteria was opened on 17<sup>th</sup> January 1956, marking the 10<sup>th</sup> anniversary of the establishment of the unique student organisation “Jaroslav Hvala”. The breakfast was given to the students and assistants at economical prices, and the financial business was led by the Dean Office. Around 300 students and 35 assistants had had breakfast every day.

It should be emphasized that the Central Academic Restaurant existed at the Faculty already in the 1930s, and thanks to the Maecenas, poorer students were given free daily meals or meals with a substantial cash discount. The president of that institution was Prof. Dr. Nikola Ritzzoffy.

The student diet was discussed at the Faculty Council session in January 1959, and during the discussion on the construction course of the Faculty, the arrangement of the restaurant was planned in the premises under the Amphitheater lecture hall. The student restaurant was opened on 18<sup>th</sup> December 1959, and its organisation was initially left to the students. According to the Council report for the academic year 1965/1966, the student restaurant was handed over to the Union branch of the Faculty to deal with the restaurant management in the most convenient way. A private lease contract for 1967 was renewed so alcoholic beverages were forbidden.

In 1983, a quality student restaurant of the Student Center was opened. It had 204 m<sup>2</sup>, and in 1984 it was enlarged to 220 m<sup>2</sup> of useful space for the dietary needs of the Faculty staff. The restaurant was partially rearranged in 1988. Today, it is located in the same basement and ground floor premises of the Amphitheater lecture hall of the Department of Anatomy, Histology and Embryology, the possibility of its relocation to the premises of the southern building (which were used by the Department of Microbiology and Infectious Diseases with Clinic until 2016) is being considered.

The student restaurant space has kept its original form since 1980s







The covered passage with tiled round green pylons between the main building and the complex of buildings for the theoretical-experimental departments is one of the Faculty's characteristic features.



## II. MODERN HISTORY





SVEUČILIŠTE U ZAGREBU  
VETERINARSKI FAKULTET

1919-2019  
STOTOGODIŠNICA 100 LETA  
VETERINARSKOG FAKULTETA  
UNIVERZITETA U ZAGREBU  
U službi Jednoga zdravlja

The central facade of the main building of the Faculty of Veterinary Medicine of the University of Zagreb in Heinzelova Street.

## 4. The Faculty After the Bologna Reform (2005-2018)

### 4.1. The Organization of the Faculty

The campus of the Faculty of Veterinary Medicine of the University of Zagreb at Heinzelova Street 55 covers a total area of 58,783 m<sup>2</sup>. There are 12 buildings on that plot, with a total area of 27,331 m<sup>2</sup>, designed for performing higher education activities. According to the Self-Analysis Report by the Faculty of Veterinary Medicine, made for the external evaluation by the Agency for Science and Higher Education in 2015, a total of:

- 8 lecture theatres with a total area of 1029 m<sup>2</sup>, and 785 seats
- 55 other type of spaces (laboratories, practical rooms, IT classrooms, outpatient clinics, operating theatres, dissection halls, and in-patient facilities for animals) with a total area of 5269 m<sup>2</sup> and 979 seats is available to the students

The Faculty has 117 offices for teaching staff, where the average area per permanently employed lecturer/associate is from 6 to 30 m<sup>2</sup>.

The premises used for scientific research work cover 2070 m<sup>2</sup>, and those used for professional work 483 m<sup>2</sup>. All these rooms and premises are part of the organizational units of the Faculty. Within the Faculty there is also a student restaurant run by the Student Centre, catering to the needs of students and staff, with a total area of 350 m<sup>2</sup> and 60 seats. The introduction of the Bologna Process into the higher education system, the EAEVE report (Visitation Report to the Faculty of Veterinary Medicine University of Zagreb, adopted by the Education Committee of the European Association of Establishments for Veterinary Education and the Federation of Veterinarians of Europe, on 15<sup>th</sup> March 2003), the changes to the national legislation on scientific activity and higher education (2003), and the University Statute (2005) were the bases for drawing up a new Statute of the Faculty, which was adopted at a session of the Faculty Council held on 28<sup>th</sup> October 2005. This Statute introduced major organizational changes. The most important change was the founding of four Faculty Divisions:

1. Basic and Pre-Clinical Sciences Division
2. Animal Production and Biotechnology Division
3. Veterinary Public Health and Food Safety Division
4. Clinics Division

These Divisions represent the higher organizational form of the Faculty's structure, and are run by "heads". The departments and clinics remained the basic organizational units of the Faculty, run by heads or principals, and they were allocated to a specific Division based on the connections between and the similarity of their scientific-teaching and professional work.

The latest Statute of the Faculty was adopted at a session of the Faculty Council held on 20<sup>th</sup> December 2017, and One of the most important changes was the founding of the University Veterinary Hospital. This is a separate organizational unit within the Faculty, formed to improve and coordinate professional, clinical work in line with the teaching areas, specialized clinics and departments within its structure. The following organizational units participate in the work of the University Veterinary Hospital, in the field of professional and clinical work with patients:

1. Clinic for Surgery, Orthopaedics and Ophthalmology
2. Clinic for Obstetrics and Reproduction
3. Clinic for Internal Diseases
4. Department of Poultry Diseases with Clinic
5. Department of Microbiology and Infectious Diseases with Clinic
6. Department of Parasitology and Invasive Diseases with Clinic
7. Department of Radiology, Ultrasound Diagnostics and Physical Therapy
8. Department of Veterinary Pathology

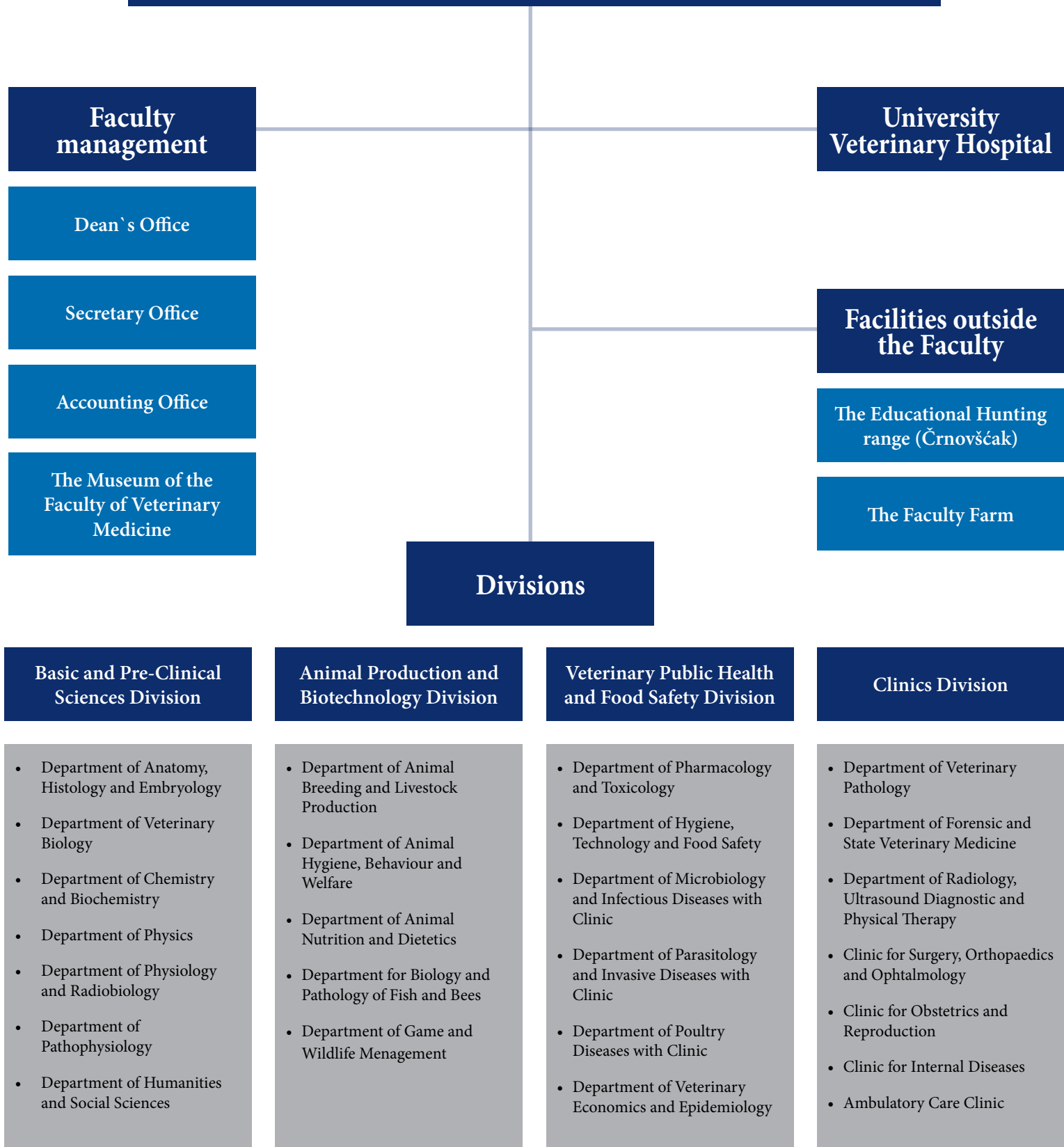
The University Veterinary Hospital is run by a headproposed by the teaching staff of the University Veterinary Hospital (by a two-thirds vote), and confirmed by the Faculty Council.

The Faculty Administration is an organizational unit of the Faculty on the level of the Divisions, that manages the Faculty, and deals with organizational tasks, legal issues, staff, accountancy and book-keeping, administrative and technical tasks, maintenance, and other tasks important for the Faculty's everyday operation. The work of the



## II. MODERN HISTORY

### Organization units of the Faculty of Veterinary Medicine





Administration is governed by the Dean, and he is assisted in this by the Vice-Dean and the Assistant Deans, by means of delegated competence, and the Secretariat as the executive body of the Dean and the Council. The units of the Faculty Administration are run by heads, who are appointed by the Dean, with the exception of the Secretariat, which is run by the Faculty Secretary. Within the Faculty Administration, amongst other things, there is an Office for EU Projects and Transfer Technology, and we are the first Faculty of the University of Zagreb with this kind of office with a permanent staff member. This has proven to be a good decision because the Faculty has recently been granted several international projects which will have a significant impact on the Faculty's international recognition in scientific research work, and the development of Centres of Excellence, such as the Centre for Experimental Surgery within the Clinic for Surgery, Orthopaedics and Ophthalmology, the development project "Centre of Excellence of Clinic for Surgery, Orthopaedics and Ophthalmology", and participation in the work of the "Scientific Centre of Excellence for Reproduction and Regenerative Medicine" of the Ministry of Science and Education of the Republic of Croatia. The Faculty Council is the professional council of the Faculty. All employees who hold scientific-teaching, teaching and scientific positions are members of the Faculty Council, with a certain number of representatives who hold associate or professional positions, student representatives, the head of the Central Library and a representative of other employees. The Faculty Council performs the following tasks: elects and dismisses the Dean and the Vice-Dean, adopts a strategy for the development of the Faculty, adopts study curricula and syllabuses, adopts the Faculty budget, passes the final accounts of the Faculty and the Dean's annual report, adopts the implementation regulations of

the Faculty, proposes and/or elects teaching staff and associates for appointment to the appropriate scientific-teaching, teaching and associate positions and titles, takes care of and renders the decisions to ensure the quality of the work of the Faculty, and performs other tasks pursuant to the Faculty Statute.

The Faculty Council works in sessions which are prepared, convened and presided over by the Dean, and held as a rule regularly once a month. Decisions are rendered if more than half the total number of members are present at the session of the Council. Preparation of individual questions from within the competence of the Faculty Council is undertaken through 10 permanent commissions, and their competence is defined by the Rules of the Work of the Working Bodies of the Faculty Council.

The Central Library of the Faculty of Veterinary Medicine of the University of Zagreb was established in 1922, and its collection initially comprised mainly journals and scientific/professional literature. It was intended exclusively for the teaching staff, collaborators and students. In parallel with the organization of the Central Library, department libraries were founded, and in 1956 there were 21 libraries which were part of the Central Library of the Faculty of Veterinary Medicine. In the departmental libraries there are journals and books related to the narrower areas of their interest, whilst in the Central Library, with the students' division, there are mainly textbooks and professional books.

Today the Central Library of the Faculty of Veterinary Medicine is the only veterinary library in the country, so its users see it as their main source of relevant information for study and scientific work. It is located on the ground floor of the main Faculty building, with



The meeting hall within the Deanery, with busts of prominent professors and associates of the Faculty.









an area of 250 m<sup>2</sup>, divided into four sections. In the reading room for group work, there is an information desk, a library collection and one member of staff. The second section comprises a reading room for individual work with textbook literature in Croatian and English. The third section is closed storage, with books and textbooks which are rarely used, and the fourth section is the librarians' office. The reading rooms are equipped with computers intended for users, with basic Windows and MS Office packages installed, with free use of the Internet and printer, intended exclusively for students. In the closed storage, alongside the collection of books, textbooks and journals, there is an area for individual work equipped with a computer, intended for individual work.

At the end of the 1980's, the computer program *Medved* was acquired, and a module installed for processing and borrowing materials. Most of the active collection of the Library was processed. The Library, under the management of Dr. Đurđica Stubičan, became part of the Scientific Information System in 1994, which resulted in the procurement of IT equipment and the Library becoming part of the network of scientific libraries. The *Medved* program was a bridge to the establishment of a National Library System, and the integrated library program, *Aleph*, which was adopted in 2014, managed by Dr. Vesna Spac, head of Library.

This involved a large number of preparatory activities for undisturbed work in *Aleph* (from procurement of printers and barcode readers, allocation of barcodes to textbooks and books, to procurement of printers and creation of membership cards). Today most books and textbooks are registered in the catalogue of the Faculty of Veterinary Medicine in the *Aleph* program. They can be searched on the Internet, and are a part of the joint catalogue of university libraries in Croatia. All new books and textbooks are immediately entered into the catalogue, and processed together with the older collection housed in a closed depot. Internet access to the catalogue is possible for users, and individuals can check online the status of the books they have borrowed.

The Library has enriched its collection through the SABRE Foundation on several occasions, with many titles of foreign professional literature. These books form the backbone of the literature in English.

In 2002 and 2003, students at the Faculty of Veterinary Medicine organized the VETLIBER campaigns, to collect books for the Central Library. Through those campaigns, a large number of national and foreign books and textbooks was collected, and those books were then made available to all Library users.

The procurement of printed journals has almost completely ceased, and digital journals and databases have taken their place. Today databases are integrated into the Electronic Resources Portal for the Croatian Academic and Scientific Community of the National and University Library in Zagreb (<http://baze.nsk.hr/>). In order to provide its users with the best possible access to scientific and professional information, the Library keeps track of databases and journals of interest to the veterinary profession and science, that is, databases and journals that are freely accessible, and informs its users about them.

In 2015 the Library became part of the Digital Academic Archives and Repository, Dabar, creating the Faculty of Veterinary Medicine Repository (<https://repositorij.vef.unizg.hr/>) which is comprised of PhD, graduate, final and other scientific and professional papers created at the Faculty of Veterinary Medicine. To date, more than 250 graduate papers written by students at the Faculty of Veterinary Medicine have been deposited in it. The full texts of papers are partially accessible only to staff and students of the Faculty of Veterinary Medicine (bibliographic data are visible to the public) and since 2017, with the author's permission, papers are accessible to the public in their entirety. Statistics indicate that papers have been accessed more than 1500 times, from almost 30 countries around the world. Each year almost 100 papers are downloaded.

Since 2016, the Library has been issuing certificates of the indexing and citations of papers for the needs of advancement in scientific and teaching careers, preparation of projects, statistics and accreditation. In





The detail of the collection of obstetrics and surgical instruments from the Museum of Veterinary History located at the Department of Forensic and State Veterinary Medicine (Faculty Archives).

this way, obtaining certificates for Faculty staff, but also other scientists in the veterinary profession, has been simplified and accelerated.

The Central Library has its own page on the Faculty website, and on Facebook, one of the social networks. Since most Library users are regular students, this has proved to be a good medium of communication with users.

The Library services directly work to support the educational and scientific-research work of the Faculty, and also reflect the development of the institution. Therefore, the lifelong professional education of librarians, mastering new trends and technologies, and keeping pace with them, is of great importance for the role of the Library at the Faculty. The education of students is a way to acquaint students with the Faculty's professional and scientific production, and with the achievements of other professionals in the world.

At the existing location of the Faculty in Heinzelova Street, there was a museum on the second floor of the south wing of the second building, but due to the lack of space for the departments, which were founded after the Faculty was moved to this location at the beginning of the 1960s, it was converted into the departments' premises.

In the 2017 Faculty Statute, Museum is listed as a separate organizational unit, and it is planned in the near future to set up a single, consolidated space to house the Faculty's Museum collections. The realization of this plan will take place in line with the availability of the material resources needed for that purpose, and until then, the Museum collections will be housed around the Faculty in several departments as before.

The Museum of Veterinary History first mentioned in 1936, when regulations were adopted, and the Department of Veterinary History founded. After several rounds of reorganization of classes, the Museum remained within the Department, but was not included in the title of the Department. The foundation and subsequent work of this museum were particularly the result of the work of Prof. Dr. Stjepan Rapić, who gathered a group of enthusiasts and founded the Section for the Veterinary History in Croatia, which operated for many years within the Association of Veterinarians and Veterinary Technicians of the Republic of Croatia. The section founded a Library of the History of Veterinary Medicine of the Socialist Republic of Croatia, where a large number of books were printed with veterinary historical contents,

many professional meetings and scientific symposia were organized, with participation of foreign experts, and with the help of its members, archive materials were collected along with other exhibits for the Veterinary Museum. The material basis for the work of the Section and the foundation of the Museum of Veterinary History was based on the support of various entities, such as the Fund for Combating Livestock Diseases, the The National Foundation for Science, and the National Community for Health Care of Livestock, and a large number of veterinary stations. The Museum was located in unsuitable premises until 1979 when, as part of the celebrations of the 60<sup>th</sup> anniversary of the Faculty, it was given new facilities, in which Prof. Dr. Vesna Vučevac Bajt staged a permanent exhibition space for the first time, and since then the Museum has been open to the public.

Equipping the Museum and collecting exhibits in the period that followed was helped by personal donations from individual veterinarians, and partially also from funding from research projects on history of veterinary medicine (see the Department of Veterinary History). The Museum facilities were furnished from the resources of the Faculty of Veterinary Medicine and housed in the Department of Forensic and State Veterinary Medicine, and exhibits are organized in groups, as follows: archive materials, veterinary and related literature, a collection of veterinary instruments and a collection of horse shoes. The most important exhibits in the Museum are described in the monograph "Collection of Veterinary Instruments from the Museum of Veterinary History", by the editor-in-chief and author, Prof. Dr. Vesna Vučevac Bajt, printed in 2009, to mark the 90<sup>th</sup> anniversary of the Faculty of Veterinary Medicine of the University of Zagreb.

There are two other museums within the Faculty. The Museum of the Department of Anatomy, Histology and Embryology and the Museum of the Department of Veterinary Pathology. The first of the two museums contains complete skeletons of domestic and wild animals, bone specimens for student practicals, bones from archaeological finds, fish bones and wet specimens of animal organs. The Museum of the Department of Veterinary Pathology contains more than 2000 macro-specimens of initial pathological changes in domestic animals. There are several collections at the Faculty which are located in the various organizational units. In the Department of Animal Breeding and Livestock Production there is a rich collection of models of



The detail of the museum collection of the Department of Veterinary Pathology with macro-preparations of pathological changes in domestic animals..



## II. MODERN HISTORY



Hunting house on the hunting range Črnovščak (Faculty Archives).

different species of animals, a collection of feathers from domestic and ornamental poultry, and fur and sheep's wool. The artistic part of the collection comprises the work of a modern sculptor, Robert Frangeš Mihanović, which still attracts interest today. In 2007, two sculptures (the bull Hercules, exhibited at the Millennium Exhibition in Paris, and a Buša cow) were lent to the Klovićevi dvori Gallery in Zagreb, as

part of the retrospective exhibition to mark the 135<sup>th</sup> birth anniversary of this internationally recognized artist.

In the Department of Game Biology, Pathology and Breeding there is a collection of trophies and specimens of game animals, with about 260 exhibits, including the antlers of a wild deer, the tusks of a boar, jaws and trophies from wild goats, a moose, a mouflon, specimens of skulls, birds, skin specimens and tanned leather.

In the premises of the Department of Biology and Pathology of Fish and Bees, there is a collection of microscopic specimens of organs and pathogens of honey bees, and bee hives and bee-keeping equipment. In addition, there is a collection of dry and wet specimens of water organisms, and wet specimens of pathologically altered organs.

Among other collections, it is necessary to mention the collection of the Department of Parasitology and Invasive Diseases with Clinic, which contains several hundred microscopic specimens of parasites and macro-specimens of infected animal organs, and the collections of the Reproduction and Obstetrics Clinic. One collection comprises veterinary instruments for use in obstetrics, which were very important in the development of veterinary science and practice. The other collection comprises deformed foetuses of all species of domestic animals (wet and dry specimens), which have been conserved in order to show more clearly the pathologies of pregnancy and birth to the students of veterinary medicine. This collection contains several foetuses of horses, sheep, cattle, dogs, cats and pigs, with the accompanying diagnoses, such as: *shistosoma reflexus*, *toracoshisis*, *janus*, *hydrocephalus* etc. This collection is used for teaching purposes.

By a Decision of the Ministry of Agriculture, Forestry and Water Management of 31<sup>st</sup> May 2005, the Faculty of Veterinary Medicine was granted the right to hunt in (manage) the state-owned hunting range, Črnovščak. It is a low-lying hunting range with a favourable proportion of forest and open land habitats, which was established in 1994. It covers an area of 2156 square hectares. It is located in the Zagreb County, south-east of Dugo Selo, and due to its vicinity

The agricultural land for building the Faculty farm.





to the Faculty of Veterinary Medicine it is suitable for undertaking practical classes in the course on game animals and plants. According to the previous and the current hunting management framework, the hunting range is inhabited by many incidental species of game animal as well as roe deer, boar, rabbits, and pheasants as the main species of game animal that are managed.

At a session of the Faculty Council held on 8<sup>th</sup> March 2006, a decision was rendered by which the state open hunting range, no. I/3-Črnovšćak, was designated as a range for holding compulsory and elective practical classes by the Department for Game and Wild Animals (now the Department of Game and Wildlife Management).

From the academic year 2010/2011, practical classes in this range have been attended by students from the Biology Department of the Faculty of Science, as a part of the course in Natural Populations Management.

From the same academic year, part of the summer school course in *Wildlife Management* has been held in the hunting range. In the hunting range samples are regularly collected for the implementation of projects, not only by the Faculty of Veterinary Medicine, but also by the Croatian Veterinary Institute and the Institute for Medical Research, as well as research for the needs of writing students' scientific studies, graduate thesis and doctoral dissertations.

Comprehensive management of the hunting range is also performed alongside teaching obligations, and it is subject to regular inspection by the Ministry of Agriculture. As part of the management, commercial wild boar and deer hunting is organized, in order to provide resources for the regular function of the hunting range. In addition, regular academic pheasants hunting is organized to mark the Feast of St. Hubert, and at the end of every academic year, there is a social event for the Faculty staff, which has been organized traditionally by the faculty administration since the academic year 2010/2011. In the academic year 2012/2013, Regulations were adopted on the educational hunting range, and a Commission for the Educational Hunting Range was formed. Finally, the Faculty of Veterinary Medicine and the Faculty of Forestry of the University of Zagreb signed an Agreement on Mutual

Cooperation to improve hunting, which is directly linked to the educational hunting range.

Activities within the Črnovšćak educational hunting range are also undertaken, alongside employees of the Faculty of Veterinary Medicine by the members of the student group for the breeding of game animals.

By a Decision of the Government of the Republic of Croatia of 5<sup>th</sup> July 2007, the Faculty was allocated 100 hectares of agricultural land in Dugo Selo (25 km northeast of Zagreb), in order to build a faculty farm. Thereby a new era began for the Faculty, in which practical teaching was to be intensified in all aspects of keeping farm animals and the optimal conditions for production, primarily of dairy cows, and other production animals.

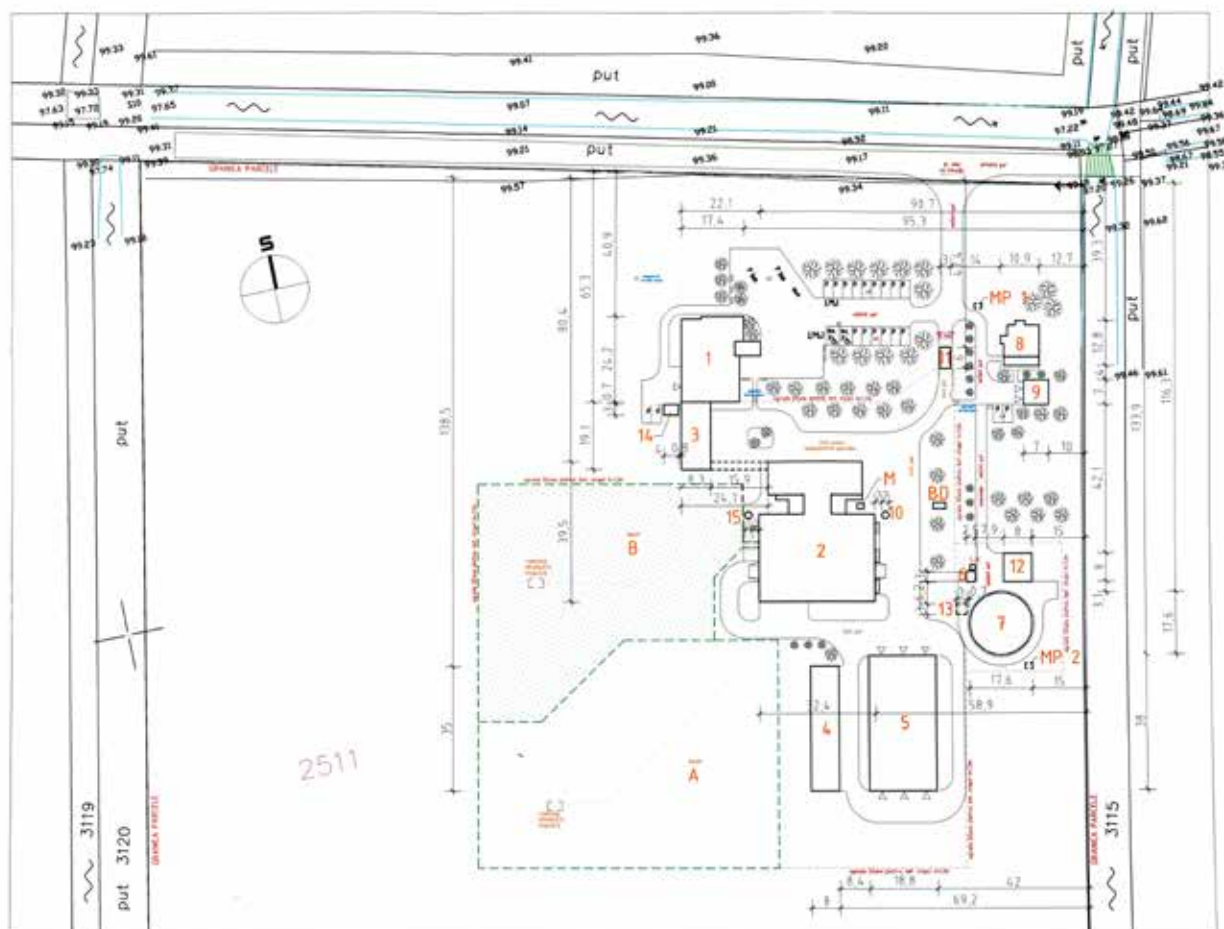
The planned teaching activities on the farm property were to include classes in integrated studies and postgraduate studies, lifelong education of practicing veterinarians, and education of livestock farmers. The conditions would exist on the farm for holding various forms of professional conferences, courses and workshops.

At the Faculty level, in the 2007/2008 academic year a decision was rendered to initiate the procedure to draw up the project documentation, feasibility study and to collect tenders and seek possible partners for joint construction, and/or management of the farm. On the basis of a Proposal by the Faculty of Veterinary Medicine submitted on 11<sup>th</sup> March 2008, The Senate of the University of Zagreb rendered a Decision on Allocation of Financial Funds, provided from a loan, for the first phase of work at the faculty farm (access road, fencing and utilities infrastructure). On the basis of this loan, in the academic year 2009/2010, an access road with utility infrastructure was built (water mains, gas line, IT cables) and since then, in view of the total value of the investment, a financing model is being sought for further construction of the Faculty Farm, including funding from EU structural funds.

The preliminary design of the Faculty farm at an agricultural land with access road.

**LEGEND:**

- 1 Educational Center-Main building
- 2 Stable for dairy cows
- 3 Eaves for machines with pedestrian corridor
- 4 Eaves for hay / straw
- 5 Trench silo
- 6 Cooling container for carcasses- standard prefabricated
- 7 Lagoon
- 8 Family house
- 9 Garage
- 10 Vertical standard silo
- 11 Disinfection barrier
- 12 Dumphill with slurry pit
- 13 Pre pump inspection shaft
- 14 Eaves-trash can area
- 15 Vertical standard silo
- A-Livestock outdoor run
- B-Livestock outdoor run
- M-Grease separator
- BD-Biodisc
- MP-Grease separator / Sand separator
- SIK-Collection pit of the carcass containers





## 4.2. Graduate study

The reform of higher education in Croatia, according to the Bologna Declaration, began in 2003, whereby the entire university community demonstrated unity and had a clear goal to make “Bologna” the foundation of the development of the Croatian system of higher education. Consequently, the faculties, including the Faculty of Veterinary Medicine of the University of Zagreb, undertook significant changes to their curricula.

The new, and still current curriculum, took account to the greatest possible extent of the criticisms and recommendations expressed by the expert team from EAEVE in their report in 2003. Moreover, the then draft document was taken into account on recognition of professional qualifications on the level of the European community. This document, amongst other things, states that the education of veterinarians should last at least five years, and the study course should consist of groups of fundamental and specific courses, categorized into four fields (fundamental sciences, clinical sciences, animal production and food hygiene).

After detailed analysis of a large number of curricula in Europe and beyond, the models selected for reorganization of classes were the curricula of the Veterinary University in Vienna (Austria), the Faculty of Veterinary Medicine-Ghent University (Belgium) and other faculties in Europe (Utrecht, the Netherlands; Giesen, Germany). Moreover, lectures by a number of eminent rectors, deans and professors from Europe and the USA who visited our Faculty were a great help in drawing up the new curriculum for graduate classes.

The new curriculum was adopted at a session of the Faculty Council held on 11<sup>th</sup> March 2005, and its application began from the academic year 2005/2006. It differs significantly from the previous curriculum, and the main changes relate to eight areas:

### 1. The duration of the study (including compulsory field work outside the Faculty)

The new curriculum for attaining the academic title of Doctor of Veterinary Medicine is organized as an integrated undergraduate and graduate study. In creating the study, it was taken into consideration that western-European faculties, who were our model in organizing the new study programme, due to the specific character of the labour market regarding veterinarians, did not accept the reorganization into a two-level system (first completion of an undergraduate study, and then the possibility of employment or enrolment in a graduate study), but a single-level system (in our case both parts have been joined into a single unit-an integrated study). We have, therefore, not accepted the system of education based on two levels, which is one of the fundamental goals of the Bologna Declaration. This later proved to be a good decision, because according to the data collected on a national level so far, most students who complete undergraduate studies continue to study on a graduate level.

The duration of the new curriculum is 6 years or 12 semesters, as is the case at the majority of the recognized veterinary faculties in Europe. This approach to conducting the study programme had to be aligned with the legislation which, following a motion by the Faculty, was undertaken in 2007 as part of the adoption of the new national Act on Veterinary Medicine. The new Act no longer prescribes a trainee internship and a trainee exam for students who study according to the new six-year curriculum. According to the new model, the Faculty enables each student to undertake practical, field work in partner institutions for the duration of the study programme. This approach to organization of the study programme enables candidates, after attaining their degrees, to apply to the Croatian Veterinary Chamber and obtain a licence for performing veterinary activities in the Republic of Croatia.



### 2. The structure of classes

The aim of the reorganization was to define the core curriculum of the new study programme in Veterinary Medicine in the Republic of Croatia, and promote the development of new compulsory and elective courses. It has been organized to encourage greater students' motivation for their own work.

In comparison with the old one, the new curriculum is characterised by a reduced number of hours of direct teaching, and has a better balanced proportion of the number of hours of lectures and practicals. The last, 12<sup>th</sup> semester has no theoretical classes and contains most of the practical work outside the Faculty, in applied fields (herd health, outpatient clinics, professional clinical work and field professional work). The vertical and horizontal integration of course content have been improved, whereby clinical courses have been given more support from the fundamental sciences. Classes are taught according to the implementation plan for each course, with a statement of the learning outcomes. Moreover, some forms of classes take place in smaller groups, enabling the teacher to devote more time to each student. In order to eliminate overlapping, multidisciplinary teachers participate in one course.



The Convention on Recognition of Qualifications for Higher Education in the European Region held in 1997 in Lisbon, Portugal (Photo: consilium.europa.eu).



The detail of the campus at the Veterinary University of Vienna (Photo: vetmeduni.ac.at).

### 3. The organization of new compulsory courses

A change in the new curriculum in relation to the old one is the reorganization of certain areas of veterinary medicine into new compulsory courses (Introduction to Veterinary Medicine, Botany in Veterinary Medicine, Basic Statistics in Veterinary Medicine, Animal Behaviour and Welfare, Molecular Biology and Genomics in Veterinary Medicine, Veterinary Epidemiology, Herd Health). The curriculum has this way has been aligned with the curricula of renowned veterinary faculties in Europe, especially since some fields have, in recent years, developed into separate disciplines, and as such are an unavoidable aspect of the education of veterinary experts.

### 4. The division of major courses into smaller units

The previous study programme was based on two-semester or even three-semester courses, which were taken as a single examination. They were very difficult for average students due to the large amount of material involved. The new curriculum was organized, as much as it was possible in the initial stage, mostly in single-semester courses (major courses have been divided up), which is also required as part of the Bologna Process. This way, taking examinations testing a smaller range of material enables students to master the programme more easily. Some classes are taught in shifts. With the aim of organizing practical classes in shifts, as well as enabling the 24-hour participation of students in the work of the Faculty clinic, clinical classes are concentrated at the end of the course, over the three final semesters.

### 5. The study regime

The order of courses and the conditions for enrolment in individual courses is strictly adhered to. Some courses represent a foundation for understanding others, therefore these courses are taught and passed in the prescribed logical order. Control of this order is ensured by prohibition of sitting examinations by candidates without having already passed the previous compulsory courses.

### 6. A large selection of elective courses

Another change to the curriculum is that over the course of their studies, students enrol in elective courses comprising 20% of their course. Some old elective courses have been retained from the old curriculum, with improved and revised content, and the new

curriculum has introduced a large number of completely new elective courses. There is a total of 71 elective courses, and students may enrol in them as they wish in any year of their course. Fundamental and pre-clinical courses are offered to students exclusively in the beginner years of the course, and professional and clinical courses in the final years of the course. There are also so-called “compulsory elective” courses, which students take according to their selected study track.

### 7. Introduction of three study tracks

Another change in the new curriculum is that during their studies students are oriented towards individual fields of veterinary medicine. When enrolling in the fifth year of the course, students select one of the following three study tracks:

- Companion Animals,
- Veterinary Public Health and Food Safety,
- Farm Animals and Horses.

In relation to the study tracks, alongside the compulsory and elective courses, students also take specific (so-called compulsory elective) courses. The chosen study track gives the students key theoretical knowledge and all the vital practical information and skills in each of the selected segments of veterinary work, and about the activities related to it. There is a particular emphasis on building students' competences through team work in small groups. In this way, students learn actively how to resolve problems, and acquire experience in team work and running projects.

### 8. Clinical/practical work at and outside the Faculty

The task of the study is to educate veterinarians able primarily to independently work in a contemporary veterinary medical practice, preventive work in herd health, and then animal breeding, supervision of food stuffs of animal origin and other forms of veterinary work. Therefore, the emphasis of the course in the study programme is on clinics, on quality practical classes in their most varied forms, from practicals, patient demonstrations, monitoring patients as mentors, professional and clinical work in the Faculty's clinics, and clinical and practical work outside the Faculty. To this end, the timetable has been increased in relation to the previous curriculum.

The teaching bases for conducting compulsory practical work outside the Faculty are many veterinary organizations and the Croatian Veterinary Institute, as well as the Ministry of Agriculture of the Republic of Croatia. The Faculty has regulated its cooperation with these institutions through Agreements.

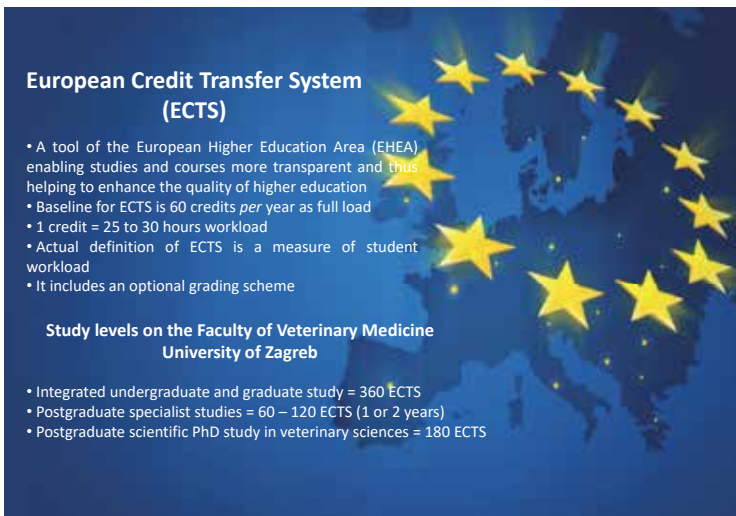
The European Credit Transfer and Accumulation System (ECTS) was established as a part of the student exchange programme within the European Region Action Scheme for the Mobility of University Students-ERASMUS (1988-1995).

In 1999, the University of Zagreb rendered a Decision to accept and draw up the ECTS, and it was to be applied in full by 2006. The ECTS was primarily created to promote academic recognition, and to facilitate the reading and comparison of study programmes. It may be applied to all types of programmes, and for the purpose of lifelong education. It serves mobile and nonmobile students. It can be used for accumulation of study points within a single institution and for their transfer between institutions. ECTS helps students move between countries, within a country, city or region, as well as between different types of institutions.

A proposal for ECTS for courses in the undergraduate study was drawn up by the ECTS Commission, and was adopted at a session of the Faculty Council held on 20<sup>th</sup> June 2002. When defining ECTS credits for undergraduate studies, the experience of institutes of higher veterinary education in Europe was taken into account, as well as the desire to align biomedical education within the university itself. The results of a student survey conducted with the aim of establishing students' total workload in mastering the course matter of a specific course contributed greatly to defining ECTS credits.



## II. MODERN HISTORY



**European Credit Transfer System (ECTS)**

- A tool of the European Higher Education Area (EHEA) enabling studies and courses more transparent and thus helping to enhance the quality of higher education
- Baseline for ECTS is 60 credits *per* year as full load
- 1 credit = 25 to 30 hours workload
- Actual definition of ECTS is a measure of student workload
- It includes an optional grading scheme

**Study levels on the Faculty of Veterinary Medicine University of Zagreb**

- Integrated undergraduate and graduate study = 360 ECTS
- Postgraduate specialist studies = 60 – 120 ECTS (1 or 2 years)
- Postgraduate scientific PhD study in veterinary sciences = 180 ECTS

98

In 2003, activities related to the introduction of ECTS at the Faculty of Veterinary Medicine were aimed at commencing work on an information package which, alongside assigning points to courses according to the students' workload, is another important part of ECTS. After the form had been initially satisfied in the academic year 2008/2009, a more contemporary information package was created and adopted, containing clearly defined catalogues of all courses. In each catalogue, the title and code of the course is given in a clear way, with the position of the course (semester), the head of the course, the teachers and associates on the course, the content of the course, the general and special knowledge acquired within that course, the forms of classes and the number of hours they involve, how the examination is sat, with a description of the form of continuous assessment of activity in classes and the grading system, the number of ECTS credits, and the compulsory and recommended literature for following classes and acquiring knowledge. This information package is created in the form of a guide for students by year of study, and it is handed out to students in the form of a brochure when they enrol in the next academic year. The catalogue was adopted at a session of the Faculty Council held on 21<sup>st</sup> January 2009, and presented at the 13<sup>th</sup> University of Zagreb Fair. University fairs have been organized regularly since 1997, so that pupils in the final years of high school, students and all interested persons could be informed about the study programmes and requirements for enrolment, student life and accommodation conditions while studying in Zagreb, the equipment of each faculty, creative places of employment in specific professions, and many other aspects which are important for young people when making a decision on enrolment at a university.

With the aim of providing students with the best possible information on the study programme, the conditions of studying and changes to the study programme, the Faculty regularly updates the information package and publishes it at the beginning of every academic year on its website, and students can get a CD copy in the student office.

In 2004, preparations were launched to align the ECTS accompanying documents with the principles accepted at the University of Zagreb. In the same period, the final preparations were also made for introduction of the credit point system for undergraduate (and postgraduate) studies. The main effort was aimed at defining and aligning the criteria on the basis of which the student workload was calculated for each semester, for each course. To that end forms were created with the appropriate instructions for filling them in. In this process, experience we had gained when assigning points to first undergraduate studies in 2002 was used, and information was exchanged with other faculties in the biomedical group. Following a proposal from the ECTS Commission, the Faculty Council, at its session held on 16<sup>th</sup> March 2005, accepted the ECTS credits for compulsory and elective courses in undergraduate studies.

The implementation of the ECTS system at the Faculty of Veterinary Medicine for the first generation of students who enrolled in the integrated undergraduate and graduate study in veterinary medicine began in the academic year 2005/2006.

For the sake of future evaluation of the study programme, at a session of the Faculty Council held on 19<sup>th</sup> March 2008, a Decision was adopted on the introduction of internal student surveys with the aim of a true assessment of the student workload concerning a specific course, expressed in ECTS credits. Students take the survey only after they have passed the examination. Data from the survey are processed and are a representative sample for future revision of ECTS credits. Data from the surveys so far show that students are less or more burdened on some courses than indicated by the ECTS credits, so it will be necessary to align the points according to the actual work needed to master the course matter.

The introduction of the ECTS system in line with the principles of the Bologna Process requires the most precise measurement of students' achievements through continuous assessment of their work in mastering the programme. Therefore, a new assessment system was created which was first applied in the academic year 2008/2009. According to this assessment system, students accumulate points during classes in a course, and the final assessment is determined by the distribution of points according to the results achieved. There are several different models for calculating points and grades, but the Faculty of Veterinary Medicine had adopted the model of point accumulation. According to this model, students accumulate points during the teaching process in various categories (presence and activity in class; continual assessment of knowledge-mid-term testing; results of the final examination), which have a minimal and maximum value (Table 10). This way, students are given the opportunity of choice in terms of the distribution of their effort, which in the end must still result in accumulation of points above the minimum threshold for each category. If the student cannot achieve this, it means his efforts in achieving the planned positive results were insufficient, and he will be denied certain rights provided for students who achieve the minimum number of points for each category.

After the points accumulated are added up, the student is given a grade on the basis of comparison of his/her success with criteria defined in advance (assessment criteria). The points accumulated are distributed in a previously defined scale, which contains grades from 1 to 5 (Table 11).



The Students' Office, the third from the left to the right is (sitting) Prof. Dr. Ksenija Vlahović, Vice-Dean for the Integrated Study and Students (academic year 2010/2011, since 27<sup>th</sup> March 2019), (standing) Vesna Pavičić, prof., Head of the Students' Affair Office since 2018 .

Table 10 An example of a system for assessment of students in courses consisting of lectures, seminars and practicals

Type of activity	Minimum number of points	Maximum number of points
Attendance at lectures	3	6
Attendance at seminars	4	6
Attendance at practicals	4	6
Activity at seminars and practicals	5	10
Continual assessment (mid-terms)	20	32
Final examination	24	40
Total	60	100

Table 11 Scale for defining grades on the basis of accumulated points

Points	Grade
Up to 59	1
60-76	2
77-84	3
85-92	4
93-100	5

This method enables determining the percentage of knowledge acquired (the number of points is also the percentage of knowledge acquired) which visibly defines the actual level of success of a student in a specific course. Moreover, this system's quality is seen in the gradual mastering of knowledge and skills over the course of the learning process, so that 60% is acquired by continuous students' work in classes, and 40% may be acquired additionally, on the basis of the final examination. This form of grading must be clearly explained in the implementation programme, so that students can understand in time that they should not study in short bursts (at one single point in time), but continually, with the help and control of teaching staff, who lead them systematically to the examination and active participation in achieving the highest possible percentage of knowledge and skills acquired. Students are this way no longer passive observers in class, but active participants in the learning process, right up to sitting the final examination and achieving their final grade, as the final indicator of the knowledge and skills they have acquired whilst attending classes in an individual course.

The final examination, therefore, is a method of additional verification of the knowledge and skills acquired, representing a form of control of the quality of the success achieved by the students and the teaching staff. The precise and well-founded system of monitoring and grading throughout the teaching process, with regular reporting to students on the points they have accumulated, also enables a transparent relationship between teachers and students, preventing the occurrence of any misunderstandings contributing at the same time to a positive working environment.

The introduction of this form of monitoring students in classes and evaluation of all activities during classes, encourages continuous work, thus contributing to better learning of course matter and achieving the necessary level of knowledge, which in the end increases the overall student pass-rate.

A responsible approach to teaching based on the establishment of a system of quality in higher education requires that each faculty draws up the relevant documents, clearly defining the goals of the teaching programme. One of these is certainly the Catalogue of knowledge and skills, which was drawn up in the academic year 2008/2009. The Catalogue contains a list of knowledge and skills for each course, with the levels of competence which the student must attain during the integrated undergraduate and graduate study in veterinary medicine. The Catalogue of knowledge and skills in a scientific discipline or profession is also an important prerequisite for precise definition of learning outcomes. Therefore, immediately after the catalogue was completed, work began to formulate the learning outcomes on the level of courses in the integrated undergraduate and graduate study in veterinary medicine.

Learning outcomes are the evaluated and positively assessed knowledge and skills and the accompanying independence and responsibility which a person acquires by learning, and is demonstrated after the learning process. Therefore, students, by attaining the learning outcomes, acquire the competences for professional performance of specific tasks, that is, for employment or self-employment.

The Catalogue of knowledge and skills, together with the learning outcomes for compulsory courses, was adopted at the session of the Faculty Council held on 17<sup>th</sup> July 2009, and for elective and compulsory elective courses at the session held on 10<sup>th</sup> February 2010. In the years that followed, it was updated several times in order to express more clearly the competences which students should acquire after taking each course.

Learning outcomes are also published in the Information package, as general and special knowledge. The implementation programme of a course defines the student activities which ensure achieving the designated outcomes. Teachers ensure that the testing of students' knowledge is in line with the established learning outcomes, and that the entire scope of knowledge is tested and is in line with level of qualification.

Regular, periodical verification of attainment of learning outcomes on the level of each course is undertaken as part of the system of internal assurance of the quality of classes using student surveys.

A study programme has its learning outcomes expressed on the level of the study programme and the qualifications described, which are published in the supplementary degree document (diploma supplement). Apart from the learning outcomes, the study programme also has separate "Minimum Practical Competences" listed, which students master during rotations at the Faculty clinics, which were adopted at a session of the Faculty Council on 26<sup>th</sup> January 2011.

Recognition of qualifications is a necessary process which enables students to study at different universities, in different countries, enabling also fair competition for jobs offered on the EU labour



## II. MODERN HISTORY

Table 12 The current curriculum of the integrated undergraduate and graduate study

COURSE	SEMESTER						Total	ECTS	
	L	P	S	L	P	S			
<b>YEAR 1</b>		<b>I</b>			<b>II</b>				
Physics and Biophysics	16	38					54	5.0	
Medical Chemistry	20	34					54	5.0	
Zoology	15	40	20				75	5.5	
Botany in Veterinary Medicine	10	10					20	1.5	
Anatomy with Organogenesis of Domestic Animals I	18	64					82	7.0	
Environment, Animal Behaviour and Welfare	8	24	8				40	3.0	
Basic Statistics in Veterinary Medicine	14	16					30	2.5	
Introduction to Veterinary Medicine	2	12	6				20	1.5	
Anatomy with Organogenesis of Domestic Animals II				20	100		120	8.0	
Biochemistry in Veterinary Medicine				28	32	12	72	7.5	
Animal Breeds Characteristics				14	36	10	60	4.5	
Histology with General Embryology				30	60		90	7.0	
Introduction to English Veterinary Terminology I					5	10	15	1.0	
Physical Education and Health		30			30		60	1.0	
<b>YEAR 2</b>		<b>III</b>			<b>IV</b>				
Physiology of Domestic Animals I.	30	50					80	6.0	
Molecular Biology and Genomics in Veterinary Medicine	5	30	10				45	3.5	
Basic Animal Nutrition	15	30					45	3.5	
Animal Breeding and Production	14	16	14	22	24		90	7.0	
Hygiene and Housing of Animals	16	24		13	20	22	95	6.0	
Veterinary Immunology	15	15					30	2.5	
Anatomy with Organogenesis of Domestic Animals III	15	63					78	5.5	
Introduction to English Veterinary Terminology II		5	10				15	1.0	
Physiology of Domestic Animals II				45	60	25	130	10	
Applied Animal Nutrition				25	50		75	5.5	
General Microbiology				12	30	12	54	3.5	
Physical Education and Health		30			30		60	1.0	
<b>YEAR 3</b>		<b>V</b>			<b>VI</b>				
Parasitology and Parasitic Diseases	30	60					90	7.0	
General Veterinary Pathology	30	60					90	7.0	
Pathophysiology I	11	10	4				25	2.5	
Pharmacology	45	35	5				85	6.5	
Radiation Hygiene	10	20					30	2.5	
Special Microbiology	15	30	15				60	4.5	
Special Veterinary Pathology				60	75		135	10.5	

Pathophysiology II	39	50	6	95	6.5	
Clinical Propedeutics	45	60		105	8.0	
Communication Skills in Veterinary Medicine	16	12		28	1.0	
<b>YEAR 4</b>		<b>VII</b>		<b>VIII</b>		
Internal Diseases	90	120		210	16.0	
Surgery, Orthopaedics and Ophthalmology I	30	60		90	7.0	
General and Clinical Radiology	15	30		45	3.5	
Game Breeding and Management	4	26		30	2.5	
Surgery, Orthopaedics and Ophthalmology II	30	45		75	5.5	
Obstetrics and Reproduction I	60	105		165	12.5	
Methods of Physical Therapy and Diagnostics	15	15		30	2.5	
Biology and Pathology of Beneficial Insects	11	25		36	2.5	
Biology and Pathology of Aquatic Organisms	11	25		36	2.5	
Toxicology	24	24	6	54	3.5	
<b>YEAR 5</b>		<b>IX</b>		<b>X</b>		
Surgery, Orthopaedics and Ophthalmology III.	30	45		75	5.5	
Obstetrics and Reproduction II	30	45		75	5.5	
Food Hygiene and Technology	30	60	30	45	165	12.5
Infectious Diseases of Domestic Animals	25	75	50	30	180	13.5
Veterinary Epidemiology	4	26		30	2.5	
Veterinary Legislation and Regulatory Affairs	15		30	45	3.5	
Ambulatory Care Clinic			60	60	3.5	
<b>Compulsory-elective courses</b>						
Diseases and Treatment of Dogs and Cats I	1	44		45	3.5	
Diseases and Treatment of Horses	9	45	36	100	7.0	
Veterinary Legislation and Food Safety Control	28	4	13	45	3.5	
Food Hygiene and Quality Control	11	30	4	45	3.5	
<b>YEAR 6</b>		<b>XI</b>		<b>XII</b>		
Forensic Veterinary Medicine	10	35		45	3.5	
Poultry Diseases	25	30	20	75	5.5	
Herd Health		15		15	1.0	
Veterinary Economics	10	20		30	2.5	
Ambulatory Care Clinic		60		60	6.0	
Clinical Fieldwork			120	120	8.0	
Professional Fieldwork			180	180	10.0	
Degree essays writing			60	60	10.0	
<b>Compulsory-elective courses</b>						
Diseases and Treatment of Dogs and Cats II		30	15	45	3.5	
Diseases and Treatment of Farm Animals	13	47	130	90	7.0	



## II. MODERN HISTORY

Diseases and Treatment of Pet Birds, Exotic Pets and Laboratory Animals	50	30	10	90	7.0
Veterinary Public Health	49	24	17	90	7.0

Table 13 Elective courses in the study programme of the integrated undergraduate and graduate study in veterinary medicine

COURSE	L	P	S	Total	ECTS
Agricultural Economics and Rural Development	10	20		30	2
Anatomy of Laboratory Animals	6	24		30	2
Archaeozoology	10	15	5	30	2
Assisted Reproduction in Veterinary Medicine	5	15	10	30	2
Autochthonous Meat Products	2	14	10	26	2
Autochthonous Milk Products	6	11	13	30	2
Biology and Ecology of Predators	8	18	4	30	2
Biological Traces and Evidences in Forensic Veterinary Medicine	2	4	9	15	1
Wildlife Diseases	4	26		30	2
Diseases and Reproduction of Sport and Working Animals	12	9		21	1.5
Cytometry in Clinical Veterinary Medicine		15	15	30	2
Diagnostic Veterinary Cytology	10	20		30	2
Dietetics of Animals	5	20	5	30	2
Feed Additives-Health Modulators	3	10	2	15	1
Ecological Production of Poultry and Game Birds	10	10	10	30	2
English Language for Academic purposes I		30	30	60	4
English Language for Academic purposes II		30	30	60	4
Physiology of Birds	15			15	1
Physiology of Amphibians and Reptiles	13	2		15	1
Hygienic Quality of Game Meat	11	15		26	2
Hygiene and Quality of Poultry Meat	4	14	4	26	2
Veterinary Emergency and Critical Care Medicine		25		25	2
Hormonal and Metabolic Disorders	13	17	30	30	2
Chemistry of Natural Compounds	15	9	6	30	2
Cinology and Felinology	20	10		30	2
Carcass Quality at the Slaughter Line	8	9	10	26	2
Clinical Anatomy	10	20		30	2
Clinical Physiology	15	15		30	2
Comparative Nutrition	5	4	6	15	1
Comparative Odontology	10	5		15	1
Hunting and Nature Protection	4	26		30	2
Reptile Morphology	4	11	15	29	2

Fish Morphology		20	10	30	2
Advanced Diagnostics and Therapy of Diseases of the Digestive System in Dogs and Cats	9	4	12	25	2
Selected Chapters in Aquaculture	5	25		30	2
Responsibilities in Veterinary Medicine	10		5	15	1
Selected Chapters on Biomedical Physics for Veterinarians	20	10		30	2
Fundamentals of Agronomy	12	7	11	30	2.5
Basic Anatomy of the Bottlenose Dolphin ( <i>Tursiops Truncatus</i> )	12	19		30	2
Basic Biology and Fundamental Physiology of Marine Mammals	10	15	5	30	2
Fundamentals of Ecologic Livestock Breeding	10	15	5	30	2
Fundamentals of Physics for Diagnostics Methods	20		10	30	2
Fundamentals of Holistic Medicine	15	15		30	2
Basic of Molecular Pathology and Histology of Tumours and Metastasis	10	20		30	2
Fundamentals of Marine Mammals Systematics and Evolution	8	2	5	15	1
Fundamentals of Scientific Research	8	4	18	30	2
Specific Anatomical Structures of the Locomotor Apparatus of the Horse		15		15	1
Parasitology in Public Health	10	20		30	2
Diseases of Bees in Contemporary Production	6	9		15	1
Comparative Anatomy of Skeletal System	10	20		30	2
Comparative Mucosal Immunology	15	10	5	30	2
History of Veterinary Medicine	15	15		30	2
Positive Impact of Animals to Human Health	5	5	5	15	1
Emerging Infectious Diseases	28	2		30	2
Game Zoology	5	25		30	2
Fishery	7	8		15	1
Structure and Function of Cell	10	8	7	25	2
Technological Systems of Poultry Production	6	5	4	15	1
Toxicology of Poisonous Plants	12		9	21	1.5
The Role of Veterinarians at Organic Farms	12	9		21	1.5
Management and Marketing in Veterinary Practice	10	20		30	2
Pigeon Keeping and Breeding		15	15	30	2
Breeding and Husbandry of Rabbits and Furbearers	3	2	25	30	2
Veterinary Ethics	15	15		30	2
Veterinary Clinical Microbiology	8	22		30	2
Veterinary Laboratory Diagnostics	14	8	8	30	2
Veterinary Nuclear Medicine	12	3		15	1
Conservation and Management of Endangered Species		15		15	1
Hygiene and Quality of Fish Meat	9	6	12	27	2
Zoocology		20	10	30	2
Zoonosis	24	2	4	30	2



## II. MODERN HISTORY



The Croatian Veterinary Institute at Savska Street no. 143 in Zagreb as the leading professional, diagnostic and analytical institution in the field of the veterinary medicine in the Republic of Croatia participates in the implementation of compulsory student practice in the 12<sup>th</sup> semester of the integrated undergraduate and graduate study of the veterinary medicine in Croatian and English language (Croatian Veterinary Institute Archives).

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market. The Council of Europe drew up the Lisbon Recognition Convention (which came into force in 1999), on recognition of higher education qualifications, whose main aim is to ensure that anyone who has attained a qualification in one country will have it recognized in another. In this context the Diploma Supplement is mentioned, and thereby a framework is given which equalizes criteria for assessment of knowledge and skills. Study programmes and graduate students have many benefits from this. A precise description of the study programme enables an objective assessment of the qualifications and success attained by each student. This facilitates the vertical mobility of students in education, that is, their path to higher levels of education, but also employment on the integrated labour market. The Diploma Supplement should also be very useful for employers, since it gives them the possibility of insight into the knowledge graduates have acquired, their professional skills and competences, the study tracks they have studied, etc. It is used as a general accepted document in signatory countries of the Bologna Declaration, and in Croatia this issue is an obligation regulated by law.

The Diploma Supplement is a document which is enclosed to a specific certificate from an institution of higher education, giving a more detailed insight into the level, content, system and rules of study, and the outcomes achieved (a list of skills according to the study track completed). This document explains the degree certificate, which as a rule contains only the graduate's basic biographical data and brief information about the professional title and discipline. The Diploma Supplement facilitates a realistic assessment of any level or qualification, and is issued to every graduating student in Croatian and English, regardless of the programme.

In the academic year 2009/2010, the final text of the Diploma Supplement was completed, drawn up in line with the instructions of the Ministry of Science, Education and Sports of the Republic of Croatia. This accompanying document was received first by seven students of the first generation according to "Bologna", who completed their studies in the academic year 2010/2011, according to the curriculum of the integrated undergraduate and graduate study in veterinary medicine.

Of the remaining activities involved in implementation of the new study programme, it is necessary to point out the introduction of shift work in classes in all years of the study, continuous implementation of student surveys for assessment of the work of teaching staff, adoption of the Regulation on the Integrated Undergraduate and Graduate Study in Veterinary Medicine, implementation of electronic studying in the teaching process, and the foundation and work of the Students' Office, as an incentive measure for the establishment of an advisory service for the study programmes at the Faculty.

In relation to the current study programme for the period from 2007 to 2018, at sessions of the Faculty Council on many occasions minor amendments to the study programme were adopted, amounting to up to 20%, for which the approval of the University of Zagreb was requested. The adopted amendments can be divided into two categories: those undertaken in compulsory courses, and those undertaken in elective courses. The aim of the amendments was to align the programme with the EAEVE recommendations, minor corrections within courses in the study programme, as well as adjustment of the class schedule into the smallest possible study groups, as a result of the opening of newly refurbished laboratories and classrooms. These amendments were also undertaken to increase the efficiency of teaching, equalizing the workload of classes per semester in individual study years, and to make horizontal and vertical connections possible in the programme of individual courses.

In 2005, a special form of recording the continuous work of each student was introduced through the national ISVU (Information System of Higher Education Institutions) system of the Republic of Croatia. Through this single system, complete data are kept on the studies of individual students, from enrolment at an institution of higher education, continuous monitoring of their work on individual courses, sitting examinations, enrolment in higher years, right up to the end of their studies. Students have access through Studomat to almost all data recorded about them.

Apart from the ISVU system of the Republic of Croatia, the Faculty also has its own support program for monitoring students' activities, the VEF-protokol, which is set up to monitor classes of students undergoing training at the Faculty's clinics. Its purpose is keeping central records on patients and students through computers in each outpatient clinic, X-ray and laboratory. The data recorded in past years provide the possibility of searching and analyzing data.

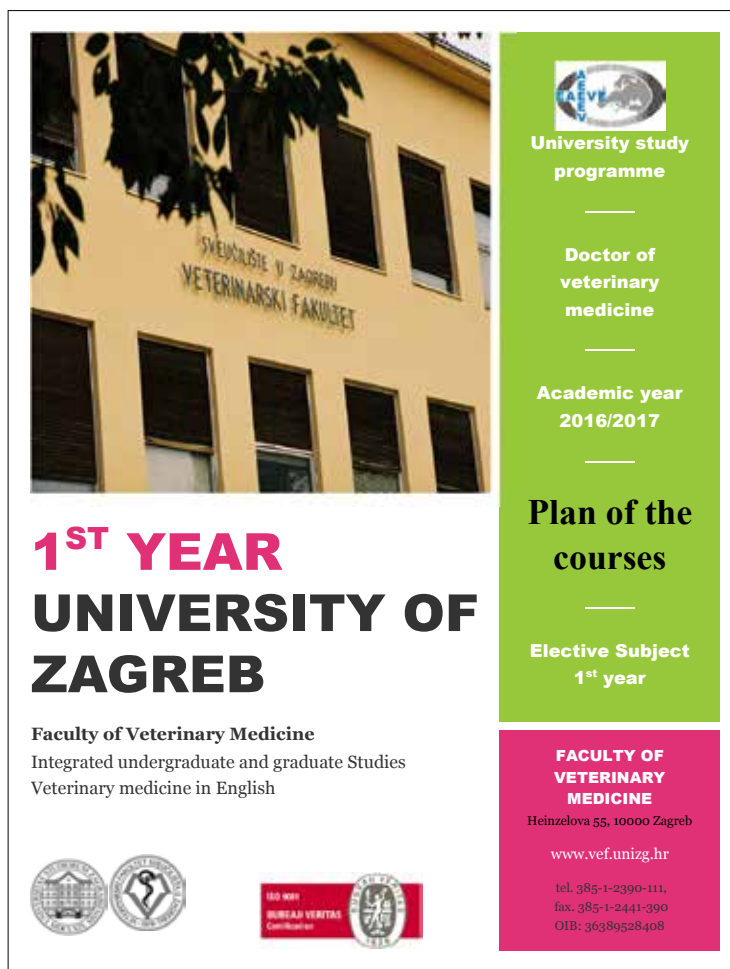
Enrolment of students at the Faculty is undertaken on a national level through the state *matura* school leaving examinations. The Faculty, by a decision of the Faculty Council, set the level of grades necessary in the state *matura* for candidates who wish to enrol, and which have been approved by the University of Zagreb.

The course is completed by passing all the examinations, and writing and defending a graduate dissertation, with the accumulation of at least 360 ECTS credits. The academic degree title is: Doctor of Veterinary Medicine.

The profession of doctor of veterinary medicine in the Republic is included in the group of regulated professions. Therefore the study programme has been gradually aligned with the guidelines of the Directive 2005/36/EC of the European Parliament and the Council of 7<sup>th</sup> September 2005 on the recognition of professional qualifications, with its amendments, as well as with national legislation.

Since June 2014, the Faculty of Veterinary Medicine of the University of Zagreb has been the competent body for issuing certificates on the formal training of veterinarians pursuant to the provisions of point 5.4.1 of Annex V of the Directive 2005/36/EC on the recognition of professional qualifications. Previously certificates were issued by the Ministry of Agriculture of the Republic of Croatia.

The idea of organizing a graduate study in English at the Faculty of Veterinary Medicine of the University of Zagreb arose after the Faculty was included in the European list of positively evaluated faculties by the international team of European Association of Establishments for Veterinary Education (EAEVE), in 2003, and matured as Croatia's



**1<sup>ST</sup> YEAR**  
**UNIVERSITY OF ZAGREB**

**Faculty of Veterinary Medicine**  
Integrated undergraduate and graduate Studies  
Veterinary medicine in English

**UNIVERSITY OF ZAGREB**

**FACULTY OF VETERINARY MEDICINE**  
Heinzlova 55, 10000 Zagreb  
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OIB: 36389528408

The promotional leaflet with general information on the integrated undergraduate and graduate study of the veterinary medicine in English language (Faculty Archives).

accession to the European Union approached. Preparations for registration of that study programme began in the academic year 2011/2012, and were particularly intense after Croatia's accession to the European Union, as the foundation for the development of the scientific teaching programmes, and consequently the improved position of the Faculty on a global level. Therefore in the academic year 2013/2014, activities intensified aimed at drawing up the new study programme in English.

The proposed curriculum in English was adopted at a session of the Faculty Council on 27<sup>th</sup> May 2015, and was outlined as a copy of the programme in Croatian. At the session of the Senate held on 8<sup>th</sup> December 2015, the University of Zagreb, by its decision, accepted the new study programme in English. The Ministry of Science, Education and Sports issued permission for the course on 11<sup>th</sup> May 2016.

With the aim of providing the best possible access to information about the new course, a Guide was prepared for foreign students, with a promotional flyer and material with general information about the study programme in English. These materials are available on the Faculty website at: <http://www.vf.unizg.hr/english/>. In addition, a series of forms were drawn up, which are the necessary for implementation of the programme (e.g. Request Form for recognition of passed examination-for students who have passed examinations on some other course, and the Certificate Form by which the head of a course and the principal confirm the recognition of a passed examination. A handbook was also drafted for classes in English outside the Faculty, the teaching of which will be possible in Croatia or abroad, with the possibility of using the ERASMUS programme of professional practice. The handbook is accompanied by prepared

forms showing the obligations students must adhere to during their stay in a different institution. During the time of the study, students will be able to express their desire to take some courses at other veterinary faculties. The standard procedure for those who go on exchanges through the University was supplemented with the procedures for those students who go on exchanges based on a bilateral agreement or under their own arrangement. After they receive the consent of the foreign faculty they will be visiting, the students must sign the "Learning Agreement" form.

Twenty-five students may enrol in the first year of studies in English, according to the permitted quota, and the price of the study is euro 9000 per academic year.

According to the requirements of enrolment in the veterinary medicine study in English, persons with the following level of prior knowledge may enrol:

- Candidates who have completed university education outside the Republic of Croatia (or its final year; college or university study in a science, with biology, chemistry or physics as their main course)
- Candidates who have completed at least four years of high-school education outside the Republic of Croatia in a state with a system of external evaluation of high-school education, may apply to the Faculty of Veterinary Medicine in the Republic of Croatia, whereby the results of their final examinations shall be recognised as the results of the state *matura* examinations.
- Candidates who have completed at least four years of high-school education outside the Republic of Croatia and who have passed the SAT Reasoning Test whose results are used to rank candidates for enrolment in the study programme in English at the Faculty of Veterinary Medicine.
- Candidates who have completed at least four years of high-school education in the Republic of Croatia, where their results from the final examination will be recognized as the results of the state *matura* examination, but they must meet a special requirement, that is obtaining a certificate proving their proficiency in speaking and writing English language (*Test of English as a Foreign Language* (TOEFL), *International English Language Testing System* (IELTS) or the *Certificate in Advanced English* (CAE) or any other document that confirms their understanding and knowledge of English language, insofar as they did not attend their high school programme in English.
- Candidates who have completed at least four years of high-school education outside the Republic of Croatia in a country which does not have a system of external evaluation of high school education.

These requirements are also the priority criteria for selection of candidates.

The first generation of students enrolled in the academic year 2016/2017, and consisted of eight students from EU countries (France, Greece, Hungary and Slovenia), and the world (Israel, Canada), who met the requirements of enrolment. According to the first objective indicators of students and teaching staff, the study and the realization of the entire teaching programme have proved to be very demanding over the first academic year, but also successful, for both the foreign students and the teaching and auxiliary staff of the Faculty. Most students met the minimum criteria for regular enrolment in the second year of the course.

For enrolment in the second and third generation of students, a significantly greater interest has been recorded in comparison with the previous generation, and in the academic year 2017/2018, 16 students were enrolled while in the academic year 2018/2019, the quota of 25 students was met for the first time.

The implementation of the study in veterinary medicine in English has shown that the Faculty of Veterinary Medicine is one of the strongest links of the University of Zagreb, ready to put the strategic guidelines of the University, such as internationalization, into action. Thus, one of the long-term strategic guidelines has been realized, ensuring the Faculty additional security for further survival and development, as well as the opportunity to be identified as the leading institution of higher veterinary education in the region.



Students graduation ceremony.









### 4.3. Postgraduate study programmes

The sudden growth of scientific knowledge and the new global approaches to higher education, as part of the generally accepted Bologna Process, which was formalized through the new national Act on Scientific Activity and Higher Education in 2003, required the fundamental reorganization of postgraduate studies as well, especially postgraduate doctoral studies. According to the new Act, the third level of university education covers three-year postgraduate university studies, and upon completion the academic degree of Doctor of Science is awarded. Therefore, the new Act abolished the Master of Science degree. Moreover, the alignment with the European Point Transfer and Accumulation System (ECTS) was prescribed for all levels of university education, including postgraduate studies.

The previous expert postgraduate study had to be organized as a postgraduate specialist study lasting up to two years, reintroducing in fact the old term “specialist” for this kind of study.

Work on the new postgraduate study began in the academic year 2002/2003, taking into account, the criticisms of the EAEVE experts, whose report stated that the postgraduate classes at our Faculty were fragmented into too many orientation programmes, which were not coordinated, leading to inappropriate use of scientific equipment and weaknesses in the students’ education. Moreover, the opinion of the National Commission for Evaluation of Institutions of Higher Education was taken into consideration, which was appointed by the Ministry of Science and Technology of the Republic of Croatia. With the aim of evaluating the quality of classes, the Commission visited the Faculty of Veterinary Medicine in the period from 17<sup>th</sup> to

19<sup>th</sup> December 2003 and was of the opinion that the curricula of our postgraduate studies very often overlapped in terms of content, or in some parts were even identical in content to undergraduate classes.

Taking these facts into consideration, drawing up of the new curricula for postgraduate studies began at the Faculty, which had to be organized according to the ECTS point system, in accordance with the Bologna Process.

The new programmes of the postgraduate studies were accepted at an extraordinary session of the Faculty Council held on 31<sup>st</sup> May 2005. It was then that the doctoral study in Veterinary Sciences was also accepted, as well as eleven postgraduate specialist studies:

1. Surgery, Anaesthesiology and Ophthalmology with Veterinary Dentistry
2. Pathology and Breeding of Domesticated Carnivores
3. Theriogenology of Domestic Mammals
4. Internal Diseases
5. Pig Production and Health Protection
6. Game Breeding and Pathology
7. Breeding and Pathology of Laboratory Animals
8. Breeding and Pathology of Exotic Pets
9. Sanitation
10. Microbiology and Epizootiology
11. Hygiene and Technology of Foodstuffs of Animal Origin

The consultations on the performing Orthopedic Workshop within the specialist study Surgery, Anesthesiology and Ophthalmology with Veterinary Dentistry.



The recommendation of the Ministry of Science, Education and Sports of the Republic of Croatia of 25<sup>th</sup> November 2005, allowed the commencement of the postgraduate studies which had been formally harmonized with the new Act.

The first call for candidates for enrolment in doctoral studies and the postgraduate specialist studies was published in the academic year 2005/2006.

In the period from 2010 to 2013, five more postgraduate specialist studies were organized:

1. Veterinary Pathology
2. Animal Welfare
3. Forensic Veterinary Medicine
4. Reproductive Health Management in Dairy Cows
5. Implementation of Veterinary Food Safety Procedures in Slaughterhouse Facilities

After the adoption of these proposals by the Council for establishing these studies at the University Senate and obtaining permits from the competent Ministry, the first call for candidates for the Veterinary

Pathology study was published in the academic year 2011/2012, for the study in Animal Welfare in the academic year 2012/2013, and the study in Implementation of Veterinary Food Safety Procedures in Slaughterhouse Facilities, Forensic Veterinary Medicine and Reproductive Health Management in Dairy Cows in the academic year 2014/2015. Thereby a total of 16 specialist studies were established at the Faculty of Veterinary Medicine.

This vertical configuration of the study programmes created the vital vertical scientific structure in the practice of veterinary work in the Republic of Croatia, which enables doctors of veterinary medicine to continue their studies at the postgraduate scientific doctoral, as well as specialized level, in the area of biomedicine and health, in the field of veterinary medicine.

Specialist study lasts between one and two years and carries a total of 60 to 120 ECTS credits. Upon completion, the academic title of University Specialist Master (Magister) is awarded, with a designation of the profession (univ.mag.med.vet.) according to the title of the study programme. Programmes of the current specialist study are presented below (Tables 14-29).

### 1. Surgery, Anaesthesiology and Ophthalmology with Veterinary Dentistry

Table 14 Specialist study programme: Surgery, Anaesthesiology and Ophthalmology with Veterinary Dentistry

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
<b>YEAR 1</b>		<b>1</b>			<b>2</b>			
Anaesthesia and Analgesia	8	18	5				31	9.0
General Surgery	5	11	4				20	6.0
Ophthalmology	10	20	7				37	11.0
Laboratory and Radiology Diagnostics in Veterinary Surgery	4	8	2				14	4.0
Head and Neck Surgery				4	8	4	16	5.0
Abdominal Surgery				10	30	10	50	13.0
Veterinary Dentistry				5	10	2	17	5.0
Urogenital Surgery				5	7	4	16	6.0
Elective courses*								
Surgery of Laboratory Animals				2	2	1	5	1.0
Surgery of Farm Animals				2	2	1	5	1.0
Surgery and Orthopaedics in Horses				2	2	1	5	1.0
<b>YEAR 2</b>		<b>3</b>			<b>4</b>			
Thoracic Surgery	4	8	4				16	5.0
Orthopaedics	10	18	5				33	8.0
Neurosurgery	4	6	4				14	5.0
Surgical Oncology	6	16	5				27	7.0
Reconstructive Surgery	3	6	2				11	5.0
Practical training and Final Exam (in the 4 <sup>th</sup> semester)								30.0

\*In the second semester, students choose one elective courses according to preference (1 ECTS credit)



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### 2. Pathology and Breeding of Domestic Carnivores

Table 15 Specialist study programme: Pathology and Breeding of Domestic Carnivores

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
<b>YEAR 1</b>		<b>1</b>			<b>2</b>			
Breeding Dogs and Cats	10	10					20	8.5
Nutrition and Dietetics	5	5					10	3.0
Internal Diseases	30	50					80	19.5
Ultrasound Diagnostics	5	10					15	5.0
Pathomorphology				15	15		30	7.0
Radiology and Physical Therapy				10	10		20	6.0
Surgery, Orthopedics and Ophthalmology				30	50		80	19.0
<b>YEAR 2</b>		<b>3</b>			<b>4</b>			
Holistic Veterinary Medicine	5	5					10	4.0
Parasitology and Invasive Diseases	15	10					25	5.0
Applied Reproduction in Rearing and Treating Carnivores	20	40					60	17.0
Infectious diseases	15	15					30	6.0
Poisoning	5						5	2.0
Final Exam or writing a Specialist Paper						180	180	18.0

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The detail of teaching at the postgraduate specialist study Internal Diseases.



### 3. Theriogenology of Domestic Mammals

Table 16 Specialist study programme: Theriogenology of Domestic Mammals

COURSE	SEMESTER						Total	ECTS	
	L	P	S	L	P	S			
<b>YEAR 1</b>		<b>1</b>			<b>2</b>				
The Effect of Nutrition on Reproduction of Domestic Animals	20	20					40	8.0	
Breeding Procedures for Domestic Mammals	20		20				40	7.0	
Endocrinology of Reproduction in Domestic Mammals	20	20					40	7.5	
Animal Hygiene, Environment and Ethology	10	10					20	5.5	
Selected Chapters from the Physiology in Domestic Mammals				20	12	8	40	8.0	
Clinical Pathology of the Metabolism				10			10	3.5	
Physiology of Breeding and Management of Sexual Function of Domestic Mammals				20	17	8	45	10.0	
Organization and Economics of Animal Reproduction				10	5		15	2.5	
Microbiology and Infectious Diseases				10	10		20	5.0	
<b>YEAR 2</b>		<b>3</b>			<b>4</b>				
Obstetrics and Perinatal Diseases of Cows	20	10	10				40	8.5	
Reproductive Biotechnology in Domestic Mammals	20	17	8				45	7.5	
Contemporary Insights into Infertility in Domestic Animals	25	15	10				50	9.5	
Selected Chapters from Forensic and Administrative Veterinary Medicine	3		7				10	2.0	
Research Procedures, Statistical Analysis and Evaluation of Results	10						10	2.0	
Diseases of Mammary Glands				5		5	10	2.0	
Perinatal Diseases of Newborn Animals				5			5	1.5	
Final Exam or Writing a Specialist Paper (in the 4 <sup>th</sup> semester)								30	

### 4. Internal Diseases

Table 17 Specialist study programme: Internal Diseases

COURSE	SEMESTER						Total	ECTS	
	L	P	S	L	P	S			
<b>YEAR 1</b>		<b>1</b>			<b>2</b>				
General Internal Clinical Propedeutics of Domestic Animals	10	60	10				80	13.0	
Laboratory Diagnostics	20	30	20				70	17.0	
General Diseases of the Digestive System				10	20	10	40	4.0	
General Diseases of the Respiratory System				4	8	4	16	3.5	
Cardiovascular Diseases				4	8	4	16	3.5	



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Diseases of Blood and Blood Cell Disorders	2	4	2	8	3.0	
Kidney and Urinal Tract Diseases	4	6	4	14	3.0	
Skin Diseases	6	4	4	14	3.5	
Diseases of the Central Nervous System	6	4	4	14	3.5	
Intensive Care	4	6	6	16	3.0	
Alternative Treatment Methods	4	4	4	12	3.0	
<b>YEAR 2</b>						
<b>3</b>						
<b>4</b>						
Orientation a) Companion Animals						
Cynology and Felinology	6	20	6	32	4.5	
Special Features of Clinical Propedeutics of Dogs and Cats	6	30	6	42	4.0	
Special Features of the Pathology of the Digestive Systems of Dogs and Cats	6	10	6	22	4.0	
Endoscopic Examination of the Digestive Systems of Dogs and Cats	2	8	2	12	3.0	
Special Features of the Pathology of the Respiratory Systems of Dogs and Cats	2	6	2	10	3.5	
Disturbances of the Function of the Endocrine Glands of Dogs and Cats	2	4	4	10	3.5	
Diseases in Old Age in Dogs and Cats	4	4	4	12	3.5	
Dietetics in Dogs and Cats	4	2	4	10	4.0	
Internal Diseases of Dogs and Cats-practical Work and Preparation for the Final Exam				400	400	30.0

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The dog's clinical examination within the course of the postgraduate specialist study Internal Diseases.



Orientation b) Horses						
The Special Characteristics of Clinical Propedeutics of Horses	10	50	10	70	8.5	
Special Features of the Pathology of the Digestive System of Horses	4	10	4	18	6.0	
Special Features of the Pathology of the Respiratory System	6	20	6	32	7.0	
Diseases of the Muscle System in Horses	10	10	10	30	8.5	
Internal Diseases of Horses-Practical Work and Preparation for the final exam				400	400	30
Orientation c) Farm Animals						
Special Features of Clinical Propedeutics of Ruminants and Pigs	10	30	10	50	9.0	
Special Features of the Pathology of the Digestive System of Ruminants	10	20	10	40	9.0	
Metabolic Diseases in Ruminants and Pigs	15	30	15	60	12.0	
Internal Diseases of Farm Animals-practical work and preparation for the final exam				400	400	30.0

## 5. Pig Production and Health Protection

Table 18 Specialist study programme: Pig Production and Health Protection

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
<b>YEAR 1</b>	<b>1</b>			<b>2</b>				
Pig Production and Breeding	20	10	20				50	14.0
Reproduction in Pigs	10	10	20				40	12.0
Physiology and Pathology of Pig Nutrition	15		5				20	5.0
Application of Molecular Genetic Methods in Improving Pig Production and Health				4	15	6	25	7.5
Clinical Pathology of the Metabolism in Breeding Pigs				5		10	15	5.0
Parasitic Diseases of Swine				13	7		20	5.0
Surgical diseases				6	8	6	20	7.0
Pig Immunology				10		5	15	3.5
<b>YEAR 2</b>	<b>3</b>			<b>4</b>				
Pathomorphological Diagnostics of Pig Diseases	15	10					25	10.0
Infectious diseases	20	15					35	10.0
Hygiene, Environment and Welfare in Pig Health Protection	15	5	5				25	7.0
Economics of Pig Health Improvement	20						20	4.0
Production Management and Health Protection of Pigs				6		9	15	4.0
Practical Application Acquired Knowledge on Pig Farms					35			12.0
Final Exam or writing a Specialist Paper					75		75	14.0



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### 6. Game Breeding and Pathology

Table 19 Specialist study programme: Game Breeding and Pathology

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
YEAR 1	1			2				
Hunting Management Legislation	10		20				30	5.0
Game Health Monitoring	10	20	10				40	15.0
Game Health Monitoring	10		10		15	20	55	15.0
Diseases of Game Animals				15		15	30	10.0
Hunting Management				15		15	30	10.0
YEAR 2	3			4				
Diseases of Game Animals	15	15			15	15	60	15.0
Hunting Management		15	15				30	5.0
Manipulative Procedures	15	30	15				60	15.0
Toxicology of Wild Animals				10		20	30	5.0
Expertise in Game Management				15	15	15	45	10.0
Final Exam or Writing a Specialist Paper								15.0

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### 7. Breeding and Pathology of Laboratory Animals

Table 20 Specialist study programme: Breeding and Pathology of Laboratory Animals

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
YEAR 1	1			2				
Biology of Laboratory Animals	6	2					10	6.5
Anatomy of Laboratory Animals	10	15					25	10.0
Physiology of Laboratory Animals	10	15					25	8.0
Genetics of Laboratory Animals	8	2					10	5.0
Breeding and Housing Laboratory Animals	4	1		4	1		10	5.0
Hygiene, Housing and Welfare of Laboratory Animals	14	8	8				30	5.5
Nutrition of Laboratory Animals				10	5		15	5.0
Diagnosis and Treatment of Infectious Diseases of Laboratory Animals				5	10		15	3.0
Diagnosis and Treatment of Parasitic Diseases of Laboratory Animals				7	4		11	2.5
Pathological Morphology of Laboratory Animals				15	15	20	50	10.0

YEAR 2	3			4		
Diagnosis and Treatment of Infectious Diseases of Laboratory Animals	5	20			25	3.5
Diagnosis and Treatment of Parasitic Diseases of Laboratory Animals	5	4			9	2.5
Pathological Morphology of Laboratory Animals	15	15			30	5.0
Laboratory Animals as Models in Biomedical Research	10	5	10	5	30	15.0
Legislation on Trade and Work with Laboratory Animals			5	5	10	3.5
Final Exam or Writing a Specialist Paper						30.0

### 8. Breeding and Pathology of Exotic Pets

Table 21 Specialist study programme: Breeding and Pathology of Exotic Pets

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
<b>YEAR 1</b>	<b>1</b>			<b>2</b>				
Morphology of Ornamental Birds	5	5	5				15	2.5
Breeding and Pathology of Exotic Ornamental Fish	10	10					20	4.0
Nutrition and Dietetics of Exotic Pets	5	5	5				15	2.5
Physiology of Bird, Amphibians and Reptiles	20	10					30	6.5
Diseases and Breeding of Pet and Wild Birds				25	25	10	60	7.0
Invasive Diseases of Exotic Pets				10	10		20	4.0
Surgery of Exotic Pets				10	15		25	4.0
Radiological Diagnosis and Ultrasound in the Pathology of Exotic Pets				5	10		15	3.0
Elective courses*:								
Systematic Qualification and Basic Biology of Exotic Pets			15					2.5
Zoonoses of Exotic Pets	5	5						2.0
Statistical Methods in Veterinary Research				6	8	6	20	3.0
<b>YEAR 2</b>	<b>3</b>			<b>4</b>				
Breeding and Pathology of Amphibians and Reptiles	6	6					12	2.0
Breeding and Pathology of Exotic Rodents	7	7					14	3.0
Breeding Procedures for Pigeons in Sport and Leisure	5		10				15	2.0
Reproduction of Exotic Pets	10	10					20	4.0
Sanitation Measures in Breeding Exotic Pets	10	10					20	4.0
Managing a Veterinary Practice (elective course)	25		5				30	3.0
Practical Work in Laboratories and Outpatient Clinics								30.0
Writing a Specialist paper					150		150	30.0



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### 9. Sanitation

Table 22 Specialist study programme: Sanitation

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
<b>YEAR 1</b>	<b>1</b>			<b>2</b>				
Soil, Water and Air Hygiene	60	30	30				120	11.0
Applied Disinfection	60	30	30				120	11.0
Microbiology	2	4	9				15	2.0
Significant Parasites in Sanitation	6	9					15	3.0
Storage Insects and Mites	10	5					15	3.0
Applied Disinfection				50	60	30	140	15.0
Sanitation in the Production and Storage of Foodstuffs				20			20	5.0
Clinical Toxicology of Insecticides and Rodenticides in Animals				20			20	5.0
Clinical Toxicology of Insecticides and Rodenticides in Humans				10			10	2.0
Veterinary Legislation and Forensic Veterinary Medicine				10		10	20	4.0
Biostatistics				5	10		15	2.0
<b>YEAR 2</b>	<b>3</b>			<b>4</b>				
Applied Deratisation	50	60	30				140	12.0
First Aid in Work and Hygiene Technical Protection Measures	10	5					15	4.0
Radioactive Contamination and Decontamination of the Environment	15	5					20	4.0
Ecology	10						10	3.0
Pigeons as an Environmental Problem	10						10	3.0
Veterinary Hygiene Service	8		12				20	4.0
Writing a Specialist paper					60		60	30.0

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### 10. Microbiology and Epizootiology

Table 23 Specialist study programme: Microbiology and Epizootiology

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
<b>YEAR 1</b>	<b>1</b>			<b>2</b>				
Biostatistics	6	4					10	3
Basic Epidemiology	8	3	4				13	6
Veterinary Bacteriology I	4	7	4				15	8

Veterinary Immunology	8	8	14				30	10
Molecular Basis of Genetic Engineering	4	8	3				15	7
Veterinary Bacteriology II				4	7	4	15	8
Veterinary Mycology				4	7	4	15	9
Veterinary Virology I				4	7	4	15	8
Pathological Anatomy				3	12	0	15	4
Microbiological Laboratory Work		210			210		420	20
<b>YEAR 2</b>		<b>3</b>		<b>4</b>				
Parasitology	4	6					10	5
Veterinary Virology II	4	7	4				15	8
Applied Epizootiology	10	20					30	8
Microbiological Laboratory Work		210			210		420	10+
Elective courses*								
Microbiology of Diseases of Fish and Bees	10	5					15	3
Animal Hygiene, the Environment and Ethology	6		9				15	3
Biology and Epizootiology of Parasites that Participate in Disease Transmission	5	10					15	3
Selected Chapters on Microbiology of Foodstuffs	5		10				15	3
Statistical Methods in Veterinary Research	3	12					15	3
Final Exam or Writing a Specialist Paper								

\*Students must enrol in at least one of the five elective courses offered

## 11. Hygiene and Technology of Foodstuffs of Animal Origin

Table 24 Specialist study programme: Hygiene and Technology of Foodstuffs of Animal Origin

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
<b>YEAR 1</b>		<b>1</b>			<b>2</b>			
Biostatistics	5	10					15	3.0
Ethics and Welfare in Veterinary Medicine	8		7				15	3.0
Food Microbiology	5	15		5	15		40	11.0
Food Chemistry and Analytics	5	15		5	15		40	11.0
Meat Hygiene and Technology	5	5	10	5	5	10	40	14.0
Hygiene and Technology of Food of Aquatic Origin	5	5	10	5	5	10	40	6.0
Milk Hygiene and Technology	5	5	10	5	5	10	40	9.0
HACCP in Food Production				10	15		25	3.0



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YEAR 2	3			4					
Food Microbiology	10	10					20	4.0	
Food Chemistry and Analytics	10	10					20	4.0	
Veterinary Legislation in Food Safety					5	15	20	5.0	
Meat Hygiene and Technology	5	5	10	5	5	10	40	10.0	
Hygiene and Technology of Food of Aquatic Origin	5	5	10				20	3.0	
Milk Hygiene and Technology			10		5	5	20	6.0	
Process Engineering				5	5	10	20	3.0	
Analytical Toxicology in Veterinary Medicine				14	2	4	20	4.0	
Elective courses*									
Management in Veterinary Public Health	5	15					20	2.0	
Radiation in Food Hygiene and Technology	5	5	10				20	1.0	
Final Exam or Writing a Specialist Paper			20				20	40	20.0

\*Students must enrol in at least one of the elective courses offered

### 12. Veterinary Pathology

Table 25 Specialist study programme: Veterinary Pathology

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COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
YEAR 1	1			2				
Comparative Comprehensive Pathology	2		10				10	5.0
Pathology of Dogs and Cats	4	12		4	12		28	10.0
Pathology of Farm Animals	3	10		3	10		26	10.0
Pathology of Horses	2	8		2	8		20	7.0
Pathomorphology of Diseases Combated Pursuant to the Veterinary Medicine Act and the Instruction on Measures of Protection of Animals from Infectious and Parasitic Diseases	6		10	6		10	32	15.0
Advanced Diagnostic Techniques in Pathology	5	10					15	5.0
Protection Measures for Animal Health				10			10	10.0
Pathological-histological Tests with Basic Cytology		20			20		40	10.0
Neoplastic Diseases with Dermatopathology				4	10		14	3.0
YEAR 2	3			4				
Pathology of Dogs and Cats	4	12					16	5.0
Pathology of Farm Animals	3	10					13	5.0
Pathology of Horses	2	8					10	3.0

Pathomorphology of Diseases Combated Pursuant to the Veterinary Medicine Act and the Instruction on Measures of Protection of Animals from Infectious and Parasitic Diseases	6	10		16	5.0
Veterinary Forensics and Legislation related to Dissection of Animals	10	10		20	10.0
Pathological-histological Tests with Basic Cytology		20	20	40	10.0
Neoplastic Diseases with Dermatopathology	4	10	20	34	7.0
Final Exam					10.0

### 13. Animal Welfare

Table 26 Specialist study programme: Animal Welfare

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
<b>YEAR 1</b>		<b>1</b>			<b>2</b>			
General Ethology	20	4	11				35	7.5
Neuroendocrine Aspects of Stress in Animals	12		8				20	4.5
Animal Behavioural Physiology	12		8				20	4.5
Ethics and Animal Welfare	29		16				40	8.0
Animal Welfare in Different Production Systems and in Breeding Programmes	6	12	7				25	5.5
Welfare of Farm Animals and Horses				20	10	5	35	7.5
Welfare of Pets and Animals for Entertainment				15	5	5	25	5.5
Game Welfare				15	5	5	25	5.5
Fish Welfare				15	5	10	30	6.0
Welfare of Laboratory Animals				14	3	8	25	5.5
<b>YEAR 2</b>			<b>3</b>			<b>4</b>		
Experimental Surgery and Anaesthesia	10	10	5				25	9.0
The Importance of Animal Welfare for Meat Quality	24	6	5				35	7.5
Influence of Animal Nutrition on Animal Welfare	2	4	9				15	4.0
Welfare in Animal Reproduction	12	18	5				25	9.0
Clinical Ethology				15	10	10	35	9.0
Animal Welfare Economics				10		10	20	4.5
Animal Welfare Legislation				18		12	30	7.0
Final exam								10.0



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### 14. Forensic Veterinary Medicine

Table 27 Specialist study programme: Forensic Veterinary Medicine

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
YEAR 1	1			2				
Legislation-law	20		16				36	9.0
Investigation of the Scene of an Incident	6	10	6				22	5.5
Forensic Veterinary Pathology	11	20	5				26	9.0
Basic Forensic Entomology	5	3	2				10	3.0
Basic Forensic Botany, Palynology and Diatomology	12	2					14	3.5
Identification of Vertebrates				8	4	8	20	5.0
Nutrition in Forensic Veterinary Medicine				10	4		14	3.5
Food of Animal Origin in Forensic Veterinary Medicine				4	2	9	15	3,5
Forensic Osteology and Archaeozoology				7	11	2	20	5.0
Assessment of the Age of Animals				2	12		14	3.5
Introduction to Forensic Veterinary Expertise				2	6	2	10	2.5
Forensic Veterinary Expertise in Animal Production and Biotechnology				2	8		10	2.0
Forensic Veterinary Expertise of Infectious Diseases				4	6		10	2.5
Forensic Veterinary Expertise of Parasitic Diseases				4	6		10	2,5
YEAR 2	3			4				
Animal Welfare from the Point of View of Forensic Veterinary Medicine	12	4	14				30	7.5
Predation and Damage to Animals	8	12					20	5.0
Comparative Odontology in Forensic Veterinary Medicine	5	10					15	3.5
Firearms and Ballistics in Forensic Veterinary Medicine	5	10					15	3.5
Applied Forensics of Fish	7	7					14	3.5
Applied Forensics of Reptiles and Birds	5	6	1				12	3.0
Forensic Veterinary Expertise of Internal Diseases	8	12					20	4.0
Forensic Veterinary Toxicology				7	6	7	20	5.0
Forensic Laboratory and Analytical Methods				6	10	4	20	5.0
Liability in the Veterinary Profession and Veterinary Ethics				12	2	4	18	4.0
Insurance of Animals				4		6	10	2.0
Forensic Veterinary Expertise in Surgery, Orthopaedics and Ophthalmology				4	6		10	2.0
Forensic Veterinary Expertise in Breeding and Obstetrics				4	6		10	2.0
Final exam (in the 4 <sup>th</sup> semester)								10.0

## 15. Reproductive Health Management in Dairy Cows

Table 28 Specialist study programme: Reproductive Health Management in Dairy Cows

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
YEAR 1	1			2				
The Relevance of the Veterinarian in Farm Management	5						5	0.5
Farm Organization		2	10				12	3.0
Computer Science in Farm Economics	2	4	8				14	3.0
Reproductive Health Programmes for Dairy Cows (Analysis of Data for Assessment of Reproductive Performance)	2		6				8	1.5
Control of Fertility, the Basic Component of Reproductive Health	3	3	6				12	3.0
Harmful Influences on Reproductive Health (Fertility) and Production	5	4	4				13	2.0
Excreta	1	12	6				19	4.0
Endocrinology of Reproduction	11		4				15	3.5
Management of Calves		5	6				11	2.0
Nutrition of Dairy Cows	4	15	14				33	7.5
Breeding and Artificial Insemination					5	2	7	1.5
Breeding Heifers					1	5	6	1.5
Breeding Dairy Cows					8	3	11	2.0
Technologically Assisted Reproduction				3	6	2	11	2.5
Ultrasound Diagnostics of Functional Tumours				1	7	2	10	2.5
Controlled Breeding				4	6		10	2.5
Clinical Diagnostics of Gestation				4	2	2	8	3.0
US Diagnostics of Gestation				2	20	5	27	5.5
Induced Abortion				2		1	3	0.5
Dry Period				2	13	5	20	5.0
The Effect of Environmental Stress Factors on Fertility in Dairy Cows				6	8	2	16	3.5
YEAR 2	3			4				
Partus Dystocia		4	4				8	1.5
Nonfunctional Infertility	3		2				5	1.0
Subfertility in the Peripartal Period and Lactation	7	20					27	5.5
Metabolic Disorders in the Puerperium	6	17					23	5.5
Functional Subfertility	8	26	3				37	8.0
Multifunctionality of Subfertility	7	17	4				28	5.5
Reproductive Toxicants	4	10	2				16	3.0
Taking Samples on a Farm				6	30	10	46	9.0
Selected Chapters on Diseases of Mammary Glands				7	14	6	27	6.5
Prevention and Treatment of Infectious Diseases				6	4	8	18	4.5
Final exam								10.0



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### 16. Implementation of Veterinary Food Safety Procedures in Slaughterhouse Facilities

Table 29 Specialist study programme: Implementation of Veterinary Food Safety Procedures in Slaughterhouse Facilities

COURSE	SEMESTER						Total	ECTS
	L	P	S	L	P	S		
<b>YEAR 1</b>		<b>1</b>			<b>2</b>			
Inspection, Control and Supervision in Slaughterhouse Facilities	5	20					25	15
The Welfare of Animals in Slaughterhouse Facilities	12	8					20	6.0
Amendment of Regulations on Food Safety in Slaughterhouse Facilities	5	10					15	4.0
HACCP in Slaughterhouse Facilities				8		7	15	10
Written and Electronic Records Kept in Slaughterhouse Facilities				2	10	3	15	5.0
Elective courses*								
Organization and Management of Slaughterhouse Facilities	3	12						5.0
Quality Assessment of Carcasses and Meat				2	3	5		5.0
Final exam								10.0

\* Students must enrol in offered elective courses, they choose one in the 1<sup>st</sup> semester and the other elective course in the 2<sup>nd</sup> semester

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Because of the quality of the organization of the postgraduate specialist study in “Surgery, Anaesthesiology and Ophthalmology with Veterinary Dentistry”, including foreign lecturers, specialists in veterinary medicine from European and American colleges, the study gained international recognition, and since 2013 more than 60 doctors of veterinary medicine have enrolled in it from Croatia,



The Dean Prof. Dr. Nenad Turk on the occasion of signing the contract for the implementation of the project *Establishing the Postgraduate Specialized Studies in Veterinary Medicine in English* at the premises of the Ministry of Science and Education of Croatia (Faculty Archives).

Slovenia, Serbia, Bosnia and Herzegovina, Montenegro, Macedonia, Kosovo, but also Bulgaria, Algiers, Bolivia, Peru, Russia, Spain and Italy. The fact that a *numerus clausus* was introduced also reflects a great interest in the study.

Clinic for Surgery, Orthopaedics and Ophthalmology of the Faculty of Veterinary Medicine of the University of Zagreb has become a place of excellence in the field of veterinary education by modernizing the equipment and the space and by investing in human resources. The study is also unique by the fact it involves internationally certified clinical specialists who are employees of various organizational units of the Faculty of Veterinary Medicine.

In October 2018, the Faculty of Veterinary Medicine of the University of Zagreb had a project approved entitled: “Establishing the Postgraduate Specialist Studies in Veterinary Medicine in English”, financed by the European Social Fund as part of the call for “Internationalization of Higher Education”. The duration of the project is two years, it will end in October 2020. The aim of the project is to establish specialist studies in English at the Faculty of Veterinary Medicine. The project involves drawing up curricula for 16 specialist studies in veterinary medicine in English, which will offer State of the Art education, with the emphasis on practical and conversational activities, in a dynamic and stimulating environment, initial accreditation of the programme, organization of the mobility of teachers, improving linguistic competence, development of teaching materials in English, participation in higher education fairs, and activities related to the horizontal principles of EU programmes.

The project will contribute to strengthening the linguistic competences of teaching staff, raising the quality of the study programmes, and positioning the institution internationally. The developed and accredited study programmes will meet the increasing needs of potential students, and increase the mobility of students and teaching staff in the long-term, additionally creating the foundations for associated studies. Establishing a doctoral study in Veterinary Sciences in English is planned in the same manner.

The doctoral programme at the Faculty of Veterinary Medicine of the University of Zagreb is the only programme at a national level providing postgraduate doctoral education of veterinarians (PhD), and it lasts three years, or six semesters. The postgraduate doctoral study in Veterinary Sciences is the highest level of education in the vertical structure of veterinary education and was formed according to the principles of the Bologna Declaration, following the example of contemporary doctoral studies of Western Europe universities. Aiming to achieve the highest possible level of excellence, the doctoral study places emphasis on methodological, theoretical and practical knowledge and the processes of scientific development. The study's ultimate goal is to create and develop independent research capacities, which represent a vital foundation for creating a future academic career or a career in the business world for its students. The study programme covers advanced knowledge in veterinary medicine. In conjunction with the development strategies of the Republic of Croatia and the Development Strategy of the Faculty, the doctoral study aims to contribute to the development of a knowledge-based society.

The doctoral study in veterinary sciences was organized in accordance with the suggestions of the EAEVE visitation team from 2003, enabling doctorands to acquire the necessary knowledge to perform research activities in the public and private sectors, and offering the possibility of employment both in Croatia and also in European Union countries, especially in the field of public health, thus realizing the concept of "one health" promoted by all EU Member States under the slogan "One World-One Health".

The study programme of the new doctoral study is organized as a single study and is aligned with the existing recognized scientific character of the Faculty. Therefore, the organization of the study in terms of course orientations was abolished, since it made student mobility difficult or limited, according to their affiliation to the departments. The new

study organization provides for greater student mobility in selection of courses, whose content will be of interest to individual students according to the subject of their doctoral dissertation. Apart from internal mobility within the Faculty, students are able to accumulate a certain number of ECTS credits by attending relevant courses at some other associated research institution.

According to the new programme, classes are based on students' practical work in mastering the latest scientific procedures. From the first year, students are included in scientific projects and instructed to monitor scientific literature continually, with the aim of developing their own opinion based on personal results and ideas.

The basic characteristic of this new doctoral study are classes from a wide field of veterinary sciences, and their adaptability to the subject of individual doctoral dissertations. The study has three course point-groups. The first group are basic methodological courses (compulsory and elective courses), which form the basis of scientific work. They provide students with basic insights into how to approach scientific work, and enable them to master some of the basic principles needed for conducting scientific processes. The second group consists of branch oriented elective courses, which students may select from the collection of about one hundred courses. They enable students to understand scientific problems theoretically in a specific narrow area (branch), and direct them to creativity in scientific work. These courses provide students with the possibility of systematically delving into a scientific issue in a specific narrow scientific branch, and give a practical basis for successful realization of the study in a specific scientific area. The courses in this group are chosen by students in consultation with their mentors, and in line with the content of their dissertations (Table 30). The third group consists of the students' scientific activities during their studies and relates to publication of scientific papers in relevant scientific journals, and their active participation in international and national scientific conferences.

Table 30 Compulsory and elective courses, with the number of teaching hours necessary, and ECTS credits

### First credit group: methodological courses

Compulsory courses					
	Course load in hours			Total hours	Credits
	Lectures	Practicals	Seminars		
Methods of Scientific and Research Work	16	8	6	30	4.0
Ethics and Welfare in the Veterinary Medicine Experimental Work	5		15	20	3.0
Statistical Methods in Veterinary Research	6	8	6	20	4.0
Informatics in Biomedicine	3	12		15	2.0

Elective courses					
	Course load in hours			Total Hours	Credits
	Lectures	Practicals	Seminars		
Enzyme Complexes in Cellular Metabolism	15		10	25	1.5
Comparative Biochemistry	14	2		16	3.5
Functional Aspects of Genetical and Biochemical Events in Normal and Tumour Cells	16		4	20	4.5



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Methods of Molecular Biology in Veterinary Medicine	12	3		15	2.0
Ecological Relations and Field of Veterinary Work	10	8	5	23	2.0
Veterinary Epidemiology	10	5	5	20	2.0
Molecular Biology in Veterinary Medicine	15	10	5	30	2.5
Cellular and Developmental Biology	15	10	5	30	2.5
Biochemical and Biological Analytics in Veterinary Medicine	5	10	5	20	1.5

### Second credit group: field-related courses

	Course load in hours			Total hours	Credits
	Lectures	Practicals	Seminars		
Functional Morphology of Poultry and Game Birds	10	15	5	30	4.5
The Anatomy of Game and Feathered Game	15	30		45	5.5
Comparative Conformation of Autopodium for Veterinary Orthopaedic Needs	15	30		45	6.0
Anatomical, Histological and Genetic Approach to Veterinary Forensics	15	30		45	6.0
Developmental Principle of Congenital Malformation in Domestic Animals	6		6	12	3.5
Biology and Physiology of Marine Mammals	15	35	10	60	6.0
Anatomy, Biology and Pathology of <i>Cetacea</i> in the Adriatic Sea	15	90		105	6.0
Applied Morphological and Molecular Methods in Population Studies of Marine Mammals	5	30		35	4.0
Comparative Morphology of Locomotion System of Vertebrates	20	180		200	10.0
Comparative Morphology of Visceral Organs of the Vertebrates	30	270		300	10.0
Comparative Morphology of Circulatory Systems of the Vertebrates	10	90		100	8.5
Comparative Morphology of the Nervous System and the Sense Organs of the Vertebrates	10	90		100	9.0
Comparative Morphology of Common Integument of the Vertebrates	10	90		100	6.5
Waters in Veterinary Practice-Quality and Testing	9	9	12	30	4.0
Veterinary Service and Environmental Protection	14	8	8	30	4.0
Air Hygiene in Livestock Housing	14	8	8	30	3.5
Sanitation Measures in Livestock Production	14	8	8	30	3.5
Veterinary Activities in Stable Projecting	14	8	8	30	4.0
Ecological Production in Cattle Breeding	20	20	15	45	4.5
Relations Between the Organisms, the Environment and the Animal Health	15	2	5	22	4.0
Comparative Technologies in Livestock Industry	14	8	8	30	3.5
Biology of Bees (Systematization, Anatomy and Physiology and Ethology of Bees)	60	25		85	8.0
Bee Breeding, Products and Apitherapy	30	15		45	4.5
Infectious Diseases of Bees	60	60		120	10.0

Parasitic and Noninfectious Bees Diseases, Poisoning and Pests	40	60		100	10.0
Statistics	20	30		50	5.5
Veterinary Risk Analysis	10	20	20	50	6.0
European Veterinary Standards and Regulations	20			20	3.0
Health Protection Programming and Animal Illness Losses Assessment Methods	30		40	70	5.5
Organization and Design of Epidemiological and Clinical Research and Data Analysis	20			20	3.0
Epidemiology and Economy of Herd Health	20			20	3.0
Analytical Epidemiology and Modelling	30	10	20	60	4.5
Animal Health Economics	30	20	20	70	5.5
Physiology of Digestion in Ruminants	12	4	4	20	3.5
Physiology of the Neuroendocrine System in Domestic Animals	12	4	4	20	3.5
Physiology and Diseases of the Hematopoietic System	6	12	2	20	4.0
Physiology of Excretion, Selected Chapters	5	3	2	10	3.0
Oxidative and Antioxidative Processes During Normal Metabolic and Stress Condition	8	4	4	16	3.5
Cardiovascular System in Domestic Animals	14	2	4	20	4.0
Sport Physiology	10	5		15	3.5
Digestive Physiology of Monogastric Animals	6	4		10	3.0
Respiration Physiology in Domestic Mammals	4		2	6	2.5
Biological Effects of Ionizing Radiation	12		8	20	4.0
Modern Genetic Approaches in the Improvement of Livestock Productivity and Health	10	4	6	20	4.5
Poultry and Game Bird Ecology, Ethology and Technology	38	17	17	72	5.5
Bacterial Diseases of Economically Usable Poultry	10	5	5	20	3.5
Viral Diseases of Economically Usable Poultry	10	5	9	24	4.0
Mycoses and Nutritional Diseases of Economically Usable Poultry	10	5	5	20	3.5
Parasites and Invasive Diseases of Poultry and Game Birds	8	12	8	28	4.0
Avian Immunology and Immunodiagnostics Methods	38	5		43	4.5
Influence of Free-Living Birds on Animal and Human Health	5	6		11	3.0
Technology of Growth and Production of Poultry in Warm Climatic Areas	10			10	2.5
Morphogenesis of Infectious and Invasive Diseases of Poultry	16	4		20	3.5
Activity of Microorganisms in Food	15	5	10	30	5.5
Epidemiology of Food-Borne Diseases	5	5	10	20	4.0
Quality Conditions of Meat and Meat Products	5	5	10	20	3.5
Quality Conditions of Milk and Dairy Products	14	2	4	20	3.0
Laboratory Methods in Food Microbiology	5	10	5	20	3.5
Chemical Methods in Food Analysis	5	7	3	15	3.0



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Chemical Composition of Foodstuffs of Animal Origin and Changes During Storing and Processing	5		5	10	2.5
Management of Foodstuff Production and Quality Control	15		5	20	3.0
Hygiene and Quality of Fish, Crabs and Shellfish	5	2	3	10	3.0
Evaluation of Quality of Poultry Meat and Eggs	5	2	3	10	3.0
Modern Technologies in Meat Industry	5	2	3	10	3.0
Veterinary Public Health	5	2	3	10	3.0
Radiation Hygiene	10	6	4	20	4.0
Toxicology of Animal Foodstuffs	15		5	20	6.0
Hydrochemistry and Hydrobiology in Aquaculture	45	50		95	7.5
Bases of Epizootiology, Prophylaxis and Therapy of Fish Diseases	25	20		45	6.0
Infectious Diseases of Fish	40	80		120	10.0
Parasitic and Non-Infectious Fish Diseases, Pests and Poisonings	30	75		105	10.0
Exogenous and Endogenous Immunomodulation	10	5	5	20	4.0
Mucosal Immune Biology of Mammals	10	5	5	20	4.5
Treatment of Soft Tissue Injuries	6	12	6	24	4.5
Farm Animal Abdominal Surgery	35	15	15	65	5.5
Stomach and Intestine Surgery in Small Animals	25	25	25	75	5.5
Anaesthesia of Farm Animals and Horses	6	15	4	25	4.5
Anaesthesia of Small Companion Animals	8	18	4	30	4.5
Cattle Lameness	12	8	20	40	5.0
Surgical Treatment of Tumours in Dogs and Cats	10	20	10	40	
Traumatic Injuries and Osteoarthritis	3	5		8	2.5
Regenerative Orthopaedics in Dogs and Cats	3	20	10	33	4.5
Causative Agents of Specific Infectious Diseases of Bacterial Aetiology (Tuberculosis, Brucellosis and Glanders)	4	9	2	15	3.5
Molecular Principles of Genetic Engineering	8	12	10	30	4.5
Enterobacteriaceae and other Intestinal Bacterial Pathogens in Domestic Animals	2	9	4	15	3.5
Diagnostic Applications of Immunological Tests	2	10	3	15	3.5
Animal Influenza within Public Health	15	10	5	30	4.5
Bacterial Mastitis in Cows	2	10	3	15	3.0
Mycoplasma, Coxiella and Chlamydia	2	10	4	16	4.0
Molecular Virology	5	20	5	30	4.0
Retroviral Diseases of Domestic Animals	12	8	4	24	4.5
Bacterial Infections of Respiratory Diseases of Domestic Animals	2	9	2	13	3.5
Antimicrobial Susceptibility Testing	2	10	3	15	3.0
Zoonoses Caused by Spirochetes (Leptospirosis, Lyme Borreliosis, Intestinal Spirochetosis)	10	20	4	34	5.5

Clinical Parasitology	10	10		20	2.5
Arthropods Important to Veterinary Medicine	14	6		20	2.5
Serological Methods in Veterinary Diagnostics	10	10		20	4.5
Laboratory Diagnostics in Veterinary Parasitology	10	10		20	3.0
Parasitic Zoonoses	16	4		20	3.5
Immunoparasitology	18	8	4	30	4.5
Veterinary Oncology	20	40		60	4.0
The Basics of Immunohistochemical Methods	10	20		30	4.5
Disease at the Cellular Level	10	15		25	3.5
Basic Pathology-Disturbances of Circulation	10	15		25	3.5
Pathogenesis of the Infectious and Parasitic Diseases	6	2	2	10	2.5
Pathomorphology of Environmental, Toxicologic and Nutritional Diseases	14	2	4	20	3.5
Immunopathological Diseases of Domestic Animals	14	2	4	20	3.5
Laboratory Diagnostic and Clinical Approach to Haemostatic Diseases	10	2	3	15	3.5
Acute Phase Proteins-Markers of Infection and Inflammation	9	1	2	12	3.5
Biochemical Methods: Application in Clinical Practice	8	3	3	16	3.5
Monitoring of Energetic and Metabolic Status of Dairy Cows, Goats and Sheep	10	10	4	24	3.0
Inflammatory Bowel Disease in Dogs and Cats	8	4		12	2.5
Laboratory Diagnostic of Internal Diseases	3	5		8	2.5
Veterinary Haematology and Blood Transfusion	3	5		8	2.5
Respiratory Tract Disorders	3	4		7	2.5
Myocardial and Endocardial Diseases of Dogs and Cats	3	4		7	2.5
Clinical Nutrition of Dogs and Cats	5		1	6	2.5
Diseases of Pancreas in Dogs	3	3		6	2.5
Tumours, Noninfection and Nonhereditary Conditions and Mammary Gland Diseases of Domestic Carnivores	10	4	6	20	4.5
Prevention and Suppression of Subfertility Conditions in Dairy Cows	20	20	5	45	6.0
Clinical Aspects of Applied Endocrinology Reproduction in Male and Female Mammals	30	40	35	105	6.0
Assisted Reproductive Technologies in Domestic Mammals	20	60	35	115	8.5
Obstetrics	30	75	45	150	9.0
Diagnostics and Treatment of Infertility in Domestic Mammals	24	80	40	144	10.0
Gynaecological Surgery	15	30	5	50	6.0
Wildlife Handling Procedures	15	45	30	90	6.0
Invasive Diseases of Game and Wildlife	30	45	30	105	8.0
Comparative Pathology and Ecotoxicology of Wildlife	30	45	45	120	9.5
Infectious Disease of Game and Wild Animals	30	45	30	105	8.0



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Optimization of Ration and Feed Mixtures for Animals	8	17	5	30	3.5
Specificities of Small Ruminant Nutrition	15		15	30	4.0
Monitoring Bioresidual in Foodstuff	10		5	15	3.0
Fish Anatomy, Hystology, Physiology and Embryology	30	45		75	6.5
Genetic Disease of the Animals	8	2		10	2.5

Alongside enrolling in compulsory courses, students may choose from about ten elective courses and a large number of branch courses, in order to accumulate the necessary number of 180 ECTS credits from direct classes. Direct classes carry 36 ECTS credits, which students can accumulate in the first three semesters of the study. The remaining 144 ECTS credits must be accumulated through work on a dissertation, and participation in scientific conferences and writing papers. Having completed of the doctoral study, one is awarded the academic degree of Doctor of Science in the realm of Biomedicine and Health and the scientific field of Veterinary Medicine (Dr. Sc.). Upon completion, the student is competent to participate in scientific projects, monitor scientific literature in the relevant area, write scientific papers, communicate with the scientific community in the world, propose or participate in proposals for new scientific projects, take part in university scientific teaching processes, etc. They are also capable of further postdoctoral training in scientific research institutions around the world and may also participate in the work of public and private research institutes.

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At a ceremony held on 8<sup>th</sup> November, 2017 in the main hall of the Rector's office of the University of Zagreb, in the presence of the Rector, Prof. Dr. Damir Boras and the Vice-Rector, Dean and Vice-Dean, the head of the doctoral studies and members of the Doctoral Programme Committee and the Quality Management Committee of the University of Zagreb, the designation and certificate of quality (Very High Quality) for the doctoral study in Veterinary Sciences, was presented to the Dean of the Faculty of Veterinary Medicine, Prof. Dr. Nenad Turk, by the head of the Agency for Science and Higher Education, Prof. Dr. Jasmina Havranek. This quality designation and certificate were awarded to the Faculty of Veterinary Medicine on the basis of the re-accreditation procedure of the postgraduate university study programmes in the realm of biomedicine and health.

The designation was awarded to the Faculty of Veterinary Medicine for the high level of quality in the context of research results and infrastructure, as well as high-quality laboratories. The Agency's expert commission, consisting of all the Vice-Rectors for science from Croatian universities, evaluated that the participants of the doctoral programme show a high level of commitment and dedication, and that the procedure of selection of subjects and monitoring students are of excellent quality. The Commission's report particularly pointed out the study's international dimension and strategy.

The Agency for Science and Higher Education began implementing the procedure of external evaluation of this level of education back in 2016, at the same time when the procedure was conducted at the Faculty of Veterinary Medicine. The process of re-accreditation of postgraduate university study programmes, which the Agency has undertaken in recent years, is in accordance with the existing plans for re-accreditation. The aim of evaluation is to ensure that only the studies which meet the quality criteria regarding highly qualified scientists, equipment and premises, and which offer of quality support to doctoral students in creating new knowledge, receive national permits. In its evaluation of the doctoral studies, the Agency for Science and Higher Education joined the European trend of performing external evaluation of this specific level of education, which is exceptionally important in promoting innovative and highly specialized industrial and social development.

Besides the Faculty of Veterinary Medicine, the designation and certificate of quality were at the same ceremony awarded to the Faculty of Electrical Engineering and Computing for their doctoral study "Electronics and Computing", and the Faculty of Pharmacy and Biochemistry for the doctoral study "Pharmaceutical Biochemical Science" as well, on the basis of the re-accreditation procedure of postgraduate university study programmes in the realm of technical and biotechnical sciences. These were also the first three doctoral studies at the University of Zagreb to receive the designation of high-level quality.

High quality doctoral studies, provided they have the confirmation on meeting the requirements issued by the Ministry of Science and Education, are awarded the designation of high quality for academic and promotion purposes.



The Quality Certificate (High Quality Level) for the PhD study in the Veterinary Sciences (Faculty Archives).

## 4.4. Lifelong learning

By the acceptance of the Bologna Process principles, lifelong learning programmes have become one of the nine areas recognized as priorities in the process of creating the European Higher Education Area. Thus, the Bologna Process also requires from national institutions of higher education to adapt to lifelong learning, which should provide every individual with the opportunity to shape their qualifications many times throughout their professional life.

Lifelong learning presumes acquiring and modernizing all forms of skills, interests, knowledge and qualifications throughout one's life. In the context of lifelong learning, there are several forms of education: formal education (e.g. courses at a faculty), non-formal education (e.g. improving skills needed for a specific job), and informal education, inter-generational learning (the exchange of knowledge within a family, among friends).

The main reason for the creation and application of the concept of lifelong learning are the increasing scientific and technological changes, which mean that existing knowledge and skills are quickly becoming outdated. The everyday changes resulting from the development of veterinary sciences require the establishment of a new educational system, which does not end when an individual leaves the formal education system, but continues in various forms until the end of their career. Continuous lifelong learning for doctors of veterinary medicine is an essential matter of quality and therefore also competitiveness. Having that in mind, new ways of acquiring and passing on knowledge and expertise are increasingly important and necessary, enabling veterinary experts to follow new events in their field of specialty daily.

Taking all this into account, in the academic year 2005/2006 an important step was taken to update the concept of lifelong learning at our Faculty. Apart from the usual one-day and two-day courses, the long-awaited new system of lifelong learning was launched, which was adjusted to developing skills and competences within each area of specialization. Namely, the Faculty Commission for Lifelong Learning, after multiple discussions and in consultation with working groups consisting of field veterinarians, proposed a series of courses intended for veterinarians in small practices, large practices and employees in veterinary public health. When necessary, the participation of competent lecturers from other institutions, but also lecturers from abroad was provided in implementation of the courses. The series of courses usually last two years and are held up to four times a year. According to the new concept of lifelong learning, each course offers students the possibility of acquiring new preclinical and clinical skills and knowledge. Within the framework of courses intended for small and large practices, special attention is paid at practical work, where courses for small practices are held in the clinics of the Faculty of Veterinary Medicine, which have state-of-the-art equipment, using selected clinical cases. The model used for the organization of the specialized courses for small practices are the experiences and concept of the European School for Advanced Veterinary Studies (ESAVS). Courses for large practices are usually organized on farms, and rarely at the Faculty. Courses in the field of veterinary public health and food safety are held exclusively in field conditions. Alongside the already existing courses in animal production and biotechnology (a course in applied disinfection and pest control, and a course for veterinarian hygienists and disinfectors), courses are organized in nutrition, sanitation measures in veterinary medicine, biosafety on farms, etc.

For the purpose of enabling easier following and mastering the teaching materials, the appropriate contents have been prepared and handed out to students at the beginning of the course. In order to improve the quality of lifelong learning, the students, as well as responsible persons within the institution where the student is employed, regularly complete surveys,



Professors Prof. Dr. Kristina Matković-Department of Animal Hygiene, Behaviour and Welfare, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, and Prof. Dr. Željko Pavičić-Department of Animal Hygiene, Behaviour and Welfare, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, with participants of the course *Applied Disinfection, Disinsection and Deratization*, held from 11<sup>th</sup> to 13<sup>th</sup> February 2019 (Faculty Archives).

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In the following years, the Faculty of Veterinary Medicine continued the modernization of its concept of lifelong learning, whereby the establishment of a system of quality control of individual activities of the Faculty contributed greatly. Having this in mind, Prof. Dr. Dražen Matičić was appointed Vice-Dean, responsible for quality control and lifelong learning in the academic year 2007/2008.

During the academic year 2008/2009, a special application was posted on the Faculty's website, entitled "Lifelong Learning", created by the supervisors of the courses when proposing courses for professional education of veterinarians. The application provides detailed information on the courses offered and the competences of those running the course as well as their associates. The institutional surveying of students taking the courses was continued, using a newly prepared Survey, with the aim of raising the quality of teaching and determining the level of satisfaction of students in the context of practical applicability of the knowledge and skills acquired.

In total, almost 50 course topics were held in the period from the academic year 2005/2006 to 2017/2018, which were held more than 170 times, and have been completed by more than 1600 students.

Lifelong Learning application, posted on the Faculty's web site, offers more than dozens different courses, divided into the following fields: basic natural and preclinical sciences, animal production and biotechnology, veterinary public health and food safety and clinics. Alongside each course it is possible to find basic information about the course, stating the teachers, the programme and the price of the course.

Training of faculty staff at the Faculty of Veterinary Medicine in the period from 2005 to 2018 was conducted continuously at renowned European veterinary schools and wider, within the framework of international cooperation. Most of the time it involved study trips by our staff in duration from 3 to 6 months or a year at foreign colleges



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(Germany, the Netherlands, the United Kingdom, Switzerland, Austria, New Zealand, the USA etc.) where they gained theoretical and practical experience in their selected narrow specialized fields in teaching and scientific work.

In spring 2008, at a session of the Faculty Council, a strategy of continuous education of teaching staff was adopted. Namely, the training of teaching staff at the Faculty of Veterinary Medicine from different fields of interest, through seminars and the organization of their staff in centres of excellence in veterinary medicine in Europe and the USA, are activities which, amongst other things, should offer the necessary level of quality in the implementation of specialized studies. These activities are organized as a permanent process as part of the quality guarantee in implementation of the mission of the Faculty of Veterinary Medicine of the University of Zagreb, through different forms of mobility (the Central European Exchange Programme for University Studies-CEEPUS) and specialization (the European College of Veterinary Medicine-ECVM and the American College of Veterinary Medicine-ACVM).

From the academic year 2005/2006 to 2017/2018, a total of 47 visits abroad were undertaken by teaching staff at foreign universities, through CEEPUS.

The Faculty became involved in the European initiative for training of veterinary specialists in a specific field, and currently there are six colleagues with active *Diplomate* status (Prof. Dr. Nikša Lemo, Assoc. Prof. Dr. Dean Konjević, Prof. Dr. Estella Prukner-Radovčić, Assoc. Prof. Dr. Andrea Gudan Kurilj, Assist. Prof. Dr. Marko Stejskal and Assist. Prof. Dr. Zoran Vrbanac) at the Faculty who have successfully fulfilled the very strict criteria of the European Board of Veterinary Specialisation (EBVS).

Prof. Dr. Nikša Lemo attained the title of *Diplomate-European College of Veterinary Dermatology* (ECVD) in 2010. The ECVA is one of the oldest European colleges, founded in 1992, which has since then provided the veterinary and professional public with the best possible care for animals with dermatological diseases through European experts educated in veterinary dermatology.

Assoc. Prof. Dr. Dean Konjević gained the title of *Diplomate-European Veterinary Specialist in Zoological Medicine, Wildlife Population Health* at the European College of Zoological Medicine (ECZM) in 2010. The ECZM is an institution of the European veterinarians specialists in the field of zoological medicine, founded and recognized within the EBVS. The ECZM grew from the foundations of the European College of Avian Medicine and Surgery (ECAMS) which was founded in 1993. Recognizing the need to expand its specialization, in 2009 the EBVS also founded the following temporarily recognized new fields of specialization: Herpetological Medicine, Small Mammal Medicine and Wildlife Population Health, and during 2012 also Zoo Health Management. The aim of the ECZM is to ensure progress in research and practical work in the field of animal welfare and health of free-living wild animals, as well as those in captivity.

Prof. Dr. Estella Prukner-Radovčić gained the title of *Diplomate-European College of Poultry Veterinary Science* (ECPVS) in 2012. The ECPVS is a European institution, officially recognized in 2008 as part of the EBVS, which takes care of establishing and maintaining professional standards for European veterinarians specialized in the field of poultry. It also issues guidelines and requirements for postgraduate education, is in charge of research work and the spread of knowledge of poultry practice, promotes the health and welfare of poultry, and takes care of the profitability of the poultry sector, taking into account the preservation of the environment and sustainable development of agriculture.

Assoc. Prof. Dr. Andrea Gudan Kurilj gained the title *Diplomate-European College of Veterinary Pathologists* (ECVP) in 2015. The ECVD was founded in 1995 with the aim of improving veterinary pathology and promoting high standards in the mentioned discipline. This college is a part of the general education scheme of doctors of veterinary medicine in the European Union, which is coordinated with the ECCVT (European Coordination Committee on Veterinary Training) and includes the FVE (Federation of Veterinarians of



Professors with diplomate status. First row from the left to the right: Estella Prukner Radovčić active diplomate ECPVS; Dean Konjević active diplomate ECZM and Andrea Gudan Kurilj active diplomate ECVP. Second row from the left to the right: Nikša Lemo active diplomate ECVD; Alen Slavica diplomate ECZM (2012-2017); Albert Marinčulić diplomate EVPC (2007-2017) and Zoran Vrbanac active diplomate ECVSMR, ACVSMR.

Europe), EAEVE (European Association of Establishment for Veterinary Education) and the EBVS (European Board of Veterinary Specialisation). The mission of the ECVP is to contribute to maintaining and improving the quality of European specialists in veterinary pathology throughout Europe on the highest level, and in that way ensures an excellent veterinary medical service for the public. Assist. Prof. Dr. Marko Stejskal gained the title *Diplomate-American College of Veterinary Surgeons-Small Animal* (ACVS) in 2016. He has held the title *Diplomate-European College of Veterinary Surgeons* (ECVS) since 2017. The ACVS was founded in 1965 and has since then set and represented the standards of expertise and professional excellence in veterinary surgery. The college has slightly over 2000 members. The ECVS was founded in 1991 with the same aim, and has about 700 members.

Assist. Prof. Dr. Zoran Vrbanac gained the title *Diplomate-American College of Veterinary Sports Medicine and Rehabilitation-Canin* (ACVSMR) in 2016. He gained the title *Diplomate-European College of Veterinary Sports Medicine and Rehabilitation-Small animals* (ECVSMR) in 2017. The ACVSMR was founded in 2010 with the purpose of meeting the unique needs of sporting and working animals, and all animals in need of rehabilitation. The ECVSMR was founded and recognized by the EBVS in 2017, and Assist. Prof. Dr. Zoran Vrbanac is one of the founding members.

At this moment, four young employees of the Faculty are taking part in various residency programmes at the Faculty of Veterinary Medicine (Assoc. Prof. Dr. Ana Beck, Ana Petak, DVM, Dr. Maja Lukač, Assist. Prof. Dr. Marin Torti) who will, in the near future have the opportunity to become European specialists, and in that way contribute to raising the number of veterinary specialists at the Faculty to two-figure numbers.

Currently there are three active residents' programmes as part of the European specialized programmes of the European Board of Veterinary Surgeons at the Faculty of Veterinary Medicine, as follows: European College of Veterinary Dermatology (Prof. Dr. Nikša Lemo, Dipl. ECVD), European College of Veterinary Pathology (Assoc. Prof. Dr. Andrea Gudan-Kurilj, Dipl. ECVP) i European College of Zoological Medicine (Assoc. Prof. Dr. Dean Konjević, Dipl. ECZM).

## 4.5. Scientific research activities

Research activities at the Faculty of Veterinary Medicine of the University of Zagreb have from the very beginning been one of the basic elements of the Faculty's work, and its success is seen in its overall national and international recognition. Scientific work at the Faculty is based on the scientific research activities of students, teaching staff and researchers in undergraduate and postgraduate classes, as well as the realization of scientific research projects on a national and international level. Today, research work at the Faculty is primarily conducted on the basis of national scientific projects financed by the Ministry of Science, Education and Sports, the Croatian Science Foundation, the Ministry of Agriculture, the Ministry of Environment Protection, the City of Zagreb, units of local government, the State Institute for Nature Protection, and various state agencies and public institutions, whilst technological-developmental-research projects are financed by the Ministry of Science, Technology and Sports. International projects are carried out with individual EU member states, or are the result of international scientific cooperation with recognized researchers on the level of bilateral research projects and multilateral COST, FP7 and HORIZON 2020 programmes of the European Union.

In the framework of national scientific projects of the relevant Ministry of Science, Education and Sports, during the past five-year cycle from 2007 to 2011, the Faculty of Veterinary Medicine of the University of Zagreb has had 49 projects approved. These projects were divided into seven programmes (comprising three or more projects) and represented logical units of interactively linked projects, with the aim of achieving a more comprehensive approach to specific scientific questions. The programmes adopted for realization at the Faculty were designated as follows: 1. Hygiene, Quality and Safety of Animal Foodstuffs within the EU; 2. Comparative Oncology; 3. Applied Biomedical Research into Game Animals in Croatia; 4. Protozoic Diseases-from epizootiology to therapy; 5. Combating Infertility in Cattle in order to Improve Production; 6. The Health and Breeding of Pigs: immunobiological, biotechnological and biomedical



International field training in the Swiss Alps on livestock protection against large carnivore damage, run by the Large Carnivore Initiative for Europe (LCIE) (Photo courtesy of Prof. Emeritus Đuro Huber).



The detail of the lecture of the Prof. Dr. Christoph Winckler from the University of Natural Resources and Life Sciences, Vienna, Austria within the workshop of FP7 AWARE project in 2011 (Faculty Archives).

criteria; 7. The Health of Birds, Humans and the Environment. Since the Ministry of Science, Education and Sports did not publish a new call, financing these projects continued right up until 2013, and in the process of evaluating the results of the projects conducted in the academic year 2010/2011, the MSES approved the continuation of funding of 41 projects.

From 2007 to 2011, the Faculty had seven new national projects approved, financed by the Ministry of Agriculture, the Ministry of Science, Education and Sports, and other institutions. Three new VIP projects were therefore realized, along with cooperation in a technological research project with the Traumatology Clinic in Zagreb, on growing tissue equivalents (headed in the cooperating institution by Prof. Dr. Maja Popović).

Two projects were financed in the scope of the Environment Protection and Energy Efficiency Fund activities: *Monitoring the Population of Wolves and Lynx in Croatia* (head researcher Prof. Dr. Đuro Huber) and *Research into the Genetic Characteristics of the Eurasian Lynx* (head researcher Dr. Magda Sindičić). At the same time Croatian Motorways financed the project *Monitoring Wolves and the Establishment of Monitoring of Large Wild Animals in the Region of the North Velebit National Park* (head researcher Prof. Dr. Đuro Huber).

The international scientific activities of the Faculty were also strong, so work continued on six projects as part of the international cooperation with Norway (1), Germany (1), Italy (1), the Netherlands (1) and the European Union (2).

Since 2007 an impressive number of 30 new international projects has been realized in the framework of bilateral cooperation with Serbia (1), Macedonia (2), Germany (2), Norway (1), Italy (1), the Netherlands (2); as part of multilateral cooperation on the EU project of the Atomic Energy Agency, and the Food and Agriculture Organization of the United Nations (FAO) (1); within the Southeast European SERA-ERA-NET (5); as part of European cooperation in Science and Technology-COST (6) and even the FP7 (6) projects. The realization of these international projects was co-financed by the MSES, and European Union funds (Table 31).



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Table 31 International projects in the period from 2007 to 2011 (listed alphabetically according to the name of the project head)

No.	Project head	Project name
1	Hrvoje Gomerčić	Rettung der letzten Adria-Dellfine (München)
2	Željko Grabarević	Immunohistochemical analysis of mammary gland tumours in female dogs (Macedonia)
3	Juraj Grizelj	Balkan Network of Biotechnology in Animal Reproduction for the Protection and Restoration of Animal Genetic Resources in the Region (SERA-ERA-NET)
4	Juraj Grizelj	Maternal Interaction with Gametes and Embryos (COST)
5	Juraj Grizelj, Silvijo Vince	The Optimization of Superovulation, Cryopreservation and Transfer of Goat Embryos (Macedonia)
6	Juraj Grizelj, Silvijo Vince	Hormone Free Non-Seasonal Goat Reproduction for a Sustainable European Goat-Milk Market (FP7)
7	Juraj Grizelj, Silvijo Vince	Maternal Interaction with Gametes and Embryos-GEMINI (COST)
8	Juraj Grizelj, Silvijo Vince	Sustainable Production of Traditional Cheeses from Local Sheep Milk, in the Balkans: 1. Improved Reproductive Management of the Indigenous-Sheep-Breeds Population, 2. Ensuring the Hygiene and Quality of Traditional Cheeses (SERA-ERA-NET PLUS)
9	Đuro Huber	Building the Capacity to Meet the Challenges of Multi Level Democracy: The Case of Conserving Species with Transboundary Populations (Norway)
10	Đuro Huber	Conservation of Large Carnivores in Croatia (Cofunding for DinaRis project-EURONATUR Germany)
11	Đuro Huber	Gaining and Maintaining Public Acceptance of the Brown Bear in Croatia-BBI MATRA Poject (The Netherlands)
12	Đuro Huber	Hunting for Sustainability (HUNT) (FP7)
13	Đuro Huber	Improving the Coexistence of Large Carnivores and Agriculture in S. Europe-COEX (LIFE-Italy)
14	Đuro Huber	Protecting Species Through Biodiversity Communication/Campaigns Regarding Taking Animals From Nature and Keeping Wild Animals in Captivity (The Netherlands)
15	Đuro Huber	Recreation of the BALKAN NET, a network of conservation bodies in countries sharing continuous large carnivore populations (SERA-ERA-NET)
16	Đuro Huber	Transboundary Cooperation in Management, Conservation and Research of the Dinaric lynx population-INTERREG IIIA (Slovenia)
17	Zdravko Janicki	Implementation of Serology Diagnostic Methods in Invasion Evaluation of Deer Populations with <i>Fascioloides magna</i> and <i>Fasciola hepatica</i> in the Republic of Croatia and Republic of Slovenia (Slovenia)
18	Lidija Kozačinski	BASELINE-Selection and Improvement of Fit-For-Purpose Sampling Procedures for Specific Foods and Risks (FP7-KBBE-2007-2A Collaborative project)
19	Albert Marinculić	Goat-parasite interactions:from knowledge to control (COST)
20	Željko Pavičić	Animal Welfare Research in an Enlarged Europe (FP7)
21	Estella Prukner-Radovčić	Animal chlamydioses and the zoonotic implications (MoU:241/02) COST Action 855
22	Estella Prukner-Radovčić	Distribution and initial molecular characterisation of enterohemorrhagic <i>E. coli</i> (EHEC) specific virulence factors of <i>E. coli</i> strains from domestic animals and man:an assessment of zoonotic significance in the West Balkan (SERA-ERA-NET)
23	Estella Prukner-Radovčić	Foodborn zoonoses: a coordinated food chain approach (MoU:266/01) COST Action 920
24	Estella Prukner-Radovčić	Strengthening cooperation in food safety research in the enlarged EU-FOODSEG Safe food for Europe-Coordination of research activities and dissemination of research results of EC funded research on food safety (FP7)
25	Estella Prukner-Radovčić	Supporting Early Warning and Surveillance of Avian influenza infection in Wild and Domestic Birds and Assessing Genetic Markers for Bird Resistance (Multilateral EU)

26	Estella Prukner-Radovčić	The importance of chlamydia infections in birds for animal and human health in South-eastern Europe (SERA-ERA-NET)
27	Estella Prukner-Radovčić	WildTech: Novel technologies for surveillance of emerging and re-emerging infections of wildlife (FP7)
28	Nenad Turk	Serological and molecular identification of <i>Leptospira</i> spp. isolates (Slovenia)
29	Romana Turk	Farm Animal Proteomics (COST)
30	Tatjana Živičnjak	Epizootiology and epidemiology of leishmaniosis in Croatia and Serbia. Sandfly presence in non-zootic areas and serological monitoring of canines (Serbia)



Ultrasound examination of the sheep ovaries at the Hellenic Agricultural Organization-Demeter, Veterinary Research Institute, Solun, Greece, 2011, within the project Sustainable Production of Traditional Cheeses from Local Sheep Milk in the Balkans: 1. Improved Reproductive Management of Indigenous-Sheep-Breeds Population, 2. Ensuring the Hygiene and Quality of Traditional Cheeses (SERA-ERA-NET PLUS) (Photo courtesy of Prof. Dr. Juraj Grizelj and Assoc. Prof. Dr. Silvijo Vince).

In the academic year 2011/2012, the Faculty of Veterinary Medicine had two projects approved by the University of Zagreb Development Fund: *Laboratory Diagnostics of Endocrine Disorders in Veterinary Medicine: Interaction of Hormones, Infection Mediators and the Haemostatic System* (headed by Prof. Dr. Renata Barić Rafaj) for the period from 2011 to 2013, and *Production of Morphological Preparations of Protected Animal Species* (headed by Assist. Prof. Dr. Martina Đuras) for the same period of time. The international scientific bilateral project of the Ministry of Science, Education and Sports of the Republic of Croatia was also approved, under the title: *The Impact of Chinese Herbs with Different Approaches on the Healing Process of Fractures in Animals* (headed by Prof. Dr. Josip Kos) for the period from 2012 to 2014. As part of the STRE+P programme, the FP7 project was implemented, under the title: *Protection of Consumers by Microbial Risk Mitigation through Combating Segregation of Expertise* (head of research for Croatia Prof. Dr. Estella Prukner-Radovčić) lasting from 2012 to 2014.

The positive trend of registering projects with the Council for Research in Agriculture (*Vijeće za istraživanje u poljoprivredi-VIP*) continued so that from 2012 to 2014 the Faculty was approved five new VIP projects.

In 2013, the relevant Ministry of Science, Education and Sports decided to introduce designated multi-year institutional financing of scientific activities through the Universities (so called Grants for Universities), and within the framework of this system, the Faculty has received a total of 159 grants for scientific research activities up to 2018.

An Agreement on Allocation of Funding by the Croatian Science Foundation was concluded following the call for applications entitled "Established Research Projects". The Foundation took over the obligation of financing the project *Molecular Epidemiology of Selected Parasitic Diseases of Wildlife* (head Assist. Prof. Dean Konjević) for the period from 2014 to 2017. The Fund for Environment Protection and Energy Efficiency concluded an Agreement with the Faculty on the direct participation of the Fund in co-financing the project *Monitoring the Mortality of Sea Mammals in Croatia* (headed by Assist. Prof. Dr. Tomislav Gomerčić) in 2014.

Following the call for proposals entitled: Strengthening the Capacity for Research, Development and Innovation, by the Ministry of Science, Education and Sports, the Faculty received a Decision on financing for the project: *Intramammary Propolis Formulation for Prevention and Treatment of Mastitis in Dairy Ruminants* (headed by Assist. Prof. Dr. Jelena Šuran) for the period from 2014 to 2016. The State Institute for Nature Protection financed the project: *The Status of the Wolf Population in Croatia* (headed by Prof. Dr. Josip Kusak) in 2014.

Financing for new international projects was also approved. The IPA project: *High Tech Veterinary Platform for High Transparency and Competitiveness* (headed by Assoc. Prof. Dr. Igor Štoković) was implemented in the period from 2013 to 2015. The EU Commission approved the COST project *Epigenetics and Periconception Environment-Periconception Environment as an Epigenomic Lever for Optimising Food Production and Health in Livestock* (headed by Prof. Dr. Juraj Grizelj) for the period from 2013 to 2016. A project was implemented entitled: *Networking to Enhance the Use of Economics in*

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The research team of the project BIO-CHIP Bioengineered Grafts for Cartilage Healing in Patients, the Horizon 2020 Program, just before the beginning of the arthroscopy in sheep in June 2016. From the left to the right: Petar Kostešić, DVM, Academician Dražen Matičić, Mirta Vučković, DVM and Prof. Dr. Dražen Vnuk (Photo courtesy of Academician Dražen Matičić).



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Table 32 Projects currently active at the Faculty of Veterinary Medicine (listed alphabetically according to the name of the project head)

No.	Project head	Project name	Sources of financing
1	Renata Barić Rafaj	BMBS COST Action BM1405 Non-globular proteins (NGP-NET)	COST Action EU
2	Martina Đuras	<i>Anisakis</i> spp: genomic epidemiology	Croatian Science Foundation
3	Martina Đuras	Monitoring bottlenose dolphins ( <i>Tursiops truncatus</i> ) and other sea mammals in the Šibensko-kninska County Coastal Area	Public Institution for Nature Protection of the Šibensko-kninska County.
4	Martina Đuras	Blue Project-Contribution to the development of a programme of socially beneficial learning at the VFUZ	European Social Fund
5	Tomislav Gomerčić	Monitoring the Mortality of Sea Mammals in the Adriatic Sea	Croatian Agency for the Environment and Nature
6	Danijela Horvatek Tomić	Improving current understanding and research for sustainable control of the poultry red mite <i>Dermanyssus gallinae</i>	COST Action EU
7	Đuro Huber	Population level management and conservation of brown bears in northern Dinaric Mountains and the Alps	LIFE+ Nature and Biodiversity, EU
8	Đuro Huber	Research into the Number, Use of Space and Behaviour of Bears in the area of the Plitvice Lakes National Park-phase 2	Plitvice Lakes National Park
9	Lidija Kozačinski	Beneficial Production	Croatian Food Agency
10	Josip Kusak	Spatial Ecology of Wolves in the Area of the Plitvice Lakes National Park	Plitvice Lakes National Park
11	Josip Kusak	Spatial Ecology of Lynx in the Area of the Plitvice Lakes National Park	Plitvice Lakes National Park
12	Tomislav Mašek	Nutritive modulation of the metabolism of docosahexaenoic acid in diabetic dyslipidemia	Croatian Science Foundation
13	Dražen Matičić	BIO-CHIP bioengineered grafts for Cartilage Healing in Patients	EU Horizon 2020
14	Dražen Matičić	OSTEOproSPINE Novel Bone Regeneration Drug Osteogrow: Therapeutic Solution for Lumbar Back Pain	EU Horizon 2020
15	Vladimir Mrljak	FP7 ERA Chair projekt "VetMedZg"	EU FP7
16	Vladimir Mrljak	"BioDog" (Proteomic approach in the discovery of early-stage biomarkers in kidney and cardiac disease of dog)	Croatian Science Foundation
17	Vladimir Mrljak	H2020 "MANNA" (Molecular Animal Nutrition)	EU Horizon 2020
18	Ljiljana Pinter	In the Company of Microbes	European Social Fund
19	Maja Popović	Innovative functional products from lamb's meat	Croatian Science Foundation
20	Estella Prukner-Radovčić	GroupHouseNet	COST Action EU
21	Estella Prukner-Radovčić	KeelBoneDamage	COST Action EU
22	Lada Radin	Pan-European soft skills curriculum for undergraduate veterinary education-SOFTVETS	ERASMUS+
23	Marko Samardžija	Modulation of metabolic, endocrine and antioxidative status in dairy cows through dietary zeolite supplementation (ModZeCow)	Croatian Science Foundation
24	Krešimir Severin	Support to EU "Contribution to implementation of CITES Convention in BiH"	EU
25	Magda Sindičić	Preventing the extinction of the Dinaric-SE Alpine lynx population through reinforcement and long-term conservation	LIFE Nature programme of the European Commission

26	Magda Sindičić	DNA evidence of the distribution and vitality of the endangered Balkan Chamois	Croatian Science Foundation
27	Kristina Starčević	Dietary lipids, sex and age in pathogenesis of metabolic syndrome	Croatian Science Foundation
28	Ivana Tlak Gajger	Sustainable pollination in Europe-joint research on bees and other pollinators (SUPER-B)	COST Action EU
29	Ivana Tlak Gajger	European <i>Paenibacillus larvae</i> variability project-EuroPLarva	EU Ref Lab-EU Commission
30	Ivana Tlak Gajger	Vets and Bees	FVE-EVERI
31	Nenad Turk, Josipa Habuš, Zrinka Štritof	The role of biotic factors in the vitality of the narrow-leaved ash ( <i>Fraxinus angustifolia</i> , Vahl.) in flooded forests in Croatia	Croatian Science Foundation
32	Nenad Turk, Josipa Habuš	Network for evaluation of One Health NEOH TD1404	COST Action EU
33	Nenad Turk, Zoran Milas	ZOE-Zoonoses online education	ERASMUS+



Investigations of lipid metabolism on rodent model in a project: *Dietary lipids, sex and age in the pathogenesis of metabolic syndrome*.

*Animal Health, Education, Research and Policy Making in Europe and Beyond* (partner country researchers Assist. Prof. Dr. Denis Cvitković, Prof. Dr. Marina Pavlak and Prof. Dr. Marko Tadić) from 2014 to 2016. The Norwegian government financed the implementation of the project: *The Role of Natural Resources in Sustainable Rural Livelihoods in the Western Balkans-The Distribution and Flow of Costs and Benefits* (head of research for Croatia: Prof. Dr. Đuro Huber) for the period from 2014 to 2016.

In 2016 the Faculty was approved the project of the Francophone University Agency, AUF, Office for Central and Eastern Europe. BECO: *L'optimisation des paramètres de reproduction, de génétique et de santé pour l'amélioration de la production des troupeaux de chèvres. Oh, ma chèvre!* (project coordinator: Prof. Dr. Juraj Grizelj). This project lasted up to 2017 with the aim of creating a network of scientists from central and eastern Europe working on different aspects of goat-breeding (reproduction, breeding, udder diseases, infectious diseases), and enabling them to integrate the results of research and solution development to the current challenges faced by farmers in central and eastern Europe.

Currently in 2018, thirty-three projects are being run at the Faculty of Veterinary Medicine of the University of Zagreb (Table 32) in which the Faculty is a partner or the applicant, and which are financed from a whole series of national and international funds (ESF, Erasmus+, COST, HZZ, Horizon, LIFE, FP7, OBZOR2020). The management of the Faculty of Veterinary Medicine registered two projects with the European Social Fund through the Office for EU Projects in 2018. Within the framework of the call *Internationalization of Higher Education*, a project was registered entitled: *Establishing the Postgraduate Specialized Studies in Veterinary Medicine in English*, and in the framework of the call *Implementation of the Croatian Qualifications Framework on the Level of Higher Education*. The project *Development of Higher Education Standards for Professions, Qualification Standards and Improvement of the Integrated Undergraduate and Graduate Study in Veterinary Medicine with the Application of the Croatian Qualifications Framework at the Faculty of Veterinary Medicine of the University of Zagreb*. The project, *Establishing Postgraduate Specialized Studies in Veterinary Medicine in English* was approved for implementation from the beginning of the academic year 2018/2019, whilst the results of the other applications mentioned are expected by the end of 2018.

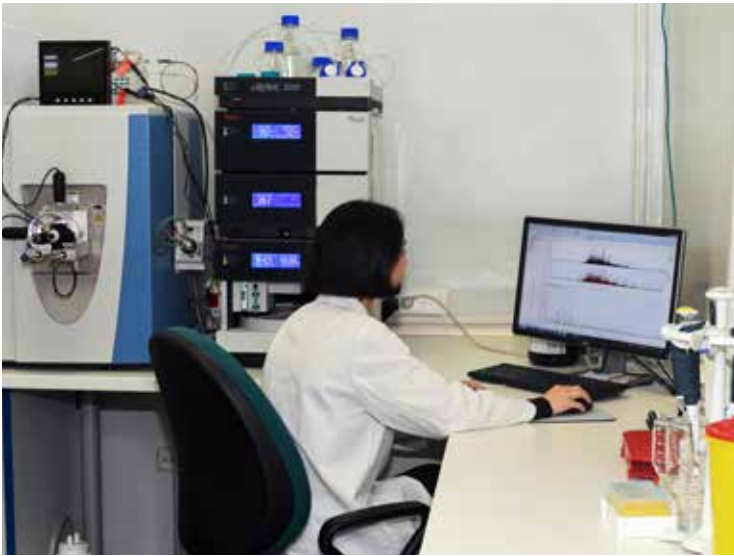
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Since 2014 investigations of lipid metabolism during metabolic diseases have been important part of basic and applied biomedical research at Faculty of Veterinary Medicine with more than 30 team members.



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The researcher on ERA Chair project “VetMedZg” Anita Horvatić, PhD performs proteomic analysis using mass spectrometry (Q EXACTIVE PLUS-Nano HPLC System; Thermo Scientific).

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Regardless of the unfavourable financial aspects, the scientific activity of the employees of the Faculty has, in the past decade, remained consistent and the advances in terms of quality must be pointed out, which are primarily seen in scientific publications, that is, publication of scientific papers in prestigious world-recognized scientific journals, not only in the field of veterinary medicine but also in the fields of biomedicine, biotechnology and natural sciences. Staff at the Faculty today publish their papers in a large number of renowned international publications, and in recent databases more than 300 (302) different journals have been registered in which researchers from the Faculty of Veterinary Medicine have published the results of their scientific research.

Since one of Faculty's strategic aims is to raise the quality of scientific production, all the important parameters of scientific activities have been monitored in the past ten years. They were primarily aimed published results of research activities (the quality of the journal—the “Impact Factor” (IF); the average five-year IF; the quarterly values, citations of individual articles or authors). The analysis of the data collected showed significant improvement in quality regarding the ranking of the scientific journals in which researchers from the Faculty of Veterinary Medicine have published their papers. In the category of Veterinary Sciences, according to data from the “Web of Science” (WoS) in the past decade, 133 to 145 scientific journals are ranked in four value categories (Q1-Q4) primarily regarding their annual or five-year Impact factor (IF) and the best positioned journal, with the highest impact factor is “Veterinary Research”, with an average five-year impact factor higher than 3 (IF=3.290, we point out that in the category Veterinary Sciences there are currently two journals with a higher impact factor, “Annual Review of Animal Bioscience” IF=4.348, which only publishes review articles, and “Fish & Shellfish Immunology” IF=3.025, which is narrowly specialized in the field of immunology of sea organisms). It is important to mention that a significant advance in terms of quality took place in scientific publications over the past decade. The average impact factor of internationally recognized journals in which employees of our Faculty have published papers has drawn closer to the median IF for the field of veterinary medicine, which is about 0.9. In the past eight years, the number of papers in the most prestigious journals has increased significantly, in the fields in which scientists from the Faculty publish (a rise was recorded in papers in Q1 and Q2 journals of 43%).

In the category “Veterinary Sciences”, scientists from the Faculty have published a significant number of papers in journals which come within the most prestigious Q1 (IF>1.5) group of scientific publications,

such as “Veterinary Parasitology” (IF=2.242, 9 papers), “Research in Veterinary Science” (IF=1.504, 8 papers), “BMC Veterinary Research” (IF=1.643, 7 papers), “Veterinary Microbiology” (IF=2.564, 6 papers), “Veterinary Record” (IF=1.741, 6 papers) and “Theriogenology” (IF=1.838, 5 papers). It is certainly important to point out that a large number of researchers from the Faculty are publishing the results of their research in other categories of scientific publication. For instance, in the category “Agriculture, Dairy and Animal Sciences” 17 papers have been published in the renowned journals “Animal Reproduction Science” and “Reproduction in Domestic Animals”, and in the category “Food Science and Technology” ten papers have been published in journals with high impact factors (IF > 3), such as “Food chemistry”, “Food Control” and “Food and Chemical Technology”. Scientists from our Faculty have succeeded in publishing their papers in journals with very high impact factors (Table 33) and we would certainly like to point out the successful publication of the results of research in the prestigious journal “Science” whose IF is higher than 30, whilst the five-year impact factor in the year of publication of the scientific article was higher than 35 (IF=35.263).

The number of citations of scientific papers by staff from the Faculty of Veterinary Medicine is growing constantly, so that in the twelve-year period in question (2006-2017) the total citations according to the SCOPUS base was almost twenty-four thousand (23,977). If we look at the citations in terms of the number of scientists, we can say that the average total citations per scientist was 80, which shows the already stable trend of growth of citations, that is, the recognition of the scientific research activities of staff at the Faculty on an international level. It must be emphasized that there are scientists at the Faculty whose papers have been cited more than a thousand times, and they also have a large number of papers which have been regularly cited over a long period of time, which shows the importance of their published results. Evaluation of scientific activities is most often measured by scientific productivity and its impact, measured by different cited analyses. These analyses include a whole series of metric methods, and since 2005, one of the important factors in the evaluation of the success of an individual scientist has been the so-called h-index, which shows the relationship of quantity (the number of cited papers) and quality (the number of citations). Research has shown that in Croatia the average h-index of scientists is five (which means that a minimum of 5 papers have been cited 5 times). Scientists from our Faculty have



The primary objective of the LIFE Lynx project is to rescue the Dinaric lynx population from extinction. The main threat is inbreeding, so 14 animals will be translocated from Slovakia and Romania to Croatia and Slovenia (Photo courtesy of Assist. Prof. Dr. Magda Sindičić).

Table 33 Prominent international scientific journals in which researchers from the Faculty of Veterinary Medicine publish papers

Title of journal	Average IF in the past 5 years	SCI classification category	Quartile ranking
Science	35.263	MULTIDISCI SCI	Q1
Gastroenterology	19.131	GASTROENTERO & HEPATOL SCI	Q1
PLoS Biology	10.731	BIOLOGY	Q1
PLoS Genetics	8.555	GEN & HEREDITY	Q1
Trends in Parasitology	7.178	PARASITOLOGY	Q1
Environmental Microbiology	5.965	MICROBIOLOGY	Q1
FASEB Journal	5.435	BIOCHEM & MOLECU BIOL	Q1
Molecular nutrition and food research	5.232	FOOD SCI & TECHN SCI	Q1
Neuropharmacology	4.667	NEUROSCI; PHARMACOLOGY	Q1
PLoS One	4.015	MULTIDISCI SCI	Q1

a wide range of h-indexes, ranging from 2 to 19, but it is important to point out that more than two-thirds of the scientists (78.1%) have an h-index higher than 4, which is far above the Croatian average.

The Faculty staff is, alongside the intensive international scientific activities, active as lecturers, heads of departments, presidents and members of scientific and organizational committees included in a large number of scientific conferences and congresses organized both in this country and abroad. In the past decade, researchers from the Faculty have taken part in the realization of more than 350 scientific conferences, and have published a large number of scientific papers in the collected papers of conferences with international review (205), more than one hundred and fifty papers in collected papers with national review (169), and about one hundred published invited lectures from scientific conferences and congresses. Besides the very strong publicist activities (in total over the last ten years 2817 published bibliographic units have been recorded), scientists from the Faculty of Veterinary Medicine have also excelled as hosts of the international congress "Veterinary Science and Profession", as co-organizers of the Croatian Veterinary Congress with international participation, and as the initiators of successful inter-institutional cooperation with many institutions of higher education and scientific institutions. They have received recognition and awards for their scientific and research activities, and deserving individuals have significantly contributed to the credibility of the Faculty through their work and become permanent or corresponding members of esteemed national and worldwide scientific associations and academies.

Finally, we can say that the Faculty of Veterinary Medicine, over its one hundred years of successful activity, has always been a prestigious Croatian scientific institution, actively present in the European research area, which is still shown today by the constant improvement of its scientific research activities, participation in national and international research projects and organization of scientific conferences and congresses. Furthermore, the Faculty is a centre of scientific excellence, whose scientific research potential, in cooperation with commercial entities, is used in researching into new, and developing of the existing high-technology products. All the staff, led by the administration, are determined in striving to make the Faculty a regional research centre, founded on the promotion of scientific excellence in fields important for regional and local development. In the future, the Faculty will conduct its scientific activities according to the principles of full synergy with international research achievements, and the results will be incorporated into national and regional economic development.

Regarding the implementation of European and world standards in employing the best scientific staff, the Faculty applies a policy of employing the most successful students in a generation as young scientist, according primarily to the interest shown in teaching and scientific activities during their studies (assistantship, writing scientific papers, Rector's and Dean's awards), and their grade average. The Faculty of Veterinary Medicine, as part of the University, has accepted the obligation of applying good European practice. The University of Zagreb has decided to support the principles of the European Charter for Researchers and the Code of Conduct for Recruitment of Researchers, and on 11<sup>th</sup> March 2010, it signed the Declaration on endorsement of the European Charter for Researchers and the Code for recruitment of researchers. In order to implement the Charter and the Code, the Faculty has adopted the Human Resources Strategy and Action Plan of the University. This means that the publication of all calls for applicants on international websites from the moment Croatia acceded to the EU (all tenders for posts at the VFUZ from July 2013 have been published on the EUROPASS website).

The Faculty also conducts a very active policy of development of young scientists. In 2008, for example, there were forty-one members of staff with the status of junior scientist. All junior scientists are granted free enrolment in all semesters of their doctoral study. Up until the end of 2014, all of these junior scientists had attained the title of Doctor of Science. The one-hundred percent success of these junior scientists in attaining the highest scientific title, along with noteworthy scientific production, indicates the systematic care of mentors and heads of projects for scientific juniors at the Faculty of Veterinary Medicine. In addition to this, in 2011 an Office for Junior Scientists and Associated Professions was founded at the Faculty, having an advisory role for all young scientists. A Fund for co-financing of visits by young scientists for training abroad was also founded. Depending on its financial situation, the Faculty supports from its own resources full-time doctoral students whose scientific papers have been accepted for presentation at scientific conferences, paying their registration fees, and if possible also their travel expenses. In cooperation with the University, once a year they organize Info-days for doctoral students, and through the Alumni and Friends Club of the Faculty of Veterinary Medicine of the University of Zagreb, and the Association of Graduates and Friends of Faculties of the University of Zagreb (AMAC-VEF), the Faculty organizes lectures and workshops aimed at raising the scientific competence of young scientists.



## 4.6. Professional work

From 2005 to 2018, professional work was conducted by the Faculty within its organizational framework and in cooperation with commercial entities, associations of producers of animals and food of animal origin, local government and other state institutions.

Professional and clinical work is organized in the Department of Veterinary Pathology, the Clinic for Surgery, Orthopaedics and Ophthalmology, the Clinic for Internal Diseases, Clinic for Obstetrics and Reproduction, the Department of Microbiology and Infectious Diseases with Clinic, the Outpatients Clinic and laboratories of the Department of Parasitology and Invasive Diseases with Clinic, the Department of Radiology, Ultrasound Diagnostics and Physical Therapy, the laboratories of the Department for Biology and Pathology of Fish and Bees, and in the Outpatients Clinic for birds and the laboratories of the Department of Poultry Diseases with Clinic.

Cooperation with commercial entities through laboratory diagnostics is undertaken by the Department of Hygiene, Technology and Food Safety, the Department for Animal Hygiene, Behaviour and Welfare, and the Department of Animal Nutrition and Dietetics. Furthermore, the Department of Game and Wildlife Management implements a programme with the aim of combatting and treating fascioloidosis in deer in the hunting and breeding ranges of these game animals.

Today, the staff working at the clinics and laboratories of the Faculty of Veterinary Medicine, monitoring the development of their profession through individual training at internationally recognized faculties, are able to take part in the most complex procedures on animals and contemporary laboratory diagnostics. This goes along the lines of the renowned European clinics and laboratories that are part of regional veterinary colleges, with respect for the tradition of 24-hour service provision. The quality level of the clinical and laboratory activities of the Faculty of Veterinary Medicine has particularly become prominent from 2003 on, as a result of significant investments in comprehensive construction work, with the aim of detailed and complete renewal of the clinical and laboratory premises. It reaches its height in 2008 onwards, when the clinical and laboratory premises were renovated through well-planned use of donations, and its own investment in systematic procurement of the latest equipment and apparatus.

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The detail from the dog's liver tumour surgery performed by Academician Dražen Matičić and Prof. Dr. Dražen Vnuk in January 2015. The operation was performed in the presence of the 7<sup>th</sup> semester students (Faculty Archives).

The latest major investment was certainly the construction of the Department of Microbiology and Infectious Diseases with Clinic, which began in 2011 and was completed with the official opening in 2016. The new clinic, covering an area of 900 m<sup>2</sup>, consists of an outpatients clinic for healthy animals (dogs, cats, and other pets), an outpatients clinic for sick animals, an outpatients clinic for horses and farm animals, two clinical laboratories, a pharmacy, four in-patient stations for treating dogs, cats and other pets, an isolation unit, stalls for treating horses and farm animals, and a large number of auxiliary premises.

In the same period, computerization of clinical work (outpatient protocols) was also undertaken, in order to set high standards in working with clients, and to define a uniform price list for services. It is because of this approach, that the clinics and laboratories at the Faculty earn most of the Faculty's income, in the category of income earned through its own activities.

Today, the laboratory work at the Faculty has been expanded by the foundation of the Forensic Laboratory (ForensicLAB) at the Department of Forensic and State Veterinary Medicine. The Veterinary and Safety Directorate issued a decision authorizing ForensicLAB as an official laboratory in the field of veterinary activities for genotyping of animals (dogs, cattle, ungulates, sheep and goats).



The detail from the dog's perianal tumour surgery using the laser performed by Prof. Dr. Dražen Vnuk and Dr. Andrija Musulin in April 2012 in the presence of the 8<sup>th</sup> semester student (Faculty Archives).

As part of the thorough renewal of the Faculty, a great deal has been invested in the development of laboratory work. Since 2003, construction work has been intensified with the aim of renewing the Central Clinical Laboratory and the diagnostic laboratories, within individual organizational units. Through its own investment, as well as valuable donations, the vitally necessary contemporary laboratory equipment was procured and thereby the conditions met to launch the accreditation of individual laboratories. Namely, one of the strategic questions in maintaining the activities within the Faculty is certainly the accreditation of laboratories according to the HR EN ISO/IEC 17025 standard, which was confirmed by the Croatian Accreditation

Agency (HAA). The initiative to start accreditation was launched in the academic year 2008/2009 by the Department for Hygiene and Technology of Animal Foods (now the Department of Hygiene, Technology and Food Safety) and they were joined by the heads of departments and laboratories of the Veterinary Public Health and Food Safety Division, who participate in regular diagnostics of infectious and invasive diseases for the Ministry of Agriculture, Fisheries and Rural Development-Department for Veterinary Medicine, and the Ministry of Health and Social Welfare of the Republic of Croatia. In 2009, the Faculty Council approved of the introduction of the accreditation process as a strategic goal of the Faculty, and began the preparation of the necessary documentation.

With the aim of quality preparation for the accreditation procedure, and bearing in mind that significant investments in the laboratories performing professional work, which thereby bring significant income were necessary, the Faculty Council gave its support to the laboratories of individual departments in the Veterinary Public Health and Food Safety Division by financing the establishment of accredited methods, and made renovation of certain premises (construction and equipment procurement priority.)

In December 2010, HAA experts undertook the first evaluation of the six registered laboratories, using six testing methods. After the evaluation was conducted and weaknesses corrected, on 27<sup>th</sup> April 2011, the laboratories in the accreditation process became accredited



Within the expert work in the Laboratory for Honeybee Diseases (APISlab) the early diagnosis of American foulbrood is carried out by inoculating a sample of honey on nutrient mediums. It is a monitoring method for prevention of the occurrence of clinically visible signs of the disease.



**Potvrda o akreditaciji**  
Accreditation Certificate

**Omve se utvrđuje da je**  
This is to recognize that

Sveučilište u Zagrebu Veterinarski fakultet  
Odjel za veterinarsko javno zdravstvo i sigurnost hrane  
Odjel za animalnu proizvodnju i biotehnologiju  
University of Zagreb Faculty of Veterinary Medicine  
Veterinary Public Health and Food Safety Division  
Animal Production and Biotechnology Division  
Heinzelova 55, HR-10000 Zagreb

**osposobljen prema zahtjevima norme**  
is competent according to  
**HRN EN ISO/IEC 17025:2007**  
(ISO/IEC 17025:2005+Cor.1:2006;  
EN ISO/IEC 17025:2005+AC:2006)  
**za/ to carry out**

**Laboratorijska ispitivanja u području veterinarske medicine**  
Laboratory testing in veterinary medicine

**u području opisanom u prilogu koji je sastavni dio ove potvrde o akreditaciji.**  
for the scope described in the annex which is the constituent part of this accreditation certificate.

**Br./No.:** 1309  
**Klasa/Ref.No.:** 383-02/15-30/045  
**Urbroj/Id.No.:** 569-02/6-16-39  
Zagreb, 2016-04-27

**Akreditacija istječe.** Accreditation expiry: 2021-04-26  
**Prva akreditacija.** Initial accreditation: 2011-04-27

**HAA je potpisnica multilateralnog sporazuma s Europskom organizacijom za akreditaciju (EA)**  
HAA is a signatory of the European co-operation for Accreditation (EA) Multilateral Agreement

**Ravnatelj:**  
Director General:  
Tihomir Babić, dipl. ing.

**HAA** Hrvatska akreditacijska agencija  
Croatian Accreditation Agency

HAA-06-7/7-1 Izdavanje/Issue 6

The Accreditation Certificate of the Laboratories within the Division of Veterinary Public Health and Food Safety, and the Division of Animal Production and Biotechnology by the Croatian Accreditation Agency.

laboratories in the field of “Laboratory Diagnostics in the Field of Veterinary Medicine and Microbiological Food Testing”. The accreditation certificate was issued for a period of five years, given that HAA experts undertake obligatory annual inspections.

The following laboratories were accredited:

- The laboratory for equine viral arthritis of the Department of Microbiology and Infectious Diseases with Clinic (ARTERlab)
- The laboratory for leptospirosis of the Department of Microbiology and Infectious Diseases with Clinic (LEPTOlab)
- The laboratory for equine infectious anaemia of the Department of Microbiology and Infectious Diseases with Clinic (IAKlab)
- The laboratory for control of foodstuffs of the Department of Hygiene, Technology and Food Safety (LabNAM)
- The laboratory for diagnostics of trichinellosis of the Department of Parasitology and Invasive Diseases with Clinic (LabT)
- The laboratory for chlamydia of the Department of Poultry Diseases with Clinic (CHLAMlab).

Considering the effort and financial resources invested in accreditation, the laboratories were expected to retain their accreditation and even extend it, meaning generate income, as they had stated in the explanation for the accreditation. Unfortunately, due to their greater expenditure in relation to income, the Department of Hygiene, Technology and Food Safety in 2011 and the Department of Parasitology and Invasive Diseases with Clinic in 2016, were not able to renew their accreditation.

Following the inspection conducted from 16 to 17 February 2016, the laboratories of the Department of Microbiology and Infectious Diseases with Clinic and the Department of Poultry Diseases with Clinic, entered a new five-year accreditation cycle. In the same year, an inspection was for the first time undertaken at the Laboratory for Bee Diseases (APISlab) of the Department of Biology and Pathology of Fish and Bees. This resulted in the Animal Production and Biotechnology Division gaining an accredited laboratory with two accredited methods. In the period that followed (2017-2019) these laboratories have retained their accreditation certificate and perform their work as the reference laboratories of the Ministry of Agriculture-Department of Veterinary Medicine and Food Safety.



The new building of the Clinic for Infectious Diseases, with the Animal Isolation Unit covering 900 m<sup>2</sup>. The building was built in 2016.







## II. MODERN HISTORY

Table 34 Projects financed by bodies of local government in alphabetical order of the heads of projects, from 2005 to 2018

No.	Project head	Project name
1	Darko Gereš	Epidemiological monitoring of the reproductive health of mares in the Virovitičko-podravaska County
2	Lidija Kozačinski	Protection of Međimurje meat “z tiblice” with the designation of original product, preparation and creation of specifications (Ministry of Agriculture, Fisheries and Rural Development and the Association for Protection of Indigenous Food Products of Međimurje)
3	Bela Njari	Horse meat sausages (salami)-Brand name (Ministry of Agriculture, Fisheries and Rural Development and the Association of Horse Breeders of Kloštar Ivanić)
4	Estella Prukner-Radovčić	Establishing the status of bird health in the area of the City of Zagreb as a possible source of infection of humans (City of Zagreb-Department of Health, Labour, Social Welfare and Homeland War Veterans)
5	Emil Srebočan	The status of the eco-system of the Molva gas fields (INA-Naftaplin, and the Institute of Public Health of the Koprivničko-križevačka County)
6	Dagny Stojčević	Control of public areas contaminated by parasitic factors dangerous for human health in the area of the City of Zagreb (City of Zagreb-Department of Agriculture and Forestry)
7	Miljenko Šimpraga	Production of goat meat with the designation of ecological product of Croatia (Ministry of Agriculture, Fisheries and Rural Development and the City of Knin, municipality of Biskupija, municipality of Kijevo).
8	Ksenija Vlahović	Crows in the urban environment (City of Zagreb-Department of Agriculture and Forestry)

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The Faculty's professional work in the period in question focused on several projects financed by local government, and covered the fields of reproduction, eco-toxicology, parasitic zoonoses, birds as carriers of zoonoses, and the development of food products research, in order to protect their geographic origin (Table 34).

Besides professional clinical work and laboratory diagnostics, the Faculty is, in accordance with its Statute, registered to perform other professional work. Special emphasis should be placed on assessing documentation on the safety and residues of veterinary medical products, writing pharmacological-toxicology reports for the needs of placing veterinary medical products and biocidal preparations on the Croatian market, as well as activities of veterinary pharmacovigilance, conducted by the Department of Pharmacology and Toxicology.

Furthermore, the Faculty has, in the mentioned period, intensified its professional work regarding the contractual cooperation with livestock farms, stables, the meat and dairy industry, factories for producing livestock feed, producers of eggs and dairy products, fish farms and other organizations where Faculty staff, with their professional experience, contribute to resolving problems related to animal healthcare, livestock production, veterinary public health and food safety.

A special area of Faculty's professional work concerns organizing courses as part of the lifelong education of doctors of veterinary medicine, in cooperation with the Croatian Veterinary Chamber and includes contemporary topics from pre-clinical and clinical veterinary medicine, animal production and biotechnology, and veterinary public health and food safety. The Faculty has lately organized courses for education of experts and other professions (medics, biologists, agronomists etc.), such as courses in training people who work with experimental animals and animals used for production of biological preparations, in accordance with the national legislation (Regulations on Protection of Animals used for Scientific Purposes).

The professional work of Faculty's professors are also evident from the publication of professional articles and books, appearances on television and radio programmes, participation in professional

conferences, workshops and other meetings, where they promote their experience in various fields of veterinary medicine to the wider social community.



In 2005, Prof. Dr. Estella Prukner-Radovčić was appointed by the decision of the mayor of the City of Zagreb for the President of the Expert Committee for the Monitoring of Avian Influenza and the Zoonoses in Free Living Birds in the Area of Zagreb. Along with this, the project Establishing the Status of Bird Health in the Area of the City of Zagreb as a Possible Source of Infection of Humans (2006-2007) was approved the following year. During the project the health status of the swans from Jarun Lake was also investigated and the staff of the Department of Poultry Diseases with Clinic, as well as the students were involved (Photo courtesy of Prof. Dr. Estella Prukner-Radovčić).

## 4.7. International cooperation

International cooperation, as one of the very important strategic guidelines of the development of the Faculty, has seen a significant rise in activity and accelerated expansion over the past two decades. At the same time, all forms of academic mobility have been highly internationalized. The intensified international activities of the Faculty of Veterinary Medicine have been especially visible from the time of the introduction of the new study programme (aligned with the Bologna Declaration) in the academic year 2005/2006, right up to the present day. The international cooperation is one of the major factors of recognition of the Faculty, not only in a regional, but also in a wider international sense. The international cooperation by the Faculty of Veterinary Medicine is currently practised on the basis of the individual cooperation of members of the academic community, chairs, departments, clinics or individual divisions, as well as cooperation of the Faculty with related institutions in the near or wider surroundings. The Faculty is signatory to a large number of bilateral and multilateral agreements, and participates in the work of international inter-faculty and university networks and associations on the realization of international projects in the field of higher education, and international scientific and professional research projects.

The significant rise in the international activities of the Faculty in this period of time is also the result of several important factors and the circumstances that led to them. After the Faculty had passed the international evaluation for the first time (EAEVE, 2003), a new policy was adopted for encouraging inter-institutional cooperation among veterinary faculties and universities at the level of the EU. At the same time, the University of Zagreb launched a powerful campaign to promote international cooperation regarding all its constitutional parts. All these events made it possible for the Faculty staff, over the past twelve years, starting from the academic year 2005/2006, to participate in a very large number of international activities. It can therefore be said that this period, in terms of international cooperation, has certainly been one of the most fruitful ones in the long and rich history of the Faculty.



From the left to the right: the Dean Prof. Dr. Nenad Turk, Prof. Dr. Benjamin Brainard, DACVAA, DACVECC (College of Veterinary Medicine, University of Georgia, Athens, SAD) and Academician Dražen Matičić photographed during the Symposium of the Veterinary Specialists at the Croatian Academy of Sciences and Arts (2018), i.e. during the visit of the Prof. Dr. Benjamin Brainard to the Faculty of Veterinary Medicine of the University of Zagreb (Photo courtesy of Zoran Juginović).

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Numerous foreign eminent scientists, teachers and experts have visited our Faculty, and in the period from the academic year 2005/2006 to 2005/2006 and 2017/2018, we recorded one hundred and thirty-six visits, where eminent international experts held a significant number of lectures (91) for students, teachers and Faculty staff. A large number of these lectures was organized with the help of the Alumni and Friends Club of the Faculty of Veterinary Medicine of the University of Zagreb, which in this period participated in organizing 58 lectures for students, teachers and Faculty staff. In the academic year 2005/2006, we recorded visits by teaching staff from Canada, America, Austria, Italy, the Netherlands, Israel, Slovenia and Bosnia and Herzegovina. In the following year, the Faculty was visited by veterinary experts from America (Iowa, Texas), the Netherlands, France, Korea, Kosovo, Slovenia and Puerto Rico. In the academic year 2007/2008, several delegations from veterinary faculties from the region visited the Faculty. There was also a visit by a delegation from the faculty in Tirana, Albania, and also the dean and vice-dean from the Faculty of Veterinary Medicine in Skopje, Macedonia. There were also frequent visits by experts from far-off parts of the world, like visits from veterinary experts from Alaska and the Canadian Prince Edward Island Edward. Prof. Dr. Kai Frolich (Germany) held several lectures for students of the Veterinary, Agronomy and Forestry Faculties. Prof. Dr. Frank J. M. Verstraete (Davis, California) held a course in veterinary dentistry and Prof. Dr. Reinhard Hirt, the head of the Department for Small Animals of the Clinic for Internal Diseases of the Veterinary University in Vienna, held practical classes in endoscopy of the respiratory and digestive systems.

In accordance with the increasing volume of international exchanges and the strategy of internationalization, the University of Zagreb saw the need to found an office which would perform all tasks related to international activities, both for the University as a whole, and for its individual parts. Prompted by correspondence by the Rector, the Faculty's administration at that time decided to create an Office for



Assist. Prof. Dr. Marko Stejskal, Dr. Andrija Musulin, Petra Dmitrović, DVM, with the students of the 8<sup>th</sup> semester following the instructions of the Prof. Dr. Benjamin Brainard, DACVAA, DACVECC, during the Brahioccephalopathic Syndrome surgery (Faculty Archives).



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Assoc. Prof. Dr. Igor Štoković, Head of the Office for International Cooperation from 2009 to 2014 (Faculty Archives).

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International Cooperation, in accordance with the legal acts of the University, and in that way facilitate the process of integration of the Faculty into European scientific research activities and higher education programmes. The Office for International Cooperation of the Faculty of Veterinary Medicine was formally founded in the academic year 2007/2008, with the aim of preparing the documentation needed for participation in the work of international organizations: the European Association of Establishments for Veterinary Education (EAEVE) and the Veterinary Network of European Student and Staff Transfer (VetNEST). It monitors and supports the inclusion of the Faculty and its staff and students in various international organizations and programmes, is in charge of correspondence and negotiations on a bilateral basis, encourages the development of international bilateral and multilateral cooperation and proposes new cooperation agreements with foreign universities and veterinary faculties, as well as their realization. Over its ten-year existence, the office has continuously informed staff and students of the available programmes of international cooperation, the relevant and recent international activities, the possibilities for receiving support and it regularly and timely informs of calls for scholarships, projects, exchanges and other international events.

At the beginning of the following academic year, 2008/2009, a dean's team from the Faculty of Veterinary Medicine of the University of Sarajevo visited the Faculty, and a new bilateral agreement was signed on increasing the volume of exchanges of teaching staff and students, and defining the conditions of work on joint projects. In view of the constant growth in international activities at the Faculty, a new Commission was founded for international cooperation, which set as its priority and main task to coordinate the departures of young scientists for professional training and applications for scholarships (within ERASMUS; BASILEUS, CEEPUS, and other international exchange programmes). As in the previous period, the Faculty gave financial support to students and staff for training at foreign institutions, and co-financed the stay of foreign lecturers and scientists at the Faculty, in accordance with the rules regulating these activities on the level of the University. In the academic year 2008/2009, students and teaching staff from the Faculty went on professional visits and training, summer schools, workshops, meetings of international professional associations or international congresses to Albania, Belgium, Brazil, Greece, Italy, Israel, Hungary, the Netherlands, Germany, Poland, the USA, Spain, Switzerland and Sweden.

The academic year 2009/2010 was marked by the inclusion of the Faculty into the ERASMUS programme, in the framework of which

the first longer-term student (undergraduate and postgraduate) scholarships were granted for one semester at the University of Veterinary Medicine of Vienna. Professional practice for our students was organized with veterinary faculties in Ghent, Ljubljana and Bristol. Visits by veterinary experts from all around the world continued, eminent veterinarians from the United States of America (Cornell Veterinary College) and a representative of the Food and Drug Administration (FDA) and the American Academy of Veterinary Pharmacology and Therapeutics (AAVPT), Italy (Sardinia), Austria (Vienna), Germany (Frankfurt), Poland (Warsaw), Bosnia and Herzegovina (Sarajevo) and Serbia (Belgrade) visited the Faculty. We particularly point out the visit by Prof. Dr. Walter Winding, President of the Federation of Veterinarians of Europe (FVE), who held a series of meetings presenting useful information on cooperation between the FVE and EAEVE, and the demanding requirements set before EU institutions working to educate veterinarians. Faculty staff participated in organizing scientific conferences (VEPRA, European College Day) and international workshops, and in the framework of the EU Veterinary Week 2010 held in Brussels, our students held noteworthy seminars.

In the academic year 2010/2011, Faculty staff participated in the realization of three COST projects: Maternal Interaction with Gametes and Embryo, Goat-parasite interactions: from knowledge to control and Farm Animal Proteomics. Many foreign guests visited the Faculty, of which we particularly point out the delegation from the University of Georgia (UGA), led by the rector and deans of individual units of this eminent American university. The visit of the American delegation was organized by the Rector's Office of the University of Zagreb, and the esteemed guests toured the new laboratories in the Department of Hygiene, Technology and Food Safety, and the premises of the clinics of the Faculty of Veterinary Medicine of the University of Zagreb. In the same year, examinations were held at the Faculty to gain the status of *Diplomate of the European Veterinary Parasitology College (EVPC)* before a commission composed of three *Diplomateas* from that college. The EVPC is a newly-founded European institution for establishing and maintaining professional standards of European veterinarians specialized in the field of veterinary parasitology.

The academic year 2011/2012 was marked by several important events in the field of international cooperation. Our already traditional congress "Veterinary Science and Profession" outgrew its national



Participants of the International Symposium Game and Ecology in a visit to the Plitvice Lakes National Park in 2007 (Faculty Archives).





Prof. Dr. Juraj Grizelj at the stand at the “Best-Beruf Studium Weiterbildung” fair in Vienna in 2016 (Faculty Archives).

framework and officially became an international conference, which has experts from neighbouring countries on its organizational committee (Slovenia, Macedonia, Bosnia and Herzegovina) and the United States of America. A delegation of Chinese scientists from Peking, from the College of Veterinary Medicine, China Agricultural University visited the Faculty. This visit was a part of an international Croatian and Chinese scientific research project entitled: The impact of Chinese herbs and different approaches to the healing process of fractures in animals. During their stay in Croatia, the Chinese experts met with the management of the Faculty of Veterinary Medicine and were acquainted with the organization and work of the Faculty. We also recorded visits from a large number of internationally renowned experts from Europe (Austria, Belgium, Italy, Hungary, the Netherlands, Germany, Slovakia, Slovenia, the United Kingdom) and America, who spent time at the Faculty and gave very well attended lectures.

At the Faculty of Veterinary Medicine of the University of Zagreb, in the academic year 2012/2013, there were visits by teaching staff and scientists from Austria, Belgium, Bosnia and Herzegovina, Czech Republic, Denmark, Finland, France, Italy, Hungary, Macedonia, the Netherlands, Germany, the USA, Slovakia, Slovenia, Serbia, Spain and the United Kingdom. The reasons for their visits were related to scientific-research, bilateral and multilateral EU projects, laboratory work and international cooperation. Guests gave six (6) lectures for students, teaching staff and doctors of veterinary medicine, in the Alumni and Friends Club of the Faculty of Veterinary Medicine. The year was also marked by the signing of a large number of international agreements and contracts on cooperation with established institutions in Europe and the world (Athens, Budapest, Ghent, Wrocław, University of Florida, West Kazakhstan University).

In the academic year 2013/2014, international experts from veterinary institutions in Vienna, Cáceres, Košice, Ljubljana, Novi Sad, Parma and Tirana stayed at the Faculty, and our teaching staff held classes in Karditsa (Greece) while short mobility visits were undertaken by teachers in Brno, Ghent, London, Skopje, Turin and Wrocław. An international summer school *Wildlife Management* was organized with eighteen students from Austria, Czech Republic, Hungary, Slovakia and Slovenia.

In the academic year 2014/2015, professors from Mexico, the USA (Iowa) and Albania visited the Faculty. New bilateral agreements were signed on cooperation with veterinary faculties from Mexico, Venezuela, Italy and Belarus. As part of the activities of the COST

project EPICONCEPT, the Faculty organized an annual workshop on the subject of the Periconception Environment in Dubrovnik, in April 2015. We continued our successful cooperation with the University Agency for Francophone Countries (AUF), and with the EBVS (European Board of Veterinary Specialisation). The proposal by the resident of the programme, Assist. Prof. Dr. Dean Konjević, Dipl. ECZM (Faculty of Veterinary Medicine of Zagreb) and Prof. Dr. Gorazd Vengušt, Dipl. ECZM (Faculty of Veterinary Medicine of Ljubljana), was positively assessed by the Education Commission of the European College of Zoological Medicine, and approved for inclusion in the Faculty of Veterinary Medicine of Zagreb and Ljubljana as the responsible bodies in the programme.

In the academic year 2015/2016, several renowned teachers visited the Faculty, and we particularly emphasize on the visit by Prof. Dr. Chad Schmiedt (College of Veterinary Medicine University of Georgia, Athens, Georgia, USA) to the Clinic for Surgery of the Faculty of Veterinary Medicine, during which cooperation on the further education of young people at the Veterinary Hospital of UGA, USA was arranged. Univ. Prof. Dr. H.C. Walter Baumgartner, *Diplomate ECBHM* (President of the World Association for Buiatrics, Clinic for Ruminants, of the University of Veterinary Medicine, Vienna, Austria) visited the Faculty at the end of 2015 and held two lectures on metabolic problems in ruminants in the Clinic’s lecture theatre. The Faculty concluded agreements on cooperation with related faculties from Cuba, Kazakhstan and the USA (Seattle) and our teaching staff cooperated with veterinary institutions from the entire world (Austria, Cuba, USA-Iowa, Poland, Italy, Slovakia, Estonia, Slovenia, the United Kingdom, Romania, Macedonia, Bosnia and Herzegovina and Serbia). In March 2016 representatives from the Faculty took part in the largest international University fair in the region: “Best-Beruf Studium Weiterbildung” held in Vienna. On its joint stand, the University of Zagreb had the opportunity to promote its new study programme in veterinary medicine in English.

In the next academic year, 2016/2017, eminent professors from Hungary (Prof. Dr. Laszlo Frenyo and Prof. Dr. Tibor Bartha) held lectures on the subject of the study of veterinary medicine in foreign languages, in which the Veterinary University in Budapest has long experience. In May 2017, representatives of the University of Veterinary Medicine in Budapest spent two days visiting the Faculty, the Rector, Prof. Dr. Péter Sótonyi and Vice-Rector for international



Students of the integrated undergraduate and graduate study of the veterinary medicine from Austria, Czech Republic, Israel, Hungary, North Macedonia, Germany, Poland, Slovakia and Slovenia at the *International Summer School Zoonoses* in Dubrovnik in 2018 (Faculty Archives).



## II. MODERN HISTORY



Deans and Vice-Deans of the Faculties of the VetNEST members at the celebration of the 225<sup>th</sup> anniversary of the University of Veterinary Medicine Budapest held within the annual EAEVE Assembly in Hungary 2012. From the left to the right: Prof. Tibor Bartha, Vice-Dean for International Cooperation, University of Veterinary Medicine Budapest, Hungary; Prof. Stanislaw Winiarczyk, Dean of Lublin Veterinary School, Poland; Prof. Jan Twardon, Dean, Faculty of Veterinary Medicine, Wroclaw, Poland; Prof. Olga Zorman Rojs, Vice-Dean for Education, Faculty of Veterinary Medicine, University of Ljubljana, Slovenia; Prof. Ladislav Steinhauser, Dean of Faculty of Veterinary Hygiene and Ecology, Brno, Czech Republic (Faculty Archives).



The EAEVE/FVE Evaluation Team for our Faculty, Visit Stage 1 in June 2013. From the left to the Right: Prof. Dr. Nikša Lemo (internal liaison officer), Prof. Dr. Stefano Rea (Italy), Isa Immonen (student member from Finland), Prof. Dr. Thomas Blaha (Germany), Prof. Dr. Ana Maria Bravo Del Moral (Chair-Spain), Dr. Barry Johnson (UK), Prof. Dr. Gilles Dupre (Austria), Prof. Dr. Stefano Romagnoli (EAEVE Coordinator-Italy) (Photo courtesy of Prof. Dr. Nikša Lemo).

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cooperation Dr. Tibor Bartha, and representatives of the Hungarian Veterinary Chamber, the president, Dr. Gábor Gönczi and secretary, Dr. Atila Kos. The improvement of our bilateral cooperation was agreed on with representatives of the most important veterinary institutions in Hungary, especially within the framework of studies in veterinary medicine in English, and a date was set for signing an agreement on a strategic partnership, which was then signed in September 2017 in Budapest. Our successful cooperation continued with the Veterinary Teaching Hospital, College of Veterinary Medicine, University of Georgia, Athens, USA. Prof. Dr. Amie Koenig (UGA) spent time at the Surgery, Orthopaedics and Ophthalmology Clinic in October 2016. During her visit, Prof. Koenig successfully organized several workshops in the field of intensive care of animals, at which doctors of veterinary medicine were given new insights and learned techniques used in emergency situations by our American colleagues. Prof. Dr. Benjamin Brainard, Dipl. ACVAA/ACVECC from the College of Veterinary Medicine, University of Georgia, Athens, USA spent time at the Clinic for Surgery, Orthopaedics and Ophthalmology in April 2017. During his visit, Prof. Brainard continued training in emergency medicine and taught teachers and students the latest methods used in intensive care of critically ill patients. New international agreements on cooperation were signed with veterinary institutions from Spain, Italy, Turkey, Moldavia and Bulgaria, and teachers from the Faculty worked together with colleagues from Austria, Bosnia and Herzegovina, Italy, Hungary, Macedonia, Germany, Poland, Slovakia, Slovenia, Serbia and the United Kingdom. In April 2017, in cooperation with the members of VetNEST, the Faculty organized an international summer school in Dubrovnik for students entitled *Zoonoses*.

From 2005 to 2010, the activities of the Faculty, in the framework of EAEVE, were aimed at participation of Faculty representatives in annual assemblies and their inclusion in the work of individual committees of this prestigious association. This way, we took an active part in the adoption of important EAEVE documents, and the adoption of new rules of procedure (Standard Operating Procedure-SOP) on the basis of which evaluation and accreditation procedures are conducted

in all EU institutions which organize education of veterinarians, according to the criteria of a regulated profession (Directive 2005/36). We were also included in the adoption of amendments to the Statute with the purpose of acceptance of EAEVE into full membership of the European Association for Quality Assurance in Higher Education (ENQA) and adoption of the short-term strategy of EAEVE.

At the annual assemblies, during this period, about twenty workshops, conferences and symposiums were organized on assuring the quality of veterinary education, extramural classes, communication skills, professional ethics and management, specializations within the veterinary medicine study, and alignment of veterinary curricula. The knowledge acquired at the annual assemblies (Warsaw, 2005; Ghent, 2006; Konya, 2007; Copenhagen, 2008; Hanover, 2009; Vienna, 2010) aided the implementation of activities with the aim of improving the quality of work in all areas of the faculty's activities.

The EAEVE annual assembly held from 11<sup>th</sup> to 12<sup>th</sup> May 2011 in Lyon was a turning point for our Faculty, because at that assembly we arranged a new visit of their evaluation team to Zagreb with the president of EAEVE, Prof. Dr. Laszlo Fodor. Preparation for the repeat evaluation of the Faculty began with the appointment of a Commission for drawing up the Faculty's self-evaluation report (SER). This important task of drawing up the main document on the basis of which, through thirteen most important chapters, members of the expert team gain insight into the organization and work of the Faculty, took almost a whole year.

At the 25<sup>th</sup> annual assembly of EAEVE, held from 15<sup>th</sup> to 18<sup>th</sup> May 2012 in Budapest, the final date for the team's visit to our Faculty was set for 10<sup>th</sup> to 14<sup>th</sup> June 2013. After having become completely acquainted with the Faculty's work over four days, and having visited the extra-mural facilities, the members of the evaluation team expressed at the end of their visit, their satisfaction with what they had seen. They especially praised the very good organization, openness and readiness for discussion of the entire Faculty's staff, and the exceptional hospitality and excellent treatment received, as well as friendly and very pleasant atmosphere throughout the entire evaluation procedure. The final report by the expert team contained forty pages of text, which dealt with all the areas of the Faculty's activities. The final assessment by the expert team was positive, with some weaknesses established in the



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The Faculty representatives, Dean Prof. Nenad Turk (first to the right) and the Vice-Dean for Quality Control Assist. Prof. Dr. Danijela Horvatek Tomić (second from the left to the right) with Macedonian delegation at a reception at the House of Lords during the EAEVE Annual Assembly in London in 2017 (Faculty Archives).

area of biosafety, so our Faculty remained on the EU list of positively evaluated veterinary institutions of higher education, under the condition of resolving the established weaknesses .

Immediately after receiving the final report, the necessary activities were undertaken in order to achieve high safety standards in all of the Faculty's activities. New procedures were prepared, with guidelines for occupational safety for staff and students who are exposed to the action of biological and chemical agents. A new protocol was drawn up for disinfection of the vehicles of the outpatient clinic, and new records were prepared for monitoring the disposal of dangerous biological and chemical waste. Shortly after receiving the interim report on all undertaken measures and improvements, the expert group from EAEVE revisited the Faculty again on 16<sup>th</sup> and 17<sup>th</sup> March 2015. The final report by the experts, who had undertaken the revisitation procedure, was very concise and stated that the Faculty of Veterinary Medicine had completely resolved all the shortcomings in relation to biosafety. Members of the expert team recommended the EAEVE competent bodies that the Faculty be awarded, within the shortest possible time, the status of full member, which took place at the EAEVE annual assembly held from 20<sup>th</sup> to 22<sup>nd</sup> May 2015 in Istanbul, Turkey. In this way, the Faculty once again proved that it belongs in the select company of European institutions who have met the highest EU standards in the education of veterinarians, and acquired the possibility for their degrees to be recognized throughout Europe.



## II. MODERN HISTORY



The Faculty representatives from the left to the right: Assist. Prof. Dr. Danijela Horvatek Tomić, Vice-Dean for Quality Control, Dean Prof. Dr. Nenad Turk and Prof. Dr. Alen Slavica, Head of the Office for International Cooperation, with the flag of the EAEVE at the Annual Assembly in Hannover in 2018 (Faculty Archives)

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From 12<sup>th</sup> to 13<sup>th</sup> May 2016 the 29<sup>th</sup> annual assembly of EAEVE was held in Uppsala, Sweden. At the assembly Faculty representatives presented for the first time to the leaders of EAEVE a proposal according to which Zagreb could organize the EAEVE annual assembly in 2019, in the year when the Faculty celebrates the centenary of its foundation and work, and the University of Zagreb marks the 350<sup>th</sup> anniversary of its foundation. The proposal met the approval of the EAEVE leadership and the Faculty delegation was advised to send an official letter of intent to the organizers of the general assembly. With the approval of the Faculty Council, an official letter of intent was sent at the end of 2016 to the president of EAEVE, Prof. Dr. Ana Bravo, and as early as the beginning of 2017, the Faculty received response accepting its nomination for organization of the EAEVE annual assembly. The Faculty of Veterinary Medicine was the only official candidate at the jubilee 30<sup>th</sup> annual assembly of EAEVE in London for organizing of the 2019 assembly. After the Dean Prof. Dr. Nenad Turk presented the basic information on the Faculty, the University, Zagreb and Croatia, the delegates voted and the Faculty of Veterinary Medicine of the University of Zagreb was unanimously chosen to host the general assembly of EAEVE, which will be held in May 2019. This outcome was one more major success, taking the opportunity of organizing the general assembly of the most important European association in the field of the higher education of veterinarians in the year when the Faculty celebrates its important anniversary. .

In the period from 2005 to 2010, a total of six annual assemblies of VetNEST were held in countries which are full members of this regional association (Wroclaw, 2006; Budapest, 2009, Brno, 2010), but also in countries which are associated members of VetNEST (Sarajevo, 2007), of which two assemblies were held in Croatia (Brijuni, 2005 and Zadar, 2008).

From 24<sup>th</sup> to 26<sup>th</sup> August 2006, the annual assembly of VetNEST was held in Wroclaw, Poland. At the assembly various aspects of the future cooperation among the members of the VetNEST association were discussed, and in view of the fact that, on the basis of the two-year rotation of this assembly, it was an election assembly, new leadership was elected. The Dean of the Faculty of Veterinary Medicine of the University of Zagreb, Prof. Dr. Ljiljana Pinter, was elected the new president of VetNEST, and Prof. Dr. Lidija Kozačinski was elected as

secretary. This election of the new leadership of VetNEST gave our Faculty the opportunity to be the creator of new forms of cooperation among members.

At the VetNEST annual assembly held from 18<sup>th</sup> to 20<sup>th</sup> September 2008 in Zadar, alongside the standard programme, for the first time the planned joint conference was held (VetNEST Conference Extra-mural Teaching in the Study of Veterinary Medicine) on the subject of the organization and implementation of extramural classes and workshops and a symposium for students on the subject of indigenous species of animals. At the conference, alongside national speakers, invited foreign speakers also gave presentations, as well as experts in veterinary sciences. The conference was also attended by representatives of important European veterinary associations, EAEVE and FVE, as well as representatives of the Croatian Veterinary Chamber and the Croatian Veterinary Institute.

At the annual VetNEST assembly, held from 4<sup>th</sup> to 6<sup>th</sup> September 2009 in Budapest, Hungary, special attention was paid to the CEEPUS programme. It was regrettably established that, at the latest call for applications for that programme, the VetNEST proposal did not receive the requested financial support. It was concluded that for the beginning of 2010 a new proposal should be drawn regarding the exchanges within the VetNEST group, which would express more precisely the forms of cooperation among faculties in an exchange (joint projects in the sense of joint degree programmes, foundation of international summer schools etc.). The newly elected CEEPUS coordinator of the VetNEST network, Assist. Prof. Dr. Igor Štoković was appointed the main coordinator for this task, and he also held the position of CEEPUS coordinator at our Faculty.

The annual assembly of VetNEST for 2010 was held from 11<sup>th</sup> to 12<sup>th</sup> October in Brno, Czech Republic, and on the basis of successful coordination in drawing up the proposal for the CEEPUS programme, a report was submitted on the restored possibility of student and teaching staff exchange in the academic year 2010/2011. One of the requirements of the application was the realization of joint programmes between faculties in the exchange. In the framework the programme it was therefore proposed that a summer school be held in wildlife management, which was then successfully organized in July 2011 at the Faculty of Veterinary Medicine, by the Department for Game Biology, Pathology and Breeding (now the Department of Game and Wildlife Management), and the Office for International Cooperation. Later at the assembly, as part of the CEEPUS application, the project was presented regarding a joint postgraduate specialist study (Joint



Members of the VetNEST delegations (from the left to the right three delegates from Slovenia, two from Poland and four from North Macedonia) at the Annual VetNEST Assembly in Košice in 2013 (Faculty Archives).



Participants of the Annual VetNEST Assembly in Šibenik in 2016 (Faculty Archives).

Degree Programme) in veterinary public health (Veterinary Public Health Management, master's study), which had been prepared by the Veterinary Faculties in Zagreb and Sarajevo.

The following year, the assembly of the members of the VetNEST group was held from 12<sup>th</sup> to 13<sup>th</sup> October 2011 in Wrocław, Poland. In the working part of the assembly, applications were presented for future summer schools, whereby the University of Brno announced the organization of summer school in the field of veterinary public health (Food hygiene), while our Faculty announced the organization of summer schools in the field of reproduction of ruminants (REPRO) and wildlife management. The proposal by the Croatian delegation on the joint organization of an international veterinary congress on the level of VetNEST where as a starting point the already existing international congresses organized on the level of members of VetNEST could be used, drew special attention of all the delegates present.

The next annual assembly of VetNEST was held in Austria, at the Veterinary University in Vienna, from 20<sup>th</sup> to 22<sup>nd</sup> September 2012. The Faculty representative reported on the changes undertaken at our Faculty, the enrolment quotas, the number of graduate students, construction of the new isolation unit and postgraduate programmes. During his presentation of the improvements at the Faculty of Veterinary Medicine of the University of Zagreb, he especially pointed out the intensive preparations which the Faculty had taken in the past period as part of the preparations for the visitation and evaluation procedure by EAEVE, which had been arranged for June 2013. Later at the assembly the new president of VetNEST was elected for a two-year period, the Rector of the University of Veterinary Medicine and Pharmacy from Košice, Prof. Dr. Emil Pilipčinec, and Prof. Dr. Jana Mojžišova was confirmed as the secretary general. Cooperation was agreed with one of the best European Faculties-VetMed Universitat Wien-on Omics research in the framework of the Viennese "Research Core" centre and experiences were exchanged related to the upcoming EAEVE evaluation.

The annual assembly of VetNEST was held from 17<sup>th</sup> to 19<sup>th</sup> October 2013, organized by the Veterinary University of Košice, Slovakia. All the representatives of faculties in the VetNEST association reported on the changes at their faculties, and submitted their annual reports. At the assembly, the organizer of the VetNEST assembly for the following year was arranged, and it was to be the Faculty of Veterinary Medicine University of Ljubljana. Colleagues from Vienna submitted their candidacy for 2015, when their university was to celebrate its 250<sup>th</sup> anniversary, so that our Faculty submitted its application to host the annual assembly in 2016.

During the academic year 2014/2015, the VetNEST assembly was held twice. The first time was in Portorož, Slovenia, on 12<sup>th</sup> and 13<sup>th</sup> November 2014. At the assembly a new VetNEST president was elected, for a two-year period (2014-2016), the Dean of the Faculty of Veterinary Medicine University of Ljubljana, Prof. Dr. Andrej Kirbiš, whilst the secretary general elected was Prof. Dr. Breda Jakovac Strajn. The continuation of cooperation was agreed, as well as registration of joint projects as part of the ERASMUS+ programme. The second time in the same academic year, the host of all representatives of VetNEST was Vienna, where the 22<sup>nd</sup> annual assembly was held from 17<sup>th</sup> to 19<sup>th</sup> June 2015, along with the celebration of the 250<sup>th</sup> anniversary of the foundation of the Veterinary University in Vienna.

In 2016, our Faculty was the organizer of the annual VetNEST assembly, which was held in Šibenik from 19<sup>th</sup> to 22<sup>nd</sup> October. There was discussion on the changes to the curriculum and the possibilities of harmonization of the curriculum on the level of VetNEST, new studies, changes to the infrastructure of some members, the number of students enrolled and graduated, the organization of summer schools and congresses, and exchanges of students, teaching and non-teaching staff. At the assembly, reports were also submitted on the academic mobility of students and teachers for the academic year 2015/2016. At the assembly, the new presidency of VetNEST was also elected for the term from 2016 to 2018, and the Dean of the Faculty of Veterinary Medicine of the University of Zagreb, Prof. Dr. Nenad Turk was unanimously elected as the new president. The role of secretary general for the same period was given to Prof. Dr. Alen Slavica, head of the Office for International Cooperation at our Faculty.

The next VetNEST Annual Assembly was held in Budapest from 16<sup>th</sup> to 18<sup>th</sup> October 2017. The Assembly was chaired by the Dean of the Faculty of Veterinary Medicine in Zagreb, Prof. Dr. Nenad Turk and reports were submitted by Assist. Prof. Zoran Vrbanac-CEEPUS Coordinator of the VetNEST group, Assist. Prof. Dean Konjević-Vice-Dean for Research, Postgraduate Studies and Lifelong Learning and Prof. Dr. Alen Slavica-General Secretary of the VetNEST who reported on the activities of the working group ("Task Force Unit") where he was elected the Coordinator. After the VetNEST Annual Assembly,



From the left to the right: Rector of the University of Veterinary Medicine Budapest Prof. Dr. Péter Sótónyi, Dr. Mladen Andrić, Ambassador Extraordinary and Plenipotentiary of the Republic of Croatia in Hungary and the Dean of our Faculty Prof. Dr. Nenad Turk on the occasion of signing the bilateral strategic agreement between the University of Veterinary Medicine Budapest and the Faculty of Veterinary Medicine of the University of Zagreb in 2017 (Faculty Archives).



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Participants of the Annual VetNEST Assembly in Ohrid, North Macedonia, in 2018 (Faculty Archives).

delegation of the Faculty of Veterinary Medicine in Zagreb stayed in the capital city of Hungary for the signing of the strategic agreement with the Faculty of Veterinary Medicine of the University of Budapest. The agreement was signed by the Dean of the Faculty, Prof. Dr. Nenad Turk, with the presence of diplomatic representatives from Croatia while on the Hungarian side the document was signed by the Rector of the University of Veterinary Medicine in Budapest, Prof. Dr. Péter Sótonyi.

The jubilee Assembly of the VetNEST was held in Ohrid from 20<sup>th</sup> to 22<sup>nd</sup> September 2018, in accordance with the agreement at the last Annual Assembly in Budapest. This Assembly ended our Faculty's two-year chairmanship in the VetNEST association, taken over at the Annual Assembly in Šibenik in 2016. Over the past period, a whole series of initiatives have been launched. "Task-force" group has been established, the Statute of VetNEST has been amended, the rules for the joining of new members have been set and new joint projects have been registered. Additionally, the ERASMUS + joint project *Pan-European soft skills curriculum for undergraduate veterinary education (SOFTVETS)* has been launched with the Faculty of Veterinary Medicine of the University of Zagreb as the Coordinator. Delegation of our Faculty consisting of the Dean Prof. Dr. Nenad Turk, Prof. Dr. Alen Slavica-Head of the International cooperation office, Assist. Prof. Zoran Vrbanac-CEEPUS Coordinator of the VetNEST network, Assist. Prof. Marko Pećin-CEEPUS Coordinator of the Faculty and Dr. Lada Radin-Coordinator of the SOFTVETS project, was included in the Annual Assembly chaired by Prof. Dr. Nenad Turk. The annual report was submitted by all VetNEST members, and for the new president of the association prof. Dr. Petra Winter, Rector of the Vienna Veterinary University, was elected, while Dr. Phil. Ursula Schöber from Austria was confirmed the General Secretary. As the next host of VetNEST Annual Assembly, the Veterinary Faculty from Brno was proposed. The celebration of the 25<sup>th</sup> anniversary of the VetNEST establishment should be especially mentioned, where the only active member of the founding group, Prof. Dr. Laszlo Frenyo from Budapest, reminisced on practical informal gathering and the idea of the Central European Veterinary Association establishment, which has grown into a stable network with twenty-five years of experience and a successful activity in Central Europe.

From 2005 to 2018, through the CEEPUS network (Central European Exchange Programme for University Studies) constant

Table 35 CEEPUS scholarships from 2006/2007 to 2017/2018

Academic year	Outgoing* CEEPUS scholarship Teaching staff	Outgoing* CEEPUS scholarship Students	Incoming** CEEPUS scholarship Teaching staff	Incoming** CEEPUS scholarship Students
2005/2006	-	-	-	-
2006/2007	4	9	1	3
2007/2008	0	9	2	3
2008/2009	1	6	2	7
2009/2010	-	-	-	-
2010/2011	4	3	7	17
2011/2012	5	9	7	29
2012/2013	6	7	3	10
2013/2014	7	16	4	15
2014/2015	4	15	3	4
2015/2016	3	30	4	13
2016/2017	6	24	8	20
2017/2018	7	25	7	28
<b>TOTAL</b>	<b>47</b>	<b>153</b>	<b>48</b>	<b>149</b>

\* Scholarship students and teachers from the Faculty of Veterinary Medicine of the University of Zagreb at foreign universities

\*\* Foreign scholarship students and teachers at the Faculty of Veterinary Medicine of the University of Zagreb

Table 36 International exchanges in the ERASMUS/E+ Programme in from 2009/2010 to 2017/2018

Academic year	Outgoing* ERASMUS scholarships Teaching staff	Out-going* ERASMUS scholarships Students	Incoming** ERASMUS scholarship Teaching staff	Incoming** ERASMUS scholarships Students
2009/2010	-	2	-	-
2010/2011	-	6	-	4
2011/2012	-	8	-	6
2012/2013	-	4	1	10
2013/2014	6	7	1	7
2014/2015	4	10	4	10/28 months
2015/2016	2	19	4	17/48 months
2016/2017	3	26	7	20/77 months
2017/2018	5+2***	21	9+4***	36/77 months
<b>TOTAL</b>	<b>20</b>	<b>103</b>	<b>26</b>	<b>110</b>

\* Scholarship students and teachers from the Faculty of Veterinary Medicine of the University of Zagreb at foreign universities

\*\* Foreign scholarship students and teachers at the Faculty of Veterinary Medicine of the University of Zagreb

\*\*\* Non-teaching staff

annual exchanges of teachers and students have taken place, with the exception of the academic years 2005/2006 and 2009/2010, when the proposed VetNEST projects were not approved by CEEPUS. So far, in the framework of CEEPUS, from 2005/2006 to 2017/2018, a total of 47 teacher and 153 student scholarships were granted by the Faculty of Veterinary Medicine (Table 35), for stays at foreign universities within the VetNEST association. Of this number, a total of 138 short-term and 15 long-term scholarships have been used by students, and mainly short-term scholarships have been used by teaching staff. In the same period, the Faculty of Veterinary Medicine has granted a total of 48 incoming scholarships for teaching staff and 149 incoming scholarships for students from foreign faculties, members of VetNEST.

The ERASMUS programme (European Region Action Scheme for the Mobility of University Students) is an academic mobility programme in higher education. As part of the programme, students may spend part of their study studying at institutions of higher education in other countries, undertaking professional practice or combining studies and professional practice, which considerably contributes to their independence, learning of foreign languages and cultures, and a better understanding of the characteristics of work in multicultural environments.

For institutions in the field of higher education, a pre-requirement for participation in this programme is that they have been awarded a document entitled the ERASMUS University Charter-EUC, guaranteeing that the institution of higher education in question will conduct activities within ERASMUS in accordance with high-quality standards and the EU points system (ECTS), which our country has also adopted. Croatian institutions of higher education were able to participate in the ERASMUS programme for the first time in 2009/2010, in the segment of the individual mobility of students (study stays), teaching and non-teaching staff.

Since the University of Zagreb has held the university ERASMUS charter since 2009, the Faculty of Veterinary Medicine joined the ERASMUS programme in the academic year 2009/2010, when exchanges were realized with the Veterinary University in Vienna for one graduate student and one postgraduate student (table 36).

The ERASMUS programme was updated and modernized and from 2014 has been known as the EU ERASMUS+ programme 2014-2020. From the academic year 2014/2015, we have recorded a significant rise in the interest of students from our Faculty in going to foreign institutions for training (a growth rate of more than 35% per year), and an increased interest of foreign undergraduate and postgraduate students from Europe in professional training at our Faculty through the ERASMUS+ programme.

A large rise in incoming mobility was not only seen in the increased number of foreign students, but there was also a significant leap in the number of months (220) spent in exchanges, which certainly confirms



Prof. Dr. Juraj Grizelj (third from the left in the second row) during the implementation of the ERASMUS program at the Facultad de medicina veterinaria, Universidad de Cuba, Bayamo, Cuba in 2016 (Photo courtesy of Prof. Dr. Juraj Grizelj).



## II. MODERN HISTORY



Student Stella Lukman during the dog phalange amputation in the Operating Room of the Faculty of Veterinary Medicine in Ghent, Belgium during the three months ERASMUS+ practice in 2018 (Photo courtesy of Stella Lukman).



Students from Austria collecting the samples during the *International Summer School Wildlife Management* held in July 2011 (Faculty Archives).

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the quality of the work of our departments and clinics. It should also be particularly pointed out that foreign students express great interest in training in clinical work, where we have been recognized in terms of quality and the enviable number of patients. The Faculty of Veterinary Medicine of the University of Zagreb, in the framework of the new ERASMUS+ programme, has renewed bilateral agreements for 2014-2020 period with its previous partners, the veterinary faculties in Vienna, Budapest, Brno, Košice, Ljubljana, Skopje and Wrocław, and established new bilateral agreements with the veterinary faculties in Liege (Belgium); Sofia, Stara Zagora (Bulgaria); Karditsa (Greece); Bologna, Naples, Parma, Perugia, Sassari, Teramo (Italy); Tartu (Estonia); Kaunas (Lithuania); Poznanj (Poland); Cluj Napoca, Iasi (Romania) and Barcelona, Caceres, Cordoba, Lleida, Leon and Murcia (Spain).

There has been a noticeable rise in outgoing and incoming student mobility since the introduction of the ERASMUS+ programme. Since 2014/2015 there has been a continuous growth in outgoing mobility, and also an increase in incoming mobility, which is best seen if we look at the number of months spent on visits by foreign students. In the academic year 2014/2015, there were 26 months of mobility by incoming students in undergraduate and graduate classes and doctoral students. In 2015/2016 there were 48 months, in 2016/2017 as many as 77 months of mobility for incoming students, and in 2017/2018 77 months of incoming mobility are planned. In regards to the countries from which the most interest has been shown for incoming mobility for professional practice, it can be said that the largest number of months was spent by students from Spain, Estonia, Slovenia, Italy, Romania, Czech Republic, Greece and Lithuania.

Some of the incoming and outgoing mobility took place through scholarships awarded by the University Agency for Francophone Countries (Agence Universitaire de la Francophonie-AUF) and through bilateral agreements (Venezuela, Turkey).

From 2005 to 2019 the Faculty of Veterinary Medicine has been the organizer, or co-organizer of many international congresses, symposiums, conferences, workshops and summer schools in the field of veterinary medicine, and other related professions, of which we particularly point out: "Symposium and Workshop on Microbial Risk Assessment COST Action 920, WG 3" (Dubrovnik, 2005); Round Table "The Importance of Zoonoses Transmitted in Food" (Zagreb, 2005); 4<sup>th</sup> European Poultry Genetics Symposium (Dubrovnik, 2005); International Symposium "Game and Ecology" (Brijuni, 2005, Plit-

vice, 2007); "1<sup>st</sup> European *Dirofilaria* Days" (Zagreb, 2007); International Workshop "Diagnostics and Control of *Trichinellosis*: quality assurance, harmonization and certification" (Zagreb, 2007); "European College Day" (Zagreb, 2008, 2009, 2010, 2011, 2012, 2014); "16<sup>th</sup> Congress of Federación Mediterránea de Sanidad y Producción de Rumiantes-FeMeSPRum" (Zadar, 2008); "26<sup>th</sup> Annual Meeting of European Society of Veterinary Pathology" (Dubrovnik, 2008); Vet-NEST Conference "Extramural teaching in the study of Veterinary medicine" (Zadar, 2008); "4<sup>th</sup> Croatian Veterinary Congress with International Participation" (Šibenik, 2008); "3<sup>rd</sup> Symposium of the Association for Poultry Science "Facing the new era in poultry production" (Zagreb, 2008); "International Scientific Meeting of Anatomy and Physiology, Fundamentals of Medicine" (Zagreb, 2009); Round Table "Scientific Cooperation: Croatia in Francophone Countries" (Zagreb, 2009); 1<sup>st</sup> VEPR (Veterinary European Physical Therapy and Rehabilitation Association) Conference "Physical therapy of the stifle" (Zagreb, 2010); "The Meeting of Science and Practice: WVPA-Croatian Branch" (Zagreb, 2010); "12<sup>th</sup> Middle European Buiatric Congress" (Pula, 2011); international congress "Veterinary Science and Profession" (Zagreb, 2011, 2013, 2015, 2017); "Central-East European Workshop of Veterinary Dermatology" (Zagreb, 2011); summer school *Wildlife management* (Zagreb, Šibenik, 2011, 2012, 2014); "1<sup>st</sup> European meeting on leptospirosis-Eurolepto 2012" (Dubrovnik, 2012); "5<sup>th</sup> Croatian Veterinary Congress with International Participation" (Tuheljske Toplice, 2012); *International Summer School Reproduction of Ruminants* (Split, 2012); "Central-East European Veterinary Dermatology Workshop 2012" (Zagreb, 2012); European Mycoplasma Meeting "Mycoplasmas-a practical approach" (Dubrovnik, 2013); "RedNEx" (Innovative and practical management approaches to reduce nitrogen excretion by ruminants) Regional Workshop (Zagreb, 2013); "Central-East European Veterinary Conference" (Zagreb, 2014); "EPICONCEPT 2015-Epigenetics and the Periconception Environment", COST Workshop (Dubrovnik, 2015); "6<sup>th</sup> Croatian Veterinary Congress with International Participation" (Opatija, 2016); 2<sup>nd</sup> COST Conference and Management Committee Meeting-"Improving current understanding and research for sustainable control of the poultry red mite" (Zagreb, 2016); "European Meeting on Animal Chlamydioses" (Zagreb, 2017); *International Summer School Zoonoses* (Dubrovnik, 2017, 2018, 2019); "15<sup>th</sup> European Poultry Conference EPC 2018" (Dubrovnik, 2018); "32<sup>nd</sup> EAEVE General Assembly" (Zagreb, 2019).

## 4.8. Quality management

The foundation and framework for a quality assurance system are prescribed by the legislation in the field of higher education and science, where particular attention is paid to the European standards and guidelines in the field of higher education. The introduction, development and improvement of quality assurance at the Faculty of Veterinary Medicine are harmonized with and form an integral part of the measures and activities in the field of higher education in European countries and especially in the Republic of Croatia, on the basis of the national Act on Quality Assurance in Science and Higher Education from 2009.

The quality system is an integral part of the development of the Faculty and is vital in the implementation of the Strategy of development, the mission, vision and goals of the Faculty. To date, two five-year Faculty Development Strategies have been adopted (2012-2017 and 2018-2022) and they define the guidelines for development in five basic areas of strategic planning: educational activities, scientific activities, professional work, financial operations and administrative-professional and human resources activities. The strategies also contain the mechanisms for monitoring, reporting and revising the strategic goals. The Faculty conducts systematic strategic planning of its development, aligning its mission and vision to constant changes, setting strategic goals and their measures, taking care to transform these into concrete programmes, provision of the necessary resources and supervision of the realization of the strategy and its goals. Strategies are drawn up for a five-year period, but new action plans for implementation are adopted for each year. At the end of each year, the Faculty administration prepares reports on the activities achieved in the current year.

The mission of the Faculty of Veterinary Medicine of the University of Zagreb, as the only scientific and teaching institution in the Republic of Croatia in the field of the education of doctors of veterinary medicine, is to provide excellence in the education of doctors of veterinary medicine, scientific research, professional work, lifelong education and inter-institutional and international cooperation.

The vision of the Faculty is to take on a leading position in the region in the field of education of doctors of veterinary medicine (integrated undergraduate and graduate studies, postgraduate and specialized studies), and also in the field of scientific research, professional work, lifelong education, and inter-institutional and international cooperation. The aim of the Faculty of Veterinary Medicine is to continue its development through improvements to teaching, scientific and professional work, whereby through the establishment of a quality control programme would achieve the guarantee of improvement of the results of the basic work of the Faculty. The teaching programme is continually harmonized with other European veterinary colleges, according to the recommendations of EAEVE, taking into account the specific features arising from the needs of veterinary medicine in the Republic of Croatia. The Faculty programme is aligned with its mission, vision and aims, and its development capacities are in accordance with the strategic aims set, and are in line with the current legislation. By achieving its aims, the Faculty positions itself as the leading institute of higher education in the region in the field of veterinary medicine.

In the period in question, since the establishment of the Bologna Process, systematic work has been undertaken to ensure the quality of teaching, study programmes and other forms of work, through periodic internal and external evaluation, especially by the Agency for Science and Higher Education (2008, 2015) and EAEVE (2013). Other processes that take place at the Faculty of Veterinary Medicine (especially scientific research work and professional work, international cooperation, administrative business, and organization management), have been performed and supervised according to the ISO 9001

standard, which has been applied at the Faculty by a Decision of the Faculty Council since 19<sup>th</sup> February 2014. For this purpose, twelve employees of the Faculty have been trained in courses organized by the Faculty, in cooperation with the Faculty of Economics and Business of the University of Zagreb. After training and examinations, these employees received a certificate for completing professional training for internal auditors.

The ISO 9001:2008 standard is a generic standard for all activities. Croatia adopted it as a national standard and it is suitable for linking with other systems through the appropriate standards. For this reason, a Quality Control Handbook according to the ISO 9001:2008 standard was created, which the Faculty Council adopted at its session on 24<sup>th</sup> September 2014. This handbook describes the management system of all activities (teaching, scientific-research, administration and technical), which implemented in its operations the relevant legislation of the Republic of Croatia, international agreements and conventions, the requirements of the international standard ISO 9001, and all its own specifications and work standards.



The certificate for an effective and developed quality assurance system issued to the Faculty by the Agency for Science and Higher Education for the 2018-2023 period (Faculty Archives).



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The Expert Committee for External Quality System Evaluation of the Faculty of Veterinary Medicine with the members of the Dean's College in 2018 (Faculty Archives).

The process of introducing the system is conducted by the Quality Control Office, the Commission for Quality Management, and authorized certification companies and internal auditors. The Office undertakes activities in the field of alignment of the evaluation procedures with legislation and regulations, cooperation with institutions in the field of quality management, preparation of institutional and external evaluation, self-evaluation, monitoring the outcomes of the teaching process and advising teaching staff and other employees and students in the realm of quality. The Quality Control Office takes an active part in drawing up the necessary documents for monitoring the quality system. This way, regularly, every academic year, an Annual Report and Plan of Activities regarding quality control are drawn up and sent to the University of Zagreb, from which it may be seen that most of what was planned was achieved during the academic year, and that the plan of activities covers all areas of work at the Faculty-. It also shows that they are in line with the recommendations of the University of Zagreb and the Quality Control Handbook of the University of Zagreb. The area of application of the quality control system is the work of the Faculty:

- higher education services (all study programmes and all levels)
- scientific research and highly professional work
- laboratory and diagnostic procedures
- other activities which serve the basic activities: legal affairs, accounting and bookkeeping, and other support activities (library, IT service, data processing, maintenance of material resources).

The Certification Procedure was conducted pursuant to the ISO 9001:2008 standard by auditors from Bureau Veritas on 29<sup>th</sup> and 30<sup>th</sup> September 2014. After the inspection, a certificate was issued in the field of: Services in Higher Education, Scientific Research, Laboratory and Diagnostic and Professional Clinical Work.

ISO-the International Organization for Standardization, published a new edition of ISO 9001:2015 in September 2015 Transition to the new edition was therefore undertaken, that is, the revision of the documentation and drafting of a new edition of the Quality Control Handbook according to the Standard ISO 9001:2015, which the Faculty Council adopted at its session on 23<sup>rd</sup> September 2017. In the new edition of this Handbook, changes can be seen which will be reflected in the quality management system at the Faculty of Veterinary Medicine in the coming years. The greatest change will be in the system itself, which will be primarily based on risk analysis, and so preventive activities and improvements will stem from the mentioned analysis. Organizational knowledge is also extremely important, where it will be necessary to demonstrate the competences of the administration

and other employees, and quality awareness will be raised by training in the mentioned field. Conducting surveys and analyses concerning the satisfaction of service users/beneficiaries is an important part of the internal audit and will contribute to the adoption of preventive measures and possible system improvements.

The internal audit is conducted regularly at least once a year, in accordance with the Annual Internal Audit Program, so that the parts of the quality management system are checked with the purpose of determining of the non-compliance with client requirements, norm requirements and system improvement requirements. The internal audit is conducted by Faculty employees who are trained to conduct the internal audit, taking into account the achievement of independence of internal auditors in the evaluation field (the internal auditor cannot audit the field of the activity within his/her authority, author's note). The external evaluation of the quality assurance system at the Faculty of Veterinary Medicine in Zagreb was conducted for the first time by the Agency for Science and Higher Education from 22<sup>nd</sup> to 23<sup>rd</sup> March 2018. It is a Pilot Project of the Agency for Science and Higher Education, within which a five-member Professional Committee visited the Faculty. The results of the external independent periodic evaluation of the quality assurance system (*Audit*) of the Faculty of Veterinary Medicine gave an insight into the strengths, weaknesses and examples of good practice at the Faculty, and the general recommendations for further development of the system. In the end, it was estimated that all evaluation elements (Quality Policy, Planning and Management, Implementation and Monitoring, Evaluation, Improvements, Innovations and Influence) were developed.

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## 4.9. Students

The International Veterinary Students' Association (IVSA) is a global association, whose aim is to benefit the animals and people of the world by harnessing the potential and dedication of veterinary students to promote the international application of veterinary skills, education and knowledge. In the academic year 2005/2006, a weekend exchange was organized of three groups from the IVSA (known as the Cro-Slo-Austro Weekend) in Slunj, Croatia, whilst the continuation of this exchange took place in Ljubljana, Slovenia. Three representatives of IVSA Croatia participated for the period from 12<sup>th</sup> to 19<sup>th</sup> December 2005 in the 54<sup>th</sup> International IVSA Symposium which was organized in Pretoria, South Africa. One of the more important activities of IVSA is group exchanges, and in May 2006, it organized a group exchange between 20 students of veterinary medicine from The Netherlands, and the same number of students from our Faculty. Members of IVSA Croatia were very active in international cooperation, as confirmed by their participation in the IVSA International summit, and their visit to the 55<sup>th</sup> International IVSA Congress in Pomona, California, which was held from 19<sup>th</sup> to 29<sup>th</sup> July 2006. The main activities of the association were also individual exchanges, which enabled students to perform professional practical in other countries. Therefore in 2005/2006, three individual exchanges were organized at the Faculty clinics, and private clinics for large and small animals, in England and Slovenia.

In the academic year 2006/2007, ten of our students visited Vienna as part of the Cro-Slo-Austro Weekend, and were the hosts of this exchange, when 40 students from Austria, Slovenia, Switzerland, Bosnia and Herzegovina and Croatia attended the weekend in Zagreb and Varaždin. Two members of IVSA Croatia took part at the 55<sup>th</sup> International IVSA Congress in Ghent, Belgium, which was held from 19<sup>th</sup> to 26<sup>th</sup> November 2006, and nine members attended the 56<sup>th</sup> International IVSA Congress in Madrid, Spain, which took place from 16<sup>th</sup> to 27<sup>th</sup> July 2007.

In the academic year 2007/2008, a group exchange was organized with the Faculty of Veterinary Medicine, University of Sarajevo, which involved 15 students from Croatia. In the period from 16<sup>th</sup> to 29<sup>th</sup> March 2008, our students hosted the students of veterinary medicine from South Africa and returned the visit in the next academic year, from 26<sup>th</sup> March to 10<sup>th</sup> April 2009. One IVSA representative from Croatia participated from 19<sup>th</sup> to 26<sup>th</sup> December in the 56<sup>th</sup> International IVSA Symposium, held at the University Putra Malaysia (UPM) Malaysia.

In the academic year 2008/2009, the Cro-Slo-Austro weekend was held in Vienna and Zagreb. Two representatives of IVSA Croatia took part at the 57<sup>th</sup> International IVSA Symposium in Glasgow, Scotland from 29<sup>th</sup> December 2008 to 5<sup>th</sup> January 2009. In June 2009, nine student members of IVSA took part in the 2<sup>nd</sup> conference of students of veterinary medicine from the region in Sarajevo.

In the academic year 2009/2010, members of IVSA Croatia took an active part in several international IVSA meetings. Four representatives took part in the 58<sup>th</sup> International IVSA Symposium in St. George's, Grenada, from 3<sup>rd</sup> to 12<sup>th</sup> January 2010, on the topic of "Tropical Medicine", three representatives took part at the Buffalo workshop in Asyut, Egypt, from 31<sup>st</sup> January to 10<sup>th</sup> February 2010 and four students participated in the 59<sup>th</sup> International IVSA Congress in Copenhagen, Denmark, from 8<sup>th</sup> to 18<sup>th</sup> July 2010, on the subject of "Future Challenges".

During the academic year 2011/2012, a group exchange took place with students of veterinary medicine from Madrid, Spain. Eleven of our students visited the Faculty of Veterinary Medicine in Madrid, whilst six of their students returned the visit to the Faculty of Veterinary Medicine of the University of Zagreb. Students of veterinary medicine from Zagreb always took part in the usual international IVSA events. For instance, four students attended the 60<sup>th</sup> International IVSA



Representatives of the IVSA Croatia, IVSA Slovenia and IVSA Serbia at the European Veterinary Students Seminar (EVSS) in Utrecht, Netherlands in October 2016.

Symposium, from 15<sup>th</sup> to 23<sup>rd</sup> December 2011 in Belgrade, Serbia, and one student took part in the 61<sup>st</sup> International IVSA Congress in Oslo, Norway, from 15<sup>th</sup> to 27<sup>th</sup> July 2012, on the subject of Aqua Medicine and Animal Welfare.

In the academic year 2012/2013, three students attended the 61<sup>st</sup> International IVSA Symposium in Johannesburg, South Africa from 3<sup>rd</sup> to 11<sup>th</sup> January 2013, and two students attended the 62<sup>nd</sup> International IVSA Congress in Utrecht, The Netherlands, from 28<sup>th</sup> July to 7<sup>th</sup> August.

In the academic year 2013/2014, a group exchange took place with students from Uppsala, Sweden. Individual exchanges were reinstated, which enabled our students to undertake their professional practical experience abroad, or foreign students at our Faculty, and as part of the organization of IVSA Croatia, two students from Algiers spent two weeks at the clinics of the Faculty of Veterinary Medicine in September 2014.

In the academic year 2014/2015, cooperation commenced with IVSA Belgrade, and a weekend exchange was arranged under the title "ZeGe-BeGe" which, like "Cro-Slo-Austro" was meant to take place each semester at a different faculty. It began with ten students from Belgrade, who visited the Faculty of Veterinary Medicine in Zagreb and the Črnovščak hunting range. In February 2015, our students visited Belgrade. A group exchange was also organized with students from Brno, Czech Republic.

In the academic year 2015/2016, a Cro-Slo-Austro Weekend exchange took place in Ljubljana, Slovenia, which was joined by IVSA Brno, Czech Republic. Therefore, the traditional exchanges changed its title to Cro-Slo-Austro-Czech weekend. In this academic year, the ZeGe-BeGe weekend was held for the last time due to lack of interest. Besides the short weekend exchanges, a group exchange was organized which involved 18 students from Liverpool, and the same number from Zagreb. From 24<sup>th</sup> July to 3<sup>rd</sup> August 2016, three students took part at the 65<sup>th</sup> International IVSA Congress in Vienna, Austria, at which 300 students from 35 countries from all over the world took part, on the topic, "Prevention in Veterinary Medicine".

In the academic year 2016/2017, the Cro-Slo-Austro-Czech Weekend continued in Brno, and then in Vienna. Additionally, a group exchange was organized with Wroclaw, Poland. From 24<sup>th</sup> July to 4<sup>th</sup> August



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Students Renata Matić, Ivana Filipčić, Iva Benvin, Nina Vukušić and Valentina Perković at the Cultural Evening of the 66<sup>th</sup> IVSA International Congress held in Kuala Lumpur, Malaysia in 2017 (Photo courtesy of Iva Benvin).



Representatives of the Student Association *Equus* presented the work of the Association at the Spring Livestock Fair in Gudovac near Bjelovar in 2015.

2017, five students took part in the 66<sup>th</sup> International IVSA Congress in Kuala Lumpur, Malacca and Kelantan, Malaysia, after which they continued their travels and spent another week in Thailand together with IVSA members from Romania. Two students took part in the WSAVA Congress in Copenhagen, Denmark, and as IVSA volunteers were part of the organizational team.

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In the academic year 2017/2018, there was a group exchange with students of veterinary medicine from Cluj-Napoca, Romania. Members of IVSA Croatia took an active part in the 66<sup>th</sup> International IVSA Symposium in Pretoria, South Africa from 9<sup>th</sup> to 19<sup>th</sup> December 2017, at which IVSA Croatia was chosen to organize the 68<sup>th</sup> International IVSA Congress, which will be held in 2019, on the 100<sup>th</sup> anniversary of the Faculty of Veterinary Medicine of the University of Zagreb. The programme of this Congress was presented at the 67<sup>th</sup> International IVSA Congress, held from 16<sup>th</sup> to 27<sup>th</sup> July 2018 in Krakow, Poland. Members of IVSA were the organizers of the 2<sup>nd</sup> European Veterinary Students Seminar held from 14<sup>th</sup> to 17<sup>th</sup> June 2018 at the Faculty of Veterinary Medicine of the University of Zagreb. The programme of the seminar consisted of lectures and workshops covering various areas of veterinary medicine, and there was also a poster section. As part of that Seminar, a Book of Proceedings was published, the first book published by IVSA Croatia.

The Veterinary Students' Society, *Equus*, is a non-profit student association, whose aim is to improve the conditions of study and to run specific projects. The members of the association regularly organize a Motivation Week for first-year students, during which they present different groups and the work of the association on stands. They also take part in presenting their Faculty at the University Fairs in Zagreb. For many years, the Association has operated blood donation campaigns in cooperation with the Croatian Institute for Transfusion Medicine, to which many students and Faculty staff responded. Some of the special activities of the association have been printing the students' scientific professional journal *Veterinar* (Veterinary), the entertaining journal *Anamneza* (Anamneses) as well as participation in the University Sports Championships and international sporting meetings for students of biomedical sciences, known as "Humanijada". The First and Second Congresses of students of veterinary medicine with international participation were held from 14<sup>th</sup> to 19<sup>th</sup> June 2005 and 18<sup>th</sup> to 22<sup>nd</sup> June 2007, in which students from the Veterinary Faculties in Zagreb, Skopje and Sarajevo took part. On that occasion proceedings with abstracts of all papers that were presented at both congresses were printed.

Members of *Equus* took part in the "Veterinijada" from 23<sup>rd</sup> September to 8<sup>th</sup> October 2008 in Ohrid, Macedonia, which was organized as a professional congress, and gathered about fifty students.

In the academic year 2009/2010, old groups within the association were renewed and new ones founded. The Equestrian Group organized a visit to the International Horse Fair in Verona. Students also took part in the International Equestrian Tournament for students in Scotland, hosted students from Scotland and began cooperation with their Equestrian Group. The Photographic and Publishing Group published two issues of the entertaining student journal *Anamneza* and a new edition of the scientific and professional journal *Veterinar*, and the IT Group renewed the association's web site. The largest project in 2009/2010 was the organization of the educational workshop "Paw Days" on topics related to companion animals.

In June 2010 cooperation continued with students from Scotland, and a five-day exchange was organized with cross-country riding around the landscape of Istria. Our students later on organized a visit to an



Students Iva Benvin, Sofija Džakula and Luka Špelić wearing the folk costumes at the Cultural Evening of the 2<sup>nd</sup> European Veterinary Students Seminar (EVSS) held in Zagreb in 2018 (Photo courtesy of Luka Špelić).





Student Tanja Strišković at the 66<sup>th</sup> IVSA International Symposium in Pretoria, South African Republic in December in 2017 (Photo courtesy of Dunja Fuštin).



Men's basketball team at Humaniade in Poreč in 2014 (Photo courtesy of Jurica Horvat).

equestrian event in Edinburgh, Scotland, where they took part in the show jumping and dressage competition. The Equestrian Group also organized the participation in the Horse Show for breeding stallions at the Zagreb Hippodrome.

In the academic year 2012/2013, the “Egzoteam” Group was founded, with the aim of learning more about subjects related to exotic animals, such as the basic information on keeping, nutrition and other issues. The Group has premises which are known as the Habitat for Laboratory and Exotic Animals or “glodara” (rodent cave).

Members of the Association volunteer in all public events at the Faculty, where they help the Faculty and administrative staff with the organization. They are particularly active in helping to organize conferences such as international congress “Veterinary Science and Profession”.

From 1<sup>st</sup> March 2017, IVSA Croatia and Equus have been operating as a single, joint Association of Students of Veterinary Medicine.

Students from the Faculty of Veterinary Medicine of the University of Zagreb show great interest in scientific research, and are regularly included in scientific work, headed by mentors employed at the Faculty. The many Rector's awards received testify to the success of their research and writing of scientific papers. In the period from 1991 to 2011, 101 awards were presented to students of the Faculty of Veterinary Medicine, and from the academic year 2011/2012 to 2016/2017, another twenty-three. Besides the Rector's award, Dean's award is also presented for students' activities in scientific research at the Faculty.

On the occasion of marking the annual Days of the Faculty of Veterinary Medicine of the University of Zagreb, Dean's awards are presented to the best students for each year of study, according to their academic success, that is, their grade average. Commercial businesses are also actively involved in giving scholarships and awards to successful students, in which in recent years the companies Genera Dechra (previously Genera jsc, Veterina Ltd.) and Agroproteinka jsc. have been especially active. The awards and scholarships given by these companies encourage students to become involved in the development of veterinary drugs, promoting the health of animals and humans, disposal of animal products and environment protection, as important elements of veterinary work. Each year, the University of Zagreb awards scholarships to students according to the criteria of excellence in their studies (grade average), so from the academic year 2000/2001 to the 2014/2015, thirty-five scholarships were awarded to students at the Faculty of Veterinary Medicine. In 2017/2018, the Ministry of Science and Education awarded scholarships to students in STEM fields of science (this acronym comprises of the initial letters

of four fields: science, technology, engineering and mathematics), within the framework of the Operational Programme of Efficient Human Resources 2014-2020.

Our students are very dedicated and original in presenting the Faculty of Veterinary Medicine at the annual University Fair in Zagreb, and have earned several awards, e.g. in the category of communication, accessibility and friendliness in 2014, and for the most original presentation of the Faculty at the Fair in 2017. Besides their success in mastering their learning obligations and scientific production, students of the Faculty of Veterinary Medicine have always been active in social, artistic, sporting and educational events, and have received many awards in these fields as well. In this context, four Special Rector's Awards are particularly noteworthy: in 2010/2011 and 2017/2018 to the students' scientific and professional journal Veterinar, in 2013/2014 to the “Ab ovo” Academic Choir and Orchestra comprised of students from the Faculty of Veterinary Medicine, and in 2014/2015 for the educational exhibition of exotic animals “Reptilomanija+” organized by the Veterinary Students' Society, Equus.

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The Faculty presentation at the University Fair in 2017. From the left to the right: student Katarina Miljak, Prof. Dr. Blaženka Divjak-the Minister of Science and Education, student Tara Kostanjšak and Assistant Dr. Matko Perharić.



## 4.10. Activities of Faculty employees and students regarding organization of events

There are several Faculty associations, or societies, which gather Faculty students and employees in performing individual creative activities, and thus promoting the Faculty in specific fields of social activities.

The Alumni and Friends Club of the Faculty of Veterinary Medicine of the University of Zagreb was founded in 2000 with the aim of passing on and exchanging information on the results achieved in national scientific projects, and information on the scientific, professional and organizational achievements and insights of foreign institutions, where our scientists have spent time.

At first the lectures were given by former students, alumni, who work abroad, scientists with whom they cooperate, and Croatian scientists. They presented interesting topics from their field of work. Very quickly, junior scientists became involved in the work of the Club, with research topics from their fields of work, along with teaching staff and experts with subjects from molecular biology, microbiology, ethology, pharmacology, clinical veterinary medicine, food hygiene and veterinary public health, as well as other areas of veterinary medicine. From the time when the Club was founded up until the end of 2018, a total of 126 lectures have been given, which were mainly based on new insights in fields which are not represented in classical lectures. Lectures were also given within the Club covering the subject of veterinary education in the USA. It is good to know that in recent years the Club has been gathering world-recognized scientists, who give interesting lectures in order to pass on the latest insights from the field of their scientific research activities.

The Alumni and Friends Club of the Faculty of Veterinary Medicine of the University of Zagreb was given support through the foundation of an Association of Graduates and Friends of the Faculty of Veterinary Medicine of the University of Zagreb (AMAC-VEF) with which it will cooperate more intensively in the future regarding exchange of knowledge and experience, especially with our scientists abroad.

The Alumni Association of Graduates and Friends of the Faculty of Veterinary Medicine of the University of Zagreb (AMAC-VEF) was founded on 22<sup>nd</sup> October 2013. The aims and tasks of the association are to promote the reputation of the profession and strengthen cooperation, as well as encourage networking among graduates and friends of the Faculty of Veterinary Medicine of the University of Zagreb. This can be achieved by linking up with the worldwide academic network through exchange of information and coordinated action, gathering members at professional, scientific and social meetings, encouraging and supporting scientific, developmental, professional, publishing and other projects, assisting in exchanges of teaching staff and students and linking with ex-patriot doctors of veterinary medicine around the world, as well as establishing and developing cooperation with similar associations in Croatia and the world.

The first groups within the association are sporting (the Sports Club of the Faculty of Veterinary Medicine of the University of Zagreb, "Sport Vef") and musical (the Academic Choir and Orchestra of the Faculty of Veterinary Medicine, Ab ovo) and the Alumni and Friends Club of the Faculty of Veterinary Medicine of the University of Zagreb. They were founded and active before the foundation of AMAC-VEF, and joined it subsequently. The Association's web-address is: [www.vef.unizg.hr/amac](http://www.vef.unizg.hr/amac), and its e-mail address: [amac@vef.hr](mailto:amac@vef.hr).

The Sports Club of the Faculty of Veterinary Medicine of the University of Zagreb, "Sport Vef" was founded on 9<sup>th</sup> October 2007 with the aim of promoting sporting activities of students and employees of the Faculty. The club was registered as an association and represents the Faculty at various sporting competitions in Croatia and abroad.

Since the foundation of the club, and throughout all academic years, students have regularly participated in student competitions at the University of Zagreb in various sports: volleyball, handball, football, basketball, swimming, chess etc. They also participate in the traditional student competition of biomedical faculties, known as "Humanijada". At both competitions they achieve enviable results in individual and team competitions.

The sports club has successfully organized friendly sporting events with other faculties and universities. Matches are regularly held in five-a-side football between our Faculty and other faculties from the University of Zagreb. Moreover, on 4<sup>th</sup> July 2011 a friendly football match was organized between football teams from the Faculty and the Royal Veterinary College from London, UK, and resulted in a victory for our team (7:1).

It should be proudly pointed out that some students from the Faculty, in this period of time, alongside their regular duties as students, have achieved valuable sporting results at national and international sporting competitions. For instance, the student Marina Sumić, as a member of the Croatian Taekwondo team, won a gold medal in September 2010 at the European for under 21 Championship in Kharkov, Ukraine, in the category up to 62 kilos. In May 2011, she won a silver medal in the same category at the World Championship in Gyeongju, South Korea, and in May of the following year a silver medal at the European Championship in Manchester, the United Kingdom.

Faculty staff is also included in the work of the club. In their free time they take part in a variety of sports (recreational running, triathlon, cycling, sailing) and achieve significant results at competitions.

In the academic year 2016/2017, Sport Vef became part of the Society of Students of Veterinary Medicine (USVM).

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Prof. Elizabeth Schmidt presents a lecture on parasites and proteomics within The Alumni and Friends Club of the Faculty of Veterinary Medicine of the University of Zagreb.



Participation of the Faculty staff at the University Regatta in 2010 (from the left to the right: Prof. Dr. Zdenko Biđin, Faculty of Veterinary Medicine, Zagreb; Prof. Dr. Željko Pavičić, Faculty of Veterinary Medicine, Zagreb; Ivica Grlić-Radman, MSc; Assist. Prof. Dr. Vilim Starešina, Faculty of Veterinary Medicine, Zagreb; Assist. Prof. Dr. Tomislav Gomerčić, Faculty of Veterinary Medicine, Zagreb; Ivan Radionov, MSc; Prof. Dr. Marijan Cergolj, Faculty of Veterinary Medicine, Zagreb)

Members of the society take part in organizing student entertainment at the Faculty every year, with the aim of collecting money for student associations' work.

The Academic Choir and Orchestra of the Faculty of Veterinary Medicine of the University of Zagreb, "Ab ovo" was founded on 14<sup>th</sup> February 2011 with the aim of renewing the tradition of choir music amongst doctors of veterinary medicine, which was particularly popular in the 1970s and 1980s, as part of the work of the first Choir of Veterinarians and Veterinary Technicians.

The founders of the Choir are Prof. Dr. Nina Poljičak Milas and Prof. Dr. Kristina Matković, who also run the Choir. Since the academic year 2011/2012, the choir has been conducted by Maestro Josip degl' Ivelio. The choir has more than 30 members, who are students of the Faculty of Veterinary Medicine, active and retired employees and music aficionados. The composition of this ensemble is one of its kind at Zagreb University, because it also includes a chamber orchestra, led by Prof. Dr. Hrvoje Lucić.

The main purpose of the Ab ovo Academic Choir is to enable current and former student and Faculty staff to socialize in a creative environment, and to enrich the extracurricular activities. Through their active and joint musical activities, the Choir prepares for public performances, in order to preserve and make popular amateur mixed choir music, to develop and promote music within the academic community, and to nurture the musical cultural heritage whilst also promoting the reputation of the Faculty in Croatia and abroad.

Apart from regular participation in the university choir festival-Festa choralis zagrebiensis-the Choir also performs at all important Faculty events, from the ceremony on the occasion of the Faculty Day, book launches, occasional art exhibitions, and other important events, such as its performance at the opening of the "Veterinary Days", the "Croatian Veterinary Congress", the "Veterinary Science and Profession", etc. The organization of the Annual Concert at the end of the summer term in the Faculty colonnade should be pointed out in particular, as well as the Christmas Concert in the Faculty amphitheatre, which has been traditionally organized for students, staff and guests since 2012.

The Choir has also performed abroad. On 7<sup>th</sup> March 2013, it performed in Spielfeld Castle in Austria on the occasion of celebrating Croatia's accession to the European Union. For that performance,

in the academic year 2012/2013, it received the Rector's Award for exceptional artist achievement. The Choir has performed in Italy twice, from 23<sup>rd</sup> to 28<sup>th</sup> October 2014 and from 20<sup>th</sup> to 25<sup>th</sup> September 2018, where it had notable appearances in several sacral buildings in Rome, attended by the Croatian ambassadors to the Holy Sea.

At the Faculty, scientific meetings, educational exhibitions and certain social events are organized, and since some of those events have become traditional, they are part of the Faculty's recognizable character in national and international contexts.

The scientific and professional congress entitled "Veterinary Science and Profession" was held on 6<sup>th</sup> May 2005 at the Faculty to mark the 75<sup>th</sup> anniversary of the journal *Veterinarski arhiv* (Veterinary Archives), and the 100<sup>th</sup> anniversary of the birth of the academician Ivo Tomašec. It was held 12 years after the first event (1993) with the aim of gathering scientists and experts who work in veterinary medicine, or whose work is professionally linked to it in some way. Since then, it has been held regularly biannually, with the participation of international experts from the wider region.

The latest international "Veterinary Science and Profession Congress" was held at the Faculty of Veterinary Medicine of the University of Zagreb from 5<sup>th</sup> to 7<sup>th</sup> October 2017. The Congress was organized under the patronage of the President of the Republic of Croatia, Ms. Kolinda Grabar-Kitarović, and the Mayor of Zagreb, Mr. Milan Bandić, with the support of the Croatian Academy of Sciences and Arts. Over the three days of the congress, the event was divided into six thematic units: Veterinary public health, Farm animals, Horses, Small animals, Exotic and wild animals, and Free choice of subject. More than 400 participants had the opportunity to attend lectures held by 18 international and national lecturers, who presented recent scientific and professional insights into each unit. The organizers received the largest number of abstracts so far, and a total of 101 papers were presented, of which 44 in oral presentations and 57 posters. Ten professional workshops were held in various fields of veterinary medicine. A new feature of this congress were lectures given by young doctoral students on the "Doctorate Day" which, in the presence of the Rector of the University of Zagreb, Prof. Dr. Damir Boras, was held for the first time at the Faculty of Veterinary Medicine. This enabled the promotion of young experts' excellence at the Faculty, as well as the future of scientific development of veterinary medicine. Having in mind the exceptionally important role that the veterinary experts hold



The Academic Choir of the Faculty of Veterinary Medicine of the University of Zagreb *Ab ovo* at the end of the performance at the University Choir Festival-Festa Choralis Zagrebiensis at the Croatian Music Institute on 22<sup>nd</sup> May 2015 in Zagreb.



## II. MODERN HISTORY



Prof. Dr. Nenad Turk, the Dean of the Faculty, during the opening speech of the 7<sup>th</sup> international congress "Veterinary Science and Profession", Zagreb, 2017 (Photo courtesy of Zoran Juginović).



Prof. Dr. Petar Džaja presenting a collection of books and old diplomas in the Museum of the History of Veterinary Medicine during the "Book Night" event in 2015 (Photo courtesy of Assist. Prof. Dr. Daniel Špoljarić).

in preserving human health as well as the health of the community, the last day of the congress was dedicated to lectures under the joint title "One Health". The lectures were also aimed at the wider public, giving an additional social contribution to promoting a new approach in resolving the challenges of the modern day.

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"Reptilomanija+" is an educational exhibition of exotic pets, which has been organized at the Faculty of Veterinary Medicine since 2013 and represents one of the largest student projects in Faculty's recent history.

The aim of organizing this exhibition was to acquaint students and other interested parties with the subject of exotic animals, because an increasing number of these animals are now being kept as companion animals. The idea behind the exhibition is breaking stereotypes regarding these animals and explaining this relatively new field which doctors of veterinary medicine can include in their scope of work.

Over the past six years, a large number of different exotic animals have been exhibited in the student premises of the Faculty of Veterinary Medicine, including snakes, lizards, tortoises, frogs, amphibians, spiders, various insects and even crocodiles. Due to the variety of interesting animals, over the years (2013-2018), the exhibition has been visited by 37,000 visitors, especially in the last two years (2017, 2018). The satisfaction and enthusiasm of all the visitors, from preschool children to families, have shown the value of the "Reptilomanija+" project of the Faculty students. The quality of the exhibition and the students' effort invested in its organization have been recognized by the University of Zagreb, so the students from Equus and the educational exhibition "Reptilomanija+" received a Special Rector's Award.

Although reptiles are not in the focus of veterinary education at European veterinary faculties, the exhibition "Reptilomanija+" certainly demonstrates that the Faculty of Veterinary Medicine of the University of Zagreb, with the support of the students' association Equus, is following the trends and responding to new requirements in society, not overlooking essentially important areas of veterinary public health, food safety, but also comprehensive care for the protection of health and welfare of animals in general.

The event "Book Night" was launched in 2012, at the initiative of the Publishers and Booksellers Association of the Croatian Chamber of Commerce, and the association Knjižni blok, who were joined in the

organization by the National and University Library in Zagreb, the Zagreb City Libraries, the Publishers' Reprographic Rights Association-ZANA; and the books-and-culture-oriented web portal, Moderna vremena. "Book Night" was organized with the aim of promoting, the culture of reading and discussing literature, and raising awareness of the importance of books in society, through a single national event. Marking "Book Night" was linked to Croatian Book Day (22<sup>nd</sup> April) and the World Book and Copyright Day (23<sup>rd</sup> April). The Faculty of Veterinary Medicine of the University of Zagreb joined this event for the first time in 2015. Over the one-day event, tours were organized for visitors of the Faculty library and museums, promotions of new Faculty textbooks, readings of poetry by Faculty teachers, and a musical programme.



Student Klara Fuš at the 5<sup>th</sup> educational exhibition "Reptilomanija+" held from 10<sup>th</sup> to 14<sup>th</sup> May 2017 at the students' premises of the Faculty (Photo courtesy of Yasmin Yeoman).





Visitors observing exhibits at the Museum of the Anatomy, Histology and Embryology during the "Museum Night" manifestation in 2019 (Photo courtesy of Zoran Juginović).



The Faculty presentation at the "Science Festival" in 2016 (Photo courtesy of Assist. Prof. Dr. Daniel Špoljarić).

"Museum Night" is an event which the Croatian Museum Association has been organizing in Croatia since 2005, and it takes place on the last Friday in January, when visitors are allowed free entrance to museums all over the country until late hours. The aim of this event is to show museums as institutions of heritage, identity and a vital part of the sustainable development of tourism. It encourages recognition of museums as dynamic institutions bringing together people and global sources of information and ideas and creativity, as institutions that make up the wealth of human expression and cultural diversity available to all users and all media. The event also encourages the development of curiosity in people, especially young people as a motive for visiting a museum, as an institution of knowledge, but also a place of fun and a good way to spend leisure time.

The Faculty became involved in marking the "Museum Night" event for the first time in 2016. During this event, the Faculty of Veterinary Medicine gave the public the opportunity of touring and investing the Faculty's interesting museum collections and presentations of specific topics. The theme of the Faculty "Museum Night" 2018 was "Museums and Sports-faster, higher, stronger-citius, altius, fortius", with an exhibition of posters on Faculty teaching staff who have, alongside their regular occupation and teaching and scientific research career, also achieved notable results in various sports.

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The "Science Festival" is an event which has been organized regularly in Croatia since 2003, with the aim of bringing science closer to the public through information on activities and results in the field of science, improving the public perception of scientists and motivating young people to research and acquire new knowledge. The event in Zagreb is co-organized by the University of Zagreb and, through a large number of presentations, exhibitions and workshops at its faculties, thus supports the idea of the Festival and public popularization of science.

The Faculty joined the "Science Festival" in 2016 and has since then, through interesting workshops in fundamental natural sciences (chemistry, physics and biology) and preclinical and clinical fields of veterinary medicine, enriched the content of this event for interested visitors.

Since 1992, the Faculty of Veterinary Medicine has traditionally organized "Open Door Day"s, and these events have continued after the implementation of the Bologna reform of the veterinary medicine studies. At the "Open Door Day"s, visitors (potential students and their parents) learn about the Faculty's activities and the veterinary profession. As part of this event, visitors are, through conversations with students, the Faculty administration and teaching staff, given information about enrolment, the study programme and the requirements for studying. The "Open Door Day"s programme includes an organized tour of the departments, clinics, museums and student facilities of the Faculty of Veterinary Medicine, during which visitors are shown work with animals.

As part of the "Open Door Day"s in 2015, 2016, and 2017, the "Book Night" event was held, and the "Science Festival" was held as part of the "Open Door Day"s in 2018.



The Dean Prof. Dr. Nenad Turk with the youngest visitors at the Faculty "Open Door Day" in 2018 (Photo courtesy of Zoran Juginović).



The classrooms at the Faculty, where "Reptilomanija+" (the 5<sup>th</sup> Educational Exposition of Exotic Animals) was held in May 2017 (Photo courtesy of Filip Pek).









## 4.11. Publishing activities of the Faculty and its employees

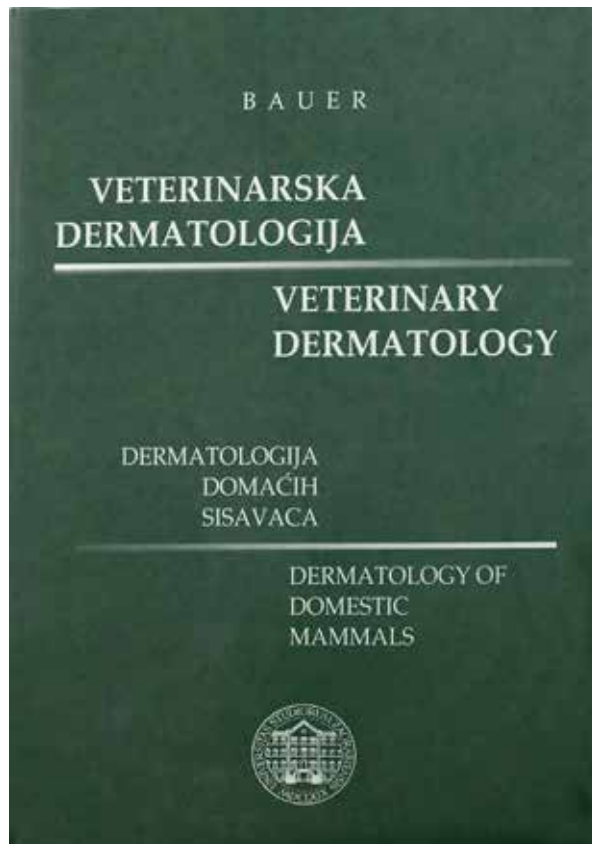
Looking at the period of veterinary publishing activities from the foundation of the Veterinary High School in Zagreb and its transformation into a Faculty (1919-2019), we can say that during that time, teaching staff, scientists, and professionals in the field of veterinary medicine, employees at the Faculty, have created and developed rich and dynamic publishing activities. This long period's main characteristic has been the team work of doctors of veterinary medicine who work in various fields of the profession, with experts of other related fields, such as masters of agronomy, forestry, engineers of biology, biochemistry, physicians and other professions. Interdisciplinary work has thereby contributed to the comprehensiveness and quality and the overall significance of the Faculty's publishing.

Book publishing in the field of veterinary medicine in the period from 1919 to 2019 has mostly stemmed from the need to publish textbooks and other teaching materials as part of the veterinary medicine studies at the Faculty. Namely, the success of the teaching process is, amongst other things, evaluated on the basis of the availability of university teaching literature, which includes university textbooks, handbooks and mimeographed notes. At first, students of the Veterinary High School, and later the Faculty, attended classes and prepared subject matter using foreign textbooks, mainly from the German speaking

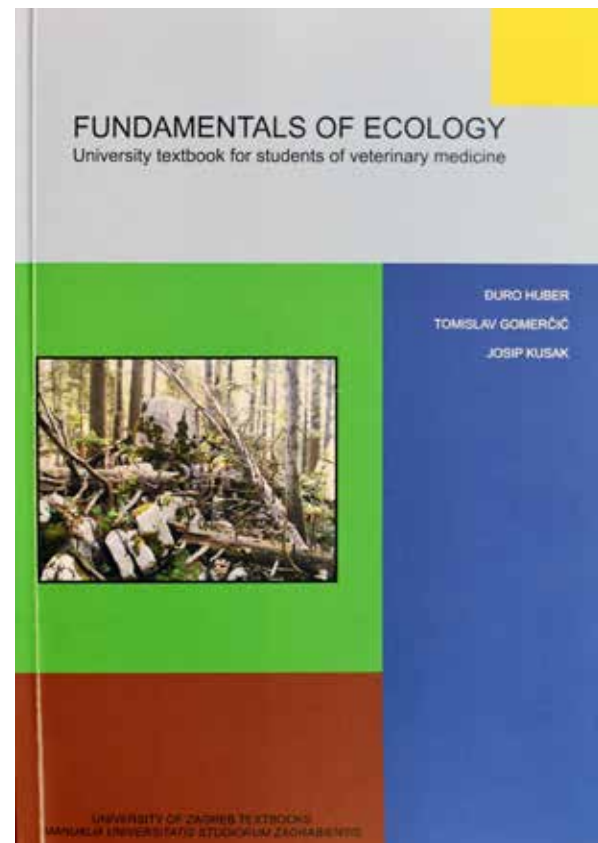
countries. The first teaching materials published produced by a teacher at the Faculty were mimeographed notes by Prof. Dr. Fran Zavrnik, in 1924., entitled, *Microscope Theory* which was expanded and in 1934 came out as *Microscope Theory and Use*, for the needs of the elective subject of the same name. Since then, and until the present day, hundreds of mimeographed notes, handbooks and textbooks have been published by the Faculty, for the purpose of almost all courses in the framework of the undergraduate study, and partially of the postgraduate study.

It is particularly worth mentioning that the first bilingual (Croatian-English) university textbook was published in 2002 by Prof. Dr. Mario Bauer, entitled, *Veterinary Dermatology of Domestic Mammals* and in 2015 the first university textbook was printed in English, by Prof. Đuro Huber, Prof. Tomislav Gomerčić and Prof. Josip Kusak, entitled *Fundamentals of Ecology*, for the purpose of the compulsory course *Zoology*, in the first year of the integrated undergraduate and graduate study in veterinary medicine in English language.

Teaching staff at the Faculty have, over the course of its history, excelled in publishing of professional literature in various fields of veterinary medicine, and the first work of this kind, written by a permanent member of the teaching staff of the Faculty, was a booklet by Prof. Dr. Stjepan Plasaj from 1929, entitled, *Infectious Diseases of Domestic Animals*, published by the Narodne novine (Official Journal) printing



The cover of the first bilingual (Croatian/English) university textbook, entitled *Veterinary Dermatology of Domestic Mammals*.



The cover of the first university textbook printed in English, entitled *Fundamentals of Ecology*.

house in Zagreb. Since then, the Faculty teaching staff have published a large number of professional books with the aim of spreading knowledge and popularizing veterinary medicine amongst the wider social community.

The autobiographical monographs written by Faculty staff are especially noteworthy. These are: *Deserving Croatian Veterinarians*, editor Prof. Dr. Stjepan Rapić (1976) and *Deserving Croatian Veterinarians II* editors, Prof. Dr. Hrvoje Gomerčić and Prof. Dr. Vesna Vučevac Bajt (2003).

Quality associates and financial and material support are the key prerequisites for launching scientific or professional journals. Veterinary journals in Croatia have a relatively long tradition, and are marked by variety. It cannot be disputed that their quality is, to some extent, an indication of the quality of a country's veterinary work. In the field of scientific or scientific and professional journals published by the Faculty of Veterinary Medicine of the University of Zagreb, the journals *Veterinarski arhiv* (Veterinary Archives) and *Veterinar* (the Veterinary) have been present on the Croatian publication market for many years, and they are still regularly published. Over the past few years, the Faculty, in cooperation with the Croatian Veterinary Chamber, has published the scientific and professional journal, *Hrvatski veterinarski vjesnik* (Croatian Veterinary Report).

The scientific journal *Veterinarski arhiv* is one of the few journals that have regularly been published from its foundation in 1931, as the Faculty's journal. At the time, there were many older veterinary faculties who did not have their own journal, so even then *Veterinarski arhiv* was internationally recognized and held importance for promoting the scientific work of the Faculty in the context European and global public. Prof. Dr. Fran Zavrnik was the most deserving for the foundation of this journal. He was a teacher of histology at the Faculty, who had at the session of the Faculty Council on 22<sup>nd</sup> January 1931, proposed publishing of a scientific journal, at the expense of the Faculty Foundation. He elaborated on the need and benefits of this journal in great detail. The proposal was accepted, and the proponent was given the task of making the necessary preparations for the publishing of the paper. At the Faculty Council session held on 2<sup>nd</sup> April 1931, he submitted a report on the preparations made, and proposed that the journal be called *Veterinarski arhiv*.

From the first edition, the editor-in-chief and the Editorial board set high scientific criteria for the journal, whereby they published only original scientific discussions and dissertation presentations, which in form, scope and scientific level were approximately equivalent to similar papers published in German scientific journals at that time. Thanks to this approach, *Veterinarski arhiv* is to be found in almost all European veterinary libraries. The largest number of papers were written at that time in Croatian, with content in English, German, French or Russian. The quality of the journal improved from year to year, and on the basis of its reputation, the Faculty began to receive other journals from abroad in exchange for it.

In the years that followed, up to the present day, these were the editors of *Veterinarski arhiv*: Fran Zavrnik (1931-1934), Ivo Babić (1934-1942), Ivo Tomašec (1943-1952), Eugen Topolnik (1953-1975), Mirko Findrik (1976), Mladen Hajsig (1976-1978), Dubravko Timet (1979-1993), Hrvoje Gomerčić (1994-2000), Josip Madić (2001-2017) and Velimir Sušić (2017-today).

At the time when the editor was Prof. Dr. Hrvoje Gomerčić, the journal acquired the characteristics of an international journal, in two editions: the printed edition ISSN 0372-5480 and the internet edition: ISSN 1331-8055. The printing of papers only in English began, with a summary in Croatian. Although it had an editorial board always composed of the most distinguished Faculty professors almost the entire period it was published, in issues 1-3 of volume 64 in 1994, an International Advisory Board was introduced.

After occasional difficulties regarding the regularity of the publishing of the journal, since 2003 it began to be printed regularly and on time, whereby it fulfilled the requirements for re-assessment for listing in one of the prestigious indexed publication databases, merged under ISI.

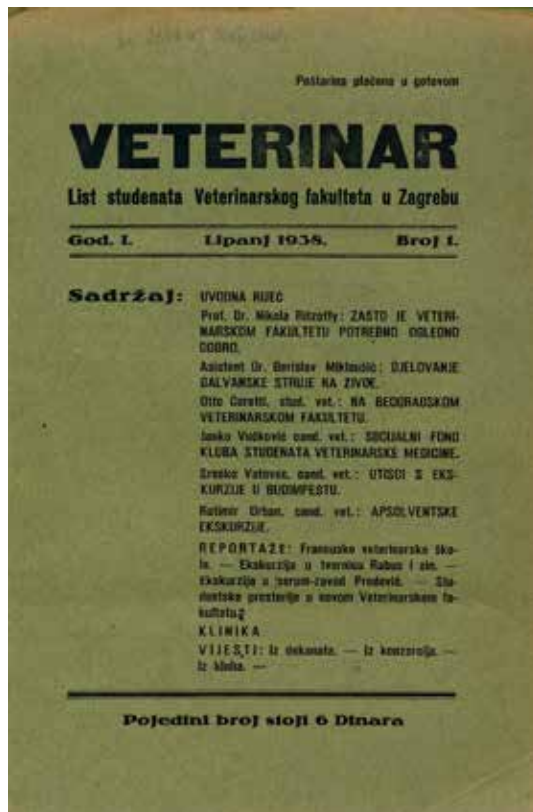


The cover of the first issue of the Scientific Journal *Veterinarski arhiv* (The Veterinary Archives) from 1931.

As a result of dedicated work of those responsible for the editorial concept, the diligent preparation of every issue and raising the quality of the journal according to international standards in general, *Veterinarski arhiv* was, from issue 1, volume 79, in 2009, once again indexed in the Science Citation Index Expanded (SCI). The national and foreign reviewers, who on the basis of their competence and objectivity, assess the value of the manuscripts received and contribute to the quality of each new issue of the journal, have also undoubtedly played a vital role. Regardless of the effort invested by everyone involved in the preparation of each issue, the journal would not come out regularly if the funds necessary for its printing were not available. They were mostly provided by the Faculty's own activities and the financial support of the Ministry of Science. *Veterinarski arhiv* publishes scientific papers, review articles, short reports, case presentations, and book reviews from all fields of veterinary science and medicine, including occasional presentations from scientific conferences. Papers published in *Veterinarski arhiv* have been regularly cited, alongside the SCI-expanded data base, in: Journal Citation Reports/Science Edition, Biological Abstracts, BIOSIS Previews, CAB Abstracts (Index Veterinarius, Veterinary Bulletin), FISHLIT, SCOPUS and Zoological Record. With regards to the position of *Veterinarski arhiv* among the world scientific journals, according to Elsevier's database SCOPUS, it may be said that its position over the last ten or so has been around the middle of the impact factor scale, between 0.3 and 0.4. With respect for the efforts made so far by the Editorial Board in achieving the appropriate quality of the journal and its listing in the SCI-Expanded database, further enhancement of the scientific excellence of *Veterinarski arhiv* is to be expected in future, striving for the level of eminent and recognized international journals. The scientific and professional journal of students of veterinary medicine, *Veterinar*, has a long tradition. The first issue was published on 1<sup>st</sup> June 1938, and it was launched by the student of that time, Ratimir Orban with associates. His idea was to publish scientific and



## II. MODERN HISTORY



The cover of the first issue of the Scientific and Professional Journal of Students of Veterinary Medicine, *Veterinar* (The Veterinarian) from 1938.

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professional papers by Croatian and foreign students of the Faculty, as well as students and experts in the fields of biomedicine and health, and biotechnology.

The fact that the *Veterinar* is one of the oldest student journals in Europe is particularly impressive and speaks of the richness of Croatia's tradition and cultural heritage. It should be noted that students of the Faculty founded this journal in a relatively small city of an economically poorly developed Balkan country only twenty years after the foundation of their Faculty, in 1919, while at the same time none of the better known veterinary colleges with a far richer and more developed tradition in western Europe did not have student journals, even though veterinary education had been present for more than two centuries. This fact alone shows the exceptional potential, value and decisiveness possessed by our students of that generation. The foundation of the journal *Veterinar* was preceded by about twenty years of life and activity of the Faculty Students' Club, which was founded in 1919, at the same time as the Faculty itself, and which resulted in *Veterinar*. Its publishing stopped during the Second World War, and it appeared again in print in 1946, as the journal of the Alliance of Students of Veterinary Medicine of Yugoslavia, for all four faculties. In the period that followed, *Veterinar* came out as the journal of the Alliance of Socialist Youth of Veterinary Medicine of Yugoslavia, right up until 1985.

In 1993, the Veterinary Students' Society Equus, was founded, and one of its main aims was to renew the printing of the student journal *Veterinar*. After it has not been published for ten years, through the enthusiasm and determination of a few students, and with the support of the administration of the Faculty, in 1995 the publication of *Veterinar* was restored, as the scientific and professional journal of the Veterinary Students' Society, Equus. Publishing of the journal, although only one issue is published each year, ceased once again after only three years (1995-1997), after which it was launched again (2005-2007), and began to be issued continuously since 2010.

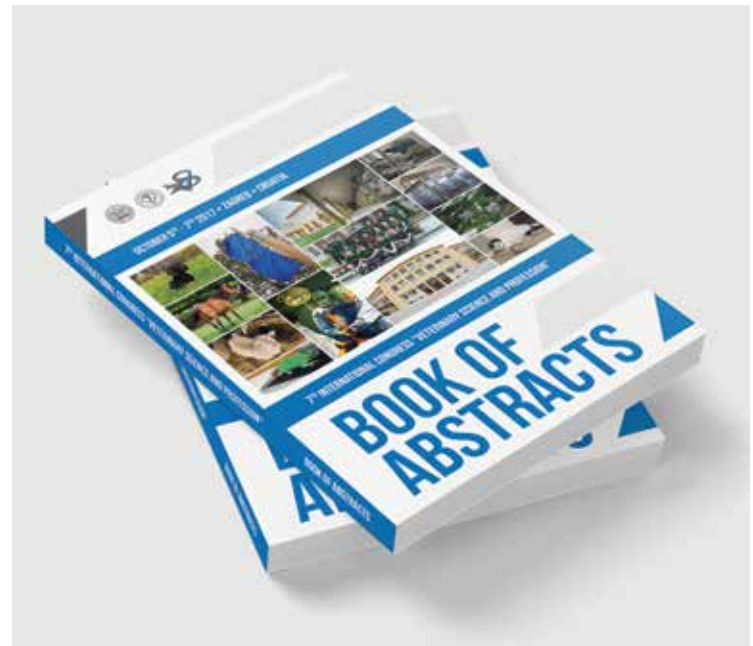
At the time of its foundation, *Veterinar* featured original scientific articles from all areas of veterinary medicine, about their importance for society, short reports on important and interesting questions related to the veterinary profession, livestock breeding and social life in general. The journal today publishes scientific and professional papers by Croatian and foreign students of veterinary medicine, as well as students and experts from the fields of biomedicine and health and biotechnology.

The importance of the renewed publication and quality of one of the oldest student journals was also recognised by the University of Zagreb. So in the academic year 2010/2011 *Veterinar* received a special Rector's Award for the best student achievement, and in 2017/2018 it received the Rector's Award for socially beneficial work in the academic and wider community.

Since 2011, it has been available to readers in an electronic version on its website (<http://www.vef.unizg.hr/veterinar/>) and through the portal of scientific journals of the Republic of Croatia-Hrčak (<https://hrcak.srce.hr/veterinar>). Only a student of veterinary medicine may be the editor-in-chief of the journal, so they are replaced after graduation.

The journal is published twice a year in 300 copies, and the student editorial committee, having in mind the criteria established earlier, endeavours to maintain its scientific profile, quality and visual identity. The journal also has an editorial board which is comprised of Faculty's younger teachers. Every scientific paper received for publishing passes through a review process, and alongside original scientific articles, professional and popular articles are also published, thereby promoting the veterinary profession and science.

The scientific and professional journal *Hrvatski veterinarski vjesnik* (Croatian Veterinary Report), has an extremely long and rich tradition. Its publishing commenced in Zagreb in 1906, as the *Veterinarski vjesnik*, and it was the journal of the Croatian and Slavonian Veterinary Society. The journal was published until 1921, when it was abolished. In the time that followed, the publishing of the journal begun again, and in 2013 a meeting was held by the representatives of the Faculty of Veterinary Medicine of the University of Zagreb and the Croatian Veterinary Chamber, and joint publication of the *Hrvatski veterinarski vjesnik* was agreed. The journal was expanded with the printing of scientific, professional and review papers important for veterinary



The Book of Abstracts from the international congress "Veterinary Science and Profession" held in October 2017.

practice, and the mentioned part is edited by Prof. Dr. Petar Džaja. The function of editor-in-chief is held by Dr. Ivan Križek, who is also the second editor of the journal.

In the first part of the journal reports are published from professional meetings and other events, and the second part comprises primarily professional papers, with the emphasis on ones from everyday veterinary practice. This section is also used for publishing scientific papers of importance for fellow veterinarians employed in veterinary practices, or who work in veterinary inspection services. The journal is issued in Croatian and is sent to members of the Croatian Veterinary Chamber, to their home address, free of charge.

In the scope of Faculty's publishing activities, it is particularly necessary to point out the publishing of occasional books (memorials, bibliographies, monographs) to mark anniversaries of the Faculty, and individual organizational units. The first Memorial was published in 1959 to mark the 40<sup>th</sup> anniversary of the Faculty (editor-in-chief Prof. Dr. Eugen Topolnik), and then in 1969 to mark the 50<sup>th</sup> anniversary of the Faculty (editor-in-chief Prof. Dr. Stjepan Rapić). The second occasional work, marking the half century of the Faculty's existence was the *Bibliography 1919-1969*, which was published in 1971 (editor Prof. Dr. Adolf Režek). With the aim of marking the 60<sup>th</sup> anniversary of the Faculty, the *Bibliography 1919-1979* was published, printed in 1982 (editor Prof. Dr. Uroš Bego). In the following period, in 1989, a Memorial was published to mark the 70<sup>th</sup> anniversary (editor Prof. Dr. Vesna Vučevac Bajt) and in 1999, a Special Book to mark the 80<sup>th</sup> anniversary (editor: Prof. Dr. Tomislav Balenović). On the occasion of marking the 90<sup>th</sup> anniversary of the Faculty a bilingual monograph was published entitled; *Collection of Veterinary Instruments from the Museum of the History of Veterinary Medicine* (editor Prof. Dr. Vesna

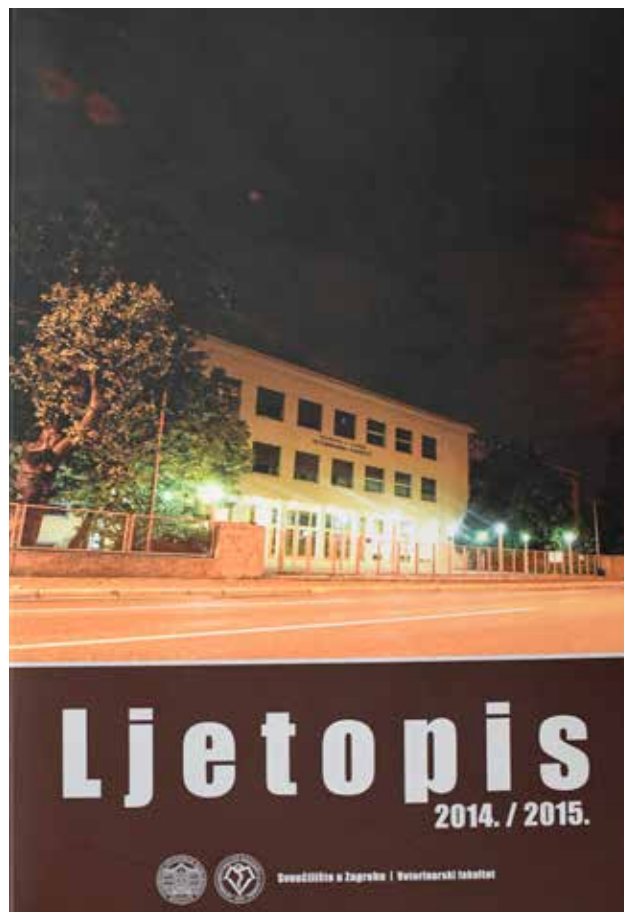
Vučevac Bajt). A special monography, *The Faculty of Veterinary Medicine and Veterinary Publishing Activities in the Republic of Croatia, 1991-2011* was published in 2012 (editors and authors Prof. Dr. Željko Pavičić and Prof. Dr. Marko Samardžija).

In recent times, several Memorials on the departments have been published: *50 Years of the Department of Chemistry and Biochemistry, 1940-1990* (editor Prof. Dr. Aleksandar. Lutkić); *45 Years of the Department of Zoohygiene 1948-1993* (editors Prof. Dr. Antun Asaj and Dr. Maks Karlović); *75 Years of the Department of Hygiene, Technology and Food Safety 1922-1997* (editors Dr. Maks Karlović and Prof. Dr. Josip Živković); *80 and 90 Years of the Department of Physiology and Radiobiology 1919-1999, 1919-2009* (editor Prof. Dr. Dubravko Emanović); *65 Years of the Department of Animal Hygiene, Behaviour and Welfare* (the former Department of Animal Hygiene), 1948-2013 (editor Prof. Dr. Željko Pavičić).

From the academic year 2000/2001, the Faculty has regularly been publishing the *Veterinary Faculty Yearbook*, in which every year, alongside reports on classes, quality control, finances, professional and scientific work, a list of all the scientific papers by staff of the Faculty is annexed, aligned with data from the Croatian Scientific Bibliography. The *Yearbook* is presented at the celebration of the Faculty of Veterinary Medicine Day, which is organized in the middle of November every year. Furthermore, the Faculty publishes the *Proceedings of the Veterinary Congress with International Participation*, which is held every four years. The proceedings include all papers "in extenso" in which the results of work and research are presented on scientific subjects covering all four scientific branches in the field of veterinary medicine. The Faculty is also the publisher of a Collection of Abstracts of papers from the international congress "Veterinary Science and Profession", which is traditionally held every other year and is organized by the Faculty.



The cover of the scientific and professional journal *Hrvatski veterinarski vjesnik* (Croatian Veterinary Report) 2019.



The cover of the *Veterinary Faculty Yearbook* from the academic year 2017/2018.





Entrance into the Surgery, Orthopaedics and Ophthalmology Clinic for the patients and owners.





# III. DIVISIONS





## 5. Basic and Pre-Clinical Sciences Division

### 5.1. Department of Anatomy, Histology and Embryology

Immediately after the foundation of the Veterinary High School, in 1919 the Department of Systematic and Topographical Anatomy began its work, followed by the Department of Histology and Embryology in 1921. The first professors were the anatomist Prof. Jaroslav Sakař and the histologist Prof. Dr. Fran Zavrnik. Up to 1940 both Departments were located in unsuitable premises at the old location in Savska Street, but then they moved temporarily to the newly built main building at the new Faculty location in Heinzelova Street. In 1948 each of them moved to their own premises in the completed northern wing of the second building of the theoretical experimental Departments, where they still are today. In 1951 they were merged into the single Department of Anatomy, Histology and Embryology, but they remained in separate premises. Today there is a large museum collection of preparations in the Department (bones, organs, developmental stages of animals, various forms of placentas, bone remains of animals found in archaeological locations, and about three hundred skeletons of dolphins found along the Croatian part of the Adriatic Sea) where they have been collected and catalogued for many years. Thanks to the engagement of the Assist. Prof. Dr. Žarko Dolinar the collection also contains a human skeleton. Also, numerous oil on canvas paintings, painted by senior technical associate Silvio Trapan while observing histological preparations, are of museum value.

In the Department of Anatomy, Histology and Embryology there are two laboratories, the histology laboratory and histochemistry laboratory, which have existed since the Department was founded, and the DNA analysis laboratory, which was opened about ten years ago. The histology and histochemistry laboratories were founded primarily in order to prepare histology preparations for teaching purposes, but very quickly its work became the backbone of the development of the scientific work of the teaching and professional staff of the Department.

For the last 20 years the laboratory has been upgraded by purchasing new, modern equipment and an appropriate space in line with the requirements of the 21<sup>st</sup> century will be provided with the planned

arrangement. The state-of-the-art DNA analysis laboratory is located in a suitable space. Beside the Department's staff the laboratory is also open for use to all scientists at the Faculty of Veterinary Medicine and it provides the possibility of cooperation with other institutions.

At the Veterinary High School and the Faculty of Veterinary Medicine, anatomy was initially taught separately from histology and embryology until 1954, when a single teaching course was created, but the classes were still held separately. Examinations were at first separate, but by a decision of the Faculty Council of 1956 a single examination was introduced so that professors of anatomy and professors of histology and embryology examined the entire course matter. In 1967 the complete course matter of anatomy, histology and embryology was divided into two parts: Anatomy I (Bones, Ligaments and Joints) in the 1<sup>st</sup> semester and Anatomy II, Histology and Embryology in the 2<sup>nd</sup> and 3<sup>rd</sup> semesters. In 1977 the new course Applied Anatomy was introduced in the 5<sup>th</sup> semester.

Since 1987 the course is called Anatomy, Histology and Embryology and it is taught in the 1<sup>st</sup> and 2<sup>nd</sup> semesters and in 1995 the course Applied Anatomy was abolished and the professors of the Department introduced elective courses into the curriculum. With the adoption of curriculum and syllabus of the undergraduate and graduate study of veterinary medicine according to the Bologna Process since 2005/2006 academic year, the organization of teaching at the Department changed significantly. Anatomy course matter was separated into three and Histology into two one-semester courses, and finally after 50 years the Anatomy and Histology exams were separated.

Under the amended curriculum of the integrated undergraduate and graduate study of Veterinary Medicine since 2007, professors at the Department hold classes in the 1<sup>st</sup> semester in the course Anatomy with Organogenesis of Domestic Animals I, then in the 2<sup>nd</sup> semester in the course Anatomy with Organogenesis of Domestic Animals II and in the 3<sup>rd</sup> semester in the course Topographic Anatomy of the Head and Neck, which changed its name in 2009 to Anatomy with Organogenesis of Domestic Animals III. The course Histology and General



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Embryology is taught in the 2<sup>nd</sup> semester. As part of the integrated undergraduate and graduate study of veterinary medicine professors at the Department run nine elective courses: Specific Anatomical Structures of the Locomotor Apparatus of the Horse in the 2<sup>nd</sup> semester, Structure and Function of Cell, Comparative Anatomy of Skeletal System, Reptile Morphology, Basic Anatomy of Bottlenose Dolphin (*Tursiops truncatus*) in the 3<sup>rd</sup> semester, Anatomy of Laboratory Animals and Archaeozoology, both in the 4<sup>th</sup> semester, Clinical Anatomy in the 6<sup>th</sup> semester and Fish Morphology in the 9<sup>th</sup> semester. Professors at the Department also participate in teaching elective courses Basic Biology and Fundamental Physiology of Marine Mammals and Fundamentals of Marine Mammals Systematics and Evolution, both in the 4<sup>th</sup> semester. Very quickly after the introduction of the postgraduate study at the Faculty of Veterinary Medicine, in the 1963/1964 academic year the postgraduate study was held in Histology and Embryology, over three semesters. Already the following academic year the study was renamed Anatomy, Histology and Embryology, and it was extended to four semesters. After passing the examinations and having received a positive grade for an independent written study, the candidates were awarded a diploma with the academic title of Master in the Field of Anatomy, Histology and Embryology. The study was renewed in 1985, and after passing the mandatory examinations and a successful defence of the Master's thesis, the candidates attained the title of Master of Science in the Field of Anatomy, Histology and Embryology. Since 1995/1996 academic year a two-year Master's study and a three-year PhD study were organized, which were offered until the 2003/2004 academic year. Professors at the Department up until that time took part in other postgraduate studies at their mother Faculty, in scientific and specialized training. Since 2005/2006 academic year, professors took part in teaching the university's scientific PhD study in Veterinary Sciences over three years, where they headed up 14 specialized branch oriented courses.

The scientific work in the history of both Departments, and later the united Department of Anatomy, Histology and Embryology, has had a significant impact of international proportions, where Prof. Dr. Teodor Varićak was particularly outstanding. In his scientific work he made a contribution to knowledge of the construction of the liver and blood vessels, especially in mammals and fish, and on the basis of his contributions to science he became a corresponding (1955-1958) and a full member (1958-1977) of the Yugoslav Academy of Sciences and Arts (JAZU). In the recent history of the Department the associate member of the Croatian Academy of Sciences and Arts, Prof. Dr. Hrvoje Gomerčić, has been particularly outstanding, having worked on implementing many international projects related to protection of sea mammals in the Adriatic Sea since the Republic of Croatia became independent.

Professors at the Department's history have been active in professional associations for advancing veterinary medicine (Jaroslav Sakař), holding responsible positions as Vice-Rector and Rector of the Veterinary High School (Jaroslav Sakař, Fran Zavrnik) and the University of Zagreb (Teodor Varićak), then as Vice-Dean and Dean of the Faculty (Jaroslav Sakař, Fran Zavrnik, Teodor Varićak, Mladen Zobundžija), they were part-time professors at other institutions of higher education (Jaroslav Sakař, Tomislav Ciliga, Teodor Varićak, Uroš Bego, Mladen Zobundžija, Krešimir Babić, Vesna Gjurčević-Kantura, Damir Mihelić, Hrvoje Gomerčić, Zvonimir Kozarić, Hrvoje Lucić), and editors of scientific journals in natural and veterinary sciences in Croatia (Teodor Varićak, Hrvoje Gomerčić). Almost all the professors at the Department have gained experience at well-known veterinary colleges around Europe and in the USA, which, with the transfer of new insights to the teaching and scientific work at the Faculty, the Department of Anatomy, Histology and Embryology, has ensured their international recognition.



There is a large museum collection of preparations at the Department of Anatomy, Histology and Embryology. The exhibits have been collected for years. Part of the collection which comprises glazed, elaborate complete skeletons of various species of domestic and wild animals is located on the Department's first floor. The most interesting exhibits date back to the 1960s, and they were made from materials obtained from the Zoological Garden in Zagreb.



The rich museum collection of the Department of Anatomy, Histology and Embryology is especially valuable because of the bone remains of various species of animals found in archaeological sites throughout Croatia, as well as some three hundred complete dolphin skeletons. The carcasses of those dolphins were found along the Croatian part of the Adriatic Sea. These two collections have found their place within the specially designed space of the Department.



Entrance to the dissection hall of the Department of Anatomy, Histology and Embryology. *This is the place where Death is glad to help Life*



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Anatomy with Organogenesis of Domestic Animals I (18 hours of lectures, 64 hours of practice classes, 7 ECTS credits), Anatomy with Organogenesis of Domestic Animals II (20 hours of lectures, 100 hours of practice classes, 8 ECTS credits) and Anatomy with Organogenesis of Domestic Animals III (15 hours of lectures, 63 hours of practice classes, 5.5 ECTS credits). Practice classes take place in the dissection hall equipped with enough preparations for students to master the teaching material.

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The DNA Analysis Laboratory is equipped with new, state of the art equipment, and is free to use for all scientists at the Faculty of Veterinary Medicine and also available for scientists from other institutions who are cooperating with scientists from the Faculty of Veterinary Medicine. The laboratory consists of three rooms where the following research procedures are employed: DNA and RNA isolation methods, sample purification and measuring of sample purity, PCR and PCR products visualization.



For many years, Anatomy, Histology and Embryology have been taught at the Faculty of Veterinary Medicine in Zagreb as one course. Each course was taught separately, but the final exam was just one for all three courses. By adopting the Integrated Undergraduate and Graduate Study of Veterinary Medicine, the course Histology and General Embryology became a course for itself (30 hours of lectures, 60 hours of practice classes, 7 ECTS credits). Teaching takes place in the Histology Department practice room on the Department's second floor.

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Every student attending Histology and General Embryology practice classes has at her or his disposal a quality optical microscope and a box with all the histological preparations needed for students to master the teaching material.







## 5.2. Department of Veterinary Biology

Part of the first curriculum of the Veterinary High School (from 1920) was the course Natural Sciences, which included Biology as well. At first, classes in biology were taught by the professor from the The University of Zagreb School of Medicine Prof. Dr. Boris Zarnik, and in 1940 the Faculty Council appointed the first biology professor, Zdravko Lorković, and classes began to be held at the Faculty of Veterinary Medicine.

The Department of Biology was founded in 1942, and was initially at the Faculty's old location in Savska Street. It moved to the new location in 1953, and has been in the main building of the Faculty since 1957. From 1960 to 1966 it operated within the Department of Biology of the University of Zagreb, but was once again given the status of a Department of the Faculty of Veterinary Medicine. Since 2005 it has been part of the Basic and Pre-clinical Sciences Division, and since 2017 it is called Department of Veterinary Biology.

The Biology curriculum has been changed many times, and the changes have included amendments to the content and title of courses, lecture schedule, and course schedule per semester. In the beginning, Biology was taught in the 1<sup>st</sup> and 2<sup>nd</sup> semester, and from the academic year 1954/1955 to 1966/1967 the course was shortened, and only taught in the 1<sup>st</sup> semester. Lectures covered the fields of zoology, systematics, cytology, embryology, inheritance, genetics and molecular biology. With the introduction of the Bologna process, and course harmonization with the programs of European faculties, since 2005/2006 academic year the previous course Biology was divided into the course Zoology in the 1<sup>st</sup> semester, and Molecular Biology and Genomics in Veterinary Medicine in the 2<sup>nd</sup> semester. According to that curriculum, professors from the Department also taught classes in Botany in Veterinary Medicine in the 1<sup>st</sup> semester. Today, alongside the compulsory courses mentioned in the integrated undergraduate course in veterinary medicine, the Department also organizes and implements elective classes in six elective courses: Conservation and Management of Endangered Species in the 2<sup>nd</sup> semester, Biology and Ecology of Predators in the 3<sup>rd</sup> semester, Fundamentals of Marine Mammals Systematics and Evolution in the 4<sup>th</sup> semester, Basic Biology

and Fundamental Physiology of Marine Mammals in the 4<sup>th</sup> semester, Comparative Mucosal Immunology in the 6<sup>th</sup> semester, and Cytometry in Clinical Veterinary Medicine in the 4<sup>th</sup> semester.

Keeping up with the new insights and on the basis of the teaching curriculum, the Department teaching staff has written several textbooks and handbooks. The latest university textbook, written by professors Đuro Huber, Josip Kusak and Tomislav Gomerčić, entitled *Fundamentals of Ecology* has been translated, and is the first textbook published for the purposes of the integrated undergraduate and graduate study of Veterinary Medicine taught in English (2016).

The Department teaching staff is also involved in teaching the postgraduate specialist studies Pig Production and Health Protection, Sanitation, and Breeding and Pathology of Exotic Pets. They also lead or are associates in nine elective and branch-oriented courses within the postgraduate scientific university PhD study in Veterinary Sciences, in the field of molecular biology, cell and developmental biology, veterinary forensics, biology and physiology of sea mammals, immunomodulation, etc.

The field of biology is very broad, so the scientific-research work of the Department of Biology is characterized by the affinities and work of individual staff members, and scientific-research groups. A large number of scientists who have worked at the Department of Biology have been involved in parasitology (Ivo Ehrlich, Terezija Hrženjak, Jure Jerčić, Đuro Huber etc.). Also, some professors have specialized in individual areas, such as biology and ecology of large carnivores, especially bears (Đuro Huber), and in the molecular aspects of colibacillosis and immunomodulation of intestinal mucous immunity in pigs (Ivica Valpotić). More recently, the scientific interest of the scientific-teaching staff has been aimed at large carnivores, with the emphasis on the ecology of wolves (Josip Kusak), the ecology and population genetics of marine and terrestrial mammals (especially the lynx and dolphins), research into the role of wild animals in the health of the eco-system (Tomislav Gomerčić), avian chlamydiosis (Ksenija Vlahović), the use of cell/tissue therapy on the cell and molecular levels, modulation of immunity and



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health as an alternative to antibiotics in breeding animals for human consumption, studies of the material traces in criminal offences in the field of veterinary forensics, and the use of nanotechnology in corneal tissue engineering (Maja Popović and Danijel Špoljarić). In 2018, a four-year project led by Prof. Dr. Maja Popović was granted funding by the Croatian Science Foundation. This project, entitled *Innovative Functional Products from Lamb's Meat*, is aimed at establishing the effect of the addition of preparations made from edible fungi on the quality of lamb's meat for production of functional products based on innovative solutions in technological production procedures.

There are Department laboratories for scientific research work in cell and molecular immunology; biology and ecology of large carnivores, molecular genetics and chlamydiosis. They are equipped with an immunofluorescence microscope, a flow cytometer, a DNA extraction system and a PCR instrument, telemetry equipment and collars for tracking movement of large carnivores. The laboratory also uses this equipment as a teaching aid in graduate and postgraduate practice classes. In relation to the scientific-research work of the Department, it is necessary to mention its international cooperation on projects which in recent times have exceeded all the other organizational units of the Faculty in terms of their number and importance. In that field, the work of Prof. Dr. Đuro Huber has been particularly outstanding. From the beginning of the 2000's he has been the leader and co-leader of 16 international projects. The most recent project was financed by the European Commission, as part of the Norwegian Department for Nature Research, and it researches bears Prof. Dr. Ivica Valpotić was a joint leader of the international project *Live Oral Non-GMO Vaccines for Prevention of Oedema Disease and Postweaning Diarrhoea of Weaned Pigs* (Hungary-UK-USA, 2002-2004).

Members of the Department have undergone training at a large number of colleges and scientific research institutions abroad: Fort Collins, Colorado, US (Đuro Huber, 1979-1980), University of Bristol,

Bristol Veterinary School, UK (Ivica Valpotić, 1991), US Fish and Wildlife Service-Department of Interior, Ely, Minnesota, USA (Josip Kusak, 1996), Mammal Research Department Bialowieza, Poland (Josip Kusak, 2010), Fondazione Banca degli Occhi del Veneto, Zelarino, Venice, Italy (Maja Popović, 2010), Tissue Engineering and Regenerative Medicine International Society, Granada, Spain (Maja Popović, 2011), Faculty of Veterinary Medicine, University of Kafkas-Kars, Turkey (Josip Kusak, 2013; 2014), etc.

Part of the Department scientific-teaching have also made outstanding contributions in the sense of innovations. Prof. Dr. Terezija Hrženjak, in cooperation with Prof. Dr. Mira Grdiša from the Ruđer Bošković Institute in Zagreb registered a patent with the Croatian State Intellectual Property Office, entitled *Obtaining and Using a Glycoprotein Mixture from Earthworm Tissue in Biomedicine*. Prof. Dr. Ivica Valpotić received the Annual Science Award of the Republic of Croatia in the field of Biomedicine, for the important scientific achievement: the discovery of mechanisms for modulating the gastrointestinal mucosal immunity using bacterial antigens and immunomodulators (2004). Prof. Dr. Đuro Huber is the distinguished holder of the honorary title of Professor Emeritus, and the recipient of the Eugen Podaubsky Charter for special services and contribution to the advancement of scientific, teaching and professional work, and the spread of the reputation of the Faculty of Veterinary Medicine, and the veterinary profession in this country and throughout the world (2016). Since the end of 1990 Prof. Dr. Đuro Huber, and later the other professors as well, started to actively involve a large number of students in the scientific work, which resulted in numerous student scientific papers awarded the Rector's Award and Dean's Award. A large number of awarded Rector's awards have ensured that the staff of the Department of Veterinary Biology, in regard to other departments of the Faculty occupies a leading position in the scientific work with students.



During the study at the Department of Biology, students attend a compulsory course in botany, where they learn the basics of systematics, plant ecology, and basic features of plants used in cattle feeding, beekeeping and medical drug preparations. Practice classes in this course are held in the Maksimir Park in Zagreb.





As part of the compulsory Zoology course, students learn the basics of ecology. A part of the practice classes is held in the Maksimir Park in Zagreb, where students learn about the temperate deciduous forest biome, and about the dominant and accompanying plant species. In nature, the students can first handedly see examples of succession of biocenosis. They also get acquainted with the research methods in ecology, and seek and identify the basic animal groups according to the systematics of the animal kingdom.

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In order to present the molecular world as part of the lessons in the compulsory course Molecular Biology and Genomics in Veterinary Medicine, students use the three dimensional molecule models. In this photograph: practice class on the structure and bonds between the atoms in the DNA molecule and on the fundamental biological processes in which this molecule participates.



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The Department of Veterinary Biology regularly takes part in public outreach events related to popularization of science, biology and veterinary work. As part of such events, the Department doors are always open to a wide circle of citizens, and we take the greatest pleasure in the visits of young people who, with joy and interest, participate in simple experiments designed for them.

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The Department of Veterinary Biology has been conducting research on large carnivores in Croatia for a number of years, and it had all started with the Prof. Emeritus Đuro Huber's research. Capturing of large carnivores is part of this research, and this is how the lynx in this photograph was captured in Gorski Kotar in 2008. The radio telemetry tracking collars are put around the carnivores' necks to track their movement.





Due to the extremely large scientific activity at the Department, which is carried out through various international projects, and due to the singularity of nature in Croatia, and the level of its preservation, many undergraduate and postgraduate students of biology and veterinary medicine from all over the world visit the Department.



The staff of the Veterinary Biology Department are recognized worldwide as top experts in the field of large carnivores' research. They regularly transfer their knowledge and experience gained in Croatia to their colleagues all around the world. That's why they often teach their international colleagues how to catch certain types of carnivores. In this photograph: treatment of a wolf caught in Turkey in 2017.





## 5.3. Department of Chemistry and Biochemistry

Classes in Chemistry began in 1919, immediately after the Veterinary High School was founded, and they were taught in the 1<sup>st</sup> and 2<sup>nd</sup> semesters. At first, due to the lack of appropriate teaching staff and space, classes were held by a professor at the University of Zagreb, School of Medicine (Fran Bubanović) and in 1940 the Faculty Council appointed the first chemistry professor (Adolf Režek) and classes began at the Faculty of Veterinary Medicine itself.

The Department of Chemistry was founded in 1942, and until 1950 it was at the old location of the Faculty of Veterinary Medicine in Savska Street, but then it moved to the newly built Faculty in Heinzelova Street. Today the Department is positioned on the first floor of the second building of the south wing.

Until the 1978/1979 academic year the teaching staff only taught Chemistry in the 1<sup>st</sup> and 2<sup>nd</sup> semesters. From then Chemistry was only taught in the 1<sup>st</sup> semester, and the course Biochemistry was introduced in the 2<sup>nd</sup> semester. At the same time the Department changed its name to the Department of Chemistry and Biochemistry. Since the 2007/2008 academic year according to the new program the courses Medical Chemistry in the 1<sup>st</sup> semester and Biochemistry in Veterinary Medicine in the 2<sup>nd</sup> semester have been lectured. Today, alongside the compulsory courses mentioned in the integrated undergraduate and graduate study in veterinary medicine, classes are also held at the Department in two elective courses: Chemistry of Natural Compounds in the 2<sup>nd</sup> semester and Veterinary Laboratory Diagnostics in the 9<sup>th</sup> semester.

Since the 2016/2017 academic year the study of veterinary medicine held in English has been introduced with the same curriculum and program as the study in Croatian language so all the listed classes are lectured to the foreign students in English as well.

Shortly after starting the chemistry classes at the Faculty of Veterinary Medicine Prof. Dr. Adolf Režek wrote a textbook *Organic Chemistry for Medics* (1949) which made learning much easier to the students. Prof. Aleksandar Lutkić wrote a script *Biochemistry* which was published in five editions and the last extended and supplemented 6<sup>th</sup> edition was

published in the form of textbooks (Aleksandar Lutkić, Albin Jurić, ed. 2008). Several scripts with instructions for practicals in chemistry and biochemistry were also published and used by generations of students. The texts that students nowadays use to prepare and perform the practicals and seminars are: *Chemistry Exercises* (Miroslav Bajić, Ljerka Ceraj-Cerić Klier, Ivana Stolić, 2007), *Biochemistry Exercises* (Renata Barić-Rafaj, Josipa Kuleš, 2010), *Biochemistry Seminars* (Renata Barić-Rafaj, Josipa Kuleš, 2010), *Calculation in Chemistry 1<sup>st</sup> Part* (Ivana Stolić, 2013), *Calculation in Chemistry 2<sup>nd</sup> Part* (Luka Krstulović, 2013).

The Department has its own lecture theatre for teaching classes. It is used for lectures in chemistry and biochemistry, exercises in stoichiometry, seminars in biochemistry and holding mid-term examinations and written examinations. The lecture theatre has retained its original appearance, but it is equipped with modern technical apparatus, including a computer, a projector and internet access.

Laboratory practicals in chemistry and biochemistry are conducted in the form of student practical work, where students are acquainted with fundamental techniques and methods of laboratory work. They independently conduct simple chemical experiments and qualitative and quantitative measurements in analytical chemistry. During the practicals in biochemistry students undertake measurements of the most important diagnostic metabolites and enzyme activities.

Teaching staff from the Department from the very beginning of the introduction of postgraduate classes at the Faculty of Veterinary Medicine, have been included in teaching several courses in postgraduate study in scientific and specialized training. Since 2005/2006 academic year they have been running courses as part of the university PhD study in Veterinary Sciences.

From the very foundation of the Department professors have been actively involved in scientific research work. Prof. Dr. Adolf Režek conducted research in two areas: the chemistry of enzymes and biocatalysts, and research into the effect of the chemical composition of



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mineral waters on their medicinal effect. His primary scientific interest was aimed at biochemical research in enzymology. The results of that research made a significant contribution to modern biochemistry and launched intensive professional and scientific cooperation within the Faculty. At the beginning of the 1980's, Prof. Dr. Aleksandar Lutkić researched the metabolism of carbo-hydrates focusing on glycogens in various biological materials in healthy people, diabetics, pregnant women and children. More recently, Prof. Dr. Miroslav Bajić, Assist. Prof. Dr. Ivana Stolić and Assist. Prof. Dr. Luka Krstulović conducted scientific research in the field of medical chemistry, into the design, synthesis and biological evaluation of potential medications. The aim of this research was to prepare molecules whose biological activity (anti-tumour, anti-bacterial and/or anti-parasite) is founded on selective binding to specific sequences of DNA and the prevention of replication of DNA or transcription of individual genes. The research was conducted in cooperation with scientists from several prominent institutions in Croatia and abroad. The scientific interest of Prof. Dr. Renata Barić Rafaj is aimed at laboratory diagnostics of inflammatory proteins, coagulation systems, fibrinolysis, activities of inhibitors of coagulation systems, and the activities of endothelins of blood vessels. The research aimed at discovering new therapeutic goals is being conducted using a large number of contemporary diagnostic methods and the use of appropriate instruments, including mass spectrometry. A new field of research by Prof. Dr. Renata Barić Rafaj relates to a proteomic approach to the problem of obesity in cats.

The Department has two research laboratories for scientific research work. The chemistry laboratory is equipped for synthetic organic chemistry with all the necessary apparatus and equipment. It also contains a contemporary UV-Vis spectrophotometer, which is used for determining affinities and selectivity in binding compounds to polynucleotides. The biochemistry laboratory is equipped with an ELISA reader and automatic analyser for chemiluminescent measurement.

The staff from the Department have participated in international projects: COST BM1405 *Non-globular proteins-from sequence to function, structure and application in molecular physiopathology* (2014-2018); FP7-ERA Chair *Upgrading the research performance in molecular medicine at the Faculty of Veterinary Medicine University of Zagreb* (2014-2019); and in the implementation of several projects financed by the Ministry of Science and Education of the Croatia, and the Croatian Science Foundation, for which the teaching staff from the Department of Animal Nutrition and Dietetics and the Clinic for Internal Diseases of the Faculty of Veterinary Medicine of the University of Zagreb were responsible.

The Department's staff are actively involved in the expert work at the Faculty and participate in the implementation of biochemical, hematological, coagulometric and immunological analyses of different samples in the diagnostic laboratory and giving opinions based on the results of these analyses. Prof. Dr. Renata Barić Rafaj collaborates with employees of other Departments and Clinics on the introduction of new diagnostic methods in veterinary practice and the implementation of the RIQAS external quality control program.

Members of the Department have been on short study visits and research stays abroad (Germany, the UK, Spain, France, Austria and Italy). Regarding international cooperation, Prof. Dr. Miroslav Bajić has worked on scientific research work with the University of Sao Paulo (Brazil), Institute of Biomedical Sciences, Department of Parasitology (Prof. Dr. Ariel M. Silber) on testing anti-parasitic activities of compounds created in the Department and searching for effective medication against *Trypanosoma cruzi*. Prof. Dr. Renata Barić Rafaj is participating in training and preparation of joint studies with the Department of Biodiversity Animal Health and Comparative Medicine, School of Veterinary Medicine, University of Glasgow, UK (Prof. Dr. David Eckersall), University of Murcia, Spain (Prof. Dr. Jose J. Ceron) and University of Veterinary Medicine, Vienna, Austria (Prof. Dr. Ebrahim Razzazi-Fazeli).



Within the Department of Chemistry and Biochemistry there is a lecture hall that can accommodate about 100 students. It has retained its original look, but it is equipped with the state-of-the-art technical equipment that includes a computer, projector and Internet access. The classroom is used for holding lectures, seminars in biochemistry in veterinary medicine, stoichiometry practicals, and written exams and colloquia.



As part of the experimental work in the chemistry laboratory, students conduct on their own a series of different experiments and measurements in the field of qualitative and quantitative analytical chemistry. In these practicals students are introduced to the basic techniques and methods of work in the chemical laboratory, as well as with the methods of work safety.

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During the laboratory practicals students are working completely on their own. Practical include different aspects of biochemistry from spectrophotometric measurements of metabolites and blood constituents and mimicking metabolic pathways in vitro to computer simulation of enzymes and enzyme activity. The aim of these practice classes is to emphasize the importance of accurate and precise work and prepare students for their future work in the diagnostic laboratory.



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The lecture hall is also used as part of the practice classes in the Biochemistry in Veterinary Medicine course. The professor leads the students through a short introductory seminar, and they get acquainted with the methods and procedures that they will learn about that day. The introductory seminar connects the course matter taught at the lectures and seminars with practical application in the laboratory.

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Biochemical research is focused on the serum and plasma analyses, focusing on the laboratory diagnostics of inflammatory proteins, coagulation systems, fibrinolysis, activity of the coagulation system inhibitors and the endothelial blood vessel activity. One of the methods used is ELISA, and measurements are read out on an automatic ELISA reader.



The research into the synthetic organic chemistry focuses on the design and synthesis of biologically active molecules and on the determination of affinity and selectivity in their binding with the DNA / RNA polynucleotides. The obtained results point to the relationship between the structure and the biological activity of newly defined molecules, and are used to design and synthesize a new generation of potential drugs.

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As part of the Faculty of Veterinary Medicine's Doors Open Days, the Department of Chemistry and Biochemistry meets with elementary and high school students. We want to encourage their interest in gaining knowledge and enrolling in the Veterinary Medicine Study. All those who are interested get the opportunity to take part in a number of interesting workshops at which experiments in chemistry of natural compounds and biochemistry are conducted.



FIZIKA  
JE SKROZ  
SHOW!



## 5.4. Department of Physics

The Department of Physics in Veterinary Medicine was founded on 1<sup>st</sup> July 1942 by a decision of the Faculty Council, when the first permanent professor of physics, Assist. Prof. Dr. Božo Metzger, was appointed Head. Up until then classes in physics had been held by part-time professors from other faculties. In 1954 the Department of Physics became the Department of Physics within the Department of Medical Physics, which also consisted of the former Department of the School of Medicine and the Department of Physics of the Faculty of Pharmacy and Biochemistry of the University of Zagreb. Assist. Prof. Dr. Božo Metzger was appointed Head of the new Department. Since 1962/1963 academic year the Department of Medical Physics was disbanded and each faculty was given its own independent Department of Physics, together with its own teaching staff. By a decision of the Faculty in 1967 the Department of Physics was again transformed into the Department of Physics and it has remained in that form until the present day. The Departments at the other faculties in the field of biomedicine continued to hold classes in physics at the Faculty of Veterinary Medicine until 1981.

The Department of Physics is located in the Administration Building with 500 m<sup>2</sup> space, consisting of a lecture theatre with about 80 seats, a main hall with facilities for practical classes, a side room (darkroom), a library, a staff room and an area for maintenance and servicing of instruments.

Physics was taught from the very beginning as part of a compulsory course, which often underwent changes, to the extent that in the period from 1954 to 1958 it was abolished. The initial timetable according to the first curriculum in 1920, with 5 hours a week in one semester, was changed and it reached its lowest point in 2005 with one hour of lectures and 2 hours of practicals in the 1<sup>st</sup> semester. It was not until 2011 that this modest timetable for physics and bio-physics was slightly corrected, with an increase in the total number of hours by three hours lectures and eight hours practicals. This is in fact a course in basic general physics, with the emphasis on medical physics. It is only recently that classical topics from biophysics have been dealt with thoroughly, that is, the transport of ions through semi-permeable cell membranes.

In 1953 laboratory work was introduced to physics classes in the newly built Practicum. It was a joint project of the Faculty of Veterinary Medicine, the School of Medicine and the Faculty of Pharmacy and Biochemistry. The Practicum was with the equipment and structure of the practicals in accordance with that time and it was made in accordance with the Practicum of Physics at the Faculty of Natural Sciences and Mathematics. The Practicum kept a similar structure for a long time. Changes were introduced approximately 10 years ago by adding a few modern practicals adapted to biomedicine. In the last few years the Practicum of Physics underwent fundamental changes. Today's practical work in physics at the Faculty of Veterinary Medicine make it without doubt the leading practical course in physics in the field of biomedicine, given the equipment, the number of practicals and alignment of course matter to the requirements of the field of biomedicine.

In 2000 an elective course entitled Fundamentals of Physics for Diagnostics Methods was introduced, and today it is given in the 4<sup>th</sup> semester. Within this course modern tissue imaging techniques such as ultrasound, X-ray and CT diagnostics and magnetic resonance are considered. The emphasis is on understanding the link between the physical principles on the one side and the results of the imaging and its interpretation on the other side and that on the real records. Such an understanding is necessary for an optimal choice of the diagnostic method of imaging for a given clinical need and for a reliable interpretation of the results of imaging especially in atypical and doubtful situations.

In 2005 Selected Chapters in Biomedical Physics for Veterinarians was introduced in the 2<sup>nd</sup> semester. The aim was to apply fundamental knowledge in physics acquired through the compulsory course to some important physiological processes. Since 1961/1962 academic year, professors at the Department were included in running the postgraduate study in Hygiene and Technology of Foods of Animal Origin, and since 1986/1987 academic year the postgraduate study in Physiology and Radiobiology in Veterinary Medicine. This



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postgraduate study was run until the 1993/1994 academic year. Only four permanent university professors have worked at the Department of Physics to date. Their names and the periods they taught at the Department are: Assist. Prof. Dr. Božo Metzger (1942-1963), Prof. Dr. Adica Sliječević (1964-1990), Assist. Prof. Dr. Nadica Maltar-Strmečki (2008-2011), and Assist. Prof. Dr. Selim Pašić (2012-up to now). We point out two short periods of one year and a longer period of 18 years (1990-2008) when the Department did not have a permanent professor. Each of the permanent professors of physics wrote at least one handbook for students, as follows: Assist. Prof. Dr. Božo Metzger: *Physics for Medics and Veterinarians* (1947), Prof. Dr. Dragica Winterhalter, Prof. Dr. Adica Sliječević, Prof. Dr. Antun Kuntarić, Karlo Kempni: *Exercises in Physics for Students of Medicine, Veterinary and Pharmacy and Biochemistry Faculties* (1983), Nadica Maltar Strmečki, Dijana Žilić and Ana Pavić Grego: *Exercises in Physics and Biophysics* (2014), Assist. Prof. Dr. Selim Pašić: *Preparations for Practical Exercises in Physics for Students of Veterinary Medicine* (2017). For most of its life there were no capital investments in equipment at the Department. The exception was apparatus for determining the age of samples, measured using the radioactivity of radioactive carbon C14, which was procured by Prof. Dr. Adica Sliječević. This was the first apparatus of its type in the country in the 1960's. The teaching staff at the Department publish scientific papers in prestigious scientific journals in the field they work in, and they present their results at many national but above all international conferences and congresses held in Prague, Paris, Chicago, Cambridge, Rome etc. Most of them have demonstrated their international scientific character in cooperation, scientific training and stays in renowned international scientific institutions (France, Austria, Sweden, Switzerland, Czech Republic etc.).



The picture shows demonstrator Antea Klobučar helping a student perform a laboratory practical. The participation of motivated and good quality demonstrators in classes increases students' motivation for laboratory work.

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Given its state-of-the art equipment, cutting-edge instruments, and the adaptation of the laboratory practicals to the biomedical needs, the Physics Laboratory Practicum at the Department of Physics is the leading biomedical physics practicum in Croatia. In this photograph: the room (without the two darkrooms) in which Physics Laboratory Practicum takes place, with the instruments on the table.



One part of the Physics Practicum takes place in two darkrooms. In this photograph: a human eye replica with the source of light and an object, on which students can study accommodation and refractive errors, e.g. nearsightedness (myopia) and farsightedness (hyperopia).



In this photograph Assist. Prof. Dr. Selim Pašić explains the details of an practicals to the students. The calorimeter used in an practical in thermodynamics, and the Geiger-Müller counter, used to measure the linear coefficient of the absorption of electromagnetic radiation of the tissue, that can be "seen" in the X-ray images of the tissue, are on the table.





## 5.5. Department of Physiology and Radiobiology

The Department of Physiology was founded in 1920 with the appointment of Prof. Dr. Petar Gjurić as a full-time professor in physiology and also its first Head. At first it was located at the old location of the Faculty in Savska Street, and in 1940 it was moved temporarily to a new building in Heinzelova Street. In 1948 the Department was given premises on the first floor of the completed wing of the first northern building, and it is still there today. From 1961 to 1962 construction work took place in the Department, whereby part of the premises were converted to serve as a radioisotopic laboratory. By the Faculty Statute of 1978 that laboratory became part of the Department of Physiology, which was renamed as the Department of Physiology and Radiobiology. In 2003 the Department was completely renovated. Apart from construction work, the biochemistry and haematology laboratory was renewed and equipped with what was state-of-the-art equipment at that time.

According to the first complete curriculum for veterinary medicine studies of 1922, Physiology was a compulsory course that was taught in the 3<sup>rd</sup> and 4<sup>th</sup> semesters. In the years that followed the position of the course changed in terms of semesters, and according to the latest curriculum of 2005, the previously two-semester course was divided into two one-semester courses, that is, Physiology of Domestic Animals I in the 3<sup>rd</sup> semester and Physiology of Domestic Animals II in the 4<sup>th</sup> semester. The course Radiobiology was introduced in the 1970/1971 academic year as elective, but from the following academic year as a compulsory two-semester course in the 9<sup>th</sup> and 10<sup>th</sup> semesters. With the entry into the force of the new curriculum from 1985 the course Radiobiology became one-semester and it was held in the 10<sup>th</sup> semester. With the curriculum and program of the Graduate Study of Veterinary Medicine from 1995 the compulsory course Radiobiology was lectured in 6<sup>th</sup> semester.

Today, in place of that course the compulsory course Radiation Hygiene is taught in the 5<sup>th</sup> semester. Alongside these compulsory courses, professors at the Department hold classes in the elective courses Fundamentals of Scientific Research in the 2<sup>nd</sup> semester, Structure

and Function of Cell in the 3<sup>rd</sup> semester, Physiology of Birds and Physiology of Amphibians and Reptiles, both in the 4<sup>th</sup> semester, The Role of Veterinarians at Organic Farms in the 6<sup>th</sup> semester, and Clinical Physiology and Veterinary Nuclear Medicine, both in the 8<sup>th</sup> semester. In the history of the Department a large number of printed notes and textbooks have been published, and the latest literature for students is the university handbook entitled *Practicals in Physiology of Domestic Animals I.-Handbook* by Prof. Dr. Suzana Milinković Tur and Extraordinary Prof. Dr. Jasna Aladrović (2012), and the Croatian edition of the textbook by Øyestín V. Sjaastad, Knut Hove and Lav Sand entitled *Physiology of Domestic Animals*, which was prepared by the editors, Prof. Dr. Suzana Milinković Tur and Prof. Dr. Miljenko Šimpraga (2017). Physiology professors Prof. Dr. Zvonko Stojević, Prof. Dr. Jasna Aladrović, Assist. Prof. Dr. Lana Vranković, Dr. Lada Radin participated in the writing of the chapters: “Animal Behaviour Physiology” and “Neuroendocrine Aspects of Animal Stress”, University textbook entitled *Animal Welfare*, editors Prof. Dr. Željko Pavičić and Assist. Prof. Dr. Mario Ostović (2019).

Since the beginning of the 1960s the department’s professors lectured in the graduate, as well as the postgraduate studies from different perspectives (Breeding, Hygiene and Pathology of Poultry in Intensive Production, Zoohygiene, Physiology and Pathology of the Pigs Production, Physiology and Pathology of Cattle Reproduction with Artificial Insemination and Sanitation in Veterinary Medicine).

Since 1986/1987 academic year, the Department of Physiology and Radiobiology was responsible for two postgraduate studies for scientific training, that is, Physiology and Radiobiology in Veterinary Medicine, over four semesters. The founder and head of the first study was Prof. Dr. Dubravko Timet and of the second, Prof. Dr. Petar Kraljević. These postgraduate studies ran up to the 1993/1994 academic year. Since 1995/1996 academic year the Department ran a two-year Master’s and three-year PhD studies in Physiology of Domestic Animals. These postgraduate studies ran up to the 2003/2004 academic year. Today the teaching staff at the Department are the heads and professors of



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nine specialized branch courses as part of the University PhD study in Veterinary Sciences. The first generation of students enrolled in this study in the 2005/2006 academic year. In addition, teaching staff at the Department take part in teaching postgraduate specialized studies in Animal Welfare, Theriogenology of Domestic Mammals, Breeding and Pathology of Laboratory Animals, and Sanitation.

The scientific research work of the Department has been very intensive over its history, for example there was research of physiological hypothermic states, hormonal activity and resorption of minerals in the digestive system of domestic animals, establishing blood parameters reference intervals in Croatian indigenous sheep breeds and the effects of ionising radiation on chickens. In more recent times research has been conducted into biochemical indicators of stress in domestic animals, the composition of proteins of exosomal follicular fluid during folliculogenesis, antioxidant system in seminal plasma and sperm, fatty acids composition of tissues and body fluids and the mechanisms of the biological effects of radio frequency (microwave) radiation in honey bees (*Apis mellifera*).

The professional work of the Department is notable for the work of the biochemistry and haematology laboratory for the needs of undergraduate and postgraduate classes, clinical work, and preventive activities in establishing criteria for assessment of the productive and reproductive quality of animals, participation in planning and performing tasks as part of scientific research projects, and organizing classes for professional training of veterinarians and other related professions. In the laboratory, measurements are conducted and analysis of various enzymes, metabolites and substrates, minerals, fatty acids, fatty tissues, electrophoresis, anti-oxidation enzymes and non-enzyme molecules, oxidation molecules and haematology and endocrinology tests.

The professional work of the Department also includes running life-long learning courses for veterinarians. More recently the teaching staff at the Department has organized courses entitled: Physiology and

Pathology of Ostriches in Intensive Breeding (head: Prof. Dr. Miljenko Šimpraga) and Physiology and Pathophysiology of Digestive system and Metabolism in Ruminants (head: Prof. Dr. Zvonko Stojević).

Over its history the Department has worked together with other Departments of higher education abroad, and its employees have been on short or long-term professional and study visits and training courses in Prague, Czech Republic; Brno, Slovakia; Moscow, Russia; Havana, Cuba; Cornell, USA etc. The teaching staff from the Department participate actively in the work of national and international associations, such as the Croatian Physiological Society, the Croatian Radiation Protection Association, and the European Radiation Research Society (formerly the European Society of Radiation Biology). They have organized international scientific conferences such as the 11<sup>th</sup> "Ostrich World Congress" (2004) and the 1<sup>st</sup> and 2<sup>nd</sup> "International Scientific Meeting of Anatomy and Physiology: Fundamentals of Medicine" (2009 and 2014). They have taught classes in physiology at other institutions of higher education in Croatia and abroad: the Faculty of Agriculture of the University of Zagreb; the Faculty of Veterinary Medicine of the University of Ljubljana, Slovenia; the Faculty of Veterinary Medicine of the University of Tripoli, Libya, etc.

Most professors from the Department are active members of national and international scientific associations in the field of physiology and radiobiology. They have been outstanding in positions of responsibility at the Faculty, the University and other institutions, and have been awarded for their many years of work. Prof. Dr. Petar Kraljević received the Order of the Morning Star of Croatia with the likeness of Ruđer Bošković, for services to science and higher education, and their promotion in the Republic of Croatia and the world (1996). Prof. Dr. Miljenko Šimpraga received the annual State Award for Science, for popularizing and promoting science, especially in the field of biomedical sciences, veterinary branch (2002), and he also received the Order of the Morning Star of Croatia with the likeness of Ruđer Bošković (2016).



Physiology classes are organized through lectures, seminars and practicals. Prof. Dr. Zvonko Stojević holds a lecture to the students about mechanical and fermentative digestion in the forestomachs of ruminants, and about the products of microbial digestion used by ruminants.



As part of their experimental work, students carry out activities independently in a virtual laboratory. They measure lung volumes and calculate lung capacities. They explore different types of breathing, such as hyperventilation, hypoventilation and rebreathing, and measure changes in the  $p\text{CO}_2$  and pH of animal blood during a particular type of respiration.

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Practical classes in the physiology course are performed in a virtual laboratory, in the students' room for practical classes, and in the haematological and biochemical laboratories. Before the practical classes, the students are introduced to techniques for preparation of samples, and methods to determine the activity of enzymes in the stomachs of monogastric animals.



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During practical classes students perform analyses of various biological samples. Students conduct qualitative analyses of urine samples using chemical methods.

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Physiology courses teach students about the physiology of ruminants, with particular attention paid to digestive processes and the important clinical signs of these processes. With the help from their professors, the students auscultate the frequency of contractions of the reticulorumen, and examine signs of rumination in cows.



Practical classes in cardiovascular physiology introduce students to the basic concepts of the electrocardiogram, stimuli formation, and impulse conduction through the heart. Records of electrical activity generated by heart muscle depolarization, which are propagated in pulsating electrical waves towards the skin, are to be measured in a dog by electrodes applied to the dog's body.

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In the Biochemical Laboratory in the Department of Physiology and Radiobiology, staff from the department perform many analyses of biological samples as part of projects on which staff from the department are working as associates.





## 5.7. Department of Pathophysiology

The Department of Pathophysiology was founded by a decision of the Faculty Council of the 14<sup>th</sup> of August 1936, following a proposal by Prof. Dr. Lovro Bosnić, the Head of the Clinic for Internal Diseases of Ungulates and Carnivores, and Prof. Ljudevit Jurak, Head of the Department of Pathological Anatomy. In this way Pathophysiology was introduced on the veterinary medicine study before the course existed at the three medical faculties in Yugoslavia (Zagreb, Belgrade and Ljubljana) and many other European faculties.

After it was founded, the Department was located in the main building of the Faculty of Veterinary Medicine in Savska Street 16, and in 1949 it was moved to the new premises in Heinzelova Street 55.

The first time the course of Pathophysiology was mentioned was in the 1936 curriculum as a compulsory course in the 5<sup>th</sup> and 6<sup>th</sup> semesters. Over the course of its history it was taught in the 4<sup>th</sup> and 5<sup>th</sup> semesters (1954-1966) but it is now again being taught as at first, in the 5<sup>th</sup> and 6<sup>th</sup> semesters. In 2009 the present matter was divided into two courses: Pathophysiology I in the 5<sup>th</sup> semester and Pathophysiology II in the 6<sup>th</sup> semester.

According to the 2005 curriculum of integrated undergraduate and graduate studies of veterinary medicine, the elective course Hormonal and Metabolic Disorders is also taught at the Department in the 9<sup>th</sup> semester. The teaching staff at the Department have created many teaching materials which they have published in the form of printed notes, but today they are also published on the Department's web pages. Although the Department did not have its own postgraduate study, since 1963/1964 academic year the teaching staff from the Department took part in other postgraduate studies at the Faculty of Veterinary Medicine of the University of Zagreb (Zoohygiene, Pathological Anatomy, Physiology and Pathology of Cattle Reproduction with Artificial Insemination). They held classes in these postgraduate studies until the 1993/1994 academic year.

Since the academic year 1995/1996 until 2003/2004 they participated in the renewed programs of the postgraduate studies which have been formed as two years Master and three years PhD studies from

the directions Animal Hygiene, Environment and Ethology (before Zoohygiene) and Pathophysiology.

Since 2005/2006 academic year they have participated in the university PhD study in Veterinary Sciences as heads and associates teaching specialized branch courses.

The scientific research work at the Department began at the beginning of the 1950's, when following advocacy by Dr. Slavko Krvavica, the first laboratory equipment was procured. At first, research was aimed at determining amino acids, primarily in the blood and eye water of horses, and then the amino acid composition in the blood and liver of poultry suffering from atypical plague and in amniotic fluid and the sperm of boars. Other equipment was gradually procured and new methods for the researching of the amino acids and enzymes were introduced. Cooperation with several foreign institutions was established then (Institute of Pharmacology of the Faculty of Medicine in Sarajevo, Institute of Pathophysiology of the Faculty of Medicine in Ljubljana, Division of Nutrition Physiology of Pharmaceuticals Factory Hoffmann-La Roche, Basel, Switzerland, National Institute for Medical Researchs, London, United Kingdom and others).

In the next ten years, the scientific work of the Department was based on the researches of parasites biochemistry, localization of acetylcholinesterase and butyrylcholinesterase in different types of parasites and presence and activity of glutamate dehydrogenase, glutaminase I and transaminases in parasites.

At the end of the 1960's research work also began into fatty acids in parasites and parasite hosts. In that period the research of Prof. Dr. Slavko Krvavica was outstanding, as part of the international project with the Department of Agriculture of the USA, entitled *Detoxification of Free Ammonia in Ruminant Mucosa in Ruminants* (1967-1970). Within that project, research was undertaken into the function of the stratified squamous epithelium of the rumen as the location where free ammonia binds with enzymes and is held, and then the fate of the ammonia and some of the ketoacids in the ruminal mucosa. In the 1970's and 1980's, Prof. Dr. Slavko Krvavica researched



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the effectiveness of some antihelmintics and the mechanism of action of ochratoxin. For his contribution to scientific research work, in 1990 he was elected as an extraordinary member and then already in 1991 as a full member of the Croatian Academy of Sciences and Arts, in the natural science class. He also received the Order of Labour with a Golden Wreath of Yugoslavia of that time (1965) the Ruđer Bošković award (1979), and also a life's work award (1985).

Professors from the Department, Tomo Martinčić, Branimir Kampl and Ante Svetina, led scientific projects from the beginning of the 1990's in the field of pathophysiology, which were financed by the Ministry of Science, Education and Sport, and since 2013 Nina Poljičak Milas and Romana Turk led scientific research financed as part of University support.

More recently, research into the haematology of birds and reptiles has been conducted at the Department, and Assoc. Prof. Dr. Maja Belić is extremely active in research into the haematology of different species of reptiles. This is a relatively unresearched and new field of interest for veterinary medicine, but important in view of the fact that exotic animals are increasingly being kept as pets.

The contribution of today's generation of professors in scientific research at the Department is especially seen in their participation in work on international projects. So, for instance, Assoc. Prof. Dr. Romana Turk took part in the international COST project FA1002 *Farm Animal Proteomics* (2010-2014) and led the bilateral Croatian and Slovene scientific research project *The Effect of Seasonal Heat Stress on Metabolic Biomarkers and Oxydation of Biomarkers and Reproduction of Milk Cows* (2012-2013). They are also taking part in the COST project FA1308 *Dairy Care* (2014-2019). Prof. Dr. Nina Poljičak Milas and Assoc. Prof. Dr. Romana Turk are associates in the FP7-ERA Chair project *Upgrading the Research Performance in Molecular Medicine at the Faculty of Veterinary Medicine University of Zagreb* (2014-2019). Assoc. Prof. Dr. Romana Turk is also an associate

in a project of the Croatian Science Foundation entitled *Modulation of The Metabolic, Endocrinology and Anti-Oxidation Status of Milk Cows by Giving Zeolites in Feed (ModZeCow)* (2015-2019).

From its foundation the Department has focused more on scientific than on professional work. Precisely the results of scientific research at the Department have made professional cooperation possible with industry, based on research into the metabolic profile of farm bred animals, programmes to protect the production health in livestock breeding according to categories and purpose, diagnostics of internal diseases in farm animals, clinical testing of drugs and training of experts in biochemical and clinical analysis. Today the Department provides haematological testing services for blood from birds and reptiles.

Almost all the staff in the history of the Department have spent time abroad on professional and study programmes or training (Switzerland, the United Kingdom, Austria, Germany, Italy etc.). More recently, Assoc. Prof. Dr. Maja Belić has undergone training at several workshops led by renowned world experts in veterinary haematology, including training under Prof. Dr. Frank Mutchmann at the Freien Universität Berlin, Fachbereich Veterinärmedizin, Berliner Tierärztliche Gesellschaft (2015). Thanks to her personal advocacy, Prof. Dr. John W. Harvey, the greatest world expert in veterinary haematology, held a series of lectures at the Faculty of Veterinary Medicine of the University of Zagreb (2016).

The teaching staff at the Department are active at national and international conferences organized by associations such as the International Society for Animal Clinical Pathology and the European Association of Animal Production.

Assoc. Prof. Dr. Romana Turk was elected in 2017 as a guest professor at the Faculty of Agriculture, University of Novi Sad, Republic of Serbia. Assoc. Prof. Dr. Maja Belić took part as a lecturer at the educational exhibition "Reptilomanija" which was organized by students of the Faculty of Veterinary Medicine in six-year period (2013-2018).

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At the practice classes in the Pathophysiology II course students learn the blood smear and bone marrow smear interpretation techniques, how to recognize the peripheral blood cells and their developmental forms in the bone marrow, and learn the diagnostic significance of the changes in the number and morphology of these cells.



In the Department of Pathophysiology's state-of-the-art practice room, students learn blood, serum and bone marrow processing techniques, as well as blood cell and bone marrow morphology, which is important for diagnosing many diseases.



Recognizing blood cells in the smears, and taking a complete blood count are important in diagnosing and monitoring diseases in domestic animals. To help the students master morphology and differentiation, professors, assistant teachers and student tutors are ready to help when something needs to be clarified.



FRANCISCI JOELIS  
*Medic. Doct. & in Academiâ Gryphis-waldensi  
Professoris celeberrimi*

*Br. 440  
75/26*

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## 5.8. Department of Humanities and Social Sciences

The Department of Humanities and Social Sciences was established by the Faculty Council's Decision on December 20, 2017. The newly established Department is made up of the pre-existing teaching chairs: The Chair of Foreign Languages and the Chair of Physical and Health Education with the professors employed in those units. The Department also comprises the Chair of History of Veterinary Medicine, a descendent of a prior Department of the History of Veterinary Medicine and the newly formed Chair of Intellectual Skills Development. At those two chairs teaching is conducted by the professors employed at other Faculty departments or clinics or by visiting lecturers. Organizationally, the Department of Humanities and Social Sciences makes an integral part of the Basic and Pre-clinical Sciences Division. Recognition of the importance of communication skills' acquisition for the future doctors of veterinary medicine led to introduction of a new course into the Curriculum, Communication skills in Veterinary Medicine, starting in the academic year 2018/2019.

### Chair of Foreign Languages

Learning a foreign language as a part of the Faculty of Veterinary Medicine graduate degree program has a long tradition. It began in the late 1940s, when the necessity of including foreign language teaching into the education of future professionals was recognized both by the Faculty and the University. At first, for political reasons, learning Russian was mandatory. In 1949 besides Russian students could also choose to learn English or German. In the first half of the 1950's learning of a foreign language was no longer compulsory and over the following twenty years teaching foreign languages was delivered through elective courses.

At the beginning of the 1970's foreign language teaching was again introduced as a compulsory course. It was recognised as an important element of education and training of future veterinarians that contributes significantly to students' overall abilities and skills. In 1974, the 1<sup>st</sup> year curriculum integrated English language as a

compulsory course. The course was taught in the 1<sup>st</sup> and 2<sup>nd</sup> semester. However, since the acquisition of only generalist foreign language knowledge was soon recognised as insufficient and inadequate to meet the academic and educational needs of future professionals in the field, the course was designed to introduce students to the specific language register of the veterinary profession.

The entire time, since the introduction of the foreign languages for specific purpose teaching, the basic language of instruction was English. In the period from 1974 until 1978 as well as from 1993 until 2001 instead of English for specific purpose courses students who had studied German in their secondary school could attend the same type of course in German.

Up until 1980's foreign language teaching was provided by contract lecturers. In 1980-1981 professor Višnja Karlovčan took over the teaching, first as a part-time lecturer and from 1984 as a full-time lecturer. The next lecturer to be employed to teach English for specific purposes was Dubravka Vilke-Pinter. She was appointed a senior lecturer in 2000.

From the organizational point of view, teaching of English for specific purposes was first delivered with the Department of Social Sciences. In 2005 the Chair of Foreign Languages was established as an independent organizational unit.

In 2017 the Chair of Foreign Languages was integrated into the Department of Humanities and Social Sciences and Dubravka Vilke-Pinter from the Chair of foreign languages was elected its Head. Nowadays the teaching of English for specific purposes is delivered through two compulsory courses: Introduction to English Veterinary Terminology I and II which are taught in the 2<sup>nd</sup> and 3<sup>rd</sup> semesters, and two elective courses: English for Academic Purposes I and II. All the courses are complementary and aim to assist students in developing their written and oral competences to be able to communicate effectively in a professional setting. Whereas the courses Introduction to English Veterinary Terminology I and II primarily focus on teaching students the language register characteristic for the field of veterinary



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medicine, in particular veterinary medical terminology and the use of the vocabulary in context, the courses English Language for Academic Purposes I and II introduce students to the principles of organizing and structuring of a scientific text. Writing and speaking skills are developed through guided production of various forms of writing as well as of well-structured presentations and argument-based discussions relevant to the field of veterinary medicine.

Since the 2016/2017 academic year courses in English for the purposes of veterinary medicine have also been held for international students who attend the entire programme in English.

Teaching materials have always been produced by the Chair professors and have been specifically tailored to meet the needs of the students of veterinary medicine. The materials which include methodologically adapted professional texts are regularly evaluated and updated and aim to complement the curriculum of the other courses.

For a long period now only one lecturer of English for specific purposes has been employed at the Chair. The key research interest of the presently employed lecturer lie in the field of contemporary linguistics and psycholinguistics (bilingualism, cognitive aspects of learning and processing of first and foreign language, organization and functioning of bilingual speakers' mental lexicon) as well as applied linguistics and foreign language teaching methodology (discourse analysis and the analysis of specialized language of the veterinary profession).

In addition to teaching, the Chair lecturers have always been engaged in research, publishing papers and presenting results of their work at national and international conferences.

Professors employed at the Chair have also been active in professional associations of which they are members, with leading roles in some, and have always aimed to collaborate with the colleagues teaching related subjects, nationally and internationally.

### Chair of Physical and Health Education

Under the Faculty Statute of 1988 the Chair of Physical and Health Education was founded, and became part of the Department of Social Sciences in Veterinary Medicine. As part of the work of that Chair, classes were held in Physical and Health Education, taught by the first lecturer, Vinko Tomljanović.

By the Faculty Statute of 2005 a separate Chair was founded for physical and health education. Saša Čuić was elected Head of the Chair, when she was employed in 1996 after the previous lecturer retired. By the Faculty Statute of 2017 the Chair was included in the Department of Humanities and Social Sciences.

The compulsory course Physical and Health Education began to be taught in the 1978/1979 academic year in the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> semesters. Since 2005/2006 academic year, the course was taught as part of the integrated undergraduate and graduate study, and in 2015 it was awarded 1 ECTS point per semester. Since 2016/2017 academic year classes were also held for students of veterinary medicine who had enrolled in the integrated study in English.

The content of the course is chosen according to the students' interests, when they enrol in the new academic year. The basic program includes a variety of sports which the students have learned earlier in their education, and the aim is for the students to specialize completely in one physical activity to achieve a high level of training and ability in everyday sporting activities. The content of the basic program is defined on the basis of the following criteria: the interest and motivation of the students for a particular activity, the students' health status, the level of motor skills attained, gender, and the value of individual activities in everyday life. The basic programme includes the following sporting activities: handball, volleyball, basketball, football, swimming, badminton, yoga, dance, aerobics, self-defence, skiing and horse riding. Physical and health education in all aspects



The course "Introduction to English Veterinary Terminology" takes an integrated approach to develop students' competence to communicate effectively in a professional setting. It aims to introduce students to academic discourse and the features of language in the field of veterinary medicine. Readings are selected with the aim of enhancing students' understanding and ability to use veterinary medical terminology in a number of contexts.



As part of the Physical Education course, first and second year students are able to choose horse riding as an elective course. The riding school has been run since 2014 together with the Zagreb Hippodrome.

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As part of the Physical Education course, ice skating is offered as an elective course in the winter semester. It is held at the Šalata ice rink, and students from other faculties of the University of Zagreb are also included in the programme.



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should become a varied and vital part of the University, which means the open possibility for the free expression in sport of all members, students and Faculty staff. This course also helps students to do their basic study tasks better and more effectively.

Saša Čuić participates in training and preparing sporting teams of students from the Faculty of Veterinary Medicine for university sporting events. Since 1996 she has led teams of students to an international sporting and educational meeting between biomedical faculties, known as "Humanijada" and she is a member of the organizational committee of these sporting events. In that period of time students from the Faculty of Veterinary Medicine have achieved notable results in team and individual sports, such as women's football, basketball and beach volleyball, men's handball and table tennis. Since 2003 Saša Čuić has regularly organized trips for students to go skiing and she also trains non-skiers and perfects their skiing technique.

#### Chair of History of Veterinary Medicine

The Chair of History of Veterinary Medicine was founded on 28<sup>th</sup> October 1930 as an independent teaching unit. The first Head appointed was Prof. Dr. Fran Zavrnik, who was also the Head of what is today the Department of Histology and Embryology. The chair has changed its name several times. From 1976, as the Veterinary History Chair, it was integrated as part of the Department of Social Sciences, in 2005 the Department of History, Ethics and Sociology in Veterinary Medicine was founded, and since 2008 it bore the name of the Department of the History and Ethics of Veterinary Medicine. In 2013 it closed, then under the Statute of the Faculty of Veterinary Medicine of 2017, the teaching unit Chair of the History of Veterinary Medicine was founded, as part of the newly founded Department of Humanities and Social Sciences. In the Regulations of the Veterinary Faculties in Belgrade

and Zagreb, adopted by the Ministry of Education of the Kingdom of Yugoslavia on 22<sup>nd</sup> July 1936, a Seminar and museum for the history of veterinary medicine are mentioned. Since then, as part of the teaching unit for the history of veterinary medicine, work began to create a museum collection of the same name, which was particularly enhanced in the 1970's during the work of the History of Veterinary Medicine Class, which was part of the Society of Veterinarians and Veterinary Technicians of the SR of Croatia of that time. The museum was opened to the public to mark the 75<sup>th</sup> anniversary of the Faculty of Veterinary Medicine, and Prof. Dr. Vesna Vučevac Bajt was appointed Head. Apart from the valuable archive materials, the museum also includes a collection of horseshoes, a collection of old veterinary instruments and a large library on the history of veterinary medicine, with a total of 749 books, of which the oldest is the *Opera Medica*, printed in Amsterdam on the 15<sup>th</sup> of March 1663. It is important to mention the large collection of veterinary calendars and old veterinary encyclopaedias. The collection has been added to over time, and it is exhibited in the appropriate manner within the Department of Forensic and State Veterinary Medicine. It is planned to bring all the different collections at the Faculty together to create a single Faculty of Veterinary Medicine Museum, and its foundation is planned in the Statute of 2017.

After the foundation of the Chair it did not have permanent teaching staff, but part-time lecturers from other Departments, or institutions outside the Faculty. It was not until the 1976/1977 academic year that teaching of the history of veterinary medicine was entrusted to a permanent lecturer, the then Teaching Assistant, Dr. Vesna Vučevac, who continued her university career in this Chair, that is, in the Department of History and Ethics of Veterinary Medicine, until she retired in 2013. Prof. Dr. Vesna Vučevac Bajt also held classes in the courses Introduction to Veterinary and Veterinary Ethics, and after she retired her courses were taken over by professors from other Departments.



Collection of old veterinary instruments and diplomas at the Department of Forensic and State Veterinary Medicine.

According to the first full curriculum from 1922 the course entitled The history of veterinary medicine is given as a compulsory course in the 2<sup>nd</sup> semester. It has remained until the present day, and as part of the integrated undergraduate and graduate study of veterinary medicine, which began in the 2005/2006 academic year, it has remained as a elective course entitled History of Veterinary Medicine in the 2<sup>nd</sup> semester. From 1936 an elective course entitled Introduction to Veterinary was introduced in the 1<sup>st</sup> semester, which, as part of the existing curriculum, is taken as a compulsory course entitled Introduction to Veterinary in the same semester as at the very beginning. As part of the integrated undergraduate and graduate study of veterinary medicine, an elective course entitled Veterinary Ethics has been organized in the 2<sup>nd</sup> semester. Lecturers in the history of veterinary medicine worked hard to prepare the appropriate literature for students, especially Vesna Vučevac Bajt, who published notes for the *Introduction to Veterinary Medicine* in several editions (1999, 2003, 2005, 2009 and 2010), and two textbooks on the *History of Veterinary Medicine* (1993 and 2012). In the textbook from 2012 she described the development of world veterinary history, and paid particular attention to what is known about the history of veterinary medicine in Croatia. This had never been dealt with fully before.

Scientific research work in the history of veterinary medicine was conducted as part of national projects. In the 1960's Prof. Dr. Stjepan Rapić, who worked at that time as a professor and the Head of the Department of Radiology and Physical Therapy, amongst others, taught classes in the History of Veterinary Medicine and the Introduction to Veterinary Medicine, researching the history of the Farriers School and the history of the veterinary hospital and clinics in the SR Croatia. In the 1980's, Prof. Dr. Vesna Vučevac Bajt researched the history of veterinary medicine in the SR Croatia, and from the middle of the 1990's until the middle of the 2000's, she ran the project Veterinary

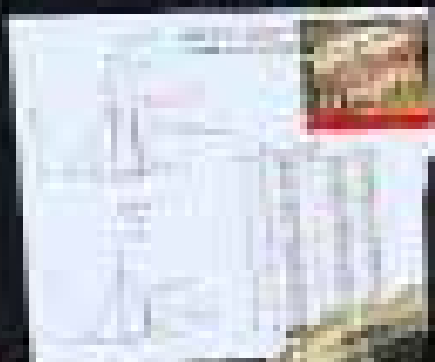
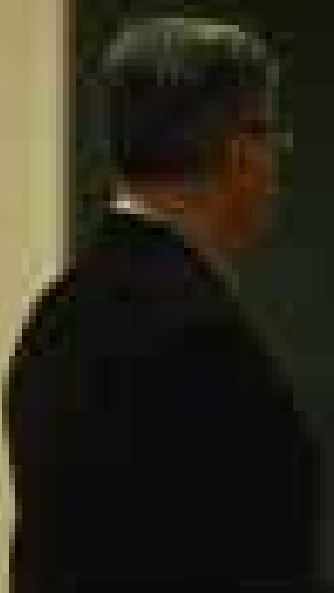
Medicine in Croatia from the Medieval Heritage to the Present Day, which was financed in two project periods by the Ministry of Science, Education and Sport of the Republic of Croatia. In the long history of the Faculty a total of ten dissertations have been written on the history of veterinary medicine, where the first was completed in 1928, and the last in 2006. The last three dissertations were written under the supervision of Prof. Dr. Vesna Vučevac Bajt.

Scientists in the field of the history of veterinary medicine to date have been engaged in preparing the memorial book for the Faculty of Veterinary Medicine and other relevant literature in that field. The last such work was published to mark the 90<sup>th</sup> anniversary of the Faculty of Veterinary Medicine of the University of Zagreb, when a bi-lingual monograph was printed, entitled *A Collection of Veterinary Instruments from the Museum of the History of Veterinary Medicine* (2009). Prof. Dr. Vesna Vučevac Bajt was the editor-in-chief and author of the introduction-A Brief Review of the History of the Foundation of the Museum. The Department has cooperated with various museums in this country and abroad, such as the Museums of the Cities of Zagreb, Vinkovci and Vukovar, and the Veterinary-Historical Museum in Copenhagen, Denmark.

Prof. Dr. Vesna Vučevac Bajt was the president of the Veterinary Medicine History Class of the Society of Veterinarians and Veterinary Technicians of the SR Croatia, a member of the World Association for the History of Veterinary Medicine (the WAHVM), a member of the Scientific Society for the History of Health Culture of the Croatia, and a member of Matica Hrvatska-Department for Natural Sciences and Mathematics. She was for many years a member of the editorial board of the journals *Historia Medicinae Veterinariae* and *Acta Medico-Historica Adriatica*. For her fruitful work in the history of veterinary medicine she received a state award for popularization and promotion of science (2004).







# 6. Animal Production and Biotechnology Division

## 6.1. Department of Animal Breeding and Livestock Production

Topics in the area of livestock production were present in classes from the very beginning of the work of the Veterinary High School, and later the Faculty of the Veterinary Medicine of the University of Zagreb. The main reason for this was the awareness that a well-educated veterinarian must know the principles of breeding and agricultural exploitation of animals, as well as that the successful prevention and treatment of diseases includes multiple zootechnical disciplines. At the beginning classes were held part-time by Prof. Dr. Sava Ulmansky from the Faculty of Agriculture and Forestry in Zagreb, and in 1932 Prof. Dr. Nikola Ritzoffy was appointed full-time Professor of animal husbandry. Immediately after his appointment, Prof. Dr. Nikola Ritzoffy began work to found the Department of Animal Husbandry, which began work in 1933. At that time, apart from the classical topics related to animal husbandry, the classes also included animal nutrition, some aspects of animal hygiene and the disciplines Encyclopaedia of Agriculture and Livestock Insurance, agricultural cooperatives and Alpine agriculture. Since the need quickly arose for expansion and specialised education in these disciplines, the Department of Animal Hygiene was founded (1948) followed by the Department for Nutrition (1960) and the Department for Livestock Economics (1964). In line with this, some disciplines were transferred from the Department of Animal Husbandry to the newly founded organizational units.

Up to 1946 the Department of Animal Husbandry was at the old location of the Faculty in Savska Street, but it was then moved to temporary accommodation at the new location in Heinzelova Street. Since 1952 it has been in its present-day premises, on the ground floor of the first building of the south wing, which is part of the complex of theoretical and experimental Departments. In the Department there are several taxidermy models of various species of poultry, and sculptures of horses, cattle, pigs, sheep and goats, and feather, teeth and wool collections. The pieces by the Croatian animal sculptor Robert Frangeš Mihanović have particular artistic value. His sculptures were exhibited with great success at the Millennium Exhibition in Paris in 1900.

Since 2005 the Department of Animal Husbandry has been part of the Animal Production and Biotechnology Division. The Department is housed on an area of 680 m<sup>2</sup> in total, which was for the most part renewed and re-equipped at the beginning of the 2000's. In addition to rooms for staff and associate it includes a library and reading room for students, and two practical rooms with a total of 45 computers and smart boards, equipment for electronic tagging of animals, and a state-of-the-art laboratory for conducting biochemical and molecular genetic analyses. By the supplement to the Statute of 2017, the Department was renamed the Department of Animal Breeding and Livestock Production.

The first curriculum for the veterinary medicine study according to the Regulations of 1922 included the course Animal Husbandry in the 3<sup>rd</sup> and 4<sup>th</sup> semesters. The initial concept of the classes in Animal Husbandry included their division into general and special parts. In the time that followed the concept of the course changed and it was moved to later years in the study, and the title of the course was also changed on several occasions. According to the curriculum from 2005, which was organized as an integrated undergraduate and graduate study in veterinary medicine, the previous course Technology of Animal Production and Breeding was divided into two courses: Animal Breeds Characteristics in the 2<sup>nd</sup> semester and Animal Breeding and Production in the 3<sup>rd</sup> and 4<sup>th</sup> semesters. Since 1987/1988 academic year, the teaching staff began to teach the elective course Statistics, which since 2005/2006 academic year has been a compulsory course entitled Basic Statistics in Veterinary Medicine in the 1<sup>st</sup> semester. Apart from these compulsory courses, professors at the Department teach classes in the elective courses Breeding and Husbandry of Rabbits and Furbearers in the 6<sup>th</sup> semester, and they participate in the study track Veterinary Public Health and Food Safety, in teaching the compulsory elective course Veterinary Public Health in the 11<sup>th</sup> semester. Since 2016/2017 academic year, an exceptional challenge in the teaching work of the Department was the introduction of teaching integrated studies in English.



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The initial form of the postgraduate studies in the Department for Animal Husbandry was in various courses in cattle breeding, pig breeding and poultry production, and reproduction of domestic animals. Since 1962/1963 academic year the Department participated in teaching the postgraduate study in Physiology, Breeding, Hygiene and Pathology of Poultry in Intensive Production, and later other studies too. Since 1989/1990 academic year, there was a postgraduate study at the Department for specialist training in Protection of the Health of Pigs, which in the 2005/2006 academic year was reorganized and renamed as Pig Production and Health Protection. The role of that study is to provide experts with quick and effective specialist education founded on developments and the current situation in the science, techniques and technology of pig production. Today the teaching staff at the Department participate in teaching a postgraduate specialist study in Theriogenology of Domestic Mammals and Animal Welfare. Moreover they also run and are associates on the compulsory course Statistical Methods in Veterinary Research and the branch module Modern Genetic Approaches in the Improvement of Livestock Productivity and Health, as part of the PhD study in Veterinary Sciences.

During the history in Croatia animal husbandry was an important branch of agriculture and has gone through many phases and challenges. The Department for Animal Husbandry, through its scientific research work, made a significant contribution to resolving those challenges, aligning its aims in research to the current situation in practice, and seeking original and applicable solutions, in line with the achievements recognised in the world. In the initial phase, from its foundation to the middle of the 1950's, the scientific work was mainly focused on characterization of domestic breeds of animals, with the intention of recognizing their specific physiological characteristics, and to propose guidelines for further improvement. A period followed when research was aimed more at intensive livestock production, with the aim of increasing productivity per head, introduction of selection criteria, especially for breeding animals, and introduction of contemporary technologies in larger farms, where a large number of animals are kept. Bearing in mind the importance of the quality of breeding bulls, the Department was the first in our country to conduct tests of biological characteristics, type and form, and meat production. A large number of experiments were conducted on fattening young cattle. The relationship was investigated between the exterior characteristics of calves and the weight of fatlings at the end of fattening. Thereby livestock producers were shown the type of calf that should be selected to achieve the best possible results in the economics of beef production. In pig farming the most up-to-date methods in quantitative genetics are used for more efficient selection of male and female animals. The relationship were researched between more important economic characteristics, especially the intensity of growth at different ages, with the conversion of feed, and the slaughter quality of the pig. The duration of the generation interval was analysed using different breeding procedures, the extent of heritability was calculated for a large number of economically important characteristics of pigs and the possibility analysed of breeding pigs in large pig farming businesses, with special reference to the organization of mating of sows, increasing sows' productivity, and reducing the costs of producing piglets. In parallel with this, a large amount of applied research in sheep breeding was also launched. Attention was given to methods of genetic improvement of domestic sheep, by cross-breeding with the appropriate breeds of sheep, and the genetic construction of production types in terms of meat and milk. Following world trends in the science of genetic evaluation of animals and selection, the Department gradually placed an increasing emphasis on the area of the relationship between the biochemical and the production characteristics of animals. With the procurement of equipment, the Department founded two small laboratories for research into minerals and polymorphic proteins, whereby more intense research began into the activities of some enzymes (phosphatase and aldolase, cholinesterase and alanine transaminase) and polymorphisms of transferrin and haemoglobins. Through this research the Department

contributed to explanations related to the effort to apply new methods in selection, according to the dynamics and genetically determined variations of certain indicators, which would make it possible to see an animal's later production capacity already at an early age. In the last twenty years the fields of research at the Department have been expanded by new topics, which increasingly include programmes to manage the health and productivity of herds and molecular and genetic methods. In that sense, procedures are analysed to reduce losses of piglets in the prenatal and postnatal periods, phenotypes and genetic forms of Simental cattle are being researched, especially in relation to trends in meat quality, the effectiveness is being analysed of cow-calf operation systems and, alongside research into seasonal breeding of sheep. Research is also being done into regression models for characteristics of longevity in pigs, and models for systematic evaluation of the health and productivity of a herd. In molecular and genetic research, particular attention is paid to the connections between fertility of sows and polymorphic variants of the ESR, PRLR, RBP4 and RNF4 genes, and the connection between seasonal breeding of sheep and polymorphism of the MTNR1A gene and the effect of polymorphism of the genes DGAT1, FASN, PRL, BRCA1 and TLR1 on milk yield and the health of the milk glands of cows. A completely new scientific area at the Department of Animal Breeding and Livestock Production is research into innovative approaches in its work, that is, the education of doctors of veterinary medicine using the high-tech veterinary platform for high transparency and competitiveness.

The staff at the Department of Animal Breeding have made a major contribution to the development and improvement of individual branches of livestock breeding, by devising and implementing selective breeding at many farms, verification of the effectiveness of different technological procedures, and active participation in the adoption of many strategic documents related to various areas of livestock breeding. This has been particularly visible in the example of pig breeding, which has gone through major changes and challenges in recent years. Long-term successful cooperation has been achieved with many pig farms, where, apart from work in selective breeding and techniques and technological programmes, broader problems have been resolved in pig production, which required a multi-discipline approach. Therefore at the suggestion of members of staff at the Department for Animal Breeding, as part of the Department of Physiology and Pathology of Animal Production of the time at the Faculty of Veterinary Medicine, in 1966 a Centre for Pig Breeding was set up.

Through its staff the Department for Animal Breeding has achieved cooperation with a large number of scientific and professional institutions abroad (Hamilton-New Zealand, Bern, Brno, Budapest, Munich, Milan, Edinburgh, Copenhagen, London, Zürich, Iowa, Parma, Uralsk-Kazakhstan), which has often also involved exchanges of scientists for the sake of training. Many of the activities of the Department have also been undertaken through the membership of its staff in scientific and professional organizations (European Association for Animal Production, EAAP, International Pig Veterinary Society, IPVS, Societa per il progresso Zootecnico, The Animal Breeding Research Organisation, ABRO-Edinburgh, Societa Italiana Veterinaria da Reddito per Animali, SIVAR, Animal Genetic Discussion Group, AGDG).

The staff from the Department for Animal Breeding have taken part in a large number of national and international conferences. The most important of the international conferences are: The World Congresses of the International Pig Veterinary Society (IPVS), the World Congresses of the International Pig Veterinary Society Hyology and Hyoiatrics, the Annual Meeting of the European Federation of Animal Science-EAAP, etc. At some scientific and professional conferences, representatives of the Department have performed important duties. Prof. Dr. Marijan Sviben was the chairman of the Organizational Committee of the 5<sup>th</sup> World Congress of the International Pig Veterinary Society Hyology and Hyoiatrics (1978), Prof. Dr. Velimir Sušić was the president of the Scientific Professional Committee of the Second Croatian Veterinary Congress with International Participation (2000), and Assoc. Prof. Dr. Igor Štoković was chairman of the Working Group of the European Federation for Animal Sciences (EAAP) for Central and Eastern Europe (2010 and 2011).



Students during their first year of study learn practical procedures in marking and describing animals for the sake of identification. In horses these procedures include micro-chipping and a diagrammatic description of each individual animal.



Assessment of age is an important part of medical history of pets who are often adopted without any known origin or date of birth. Therefore students, as part of the course “Animal Breeds Characteristics” practice assessing the age of dogs and cats. Teachers often bring their own animals to practical classes to use as models for practice.



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After mastering the course matter on breeding and selection procedures in order to improve animal populations, students learn about various systems for keeping and using farm animals. One of the technological procedures considered extramural classes is the exploitation of the genetic capacities of heifers and steers of various breeds and their crosses for fattening.

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Quick 5-minute tests of knowledge at the beginning of practicals, mid-terms and the written parts of the final examination are conducted on computers using a program that makes it possible to set a variety of types of questions, a random choice of questions for each individual test, time control in running the test, notification about the results immediately upon completion of the test, and a comprehensive statistical analysis, by which teachers are able to obtain the necessary information on the distribution of results for the test as a whole or for each individual question.



Scientific and professional activities at the Department are aimed at phenotyping and genotyping variability within and between populations of animals. Some examples are shown of the identification of individuals by microsatellite analysis of Croatian Sheepdog. Research is also undertaken into genotype variability of candidate genes linked to the production of milk in cattle and reproduction of pigs and sheep.

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Staff at the Department have taken part in a great deal of research into Croatian indigenous animal breeds. Alongside Black Slavonian Pig, Turopolje Pig and Mangulica, in recent years research into Banijska Šara Pig has intensified, for the sake of revitalization, recognition and sustainable breeding. The picture shows data collection on the measurements of the body length of Banijska Šara piglets.





## 6.2. Department of Animal Hygiene, Behaviour and Welfare

The Department was founded as the Department of Zoohygiene on the 11<sup>th</sup> of November 1948, on the basis of the need to improve the education of students in the field of veterinary hygiene. This need arose especially after the Second World War, due to the frequent animal hygiene problems in livestock production. The first professor and Head of the Department was Prof. Dr. Josip Ivoš. The Department changed its location within the Faculty in its early days. From 1965 it is located within the complex of buildings on the second floor of the south wing of the third building. Its premises comprise a library, seven rooms for professors and technical staff, and two laboratories for practical classes, which were thoroughly refurbished in 2009.

With the expansion of its teaching and scientific work in the field of animal hygiene and housing, on the 1<sup>st</sup> of February 1995 the Department was renamed as the Department of Animal Hygiene, Environment and Ethology, and on the 19<sup>th</sup> of October 2011 the Department of Animal Hygiene, Behaviour and Welfare.

The curriculum of the Veterinary High School from 1922 included veterinary hygiene for the first time as part of the course Hygiene of Livestock and Microbiology in the 5<sup>th</sup> and 6<sup>th</sup> semesters. In the 1948/1949 academic year, the compulsory course Veterinary Hygiene was introduced in the 9<sup>th</sup> and 10<sup>th</sup> semesters. In the 1950/1951 academic year the course was renamed Zoohygiene and in 1995/1996 Animal Hygiene, Environment and Ethology, and it was taught in the 5<sup>th</sup> and 6<sup>th</sup> semesters. The latest curriculum from 2005 divided this course into two compulsory courses: Environment, Animal Behaviour and Welfare in the 1<sup>st</sup>, and Hygiene and Housing of Animals in the 3<sup>rd</sup> semester. For field work the Department is equipped with contemporary equipment for measuring microclimate conditions and the hygienic quality of air in livestock housing. In its laboratories practical classes are also held in disinfection and hygienic analysis of soil and the hygiene of drinking water.

In addition to the two compulsory courses at the Department in the latest curriculum the elective courses were included: Fundamentals of Agronomy in the 3<sup>rd</sup> semester; Fundamentals of Ecologic Livestock

Breeding in the 4<sup>th</sup> semester, and Pigeon Keeping and Breeding in the 6<sup>th</sup> semester.

Professors from the Department are involved in teaching classes in other courses too: the compulsory course Introduction to Veterinary in the 1<sup>st</sup> semester, the elective course The Role of Veterinarians at Organic Farms in the 6<sup>th</sup> semester, the compulsory elective course Veterinary Public Health (in the study track Veterinary Public Health and Food Safety) in the 10<sup>th</sup> semester, the compulsory course Herd Health, and the compulsory elective course Diseases and Treatment of Farm Animals (in the study track Farm Animals and Horses), both in the 11<sup>th</sup> semester. The appropriate textbooks in animal hygiene have existed from the very beginning of the organization of the course. The latest literature for students is the Croatian edition of the textbook *The Ethology of Domestic Animals*, based on the 2<sup>nd</sup> English edition: *An introductory text* (Ž. Pavičić, K. Matković, ed., 2014) and *Animal Welfare* (Ž. Pavičić, M. Ostović, ed., 2019).

The organization and conduct of postgraduate classes at the Department began already in the 1963/1964 academic year with the organization of the study in Zoohygiene. Taking into consideration problems in the field and the technical knowledge of that time, in the 1976/1977 academic year the narrowly specialized postgraduate study in Sanitation in Veterinary Medicine was introduced. In the time that followed it was updated many times, to provide experts with the best possible education in the field of medical sanitation and veterinary public health. Today this study trains specialists who master the necessary knowledge and are trained to apply scientific insights and practical experience in the control of pests in the field of veterinary medicine, animal husbandry and municipal hygiene. Since 2012 the postgraduate specialist study in Animal Welfare has been run in the Department. The purpose and aim of this study is to train students in theoretical and practical knowledge and skills in the field of animal welfare, so they are able to independently undertake expert supervision, according to the current legislation, to evaluate animal welfare, point out failings in farming management, and give advice to



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animal owners, breeders and other interest groups in relation to the use of new technologies and insights in ensuring animal welfare.

Beside these studies, professors from the Department also take part in eight other postgraduate specialist studies at the Faculty, which points to the interdisciplinary character of Department scientists in veterinary medicine.

As part of the PhD study in Veterinary Science which began in the 2005/2006 academic year, the teaching staff teach the compulsory course Ethics and Welfare in Experimental Work in Veterinary Medicine, and nine branch oriented courses.

Staff from the Department have been intensively involved in scientific research from its foundation. This research was into the effect of the microclimate on the biological functioning and resistance of animals, and early ethological research was conducted. The emphasis was also on the studies of pedological-hydrological relations as etiology factors of alimentary disorders in domestic animals especially in pigs. In the later period studies included the effect of microclimate on animal health and weight gain in different husbandry conditions. New generations of professors continued and extended the scientific work of the Department, primarily in animal welfare. This work was undertaken mainly as part of national scientific research projects through the Ministry of Science and with the support of the University. These projects investigated the effect of bio-technological measures on pig health, reproduction and welfare, improvement of the welfare of farm animals using contemporary technology, and the effect of air quality on poultry and pig production, health and welfare. Projects were also run related to alternative systems of laying hens housing on family farms, the use of bio-safety measures in ensuring the welfare of farm animals and the effect of litter quality on the welfare and production of broilers and fattening pigs.

The Department staff members Prof. Dr. Željko Pavičić and Assist. Prof. Dr. Mario Ostović participated in the work of the international

FP7 project *Animal welfare research in an enlarged Europe*, AWARE, (2011-2014), with the aim of promoting links and increasing the effect of European research onto the welfare of farm animals through the development of a pan-European network of scientists, professors and students, and the foundation of a network of interest groups active in transferring and applying knowledge related to the welfare of farm animals.

From its foundation, professional work has been performed at the Department in the form of writing a variety of reports, opinions and proposals on the basis of analyses of the situation in the field, which were meant to contribute to the resolution of current zoohygiene problems in practice, such as improving hygienic conditions in agricultural estates in Croatia, and thereby improving production results in various branches of livestock production. From 1972 this work was extended to professional projects, mainly researches into construction and the effect of farms on the environment.

As part of its professional work, the Department has a long tradition of running courses for the lifelong training of veterinarians and related professions. The first course in Applied Disinfection, Disinsection and Deratisation was held in 1975 and has been run every year regularly since then at the Faculty of Veterinary Medicine. The teaching staff from the Department also participates in interdisciplinary course, which have been run at the Faculty since 2012, for training people working with experimental animals and animals used for production of biological preparation.

Experts from the Department have made a significant contribution through their scientific activities to the foundation and work of the International Society for Animal Hygiene, ISAH. They were the hosts and co-organizers of the 2<sup>nd</sup> International Congress on Animal Hygiene (Zagreb, 1976) and more recently the international symposiums in animal welfare (Zagreb, 2015).



The 4<sup>th</sup> semester students on a dairy farm, measuring microclimate parameters, air temperature, relative humidity and airflow velocity, mean radiant temperature and air concentrations of harmful gases, as part of the fieldwork within the "Hygiene and Housing of Animals" course.





Measurement of litter temperature with a penetration thermometer in a broiler house. Litter quality is one of the basic factors influencing poultry welfare, performance and meat quality.



Air sampling at a pig farm weaner unit to determine the count of microorganisms. Over the past ten years the Department experts conducted numerous studies researching air quality in farm animal houses, mainly within various projects.



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Determination of udder hygiene level in dairy cows. Swabbing the teat surface to determine the microbial contamination.

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Students are observing the horse behaviour to compose the ethogram. Behaviour implies all visible activities of the animal, including the resting phase, and is the result of the environmental stimuli and/or stimuli originating within the organism itself. It is an indicator of the animal's health and welfare.





Students at the fieldwork on the quality of drinking water, surface water and pond water. The quality and quantity of the aquatic ecosystems, land waters, stagnant and nonstagnant waters are important factor influencing the aquaculture.



Measurement of the consumption of potassium permanganate (KMnO<sub>4</sub>) in a laboratory, a parameter indicating the amount of organic matter in the water. Water containing the organic matter (contamination) of human, animal or industrial origin will use a certain amount of KMnO<sub>4</sub> for its oxidation.





## 6.3. Department of Animal Nutrition and Dietetics

The field of animal nutrition was included in the first complete curriculum of veterinary medicine according to the Regulations of 1922, and classes were held by the part-time professor, Prof. Dr. Sava Ulmanky from the Faculty of Agriculture and Forestry in Zagreb of that time. From 1933 nutrition was included in the classes given by the Department for Livestock, and in 1960 the Department for Nutrition of Domestic Animals was founded. Its first Head was Assist. Prof. Dr. Mirko Findrik, who immediately began work on organizing the Department. At that time the Department, apart from the education of students, experts and agricultural workers, also began professional work (analysis of feed, feed mixes, and supplements to animal feed, as well as creating recipes), and research in the field of science of animal nutrition.

After it was founded the Department changed its location, since no facilities or space had been planned for it when the Faculty was built. Today it is located on the second floor of the south wing of the second building, and has five rooms for the teaching staff, a library and a laboratory for analysis of the quality and safety of animal feed. The laboratory is equipped for liquid and gas chromatography with a mass spectrometry analyser, atomic absorption spectrometry, a magnetic stirrer, ultrasonic and thermostatic baths, apparatus for determination of fibre and fat according to Soxhelt and other small equipment. Renovation of the Department's laboratory began in 2008, but it has still not been completed. By the Statute of the Faculty of 2005 the title of the Department was changed to the Department for Animal Nutrition and Dietetics.

According to the Decree of 1922, the curriculum for Livestock included, amongst other things, the course Food Science, which was taught in the 3<sup>rd</sup> and 4<sup>th</sup> semesters. In the years that followed the title of the course changed, along with the schedule of the classes in the nutrition of domestic animals. According to the latest curriculum from 2005, the previous two-semester, compulsory course, Physiology and Pathology of Animal Nutrition was divided into the courses Basic Animal Nutrition in the 3<sup>rd</sup> semester and Applied Animal Nutrition

in the 4<sup>th</sup> semester. The teaching staff at the Department participate in teaching the compulsory course Botany in Veterinary Medicine in the 1<sup>st</sup> semester and run the elective course Feed additives-health modulators in the 6<sup>th</sup> semester, Comparative Nutrition in the 8<sup>th</sup> semester and Dietetics of Animals in the 10<sup>th</sup> semester. The staff from the Department also participate in teaching the compulsory elective courses Diseases and Treatment of Dogs and Cats I (in the study track Companion Animals) in the 10<sup>th</sup> semester, Veterinary Public Health (in the study track Veterinary Public Health and Food Safety) and Diseases and Treatment of Farm Animals (in the study track Farm Animals and Horses), and the compulsory course Herd Health in the 11<sup>th</sup> semester. The teaching staff from the Department have been included from the very beginning in postgraduate classes in poultry, pig breeding, reproduction of cattle using artificial insemination, and other postgraduate studies, where they have held classes in the nutrition of individual species of domestic animals. Today they participate in teaching eight postgraduate specialist studies, holding classes on the effect of nutrition on the welfare of animals, nutrition of dairy cows, the physiology and pathology of nutrition in pigs, the effects of nutrition on reproduction of domestic animals, nutrition of game animals, nutrition and dietetics of exotic animals, nutrition of laboratory animals etc. The professors also participate in the PhD study in Veterinary Sciences as heads and associates in the branch courses Optimization of Ration and Feed Mixtures for Animals and the Specific Nutrition of Small Ruminants.

From the very foundation of the Department a major role has been played by the scientific work of its staff. At that time, scientific work was mainly conducted in cooperation with experts from other Departments and institutions in this country and abroad. After the foundation of the Department scientific work was mainly devoted to the chemical composition and nutritional value of voluminous feed from Croatia, and later it was extended to research into the effect of nutritious substances and biologically active substances on the reproduction, productivity, health and welfare of animals.



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The scientific activity of the Department has recently focused on the researches of the effect of the phytobiotin on animal health and quality of animal products, the action of phenolic compounds in animal nutrition, comparative lipid metabolism in hosts and parasites important for veterinary medicine, influence of nutraceuticals and alternative sources of protein on health and quality animal products and others.

The staff at the Department today are outstanding in the implementation of the research project of the Croatian Science Foundation entitled: *Dietary Modulation of the metabolism of docosahexaenoic acid in diabetic dyslipidemia-dislipiDHA*, head: Prof. dr. Tomislav Mašek (2016-2020). The purpose of the project is to research the effect of n3 and n6 fatty acids and particularly docosahexaenoic acid in Types 1 and 2 diabetes on mitochondrial oxidation and peroxisomes and DHA metabolism. The staff at the Department, over the course of its history, have worked with many commercial businesses, where they have contributed by their expertise and experience to the modern equipping of new farm feeding systems, and have given advice in the provision of modern nutrition. This aspect of their professional work has led to a large number of studies and a great deal of expert discussions on the subject of nutrition of domestic animals in breeding. They also had professional co-operation with animal feed factories by conducting feed analytics and composing the complement and complete feed mixtures and antibiotics vitamin mineral premixes.

Department experts held many field lectures for animal breeders, veterinarians, veterinary technicians and for all who had contact with animal feed. Professional work included the drafting of legal regulations and standards for feed and feed mixtures. Several training courses were organized for education of the laborants working in the factories or in the animal feed mixer.

The expert work of the Department's staff today is aimed at problems in the field of the nutrition for breeding domestic and wild animals,

companion animals and laboratory and exotic animals. In that sense, professional projects and studies are arranged and implemented, for the needs of commercial and other organizations involved in the production of animal feed and breeding animals, applying the latest achievements in animal nutrition. Here, it is necessary to point out in particular Prof. Dr. Željko Mikulec, who since 2011 has been responsible for an agreement on scientific and professional cooperation with the Slovene company Tanin d.o.o. Svenica, to test preparations on the basis of tannin, and Assist. Prof. Dr. Hrvoje Valpotić, who since 2012 has been working with the company PIPO d.o.o. Čakovec to implement the agreement: *Nutritional and Immune Modulation of Health and Productivity in Poultry Production*, and since 2014 with the company TDH d.o.o. Virovitica in implementing the agreement: *Development of Products Intended for Feeding Dogs, Cats and Fish* and in 2019 the contract with ANIMAPET d.o.o. on professional co-operation in product development.

The experts of the Department participated in professional conferences as lecturers at the courses for professional training of veterinarians, livestock breeders and technologists working in animal feed factories. Today they participate in the Animal Transport Companion Course in accordance with Council Regulation (EC) No. 1/2005 and Course for the Experts Working with Experimental Animals and Animals for the Production of Biological Preparations Course in accordance with National Regulation on the Animals Used for Scientific Purposes (Official Journal of the Republic of Croatia No. 55/2013).

Members of the Department have spent short and longer periods of time on study visits around the world for training in the field of nutrition of domestic animals in intensive production, and cooperated with professors and experts from the Veterinary and Pharmacy Faculties in Brno, Czech Republic, which has resulted in a series of joint professional and scientific papers and exchanges of students in graduate and postgraduate studies.



The 4<sup>th</sup> semester students attending a lecture on ruminant nutrition within the Applied Animal Nutrition course. The acquired skills will enable them to individually formulate balanced rations for all animal species and categories.



Members of the Department performing analysis of ether extract content in corn silage samples in the Laboratory for Safety and Quality of Animal Feed. Ether extract analysis is a part of the proximate chemical analysis (Weende method) used for the feed quality assessment.



Investigation of lipid metabolism is regular scientific activity of Department of Animal Nutrition and Dietetics. Fatty acids and their metabolites are investigated using gas chromatography with mass detection.



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Assoc. Prof. Dr. Hrvoje Valpotić performing an analysis of physically effective fiber in forage using the Penn State particle separator on a dairy farm. The particle separator was designed to help in determining the correct forage particle length needed to optimize rumen fermentation, and it is an important tool in assessing the adequacy of dairy cow ration.

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Organoleptic evaluation of corn silage on a dairy farm. The determination of external characteristics such as color, shape, odor, taste, and moisture content is the first step in the assessment of feed quality, and is often performed at the dairy farms.





Sampling of the forages using probe sampler on a dairy farm. The key to successful forage analysis is taking a representative forage sample by following strict guidelines. Samples are packed into sealed plastic bags, labeled and transported to laboratories for further analysis.



Postdoctorate researcher Diana Brozić, performing the malondialdehyde, an oxidative stress marker, analysis on HPLC (high-performance liquid chromatography). HPLC is a technique in analytical chemistry used to separate, identify, and quantify each component in a mixture, and for this reason it is an irreplaceable tool in feed analysis.





## 6.4. Department for Biology and Pathology of Fish and Bees

The Department for Biology and Pathology of Fish and Bees was founded by a decision of the Senate of the University of Zagreb on the 14<sup>th</sup> of December 1936, and stemmed from the need for the development and advancement of teaching, science and practical work in veterinary medicine in the field of fishery and beekeeping. The founder was Ivo Tomašec who was at that time Assistant Professor, and later Full Professor and member of Yugoslav Academy of Sciences and Arts. The title of the Department changed several times, but since most of its work was in the fields of biology and pathology of fish and bees, from 1966 its present-day title was established.

In the curriculum of the Veterinary High School from 1922 the field of the biology and pathology of bees and silk worms, fish and other aquatic organisms were part of the planned study plan. However, classes in these fields were held for the first time in 1925 as part of the course Biology and Pathology of Fish and Shellfish, and in 1933 the course Biology and Pathology of Bees and Silkworms. Since these courses did not have full time professors to start with, prominent scientists and experts from other institutions participated in teaching, with occasional interruptions. The first permanent professor appointed to teach courses related to bees (from 1935/1936) and to fish (from 1938/1939) was Prof. Dr. Ivo Tomašec. The titles of the courses changed several times over history, and for the longest period of time classes on fish were held in the 7<sup>th</sup> and on bees in the 8<sup>th</sup> semester of the veterinary medicine study. The latest curriculum since 2005, which organized the course as integrated undergraduate and graduate studies of veterinary medicine, brought significant changes, including the position of the compulsory courses Biology and Pathology of Aquatic Organisms and Biology and Pathology of Beneficial Insects. Classes in both courses are held in the 8<sup>th</sup> semester. Because of the necessity of updating the content of the Biology and Pathology of Useful insects course, new thematic units were introduced in the curriculum-Morphological identification of exotic pests in beekeeping; Biology, Breeding and Bumblebee Diseases; and the Biology and Disease of Solitary Bees from the *Osmia* Genus in the academic year 2014/2015. The purpose of teaching a course in

the field of beekeeping and fisheries is to acquire general knowledge of beekeeping and aquaculture so that students can understand the place and role of veterinarians in recognizing and suppressing diseases. Therefore, it is necessary to emphasize the adoption of specific skills for the examination of the honeybee colony or the aquatic organism, the detection of signs of diseases, proper taking, packaging and sending of materials for laboratory tests and the proper application of preventive and therapeutic measures as well as measures to disease eradication. Accordingly, the courses enable students to work in laboratory and field conditions and meet veterinary needs in the specific contemporary and intensive production described.

Apart from these compulsory courses, professors at the Department teach classes in three elective courses: Selected Chapters in Aquaculture, Fishery and Diseases of Bees in Contemporary production. The classes in these courses have been taught in the 10<sup>th</sup> semester since the 2014/2015 academic year, and students can also enrol in these courses in the 12<sup>th</sup> semester. Professors at the Department are involved in teaching classes as part of the study track Companion Animals from the mandatory elective course Diseases and Treatment of Pet Birds, Exotic Pets and Laboratory Animals, for the method unit Aquaristics in the 11<sup>th</sup> semester, and the elective course Fish Morphology in the 9<sup>th</sup> semester of the veterinary medicine study.

Since 1962/1963 academic year a postgraduate study in Aquaculture and Fish Diseases was organized at the Department, which in the 1966/1967 academic year was renamed as Aquaculture. The study could be taken exclusively up to the 1967/1968 academic year, when it was abolished. In the 1970/1971 academic year a new postgraduate study was launched for scientific training in Fish Diseases, and in 1978/1979 scientific training in Bee Diseases. At the same time, the curriculum of the postgraduate study for specialization in Health Care of Fish was adopted, and from 1980/1981 the study for specialization in Health Care of Bees. The specialist studies were organized as supplementation of the existing knowledge of experts working in various kinds of breeding programmes for fish or bees. In 1985 improved programmes were adopted for postgraduate studies



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for scientific training in Biology and Pathology of Bees and Biology and Pathology of Fish, as well as specialized studies in Biology and Pathology of Bees and Biology and Pathology of Fish, and they could be taken up to the 1993/1994 academic year. In the 1995/1996 academic year the studies were organized according to the renewed programme for scientific training in Veterinary Medicine, as two-year Master's and three-year PhD study, in the courses Biology and Pathology of Bees, and Ichthyopathology (previously Biology and Pathology of Fish), and could be taken exclusively up to the 2003/2004 academic year. After the reorganization of postgraduate classes according to the Bologna Process the teaching staff at the Department have participated since 2005/2006 academic year in teaching four postgraduate specialist studies. In the same academic year a single university PhD study was organized in Veterinary Sciences, in which the teaching staff from the Department participate in teaching classes in nine branch courses.

From the very beginning of its work, experts from the Department have conducted scientific research, which has always been aimed at resolving acute problems and introducing new insights in the fields of beekeeping and fishery. In that initial period the work of Prof. Dr. Ivo Tomašec was particularly noteworthy, and on the basis of his scientific work in 1949 he was elected as an associate member, in 1952 as a corresponding member, and in 1960 a full member of the Yugoslav Academy of Sciences and Arts in the medical science class. In the 1970's and 80's research in the field of the biology and pathology of fish was covered by a number of projects which in terms of their course matter dealt with establishing methods for studying diseases of fish, coordinated by Prof. Dr. Nikola Fijan. It is necessary to point out the establishment of the first virology laboratory for fish in south-east Europe, and also the extremely important achievements on a global scale such as work to establish the first culture line of carp cells known as *Epithelioma papulosum cyprini* (EPC) and the first isolation of the virus *Rhabdovirus carpio*, the causative agent of spring viraemia of carp.

Throughout the history of research, the courses dealt with have been focused on current problems in beekeeping, and related to economically important diseases of honeybee colonies, primarily their aetiology, epizootiology, prevention and treatment. In the 1970's, '80s and '90s research was conducted through a series of projects, project tasks and topics. In that period the work of Prof. Dr. Duro Sulimanović was outstanding on projects to treat and prevent the most important honeybee pathologies. For his professional and scientific work, he received several awards, including the Order of Labour with Silver Wreath of Yugoslavia of that time (1989) and the Order of the Croatian Morning Star (Danica) with the likeness of Ruđer Bošković (1996).

Since 2013, with the project *Establishment of Testing Apiaries in the Republic of Croatia*, an intensive research period began once more in the field of beekeeping, which was seen in the receipt of financial support for a large number of national and international projects, covering topics dealing with comprehensive multi-disciplinary research related to studying biology, physiology and pathology of honeybees, the use of various technologies in beekeeping and their individual and simultaneous multiple effect on the vitality of honeybee colonies. The staff at the Department were involved in the following COST Action Projects: *Prevention of Honeybee Colony Losses*-(COLOSS) (2008-2013) and *Sustainable Pollination in Europe-joint research on bees and other pollinators* (SUPER-B) (2014-2018). The Department is a leading partner in the international projects: *Vets and Bees* which was active up to 2018 (European Veterinarians in Education, Research and Industry-Section of Federation of Veterinarians of Europe), and *Appliance of Effective Microorganisms in beekeeping* which was active up to 2019. Because of the continuing need to improve the education of veterinarians in the field of honeybee diseases the staff of the Department are involved in the work of the first international working group called *Vets4Bees Int* (2019).



As part of the clinical classes in the compulsory course Biology and Pathology of Useful Insects, students attend special clinical work where they learn how to suspect a certain disease, how to perform medical examination on the honeybee colony, how to sample and submit the material from hive for laboratory testing. They also acquire the skills necessary for proper application of veterinary medicine products.



From the very beginnings of the work of the Department, its staff have conducted professional work in the form of laboratory diagnostics of important diseases of fish and honeybees, professional clinical work in field conditions at fish farms and apiaries, and many other forms of cooperation with the industry, holding courses in lifelong education, drawing up reports, expert opinions, initial idea-technological design projects, fishery management plans, studies and technological studies. Further, there is constant cooperation between the Department and bodies of state administration through the work of the teaching staff in commissions that draw up regulations in areas of veterinary legislation related to combating diseases of fish and honeybees, on national, European and world levels. The Laboratory for Keeping and Research on Freshwater Fishes (IHTIOlab) is a facility for keeping freshwater fish and zebrafish intended for experiments and for research on organs, tissues and carcasses of fish, approved by the Ministry of Agriculture, No. HR-POK-018 (2014). In 2016 in the Laboratory for Honeybee Diseases (APISlab) the procedure for accreditation of the laboratory was successfully completed according to the requirements of the standard HRN EN ISO/IEC 17025:2007 for performing laboratory tests in the field of veterinary medicine: Microscopic examination of honeybee brood on presence of the bacteria *Paenibacillus larvae* spores; and the Detection and morphological identification of *Aethina tumida*, *Varroa destructor* and *Tropilaelaps* spp. The APISlab, as the National Reference Laboratory (NRL) for Honeybee Diseases has been a member of the network of reference laboratories for Honeybee diseases of the European Union since 2014, and since then has been participating successfully in the activities of the leading reference laboratory for honeybee diseases in the EU, located in France. Today the teaching staff from the Department are involved in successful cooperation with the Faculty of Veterinary Medicine of the University of Ljubljana and the Agricultural Institute of Slovenia, the University of Messina, and the Beekeeping Laboratory of Istituto Zooprofilattico Sperimentale del Lazio e della Toscana “Mariano Aleandri” in Italy.



The collaboration with the beekeepers and veterinarians primarily refers to the testing of samples sent to the Laboratory for Honeybee diseases-APISlab, when a disease is suspected.



The practical classes from the elective course Diseases of Bees in Contemporary Production is based on the expansion of knowledge in the technologies of the specialized production of the queen bees and royal jelly, and is performed in the apiary, as well as in the diagnostic laboratory for bee diseases.



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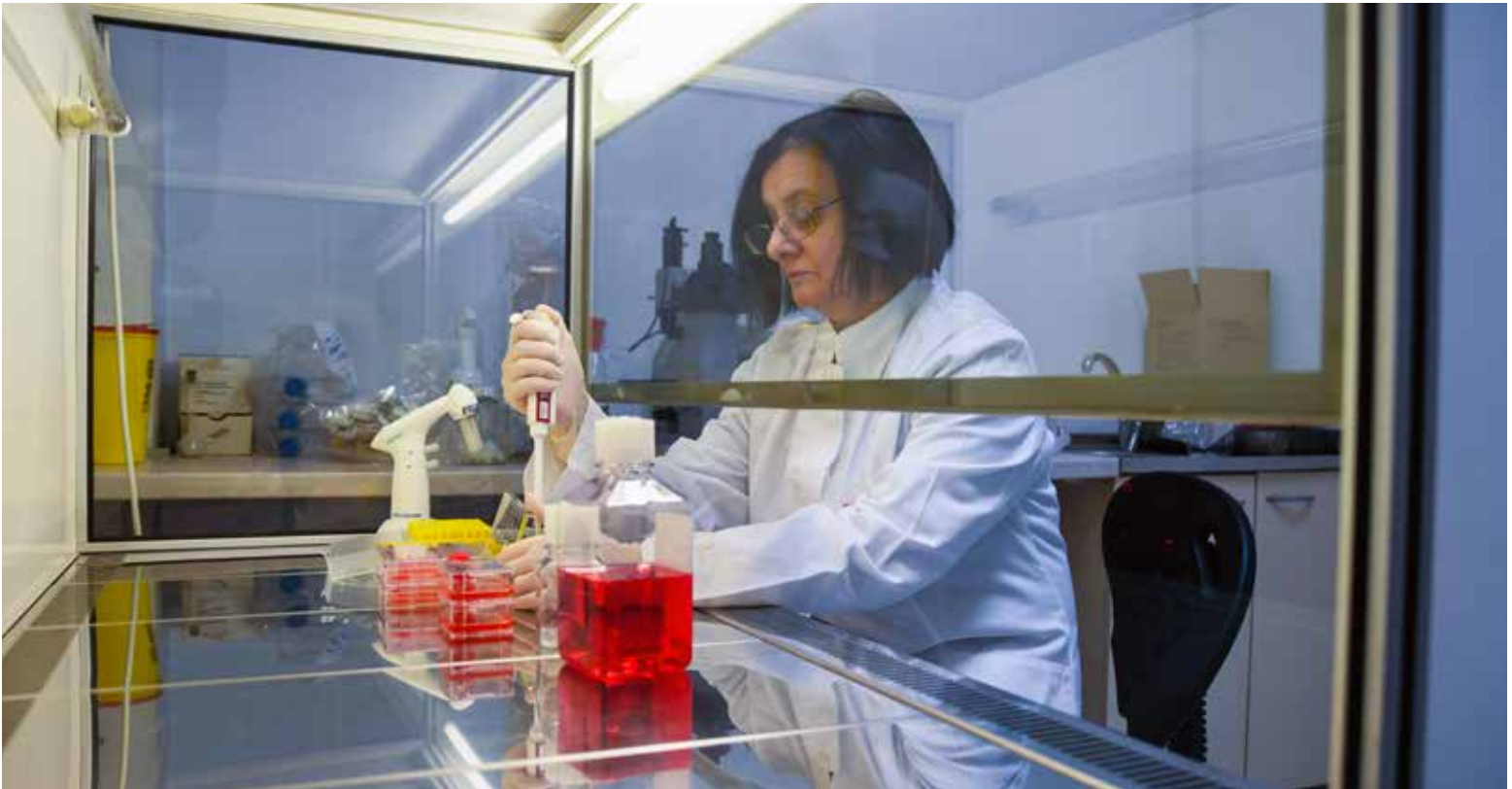


As part of the elective course Selected Chapters in Aquaculture, students spend the practical part of the course at the Public Institution AQUATIKA-SLATKOVODNI AKVARIJ KARLOVAC (Aquatika-The Freshwater Aquarium Karlovac). At the AQUATIKA, and at the freshwater fish farms, students get acquainted with the fish farming technology.

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As part of the compulsory course Biology and Pathology of Aquatic Organisms, on several occasions during the practical classes, students perform dissection and general examination of freshwater fish and sea fish. Thus, the students learn how to perform a clinical examination, how to recognise possible pathological changes, and how to collect and send samples for laboratory testing.



Isolation of viruses in cell culture. The Fish Disease Laboratory is designed to diagnose and study viral, bacterial and parasitic diseases. In the 1980's, an EPC cell line for the separation of fish viruses was established in the laboratory.



Collaboration with fish farms. The Department's experts supervise the fish health condition, recommend preventive measures, and measures needed for treating and eradication of diseases, and offer professional help and advice for the purpose of improving technology.





## 6.5. Department of Game and Wildlife Management

The interest of students of veterinary medicine and attendance at classes in the field of game animals was visible at other faculties of the University since the 1959/1960 academic year. At that time, the elective course entitled Breeding and Pathology of Game Animals was introduced within the veterinary medicine study in the 10<sup>th</sup> semester, and the classes were given by the part-time lecturer, Dr. Otto Röhr. In 1980 the Faculty appointed its own professor for this course, Prof. Dr. Martin Jakovac, who since 1980/1981 academic year taught that course under the amended title: Biology, Breeding and Pathology of Game Animals. Since 1987/1988 academic year, it became compulsory in the 5<sup>th</sup> semester, with professional practical work in the 9<sup>th</sup> semester, which speaks of the development and importance of this field within veterinary medicine. In the 1998/1999 academic year, the elective course Hunting and Nature Protection was introduced in the 10<sup>th</sup> semester.

The Chair of Game Biology and Pathology was founded in July 1988, with the aim of conducting teaching and scientific activities in the field of biology, pathology and breeding of game animals within veterinary medicine. By the Faculty Statute of 2005 the Department was renamed the Department for Game Biology, Pathology and Breeding, as an integral part of the Animal Production and Biotechnology Division. According to the Statute from 2017, the Department has been renamed the Department of Game and Wildlife Management.

The premises of the Department changed their location within the Faculty of Veterinary Medicine campus. Today the Department is located in part of the building of the Department of Radiology and Physical Therapy, and apart from the staff rooms, it has its own state-of-the-art practice facilities for graduate and postgraduate classes. Practical classes are held in the educational hunting range Črnovšćak, which was allocated to the Faculty, by a decision by the Ministry of Agriculture, Forestry and Water Management, for use in 2005 with the right of hunting management. At the beginning of 2006 the Department developed a game management plan for the period from 2006/2007 to 2016/2017 and the Hunting Administration accepted it.

On this basis the Department started with the measures of hunting and technical arrangements as well as with the measures for the breeding and exploitation of game until April 2014 when prof. Dr. Janicki hunting management jobs were handed over to Assist. Prof. Dr. Dean Konjević. With this the very intensive engagement of the employees of the Department in organization and operation of the educational hunting polygon ceased.

Under the latest reorganization of veterinary studies in 2005 and later changes to the curriculum (2012-2014) the Department offers the compulsory course Game Breeding and Management in the 7<sup>th</sup> semester, and the elective courses: Game Zoology in the 4<sup>th</sup> semester, Hunting and Nature Protection in the 8<sup>th</sup> semester, Wildlife Diseases in the 9<sup>th</sup> semester, and the elective course Comparative Odontology in the 9<sup>th</sup> semester.

The teaching staff from the Department have published several publications for the needs of students, and the latest university textbook for students of veterinary medicine was published under the title *Zoology of Game Animals* (2007).

The postgraduate specialist study in Biology, Breeding and Pathology of Game, Rabbits and Fur Animals was launched in the 1986/1987 academic year. Over the years the programme has been amended, improved and consequently its title has changed. Since 2014/2015 academic year, the postgraduate specialist study in Game Breeding and Pathology was renewed, according to the new legislation in the field of hunting. The teaching staff from the Department have been participating in teaching the PhD study in Veterinary Sciences since 2005, as part of the four branch-oriented courses.

Scientific research work began at the end of the 1980's, when the teaching staff dealt with the problems of intensive breeding of feathered game, and the survival rate as well as the effectiveness of feathered game species repopulation. Today the staff from the Department are implementing scientific projects financed from various national and international sources, including projects financed by the European Commission. Primarily research is undertaken into infectious and



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parasitic diseases of wild animals, where the latest diagnostic methods are used. Particular emphasis is put on parasitosis caused by non-native species and on the game in intensive farm production.

A large part of the research is aimed at the protection and management of protected species, especially large carnivores, and research is undertaken into the genetic diversity of wild animals.

The present-day teaching staff at the Department have been on short professional and study visits abroad, for the sake of training. Prof. Dr. Zdravko Janicki spent time at the High Veterinary Medical School in Oslo, Norway (2001). Prof. Dr. Alen Slavica went on a study visit on the subject of decapodes youth breeding in Auckland, New Zealand (2002). Assist. Prof. Dr. Magda Sindičić attended the Summer School *Ecology and Biodiversity-Understanding Patterns and Processes, Mammal Research* at the Department of the Polish Academy of Science, in Bialoweza, Poljska (2008), and with a scholarship from the Ministry of Higher Education, Science and Technology of the Republic of Slovenia, she also spent time at the Department for Ecology and Environment Safety at the Biotechnical Faculty of the University of Ljubljana (2010). In the context of international scientific cooperation, the Department has been visited by many foreign professors and scientists: Prof. Dr. Gorazd Vengušt from the Faculty of Veterinary Medicine of the University of Ljubljana, the Department of Pathology, Wild Animals, Fish and Bees (2011 and 2014), Prof. Dr. Uwe Kierdorf-Department of General and Systematic Zoology, Justus-Liebig-University of Giessen, Giessen, Germany (2004), Prof. Dr. Peter Lazar, Department of Nutrition, Dietetics and Animal Breeding, Department for Breeding and Diseases of Animals and Fish, University of Veterinary Medicine and Pharmacy, Košice, Slovakia (2005), Prof. Dr. Frank J. M. Verstraetea, dipl. AVDC, dipl. ECVS, dipl. EVDC-Department of Surgical and Radiological Sciences, School of Veterinary Medicine, University of Davis, California, USA (2005), Assist. Prof. Dr. Kai Frölich Tierpark Arche-Warder-Centre for Rare Domestic Breeds,

Warder, Germany (2008) and Prof. Dr. Uwe Kierdorf-Department of Biology, University of Hildesheim, Germany (2010).

The teaching staff from the Department have also participated in teaching classes at other educational institutions in this country. Prof. Dr. Zdravko Janicki taught a class at Karlovac University of Applied Sciences on the course of Diseases of Game Animals (2001/2002-2014/2015), and Prof. Dr. Alen Slavica in the course Manipulative Procedures with Game Animals (2007/2008-2012/2013). Prof. Dr. Zdravko Janicki has been teaching a class in the course Basic Zoology of the Mediterranean Eco-system at the University of Zadar (since 2010/2011), with the cooperation of Assist. Prof. Dr. Magda Sindičić (since 2016/2017).

Staff at the Department have been members of the organizational committees of many scientific and professional, national and international conferences, as well as launching the initiative for and organizers of two international scientific symposia entitled: 1<sup>st</sup> International Game and Ecology Symposium, 10<sup>th</sup> to 13<sup>th</sup> October 2005, Brijuni; 2<sup>nd</sup> International Game and Ecology Symposium, 17<sup>th</sup> to 20<sup>th</sup> October 2007, Plitvice). They have also reviewed university textbooks, scientific papers, and projects, and study programmes at other institutions of higher education (The Department of Wildlife Management and Nature Conservation, Karlovac University of Applied Sciences; the Department of Ecology, Agronomy and Aquaculture, University of Zadar). The activities of the staff of the Department have led to collaboration with several faculties within the University of Zagreb (Dentistry, Forestry and Agronomy) as well as the other institutions of higher education in this country mentioned above. Also, in addition to this, international cooperation has taken place with other universities and institutions: the Faculty of Veterinary Medicine of the University of Ljubljana; the Department of Pathology, Wild Animals Fish and Bees, the Department for Ecological Research, ERICO (Slovenia), the University of Veterinary Medicine in Košice (Slovakia), the Veterinary Faculty in Toulouse (France).



The study tour of a deer farm. The immediate proximity of this noble large game often elicits enthusiasm in students and, besides numerous photos, unforgettable impressions remain as well.



Field classes in the Game Breeding and Management course. All-day field classes begin with the students getting introduced to the intensive deer farming, with emphasis on individual technological units, technical equipment and spatial norms.



Field classes in the Game Breeding and Management course at the hunting field. The students learn about the technical arrangement of the hunting ground, the particularities of the habitat, and the advantages and disadvantages of the microlocations from the point of view of the construction of hunting and management facilities.



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The Olympic shooting range "Luže" near Zagreb. The members of the Croatian Olympic shooting team teach the students enrolled in the Hunting and Nature Protection course how to handle hunting weapons. Personal experience, and the guidance from the professionals is the best start to acquiring new skills.

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Students Marijana and Stefani at the practice classes in the Chemical Immobilization of Game Animals course. Students gain knowledge and acquire practical skills in handling the equipment necessary in the professionally demanding game manipulation procedures.





Evaluation of trophies requires specific knowledge and skills. The trophies of the European roe deer (roe buck) won at the hunting range Črnovšćak I / 3 are also used as teaching materials.



Professors at the Department of Game and Wildlife Management: Prof. Dr. Zdravko Janicki, Assist. Prof. Dr. Magda Sindičić, Prof. Dr. Alen Slavica. Apart from the technical activities at the Department, the scientific-research projects on protected animal species are carried out as well.





# 7. Veterinary Public Health and Food Safety Division

## 7.1. Department of Pharmacology and Toxicology

Teaching in pharmacology began in 1920, and at first it was lectured by the part-time professor Prof. Dr. Miroslav Mikuličić, professor of pharmacology at the School of Medicine of the University of Zagreb. Since then pharmacology was represented in all the later curricula of the Veterinary High School, and then of the Faculty of Veterinary Medicine. The Department of Pharmacology and Toxicology was founded in 1930, when a pharmacy was also opened which existed until 1962. The first Head and professor at the Department was Assist. Prof. Dr. Rudolf Ganslmayer. He was succeeded by Prof. Dr. Marcel Delak, who wrote the first teaching materials in pharmacology in the 1950's. Classes in pharmacology were held at the old location of the Faculty of Veterinary Medicine up to 1948, when the Department was moved to the current location.

At first there was a single course covering pharmacology and toxicology, which was taught in the 3<sup>rd</sup> and 4<sup>th</sup> semesters, from 1936 in the 5<sup>th</sup> and 6<sup>th</sup> semesters, from 1954 in the 4<sup>th</sup> and 5<sup>th</sup> semesters, and from 1967 again in the 5<sup>th</sup> and 6<sup>th</sup> semesters. With the adoption of the integrated undergraduate and graduate study in veterinary medicine, according to the Bologna Process, the fields of pharmacology and toxicology were divided and taught as two separate courses. The first generation of students of these courses enrolled in the 2007/2008 academic year. Today the course Pharmacology is taken in the 5<sup>th</sup> and Toxicology in the 8<sup>th</sup> semester.

Professors at the Department participate in the study track Companion Animals, in teaching the compulsory elective course Diseases and Treatment of Dogs and Cats I. in the 10<sup>th</sup> semester, then in the study track Farm animals and horses in teaching the compulsory elective course Diseases and Treatment of Horses in the 10<sup>th</sup> semester and Diseases and Treatment of Farm Animals in the 11<sup>th</sup> semester and in the study track Veterinary Public Health and Food Safety in teaching the compulsory elective course Veterinary Public Health in the 11<sup>th</sup> semester. Alongside these courses, the Department organizes and holds classes in the elective course Toxicology of Poisonous Plants in the 10<sup>th</sup> semester.

The Department has a small practice hall where practicals and seminars in pharmacology and the seminars in toxicology are held, and a laboratory for practicals in toxicology. Lectures in these courses are held in the larger lecture theatres at the Faculty.

At the end of the 1970's the Department ran a postgraduate study for specialization in Clinical Pharmacology, which was mainly taught by its own teaching staff. At that time its staff also participated in teaching pharmacology and toxicology as part of several specialist postgraduate studies. Since 2005/2006 academic year it has participated in teaching the postgraduate specialist studies: Breeding and Pathology of Game Animals, Pathology and Breeding of Domestic Carnivores, Sanitation and Forensic Veterinary Medicine. Since the same academic year professors from the Department have been heads and associates in implementing postgraduate doctoral studies in the compulsory course Methods of Scientific Research Work in the 1<sup>st</sup> semester, and five branch-oriented courses.

From its very foundation, scientific research work has been very intense at the Department. At first research was mainly related to the pharmacokinetics and pharmacodynamics of endo-antiparasitics, establishing the level of pollution of mammals and birds with pesticides, and research of the effects of narcotics, local anaesthetics and exciters on the central nervous system of small animals. Then research was undertaken into the effects of antibiotics on the adaptation system of highly productive hybrids of poultry, adrenocortical reactions of poultry to stress and some pesticides, research into the microsomal enzyme system, with reference to xenobiotics, some drugs and vaccines. The incompatibility of chemotherapeutics and vaccines with ionophores antibiotics, etc. was also studied. Recent research conducted at the Department has been related to the application of pharmacology and toxicology, including oxidative stress and the mechanism of action of many xenobiotics, ecotoxicological research related to toxic heavy metals and persistent organic pollutants, and the immunomodulating effect of levamisole in pigs.



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Earlier, members of the Department were included in running international projects: Prof. Dr. Vjekoslav Srebočan was the head of the international project within the scientific and research collaboration between the American Government and Yugoslavia entitled Studies of the Influence of Chlorinated Hydrocarbons with Pesticidal Properties on the Adaptation Mechanism in Poultry (1968-1972). The project continued under the title: The Influence of Chlorinated Hydrocarbons with Pesticidal Properties on the Hormonal Regulation of the Carbohydrate Metabolism in Poultry (1974-1979).

Assist. Prof. Dr. Jelena Šuran was the Head of the international project financed from the European Regional Development Fund and the State Budget of the Republic of Croatia *Intramammary propolis formulation for prevention and treatment of mastitis in dairy ruminants*, ApiMast project (2014.-2016). Prof. Dr. Emil Srebočan and Prof. Dr. Frane Božić were associates in the international FP7-ERA Chairs-Pilot Call 2013 project entitled *Upgrading the research performance in molecular medicine at the Faculty of Veterinary Medicine University of Zagreb* (2014-2019), coordinated by Prof. Dr. V. Mrljak.

Students take an active part in research at the Department, both in the practical part and in writing papers stemming from their involvement. Their research is presented in their graduate dissertations or papers for competing for the Rector's Award.

The Department is a pharmacological and toxicological information point, which provides advice to veterinary practitioners. The Department is officially conducting veterinary pharmacovigilance work (monitoring of adverse events related to veterinary medicinal products) for which the Faculty of Veterinary Medicine was authorised in 2014 by the Ministry of Agriculture of the Croatia. Unofficially, adverse reactions of veterinary drugs are monitored at the Department since 1999.

The members of the Department were the heads of the expert groups, the project reviewers and the court expert witnesses in the cases of

wildlife poisoning. They have actively participated in many seminars and workshops in pharmacology and toxicology contributing significantly to the advancement of scientific and professional activities in their field of veterinary medicine.

Over the years the employees of the Department have published a number of scientific and professional papers in national and international journals, and in the form of plenary and invited lectures at numerous international conferences in the country and abroad. They also participated in the organization of the 1<sup>st</sup> and 2<sup>nd</sup> "International Symposium Game and Ecology", held on Brijuni in 2005 and on the Plitvice Lakes in 2007; 4<sup>th</sup> and the 5<sup>th</sup> "Croatian Toxicology Congress with International Participation" in 2012 in Primošten and in 2016 in Poreč; "International Congress Special IUPHAR GI Section Symposium 2013" at the School of Medicine of the University of Zagreb; and the *International Summer School Stress: Comprehensive & Authentic Summer School 2014* at the School of Medicine of the University of Zagreb.

Members of the Department are representatives of Croatia in the European Medicines Agency (EMA) related to veterinary medicinal products, incl. veterinary pharmacovigilance. The Department staff are involved in drawing up scientific opinions on veterinary medicinal products for their authorisation, renewal and variations, in the Croatia and other European countries. They are also involved in scientific assessment of veterinary medicinal products in centralized EU procedures, under the Agreement between the Faculty of Veterinary Medicine and the Ministry of Agriculture since 2015.

The Department staff have also worked on toxicology reports for the registration of poisons. They also undertake professional evaluation of documentation for the purpose of placing biocidal preparations on the market in the Croatia.

Department members have been on short study visits and research stays abroad (Switzerland, the UK, USA, Italy and Germany).



Through lectures in Pharmacology students learn about the general principles of pharmacodynamics, organopharmacology and chemotherapy. Prof. Dr. Frane Božić teaches students about the mechanisms of drug action. This knowledge helps them master complex and comprehensive Pharmacology study matter. The students are encouraged to learn with understanding, and to first understand the logic behind the basic pharmacological principles.



Prof. Dr. Srebočan, the lecturer in Toxicology, holds an introductory lecture in which he teaches the students about terminology, poison control mechanisms, diagnostics of poisoning, procedure with the poisoned animal, antidotes, computational toxicology, taking and sending materials for chemical and toxicological testing.

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Asst. Prof. Dr. Jelena Suran (middle) and her project team members, Dr. Bozo Radic from Hedera (right) and Vlado Sliskovic (left) visited the University of Nottingham. The visit was a part of their project with main focus on research and development of non-antibiotic mastitis prevention and treatment named Apimast. Faculty of Veterinary Medicine and SME specialized for honeybee products, Hedera, have a long standing scientific collaboration on the development of non-antibiotic anti-infectives for veterinary medicine.



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Prof. Dr. Andrea Prevedar Crnić instructs a student in the final year of study on the rules of writing a graduation thesis. The usual practice is to continue the co-operation between the supervisor and the student, and to adapt the results of the graduation thesis for publication in professional or scientific journals.

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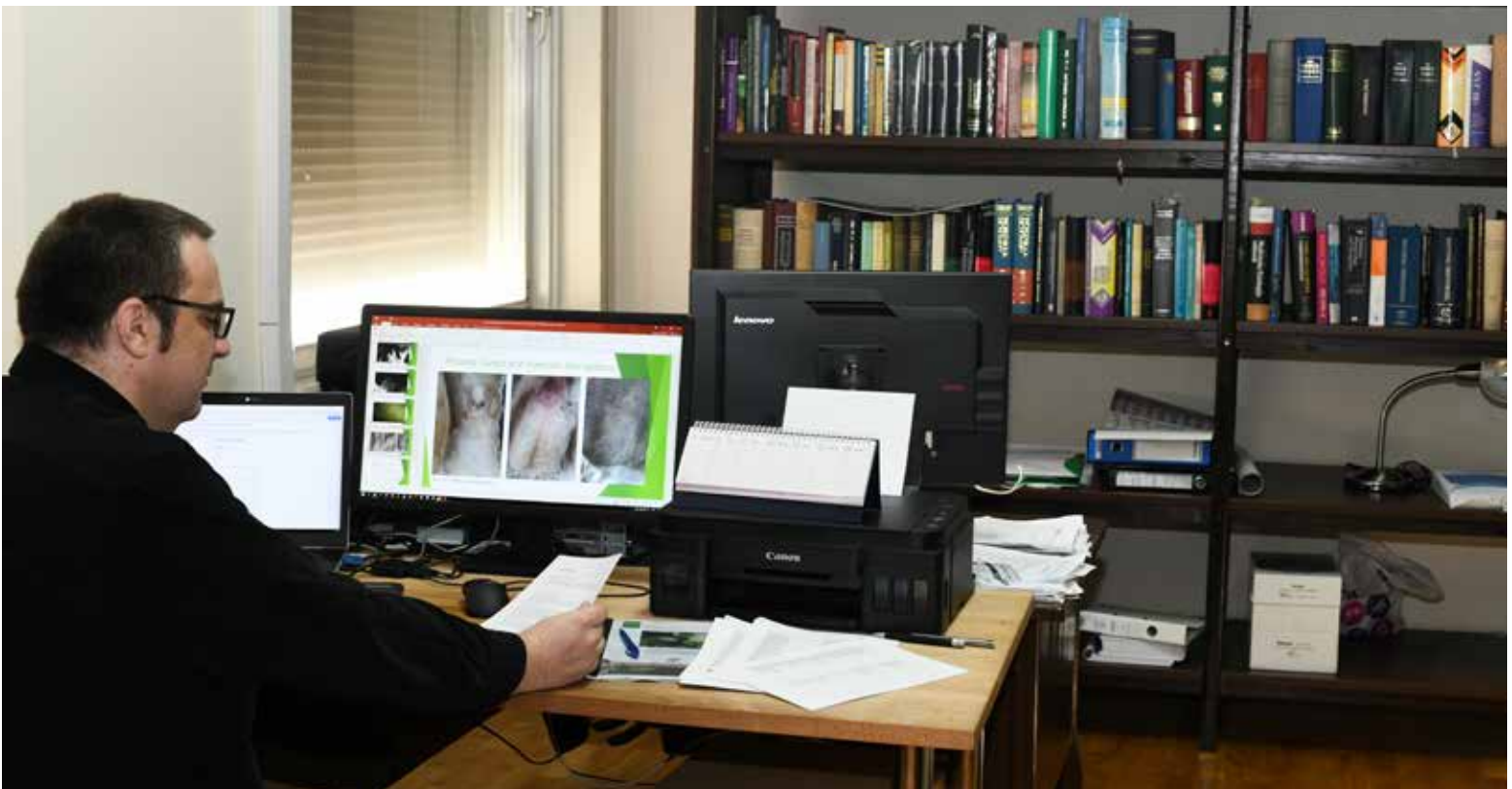


As part of the experimental practicals in the laboratory, students independently carry out simple qualitative tests to prove presence of pesticides, heavy metals and other toxins in the samples of biological material from analytical toxicology. During the course, students are introduced to the basic techniques and methods of work in the Toxicology Laboratory, as well as to the workplace health and safety methods.





A look at the Department's corridor where photographs of poisonous plants hang. These photographs are used when teaching the elective course Toxicology of Poisonous Plants. With the same purpose, the students pay a spring visit to the Botanical Garden of the Faculty of Pharmacy and Biochemistry.



Within the Department of Pharmacology and Toxicology, the safety of veterinary drugs is monitored in cooperation with the Ministry of Agriculture's Veterinary Directorate. For this purpose, a separate office has been equipped. In this photograph: Hrvoje Pavasović DVM, expert associate, who receives and processes reports on harmful reactions to the veterinary drugs, keeps records about them, monitors the rapid alert system, and reviews periodic reports on drug safety.







## 7.2. Department of Hygiene, Technology and Food Safety

The Department was founded in 1922 as the Department of Hygiene of Livestock Products (meat and milk) but it only began work in 1933 when it was given premises at the old location of the Faculty. In 1948 it moved to temporary space at the new Faculty location. In 1952 it moved to its current premises and up to 2007 it shared them with the Department of Microbiology and Infectious Diseases with Clinic. Today the Department has microbiology, chemistry, organoleptic and PCR laboratories, a library, an area for preparation of microbiological media, a reception office, staff rooms, archives and a practice hall for practical lessons.

The Department for most of its life bore the title Department of Hygiene and Technology of Animal Foodstuffs, and the last change of name took place in 2010, to the Department of Hygiene, Technology and Food Safety, due to the changes in European legislation and terminology in the field it deals with.

At the time of the Veterinary High School there was a single course entitled Hygiene of Livestock Products (meat and milk) in the 6<sup>th</sup> semester, and the professors of the High School at that time in various fields took turns in teaching classes. In 1932 Assist. Prof. Dr. Šimun Debelić was appointed the first permanent professor of meat and milk hygiene.

From 1936 the classes covered the courses: Hygiene of Meat and Milk Products, Examination of Poultry, Game, Fish, Crabs and Shellfish, Hygiene of Milk and Milk Products, Market Supervision of Foodstuffs of Plant and Other Origins, Chemistry of Foodstuffs. In 1954 a single course entitled Hygiene of Foodstuffs of Animal Origin was introduced. With the introduction of the integrated undergraduate and graduate course according to the Bologna Process, since the 2009/2010 academic year classes in the compulsory course Food Hygiene and Technology have been held at the Department in the 9<sup>th</sup> and 10<sup>th</sup> semesters. The Department, as part of the study track Veterinary Public Health and Food Safety, is responsible for the compulsory elective courses Food Hygiene and Quality Control, and Veterinary Legislation and Food Safety Control in the 10<sup>th</sup> semester, and Veterinary Public Health in the 11<sup>th</sup> semester.

Alongside these courses, the Department also organizes and provides several elective courses in the 10<sup>th</sup> semester, as follows: Autochthonous Meat Products, Autochthonous Dairy Products, Hygienic Quality of Game Meat, Hygiene and Quality of Poultry Meat, Carcass Quality at the Slaughter Line, and Hygiene and Quality of Fish Meat.

In recent years the teaching at the Department focuses more on the acquisition of practical knowledge and skills in accordance with the requirements of the EU Directives 2005/36 and the recommendations of EAEVE. It is important to emphasize the professors' great efforts in organizing and conducting the field work. Students have attended classes in food industries including industrial and crafts cattle, pigs, equidae, sheep, goats and poultry slaughterhouses, meat cutting and further processing facilities, dairies and meat processing facilities, fish market and market, honey fillers, ice cream and frozen food factories, family farms and forensic laboratories. Field work is being held with a great contribution of the associates from the mentioned facilities, authorized veterinarians of the control bodies, veterinary inspectors and technologists. Furthermore, practicals are also performed at the Department's Practice Hall and at the Microbiological and Chemical Laboratory.

From the beginning of the postgraduate studies at the Faculty of Veterinary Medicine the Department had a study in Hygiene and Technology of Food of Animal Origin. This was also the first postgraduate study to be held, which since 1961/1962 academic year was completed by more than 300 graduate veterinarians.

Today the Department is responsible for two postgraduate specialist studies: Hygiene and Technology of Foodstuffs of Animal Origin lasting four semesters, and the Implementation of Veterinary Food Safety Procedures in Slaughterhouse Facilities, over two semesters. Completion of these studies leads to the academic title of University Master-Specialist in the narrow field of the study title.

As part of the unified PhD study in Veterinary Sciences lasting three years, professors at the Department are leaders and associates for 12 branch courses and one elective course.



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The scientific research work of the staff at the Department is rich and always follows current trends. They have researched food microbiology, sustainability and freshness of food, the quality of carcasses, bio-residues, sanitation, conditions of milk quality, quality of fish, fish parasites in public health, adulteration of food, the chemical composition of food, foodborne pathogens and food spoilage microorganisms, hygiene in production of eggs and ready meals, determination of the type of meat, starter-cultures, bacteriocins, antimicrobial resistance, microbial ecology, molecular methods for detecting pathogens in food etc.

Apart from many national scientific projects, with the support of the Ministry of Science and Technology (the Ministry of Science, Education and Sport), two international projects have also been run at the Department: EU INCO *Safety of traditional fermented sausages: research on protective cultures and bacteriocins* (SAFETY SAUSAGES), FW 5, N° ICA4-CT-2002-10037, led by Prof. Dr. Mirza Hadžiosmanović (2002-2005) and FP7 *Selection and improving of fit-for-purpose sampling procedures for specific foods and risks-BASELINE*, led by Prof. Dr. Lidija Kozačinski (2009-2013). Staff at the Department have also participated in the international projects: TEMPUS JEP CD-19068\_2004 *Quality Management of Food Products*, SERA-ERANET project *Sustainable production of traditional cheeses from local sheep milk in the Balkans: 2. Ensuring of traditional cheese hygiene and quality-INDI\_SHEEP TRADI\_CHEESE* and FP7 PROMISE *Protection of consumers by microbial risk mitigation through combating segregation of expertise*. The staff at the Department are also associates in national scientific projects run by other Departments and Clinics at the Faculty, such as the Clinic for Obstetrics and Reproduction, the Department of Physiology and Radiobiology, and the Department of Veterinary Biology.

From the very beginning of its work, the staff at the Department have participated in developing the work of the food industry and trade, and

also in the development of the organization of veterinary inspection and standardisation of food quality. In that sense, they are very active in drawing up regulations in the field of veterinary legislation and standardisation of food quality. The Department maintains constant cooperation with bodies of state administration in the work of market, health and veterinary inspection, and also cooperation with the State Office for Metrology and the Croatian Chamber of Economy. The Department throughout almost its entire life has been authorized for performing analyses and super-analyses in assessment of the health safety and quality of food. The latest decision by the Ministry of Health on meeting the requirements for performing analyses and super-analyses of food was awarded to it on 19<sup>th</sup> January 2001. In 2010, the microbiological laboratory of the Department undertook the procedure for accreditation according to standard HRN ISO 17025.

The experts from the Department participate in resolving specific questions concerning the improvement of food production and in drawing up assessments of projects for building and equipping facilities in the food industry.

As part of its professional work, the Department has a long tradition of running courses for the lifelong training of doctors of veterinary medicine. Today there are three courses in lifelong education for doctors of veterinary medicine, run by Assoc. Prof. Dr. Nevijo Zdolec: Ante mortem and post mortem inspection of cattle and pigs (since 2013), Inspection of the meat of poultry, game, sheep, goats, rabbits and ungulates (since 2016) and Official controls in milk production and processing (since 2017).

Members of the Department have been on short professional and study visits and training in the United Kingdom, Libya, Italy, Malaysia, France, Slovakia, Belgium, Sweden etc. Regarding international cooperation, Prof. Dr. Lidija Kozačinski worked during her scientific research and preparation of joint papers with the institutions Alma Mater Studiorum, University of Bologna (Dr. Alessandra De Cesare,



Identification and biochemical characterization of microorganisms is carried out within the framework of microbiological food testing according to the prescribed microbiological criteria. In this photograph: the details of the *Listeria monocytogenes* bacteria identification using the API system.

Prof. Dr. Gerardo Manfreda, Prof. Dr. Marcello Trevisani), Istituto Superiore di Sanità (dr. Dario De Medici), University of Copenhagen (Prof. Dr. John Olsen), Teagasc, Ashtown Food Research Centre (dr. Geraldine Duffy), Tecnoalimenti S.C.p.A. (Marianna Faraldi), Faculty of Veterinary Medicine of the University of Sarajevo (Prof. Dr. Faruk Čaklović, Prof. Dr. Muhamed Smajlović, Assist. Prof. Dr. Davor Alagić, Prof. Dr. Almedina Zuko), University of Perugia (Beniamino Cenci Goga). Prof. dr. Lidija Kozačinski also cooperates on PhD studies at the University of Veterinary Medicine and Pharmacy in Košice, Department of Food Hygiene and Technology (Prof. Dr. Pavel Býstrický) and as a guest lecturer at the Faculty of Veterinary Medicine of the University of Ljubljana (2008), and a guest lecturer at the Faculty of Veterinary Medicine of the University of Sarajevo (2009/2010 and 2014/2015) and a lecturer at the Summer School *Aquaculture* (2017 and 2018).

Further, members of the Department (Mirza Hadžiosmanović, Lidija Kozačinski, Željka Cvrtila, Nevijo Zdolec) have cooperated in international project activities with the Agricultural University of Athens (Prof. Dr. Eleftherios Drosinos), Hungarian Meat Research Department (dr. Judith Gasparik), Department of Meat Hygiene and Technology Belgrade (dr. Slavica Vesković-Moračanin), Università degli Studi di Udine (Prof. dr. Luca Coccolin), University of Sarajevo (Prof. Dr. Faruk Čaklović, Prof. dr. Muhamed Smajlović, Associate Prof. Dr. Davor Alagić).

Assoc. Prof. Dr. Nevijo Zdolec is the editor of the international scientific book *Fermented Meat Products: Health Aspects*, which was published in 2017 on the basis of cooperation with scientists and experts from renowned universities and departments from the United Kingdom, the USA, Austria, Greece, Portugal, Germany, Slovakia, Italy, Cyprus, Spain, Serbia, Czech Republic, Chile and Japan.



Quality evaluation of food of animal origin is carried out within the professional and scientific-teaching part of work. In this photograph: determination of the freshness of milk by titration.

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The presence of pathogenic bacteria in food of animal origin is determined by standard methods and protocols. In this photograph: the details of the preparation of liquid media for detection of the *Salmonella* in the sample.



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Students perform a post mortem examination of pigs' organs in the slaughterhouse. A detail of the traditional examination of the chest organs and liver. The examination consists of a visual examination, and, if necessary, the palpation of the lymph nodes and organs, as well as making an incision in order to assess if the meat is safe for consumption.

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In cattle slaughterhouse, students at a Practicum examine the head of cattle, carcasses and organs, carry out necessary sampling, and assess whether the meat and the organs are safe for human consumption. In this photograph: a detail of the bovine head being incised, and the examination of the chewing muscles to determine whether there is a *Cysticercosis* infestation.





Chemical composition is one of the indicators of the quality of food. Students at a Practicum in the Department's Laboratory conduct chemical analysis of food and judge its compliance with regulations and its declaration.



Microbiological examination is an integral part of the process of determining whether the food is safe for human consumption. Students at the laboratory practical work determine the presence of certain microorganisms in food, determine whether the food is compliant with the prescribed microbiological criteria, and conduct determination of microorganisms.







## 7.3. Department of Microbiology and Infectious Diseases with Clinic

The organizational structure and title of the Department for Microbiology and Infectious Disease with Clinic have been changed many times over the course of its history. At the beginning of the work of the Veterinary High School there were two departments: The Department of Infectious Diseases and the Department of Veterinary Hygiene and Microbiology, which actually were a single entity and they had a joint Head. In the period from 1933 the Departments were separated in terms of space and organization, but since 1954 both Departments have been combined into a single unit. The current title, the Department of Microbiology and Infectious Diseases with Clinic, has been used since 1978.

At the newly-founded Veterinary High School in Zagreb, Prof. Dr. Stjepan Plasaj was appointed full time professor on the 21<sup>st</sup> of January 1921. He also became the first professor of Infectious Diseases and the first Head of the Department of Infectious Diseases of the Veterinary High School in Zagreb.

At the end of 1922 the Department was given its own premises in the building in Savska Street 16/I, on the left side. At first almost all the work of the Department took place in the bacteriological laboratory, where research was related to clinical materials from animals that had died of infectious diseases, but several years later the Department's clinic was built for out-patient treatment of large and small animals.

In 1933, in agreement with the Ministry of Agriculture, a Veterinary Experimental Station was founded within the Department, which developed rapidly and intensely. The Station separated from the Department in 1940 and later grew into today's Croatian Veterinary Institute. The wide variety in the teaching, scientific and professional work of the Department over the years formed the basis for the foundation of new departments within the Faculty (the Department of the Biology and Pathology of Birds, Silk Worms, Fish, Crabs, Shellfish and other Molluscs, Department of Zoohygiene and the Department of Poultry Diseases), for which the former staff of the Department are particularly to thank, that is: Prof. Dr. Ivo Tomašec, Prof. Dr. Josip Ivoš and Prof. Dr. Milan Kralj.

In 1947 the Department moved to the Faculty's new administrative building in Heinzelova Street, but until 1959 did not receive its own premises on the first floor of the first south building, where it still is today. The Infectious Diseases Clinic was housed in adapted premises in the building formerly used for animal experiments, where it remained until 2016, when it moved to newly built facilities. The modern design of the Clinic for Infectious Diseases together with its isolation unit, stretches over an area of 900 m<sup>2</sup>, and contains all the facilities and equipment needed for the activities of professors and students in procedures related to healthy and infected animals. The opening of the new facility Clinic for Infectious Diseases has made it possible to reaffirm the long ago adopted concept of reception and treatment of the infectious patients in the clinic's building and areas physically separated from other clinics of the Faculty enabling the application of high standards of biosecurity in working with diseased animals. Such organizational approach is the extension of the long ago adopted Central European and Croatian traditions and modern trends in the treatment of infected people and animals.

The content and organization of graduate studies at the Department have always been aligned with recent world trends in veterinary medicine, especially in the field of microbiology, immunology, epizootiology and infectious diseases of animals. In the planning, structure and content of classes in individual courses the situation in livestock production and the epizootiological situation in this country and the wider surroundings have had a significant influence. Classes began at the Department in 1922 in the following courses: Livestock Hygiene and Microbiology in the 5<sup>th</sup> semester, Aetiology of Infectious Diseases, with practicals in aetiological diagnostics in the 6<sup>th</sup> semester, Aetiological Therapy of Infectious Diseases with practicals (serotherapy, vaccination) in the 7<sup>th</sup> semester, and Special Pathology and Therapy (clinics) of Infectious Diseases with practical work in the 6<sup>th</sup> and 7<sup>th</sup> semesters. Over time the curriculum changed so that according to the latest curriculum from 2005, professors at the Department now teach: Veterinary Immunology in the 3<sup>rd</sup> semester,



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General Microbiology in the 4<sup>th</sup> and Special Microbiology in the 5<sup>th</sup> semester, and the course Infectious Diseases of Domestic Animals in the 9<sup>th</sup> and 10<sup>th</sup> semesters. Professors and associate professors at the Department are involved in teaching classes in other compulsory courses such as: Ambulatory Care Clinic and Herd Health, and the compulsory elective courses: Diseases and Treatment of Horses, Diseases and Treatment of Farm Animals (in the study track Farm Animals and Horses), Diseases and Treatment of Dogs and Cats (in the study track Companion Animals) and Veterinary Public Health (in the study track Veterinary Public Health and Food Safety). As part of the integrated study, the teaching staff from the Department head three elective courses: Veterinary Clinical Microbiology in the 6<sup>th</sup> semester, and Emerging Infectious Diseases and Zoonoses in the 11<sup>th</sup> semester. Since the foundation of the Department classes have been accompanied by the appropriate textbook literature, and to date more than 30 textbooks have been published at the Department.

The Department of Microbiology and Infectious Disease with Clinic was one of the first organizational units to become involved in providing postgraduate studies at the Faculty. Since 1961/1962 academic year, a postgraduate study was introduced in Microbiology and Epizootiology, and already in the following year on the level of the Board and the Council of the Faculty a decision was rendered to introduce the study General Microbiology and Mycology. Today the postgraduate classes at the Department are taught as part of the reorganized specialized study in Microbiology and Epizootiology, and the single university PhD study in Veterinary Sciences. The teaching staff from the Department participate as heads and associates in holding classes within the curricula of seven other postgraduate specialist studies, and within the PhD study as heads of eleven branch-oriented courses. According to the figures available, a total of 219 Master's theses and 203 PhD dissertations have been written and

defended at the Department, which in that regard makes it one of the most productive organizational units.

Right from the foundation of the Veterinary High School, scientific research work began in the field of infectious diseases of poultry at the Department of the Science of Infection. Moreover, research was undertaken into epizootic abortion and sterility, and forms of immunization against sheeppox. In 1927, with the support of the Ministry of Agriculture, a laboratory was founded in the Department for research into infectious diseases of bees, and already one year later Nosema disease of bees was diagnosed for the first time in this country. In that period, Prof. Dr. Stjepan Plasaj was particularly active in scientific research work at the Veterinary High School and Faculty. He is today justifiably deemed to be the initiator of scientific research work at our institution.

In the period that followed, scientific research work was aimed at implementing more than 30 national and international projects relating to research into bacterial, viral and fungal diseases of domestic animals. With the use of their own new diagnostic procedures, the Department was able to conclude more contracts with the Ministry of Agriculture and the Ministry of Health relating to routine diagnostics of infectious diseases, especially equine infective anaemia, and leptospirosis.

Six laboratories for performing most of the professional work of the Faculty are an integral part of the Department.

The Bacteriology Laboratory was founded in 1921 and the Department, on the basis of an agreement with the Ministry of Agriculture, attained the status of a diagnostic station. Today the Bacteriology Laboratory primarily serves for diagnosis of bacterial diseases, that is, isolating bacteria from material originating from patients at the Clinics of the Faculty of Veterinary Medicine. In the Bacteriology Laboratory, amongst other things, the resistance is monitored of the isolated bacteria to antimicrobial drugs, especially species of *Pseudomonas*



Since 2011, the Department with its associated laboratories has an informal status of the central national institution for the diagnosis of equine infectious diseases. In accredited laboratories, about 30,000 clinical samples of horses are searched annually.

*aeruginosa*, which is a frequent cause of various resistant and chronic infections, especially in dogs.

In the Department the Laboratory for Bacterial Diseases of the Horses was established in 2013 with the aim of conducting the routine diagnostic of bacterial infectious diseases of horses in Croatia. The work of that laboratory relates to general bacteriological testing of various forms of clinical material from horses, and diagnostics of equine salmonellosis, bacterial abortions, and contagious equine metritis, by isolating pathogens and molecular methods.

The Mycological Laboratory was founded in 1956 for the needs of routine laboratory diagnostics of animal mycoses. In the Mycological Laboratory intensive research was conducted into the epizootiology of dermatophytosis in dogs and cats, and new diagnostic methods. With the development of laboratory mycological diagnostics of dermatophytes and the independence of many out-patient clinics for small veterinary practices, over the past ten years the number of mycological tests has fallen and has been reduced to diagnostics of patients of the Faculty and referred patients, mainly from small practices, with complicated health conditions.

The Virology Laboratory was founded in 1960 and from the beginning of its work served to research viruses and viral diseases of animals. That Laboratory whether independently or in cooperation with the pharmaceutical industry, produced several vaccines for respiratory diseases of cattle and horses, and viral swine diseases, which found wide application in the very well-developed and lively livestock industry and veterinary practice of that time. In 2006 systematic and intensive research began in that Laboratory into viral diseases of horses. The result of that research was the introduction of new diagnostic methods into routine use, which created the foundation for opening a new laboratory. The need for the new laboratory was additionally based on the alignment of the legislation of the Croatia

with European standards and the commitments taken on to monitor and control a larger number of viral diseases of horses. As a result, in 2009 The Laboratory for Equine Viral Arteritis was founded within the Department of Microbiology and Infectious Diseases with Clinic. From its foundation the Laboratory has conducted routine diagnostics of equine viral arteritis for the needs of the Ministry of Agriculture. Thanks to successful cooperation with the competent Ministry, in the following year the Laboratory already extended its routine diagnostics to equine rhinopneumonitis and in 2011 it began to perform diagnostics of West Nile encephalitis. In 2010 the Laboratory successfully completed the procedure of accreditation and since 2011, by a decision of the Ministry of Agriculture, became the reference laboratory for diagnostics of equine viral arteritis and the authorized laboratory for diagnostics of equine rhinopneumonitis and West Nile encephalitis. Due to the need for objective diagnostics of infectious diseases in veterinary out-patient clinics, from 2012 to 2018 the Laboratory extended its work to serological and molecular diagnostics of viral diseases of dogs and cats, and in scientific terms it became recognized primarily for research into arboviral infections, in cooperation with national and international virologists, both veterinary and medical professionals. Today all forms of contemporary diagnostics and research virology methods are routinely performed in the Laboratory (virus-neutralization assay, hemagglutination inhibition assay, *immunoblot*, real time polymerase chain reaction, immunofluorescence etc.) as well as work with a large number of primary and line cell cultures.

The Leptospirosis Laboratory was founded in 1950, and up to 1995 routine laboratory diagnostics of leptospirosis in humans were performed, for the needs of the infectology wards of hospitals and medical centers in the Republic of Croatia. At the same time, it also performed routine diagnostics of domestic and wild animals, and since



A lecture by Prof. Dr. Ljubo Barbić to 9<sup>th</sup> semester students on the course of Infectious Diseases of Domestic Animals.



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2008 routine diagnostics of leptospirosis in horses, for the needs of the Ministry of Agriculture. From the beginning of its existence right up to the present day, the Laboratory has used microscopic agglutination in diagnostics of leptospirosis, as the world reference serological method. In the last twenty years in collaboration with scientists from the Faculty of Forestry of the University of Zagreb and the Hospital for Infectious Diseases “Dr. Fran Mihaljević” from Zagreb the molecular epizootiology of leptospirosis and hemorrhagic fever with renal syndrome is intensively studied using recent molecular procedures.

The Laboratory for Diagnostics of Equine Infectious Anaemia was founded in 1971 only one year after Prof. Dr. Leroy Coggins (Cornell University) presented the gel-diffusion precipitation test (GDP-test) as the standard method of diagnostics of EIA. The laboratory was one of the first in the world to introduce the use of serological diagnostics of diseases, and became the centre for diagnostics of that disease for the area of the former Yugoslavia and the surrounding countries. According to the world trends in diagnostics of Equine Infectious Anaemia the laboratory has been using the immunoenzyme and immunoblotting tests for four years.

Since 2011 the three laboratories at the Department (the Laboratory for Leptospirosis, the Laboratory for Diagnostics of Equine Infectious Anaemia and the Laboratory for Equine Viral Arteritis) have had the status of accredited laboratories according to the standard HR EN ISO/IEC 17025.

The accreditation of these laboratories with the qualitative and quantitative abilities of the other laboratories of the Department enabled the signing of the contract with the Ministry of Agriculture and Forestry of the Republic of Croatia by which the Department got the informal status of the central national institution for the diagnosis of contagious horse diseases. Since 2011 about 30,000 tests of the clinical samples of horses are searched annually at the Department, most of which are serological diagnosis of Equine Infectious Anemia, Leptospirosis of

Horses, Equine Viral Arteritis, Equine Rhinopneumonitis and other contagious diseases occurring in Croatia. Within the expert programs of the Ministry of Agriculture samples of horses and other animal species are also searched for several transmissible infectious diseases and diseases of natural focal points.

Over the history of the Department so far, some professors have been particularly outstanding in their scientific work and have become members of the Yugoslav, or Croatian Academy of Science and Art. The following were elected as full members of the Academy: Professors Eugen Topolnik (1979), Slavko Cvetnić (1991) and Josip Madić (2012), and Prof. Dr. Mladen Hajsig (1975) as an associate member.

A strategic policy of the Department has always been to train its staff at prestigious scientific institutions abroad. Therefore, members of the Department, from the beginning of the 1950's to the present day, have spent short or longer periods of time at numerous medical and veterinary faculties and scientific institutions all over Europe and the USA.

From the very foundation of the Department its members have developed very lively and varied cooperation with many faculties and scientific research institutions in Croatia and abroad. The foreign institutions with which staff from the Department have worked over many years include: the Faculty of Veterinary Medicine University of Ljubljana, Slovenia; the Rayne Institute, the Royal Veterinary College in London, the United Kingdom; Istituto Zooprofilattico Sperimentale Della Lombardia E Dell'Emilia-Romagna, Brescia Italy; IZS Istituto Zooprofilattico Sperimentale, Teramo, Italy; Ecole Nationale Vétérinaire d'Alfort, (research laboratory: UMR 1161 INRA-AFSSA-ENVA de virologie), Maisons Alfort, France; EU-RL for Equine infectious anaemia, equine arteritis virus and equine herpes viruses Dozulé-Laboratory for equine diseases, Dozulé, France; Institut Pasteur, Paris, France; WHO/FAO/OIE Referral centre for leptospirosis, Royal Tropical Institute, Amsterdam, The Netherlands; CDC Atlanta, USA, etc.



Since 1950, scientists of the Leptospores Laboratory have been systematically investigating the epizootiology of disease in domestic and wild animals and humans.



The bacteriology laboratory of the Department, in which routine tests are undertaken on clinical samples from animals that have been brought in, and scientific and professional research is conducted into infectious diseases of animals caused by bacteria

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The leptospirosis laboratory, transfer of leptospirosis cultures to a liquid culture medium according to Khortof, and preparation of antigens for microscopic agglutination testing



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Clinical practicals with 10<sup>th</sup> semester students in the course Infectious Diseases of Domestic Animals, in the Infective Patients' Out-patients' section of the Clinic for Infectious Diseases, with the isolation unit.

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Clinical examination and treatment of a sick cat at the Clinic for Infectious Diseases, with isolation unit. Providing in-patient care for cat upper respiratory syndrome.



Clinical practicals with 10<sup>th</sup> semester students in the course Infectious Diseases of Domestic Animals, clinical examination and treatment of a sick dog at the Clinic for Infectious Diseases, with the isolation unit, providing in-patient care for canine infectious gastroenteritis

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Clinical practicals with 10<sup>th</sup> semester students in the course Infectious Diseases of Domestic Animals, clinical examination and treatment of a sick dog at the Clinic for Infectious Diseases, with the isolation unit, providing in-patient care for canine infectious gastroenteritis-*aspiration of the v. jugularis*.





## 7.4. Department of Parasitology and Invasive Diseases with Clinic

The Department of Parasitology was founded in 1930 and the first Head was Assist. Prof. Dr. Vinko Marochino. At first the Department did not have equipment for scientific research work, so its activities were limited to teaching courses in parasitology. In 1932 Assist. Prof. Dr. Ivo Babić was appointed Head of the Department, and he gradually and systematically began to procure the most vital equipment, and organize the work of the Department into a teaching and scientific unit. During its history it has moved several times around the old and the new locations of the Faculty, but since 1957 it has been located in its current premises, on the first floor of the clinical building. The outpatients' parasitology-dermatology clinic opened in 1997, and at that time the Department's name changed to the Department of Parasitology and Invasive Diseases with Clinic. The Department consists of four classrooms, a library and a parasitology laboratory, a laboratory for human serological diagnosis, a laboratory for animal serological diagnosis, and a laboratory for diagnosis of trichinosis. The parasitology practical laboratories were built in 2017 above the clinical lecture theatre.

At first classes were held in the course of Parasitology, and in 1946 a separate course known as Invasive Diseases was introduced. This continued until 1958 when they were merged into a single course, Parasitology and Invasive Diseases. Since 1970/1971 academic year, the course Tropical Parasitic Diseases was introduced, primarily to educate students from African and Asian countries, who were studying at our Faculty on the basis of the cooperation between Yugoslavia and the Non-aligned movement. Classes in this course continued right up to 2008. In the last curriculum from 2005, in which it was organized as an integrated undergraduate and graduate study in Veterinary Medicine, the previous two-semester course Parasitology and Parasitic Diseases became a single semester course in the 5<sup>th</sup> semester. As part of that course changes were made in order to update the teaching process, introduce new thematic units and introduce clinical work to students, which they undertake in the Ambulatory Care, Parasitology and Dermatology Clinic, and housing for large animals at the Faculty

Clinics. Professors at the Department also participate in teaching the elective course Parasitology in Public Health in the 6<sup>th</sup> semester, and the compulsory elective courses Diseases and Treatment of Pet Birds, Exotic Pets and Laboratory Animals; Diseases and Treatment of Dogs and Cats II., both in the 11<sup>th</sup> semester (in the study track Companion Animals), Diseases and Treatment of Horses in the 10<sup>th</sup> semester; Diseases and Treatment of Farm Animals in the 11<sup>th</sup> semester (in the study track Farm Animals and Horses), and the compulsory elective course Veterinary Public Health in the 11<sup>th</sup> semester (in the study track Hygiene and Technology of Animal Food and Veterinary Medicine in Public Health). As part of those courses, the teaching staff from the Department teach students to find ectoparasites or endoparasites specific to individual species of animals, then the diagnostics, treatment and prevention of parasitic diseases as an essential part of the care for the health of animals and people, and the biology, development, morphology and determination of endoparasites as an aetiological factor of the occurrence of food-borne zoonoses.

A postgraduate study in Parasitology was introduced in the 1964/1965 academic year, and it lasted three semesters. In 1974 it was extended to four semesters. In the years that followed the study program was updated with new insights (1979, 1985) and since 1995/1996 academic year it was organized as a two-year Master's or a three-year PhD study. The course existed until 2003/2004 when the Master of Science study was abolished. Professors at the Department took part in teaching other postgraduate studies for scientific and specialized training, and after the organization of postgraduate classes according to the Bologna Process since 2005/2006 academic year, they were lecturers on six postgraduate specialized study courses. In the same academic year, a joint University PhD study in Veterinary Sciences was set up, in which the teaching staff from the Department took part in teaching classes in five specialized branch courses.

The scientific research work of the Department at the beginning of its existence covered systemic fauna research into parasites of domestic and wild animals. From 1936 research began into the epizootiology



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of the biology of pathogens, and later coprological diagnostics and immunodiagnosics. At the beginning of the 1950's there was a move to research protozoan diseases, especially blood protozoa and toxoplasmosis, and the biology of parasites and vectors, especially pond snails and ticks. Through merging the fields of parasitology and invasive diseases into one course, intensive work was begun to research the most important parasitic invasions and to prevent them on farms. At the end of the 1950's more extensive immunological research began, in the direction of immunodiagnosics and immunoprophylaxis, at first of fasciolosis and cysticercosis and later other helminthiasis. In that period, the work of Prof. Dr. Ivo Babić was particularly outstanding, and on the basis of his scientific contribution in 1948 he was elected as a corresponding member and then in 1950 a full member of the Yugoslav Academy of Sciences and Arts. Since 1970's research was conducted into indirect immunofluorescence in serological diagnostics of some tissue parasites, research into coccidiosis and coccidiostats, and immunodiagnosics and therapy of echinococcosis. During the 1980's extensive research work began into trichinellosis, and alongside immunofluorescence, new serological methods for immuno-enzyme testing (ELISA) began to be used, alongside immunoblotting methods. All these methods are used routinely in the laboratories of the Department in diagnostics of parasites. From that period, the scientific work of Prof. Dr. Teodor Wikerhauser stands out, and in 1975 he was elected as an associate member, in 1983 as an extraordinary member and in 1991 as a full member of the Croatian Academy of Sciences and Arts, the legal successor of the Yugoslav Academy of Sciences and Arts. Since 2005 extensive research began in epizootiology, diagnostics, treatment and prevention of leishmaniasis, in which Prof. Dr. Tatjana Živičnjak was, amongst others, the head of the bilateral Croatian and Serbian project: *Epizootiology and epidemiology of leishmaniasis in Croatia and Serbia and Distribution vectors in the non-enzootic*

*area and serological monitoring of dogs* (2008-2010). Since 2013 staff at the Department, in cooperation with the Department of Biology, Pathology and Breeding of Game Animals began research into parasites in various wild animals. The staff from the Department are participating in the international scientific FP7 ERA Chair Project entitled, *Upgrading the research performance in molecular medicine at the Faculty of Veterinary Medicine University of Zagreb* (2014-2019) and in the project of the Croatian Science Foundation, *Molecular Epidemiology of some invasive diseases of wild animals* (2015-2017). Prof. Dr. Tatjana Živičnjak was appointed coordinator for the Croatian International EFSA/ECDC project *European Network For Sharing Data on the Geographic Distribution of Arthropod Vectors, Transmitting Human and Animal Disease Agents* (2015-2019). The professional work of the Department takes place in laboratory diagnostics. At the Department from its very foundation there has been a parasitology laboratory, which is today equipped with state-of-the-art apparatus, where most of the diagnostic work takes place. Various methods of coprological testing are used (flotation, sedimentation, McMaster, FLOTAC), immunofluorescence for giardia and cryptosporidium, as well as determining parasites from organs. In the 1970's a serology laboratory was also founded in the Department, where various forms of immunodiagnosics and serological tests are performed. Serological diagnostics are performed using animal blood samples (especially pig blood for trichinelosis) and human blood. Since 2000 the laboratory has been divided into two separate units. In the animal serological laboratory various forms of tests are conducted on serum and tissue from domestic and wild animals (toxoplasmosis, neosporosis, fascioloidosis, dirofilariosis, and especially diagnostics of leishmaniasis). Within the laboratory, apart from routine examinations of serum and aspirates, there is a team for typing of leishmania in cooperation with the Leishmania Identification Reference Centre of Rome. In the laboratory, alongside diagnostics

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In the Parasitology practice room, 3<sup>rd</sup> year students attend practice classes. These classes consist of viewing parasites under a microscope, as well as of studying morphological characteristics of adult parasites and their developmental stage under the microscopes.

of leishmaniasis, leishmania is grown in cultures, and antigens are produced for serological tests. In the human serology laboratory, serological tests are conducted on human blood samples suspect for various parasitosis (echinococcosis, cysticercosis, trichinellosis, toxocariasis, and leishmaniasis) and the laboratory provides services for almost all the human medicine institutions. In 2009, when the quality control system was introduced according to the Standard HR EN ISO/IEC 17025:2007, a laboratory was founded for diagnosis of trichinellosis (LanT) at the Department. The laboratory works on the post mortem diagnostics of trichinellosis using trichinelloscopy and digestion methods on muscle tissue samples from pigs, horses and wild animals. Serological diagnostics are also performed in the laboratory to find anti-bodies to trichinella in domestic and wild pigs (boar) using immunoenzyme tests and immunoblotting.

The Department's experts conduct experimental testing of the effectiveness of various antiparasitic medicaments and give expert opinions and evaluations on these medicaments.

Patients have been received and examined at the Department since 1980s, and sampling, clinical processing and diagnostics as well as drug prescribing and giving instructions to owners on parasite suppression have been performed in the ambulance since 1977 when the Parasitological-Dermatological Ambulance was founded.

Besides the patient reception in the Parasitological Ambulance the Department's experts also go to the field preferably to the veterinary stations where a parasitological problem has emerged.

Staff from the Department have been on short-term and long-term training visits at several institutions abroad, in Europe, the USA and Brazil. Prof. Dr. Albert Marinčević was awarded the status of *Diplomate* in 2007 in the field of parasitology at the European Veterinary Parasitology College, EVPC.



Since the foundation of the Department, a large collection of protozoa, helminths and arthropods has been collected.



Since 1997, the Parasitology Clinic is the place where clinical treatment of patients, especially small animals (dogs and cats), is performed. This is where sampling and diagnostics takes place, as well as handing out medicine, and advising owners on the methods for the suppression of parasites. In addition, this is where students have their practice classes.



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Since the 1970s, trichinellosis has been a public health problem, and there were numerous outbreaks of trichinosis. It is for this reason that the postmortem diagnostic methods (trichineloscopy and artificial digestion) on pork, horse and game meat are performed at the Department's Laboratory. Also performed in the Laboratory is serological diagnostic for the detection of antibodies against Trichinosis in pigs and wild boars using an immunoenzymatic method and the Western Blotting (also called immunoblotting) technique.

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Today, various types of domestic and wild animals' serum and tissue tests (toxoplasmosis, neosporosis, fascioloidosis, dirofilariasis, and especially leishmaniasis detection) are performed at the Veterinary Serological Laboratory. In addition to the routine serum and punctate screenings, as part of the laboratory work, a team for standardization of *Leishmania* was formed in collaboration with the Leishmania Identification Reference Centre in Rome. Beside diagnosing leishmaniasis, *Leishmania* are grown in cultures at the Laboratory, and an antigen for serological tests is produced.



There is a Parasitology Laboratory here as well, since the foundation of the Department. This laboratory has been refitted a few times, and is equipped with the state-of-the-art equipment. It is in this Laboratory that the biggest part of diagnostics is performed, as well as various methods of coprological examination (flotation, sedimentation, the McMaster technique, the FLOTAC technique), detection of *Giardia* and *Cryptosporidia* by immunofluorescence, the Knott's test, as well as the detection of parasites from the organs.

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In the Human Serology Laboratory, serological tests are conducted on human blood and liquor samples for which there is a suspicion that they are positive for various parasitosis (echinococcosis, cysticercosis, trichinosis, toxocarosis, leishmaniasis). Today this Laboratory provides services to almost all healthcare facilities for humans.





## 7.5. Department of Poultry Diseases with Clinic

The need for comprehensive consideration of the problems involved in poultry production arose at the Faculty of Veterinary Medicine as long ago as 1931, when Prof. Dr. Stjepan Plasaj proposed that teaching staff should be selected for that purpose. Eminent experts of the Faculty raised that question again in 1961 and proposed that a comprehensive approach should be taken to poultry, from both a teaching and a scientific perspective. However, the Department of Pathology of Poultry in Breeding and Production was not founded until 21<sup>st</sup> February 1969, and the first member of the teaching staff was Prof. Dr. Milan Kralj. From the establishment until 1992, the Department worked closely with the Poultry Centre which after that year became part of the Croatian Veterinary Institute. In line with its expanded work and the development of the science, in 2005 the name of the Department changed to the Department of Poultry Diseases, with Clinic.

In 1992 the Department was expanded and, apart from the well-organized facilities for experimental poultry, an accompanying laboratory was also set up for mainly bacteriological and serological tests. With the recognition that during their regular education veterinarians were not taught about diseases of birds different from domestic poultry (pet birds), and that these animals were very frequently being brought to veterinary clinics for examination, new premises were set up where the Outpatients' Clinic for Birds was opened in 2002, as the first specialized Outpatients' Clinic of its kind in Croatia. In the same year a Laboratory for Molecular Diagnosis of Viral Diseases of Birds and Domestic Poultry was set up and equipped using project funds, and in 2006 the Laboratory for Chlamydia, which received accreditation in 2010.

Graduate classes have been taught since the 1968/1969 academic year, when the elective course Pathology of Poultry in Breeding and Production was introduced. Since 1970/1971 academic year it was taught as a compulsory course in the 9<sup>th</sup> and 10<sup>th</sup> semesters. According to the curriculum of 1997/1998 it was only taught in the 10<sup>th</sup> semester, and with the introduction of integrated undergraduate and graduate studies since 2005/2006 academic year, it was taught in the 11<sup>th</sup>

semester under the title Poultry Diseases. The aim of this course is to provide students with knowledge about the ways of the spreading and occurrence, clinical manifestations, pathological changes, diagnosis and treatment of poultry diseases and preventive field work interventions.

As part of the latest curriculum, the teaching staff of the Department are also responsible for two elective courses: Ecological Production of Poultry and Game Birds in the 11<sup>th</sup> semester, and Technological Systems of Poultry Production in the 11<sup>th</sup> semester.

The teaching staff at the Department also participate in teaching the compulsory elective courses Diseases and Treatment of Farm Animals (in the study track Farms Animals and Horses), and Diseases and Treatment of Pet Birds, Exotic Pets and Laboratory Animals (in the study track Companion Animals), in the 11<sup>th</sup> semester. In an effort to respond to teaching commitments, they also regularly publish literature for students, which were published at first in the form of printed notes, but more recently as the university text books Diseases of Poultry (2008) by Prof. Dr. Zdenko Biđin and Diseases of Birds Kept as Pets (2010), by Prof. Dr. Estella Prukner-Radovčić, and the university handbook, Poultry Farming (2017) by Prof. Dr. Estella Prukner-Radovčić, Assoc. Prof. Dr. Danijela Horvatek Tomić and Assist. Prof. Dr. Željko Gottstein.

Particularly extensive material from which students and veterinarians can gain solid knowledge about poultry and exotic pets is also contained in the last sixth edition of the *Veterinary Manual* (2012) in which all the professors of the Department participated.

Postgraduate classes in poultry production began at the Faculty of Veterinary Medicine since 1962/1963 academic year, as part of the postgraduate study in poultry production, and they were taught up to 1993/1994 within the Poultry Centre. After that time postgraduate classes moved to the Department, and from 1995/1996 to 2003/2004 students were enrolled in a postgraduate study in Physiology and Pathology of Poultry and Game Birds, which was organized as a two-year Master's or a three-year PhD study. Since 2005/2006 professors



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took part in teaching the university PhD study in Veterinary Sciences, where they were heads of seven specialized branch courses in the field of poultry production and diseases of other birds. In 2009, at the initiative of Prof. Dr. Estella Prukner-Radovčić, a specialized postgraduate study entitled Breeding and Pathology of Exotic Pets was organized, in order to extend teaching, scientific and professional work to birds that are not poultry, and to other exotic animals (primarily those that lay eggs).

The scientific research work at the beginning of the work of the Department was marked by Prof. Dr. Milan Kralj who, with co-workers from the Poultry Centre, for the first time in this country noted ten viral diseases of poultry and explained their aetiology and prevention. He received several awards for his notable work in poultry farming. He also held three Yugoslav medals: the Order of Labour with a Golden Wreath, the Order of Merits for the People with Silver Rays, and the Order of Labour with a Red Banner.

In the later work of the Department an exceptional contribution was made by the staff in a very wide field of scientific work in national and international scientific research projects. Research was mainly undertaken in teams, studying viral and bacterial diseases, domestic diseases of poultry and birds and other exotic pets, or of those that live freely in nature. Staff at the Department also made a scientific contribution in research into the action of many medical preparations, as well as feed supplements for poultry. The first international project was realized in cooperation with the USA in 1986, studying the effect of *E. coli* on the respiratory system of turkeys. Since then the staff of the Department have taken part in a total of 15 international projects. These projects were implemented within the COST Actions, EU SERA-ERA-NET, FP7, and the Department coordinated with two projects funded by the International Atomic Energy Agency (IAEA). This has enabled cooperation with many institutions in Europe and the USA and additional education for the professors, especially to the

younger associates. Cooperation with the University of Alma Mater Studiorum in Bologna, the Veterinary Faculties of Munich and Berlin, the Atomic Energy Agency in Vienna, the Faculty of Veterinary Medicine in Vienna and Ljubljana and many other institutions is especially important.

Regarding the national projects, those financed by the Ministry of Science have been particularly important, and they have been run by all the teaching staff of the Department. This has resulted in a great wealth of published scientific papers, where those with a high impact factor stand out in particular, mostly published as the result of international collaboration. Good cooperation was also established with the city of Zagreb through which several projects with interest not only for scientists but for all citizens as well were funded. Bird health in the area of the city is being investigated as well as procedures for the protection of the health of poultry kept on small farms around the city. The teaching staff regularly take part in national and international conferences, presenting their scientific work. Their contribution is also outstanding in organizing national but also important international scientific conferences.

The Department also achieves notable results in professional work. Throughout history, the staff from the Department cooperated not only with scientific but also with many economic organizations in the country and in the world. The Department is engaged in acute problems of practice and provides expert assistance to the poultry organizations, services of the examination of the carcasses, diagnostics, makes vaccines and gives directions for the treatment and suppression of poultry diseases.

In its own laboratories it isolates, identifies and types the isolates of various micro-organisms, primarily related to diseases of poultry and other birds, but also those related to reptiles. Also, in collaboration with the Department's Molecular Diagnosis Laboratory the genus of the bird is determined.



The Department of Poultry Diseases with Clinic has been dealing with the acute problems of the practice for many years now, and it enters into agreements with the poultry producing companies, providing them with expert assistance, vaccines, and guidelines for medical treatment and control of poultry diseases. In recent years there has been an increase in research on poultry immunoprophylaxis, which is one of the fundamental measures in poultry health protection, but also in the human health protection, because humans are end consumers of poultry.

There is also a national reference laboratory within the Department, Laboratory for Chlamydia, accredited in 2010 in line with the standard HRN EN ISO/IEC 17025:2007. The founding of an Outpatients' Clinic within the Department in 2002, specialized for illness of birds and other exotic pets, boosted teaching but also the reputation of the Faculty of Veterinary Medicine. Teaching staff from the Department also run life-long education for veterinarians by organizing a variety of workshops and courses (education on procedures for vaccinations, prevention of salmonella, avian chlamydiosis, clinical treatment of exotic pets, and micro-chipping). Cooperation with the Ministry of Culture has also been established so the Birds' Ambulance is authorized to mark the strictly protected and protected exotic animals with microchip and the registration of marked animals in the base of strictly protected and protected animals (2016). In 2017 the Department received from the Ministry of Culture a permit for carrying out wildlife rehab jobs.

The inventive work of the staff has made a special contribution to promoting the Department and the Faculty of Veterinary Medicine. In this field of work, several awards and prizes have been received and four patents have been registered. The main initiator of these activities was Prof. Dr. Hrvoje Mazija, who was awarded for his inventions in 1995 with the Order of the Morning Star of Croatia, with the likeness of Nikola Tesla, and in 2005 he received the Belgian Medal of Invention.

The professors of the Department had honorable and responsible duties at the Faculty of Veterinary Medicine as well as other numerous tasks at the state bodies what is certainly a great acknowledgment to them and to the Department. Prof. Dr. Zdenko Biđin is a member of the Committee for Veterinary Medical Products at the Ministry of Agriculture for many years. Prof. Dr. Estella Prukner-Radovčić was appointed by the Ministry of Science and Education as a representative of the Republic of Croatia at the European Commission for: EU COST

Domain Committee "Food and Agriculture" (2007-2010 and 2010-2014); Programme Committee Horizon2020 SC2 (Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy) (since 2013); Scientific Advisory Committee PRIMA foundation (Partnership for research and Innovation in the Mediterranean area) (2018-2022). Prof. Dr. Zdenko Biđin served as the Dean of the Faculty, while Prof. Dr. Hrvoje Mazija, Prof. Dr. Biđin and Assoc. Prof. Dr. Danijela Horvatek Tomić were vice-deans of the faculty. Prof. Dr. Estella Prukner-Radovčić held the function of the ECTS coordinator of the Faculty.

Heads of the Department were: Prof. Dr. Milan Kralj (1969-1984), Prof. Dr. Hrvoje Mazija (1985-1991; 1993-2006), Prof. Dr. Zdenko Biđin (1991-1993; 2009-2013), Prof. Dr. Estella Prukner-Radovčić (2006-2009) and Assist. Prof. Dr. Željko Gottstein (since 2014).

Prof. Dr. Hrvoje Mazija also made a significant contribution to the work of scientific associations (World Veterinary Poultry Association, WVPA), and for his work in that Association he was included in their Hall of Honour, and Prof. Dr. Estella Prukner-Radovčić (World Poultry Science Association, WPSA) was the president of the European Federation of the WPSA in 2018. The professors of the Department contributed greatly by their participation in the editor's committees and by reviewing articles in numerous journals.

Prof. Dr. Zdenko Biđin (1997), Prof. Dr. Hrvoje Mazija (2004) and Prof. Dr. Estella Prukner-Radovčić (2014) are full members of the Academy of Medical Sciences of Croatia. Prof. Dr. Hrvoje Mazija (2011) and Prof. Dr. Zdenko Biđin (2014) were awarded the title of Professor Emeritus, and Prof. Estella Prukner-Radovčić (2012) attained the title of *Diplomate* in Poultry at the European College of Poultry Veterinary Science, ECPVS). Dr. Maja Lukač is currently a resident in the field of the health of wild animals kept in zoos (European College of Zoological Medicine, ECZM).



The Department achieves outstanding contribution in a very wide area of scientific activity through national and international scientific-research projects. To this end, the staff at the Department of Poultry Diseases with Clinic also take part in clinical work with animals, either in the Department's Clinic or as part of the fieldwork-clinical examination and chicken material sampling.



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The Department's scientific-teaching staff takes part in the teaching of the compulsory elective course Diseases and Treatment of Birds-pets, exotic and laboratory animals, as part of the course track Pets in the 11<sup>th</sup> semester. For this purpose, practice classes for students in the 6<sup>th</sup> year are held in the Department's practice room. Among other things, the students also learn how to perform a proper physical examination of snakes and how to apply appropriate therapy.

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At the Department's Clinic there is also a stationary for sick animals, a special room for birds, and a special room for reptiles. Because of its severe clinical condition, this African grey parrot was placed in an incubator at the in-patient clinic. The incubator provides adequate temperature and isolation from other animals. In 2017, the Department received a permit for being a sanctuary for exotic wild animals.



At the Department's laboratories professional clinical work is performed as well; by using different methods isolates of many microorganisms are isolated, identified and typed. The laboratories are equipped with modern equipment, and there is a lot of diagnostics used for the needs of scientific research, patient diagnostics at the Department's Clinic, and the collaboration with the poultry producing companies.

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Since 2002 (when a Clinic specializing in exotic pets opened at the Department) until today, the Department staff has worked on clinical treatment of patients, especially birds and reptiles. The staff is involved in sampling and diagnostics, handing out medicines, instructing owners on the prevention of the diseases, proper feeding and care. Additionally, the clinic also carries out professional clinical work with students.





Word document interface showing a line graph and a data table.

**Graph:** Cumulative status of terms vs Days after first infection. The graph shows six categories: Healthy (blue), Infected (orange), Sick (green), Dead (yellow), Exterminated (red), and Exterminated village (purple). The x-axis ranges from 0 to 28 days, and the y-axis ranges from 0 to 100.

**Table:** A table with 10 columns and 14 rows of data. The first column is labeled 'Start'.

Start	1	2	3	4	5	6	7	8	9	10
100	99	98	97	96	95	94	93	92	91	90
100	99	98	97	96	95	94	93	92	91	90
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100	99	98	97	96	95	94	93	92	91	90
100	99	98	97	96	95	94	93	92	91	90
100	99	98	97	96	95	94	93	92	91	90

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## 7.6. Department of Veterinary Economics and Epidemiology

The current Department of Veterinary Economics and Epidemiology is descendant of the former Department of Livestock Management and Economics which was established in 1964. In 1975 it underwent a restructuring process and became the Department of Social Sciences with several organizational units covering economics of livestock production, organizational and economic aspects of veterinary medicine, sociology and political economy, history of veterinary medicine, foreign languages and physical and health education. In 2005 an independent Department of Veterinary Economics and Epidemiology was created.

The beginnings of teaching economics of livestock production can be dated back to the establishment of the Veterinary High School whose first full curriculum of 1922 included elective courses in Encyclopaedia of Agriculture in the 1<sup>st</sup> semester, Livestock Insurance, Agricultural Cooperatives and Alpine Agriculture in the 5<sup>th</sup> semester and Introduction to Political Economy in the 8<sup>th</sup> semester. In the 1952/1953 academic year, these courses were incorporated into a single compulsory course in Basic Socialist Agriculture taught in the 7<sup>th</sup> semester. This course was part of the curriculum until the 1962/1963 academic year. The following year a compulsory course in Economics of Livestock Production was introduced in the 7<sup>th</sup> and 8<sup>th</sup> semesters. Since then, the name and course schedule have been further changed and in the 2005/2006 academic year, when an integrated undergraduate and graduate program in veterinary medicine was introduced, the course was renamed as Veterinary Economics and is taught in the 11<sup>th</sup> semester, covering the principles of contemporary organization of veterinary service and veterinary practice, economic laws and analysis, macroeconomic and microeconomic aspects of animal health protection and veterinary public health, animal health economics and methods of assessment of economic impact of projects. Since the 2005/2006 academic year, a compulsory course in Veterinary Epidemiology was taught in the 5<sup>th</sup> semester while as of the 2012/2013 academic year it has been taught in the 9<sup>th</sup> semester. This course represents a new teaching unit within the veterinary

medicine course at the Faculty of Veterinary Medicine of the University of Zagreb. This course provides students with knowledge in work methods in veterinary epidemiology as well as analytical and other procedures in veterinary epidemiology used to determine and evaluate the disease occurrence in a population. Furthermore, by using concrete examples and task-based teaching, students are guided to solve problems individually, draw conclusions and make decisions in relation to problems they may encounter in the field, mainly with regard to the evaluation of the disease spread, the use of preventive methods and disease monitoring.

As of 2005, the new curriculum of the Department encompasses two electives: Agricultural Economics and Rural Development in the 6<sup>th</sup> semester and Management and Marketing in Veterinary Practice which today is held in the 11<sup>th</sup> semester. The first course offers students basic knowledge in rural politics and activities in the rural environment which are of importance for rural development. The second course mentioned aims to acquaint students with contemporary theories of management and administration, marketing theories and a marketing concept for organizing a veterinary practice. Professors from the Department participate in teaching the compulsory course Herd Health in the 11<sup>th</sup> semester.

Postgraduate classes have been offered by the Department since the 1986/1987 academic year, as part of the then newly-founded specialist postgraduate program in the Organization and Economics of Veterinary Services. Between the academic years 1995/1996 and 2003/2004, a two-year Master's and a three-year PhD programs in the Veterinary Economics were offered. Throughout the existence of the Faculty of Veterinary Medicine, the Department faculty members have participated in teaching other postgraduate studies as well. As of the 2005/2006 academic year, following the reorganization of postgraduate studies according to the Bologna Process, the Department faculty members participated as lecturers in seven postgraduate specialist studies. In the same academic year, a single university PhD study in Veterinary Sciences was introduced in which faculty members teach seven courses.



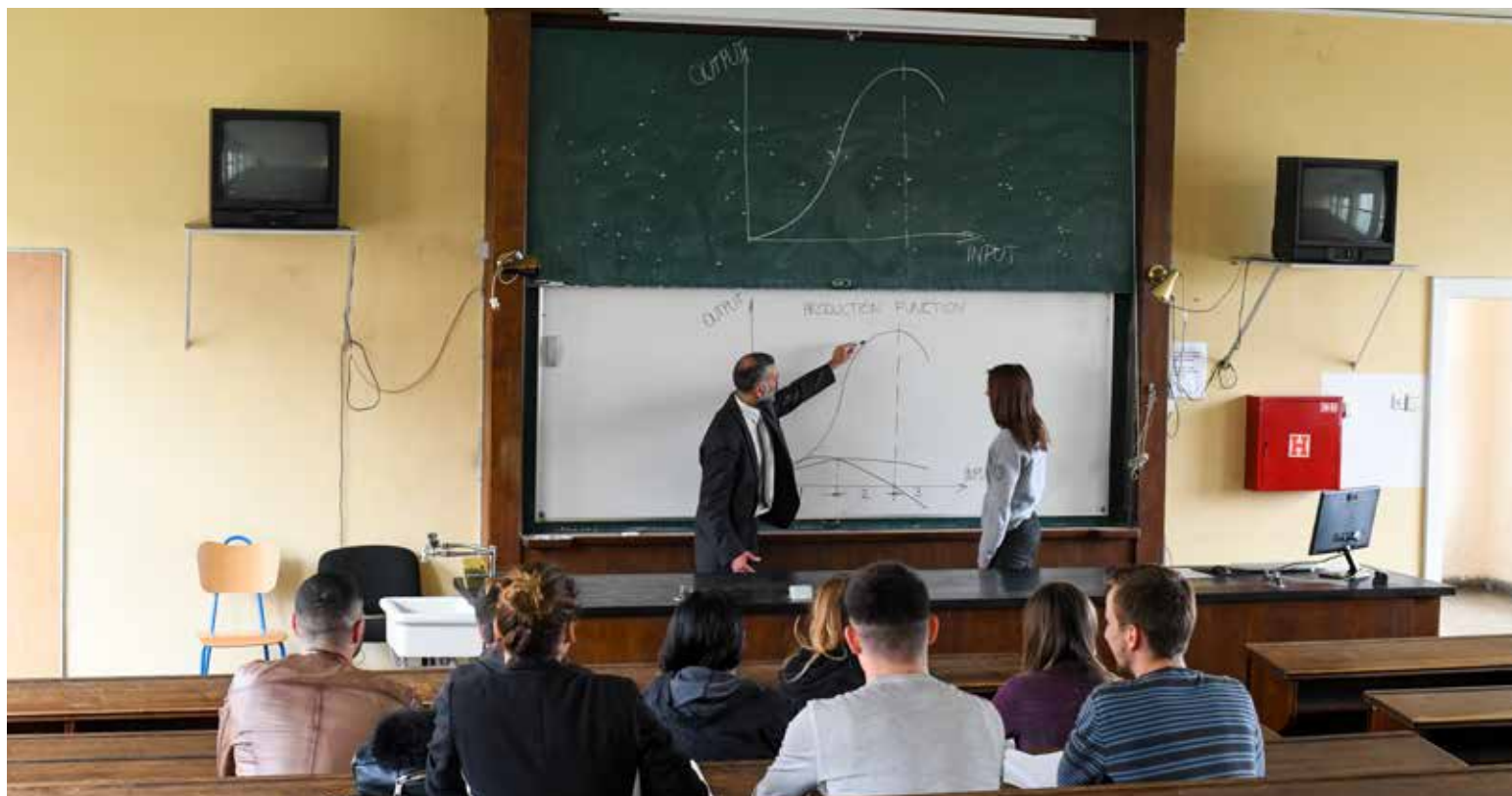
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The scientific research and professional work have been an integral part of the Department from its onset. Initially, the scientific research was related to economic analysis of veterinary procedures, preventive measures and treatments and product's market prices (Prof. Dr. Stjepan Meknić). Since the beginning of the 1970's up to the 1990's, studies were also conducted in the field of economic analysis of investment projects, cost-benefit analysis of preventive measures and treatments, the use of information technology in veterinary medicine in Croatia and the development of epidemiological databases pursuant to the EU requirements (Prof. Dr. Marko Tadić). As a result of these studies, an IT system for veterinary medicine in Croatia, known as ISVET-H, was created, along with a unified Client/Server application to collect data from primary care that are stored in specially designed databases, as well as client applications for Small and Large Practices for keeping out-patient logs in digital form.

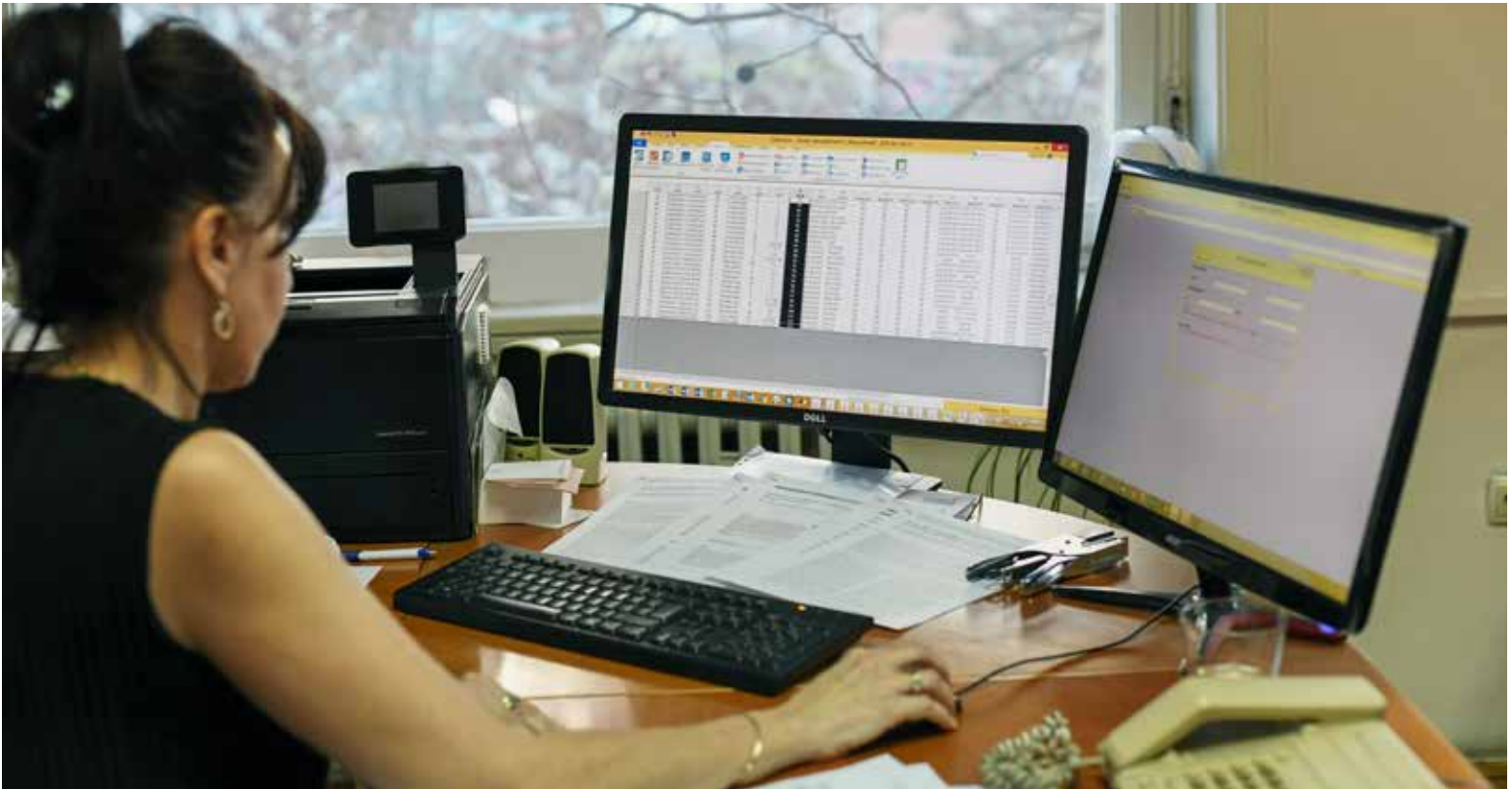
More recently, the Department faculty members have conducted a number of scientific researches related to infectious diseases and risk analysis, epidemiological researches of infectious and non-infectious diseases as well as researches in the field of molecular epidemiology and animal health economics. Their professional expertise in the field of veterinary economics and epidemiology includes development of investment projects and business plans, risk assessment studies as well as assessments of disease spread and control by using simulation models and other professional activities. That means that a large part of professional and teaching activities of the faculty members is devoted to the animal health economics and epidemiological research. The development and expansion of professional and scientific work of the Department faculty members have contributed to the advancement of the veterinary profession as a whole, including by their engagement in research of marketing in veterinary profession as well as the influence of political trends on veterinary work in Croatia.

Beside participating in nationally-funded projects, since 2006 the Department faculty members have participated in four international projects: *FP7 RISKSUR project*, Royal Veterinary College, London, UK, (2013) (M. Pavlak); *FP7 ERA Chairs Upgrading the research performance in molecular medicine at the Faculty of Veterinary Medicine University of Zagreb* (2014-2019) (Dean Konjević, Marina Pavlak); *LLP Lifelong Training Programme Erasmus. Academic Network of the European Commission-coordinator*, Royal Veterinary College, London: *Network for enhance the use of economics in animal health education, policy making and research in Europe and beyond*, (2011-2014) (Marko Tadić, Marina Pavlak, Denis Cvitković); *EU project EuropeAid Capacity building for development of the national Animal disease. Compensation fund and other services* (2013-2014) (Marina Pavlak); *IPA project Building innovation support through efficient cooperation network-BISTEC* (2013-2015) (Dean Konjević). The international recognition of the scientific and professional work of the Department faculty members is evident also from their involvement as experts in project evaluations such as within COST Actions (Marina Pavlak).

Faculty members have earned professional success and recognition nationally and internationally, best seen through their activities in the international cooperation both as professors and researchers as well as their participation as invited lecturers at national and international conferences and institutions thus contributing to the international recognition of the Department and the Faculty of Veterinary Medicine as a whole. Faculty members experts participating in international projects evaluations and in activities organized by the international organizations (*European Commission, OIE*). Some professors of the Department participated in teaching at other educational institutions and in the work of committees and working groups in public and state institutions at home and abroad (the German Embassy in Zagreb and DAAD).



During their studies at the Department of Veterinary Economics and Analytical Epidemiology, fifth-year students take a mandatory course in Veterinary Epidemiology, in which they learn about basic epidemiological principles, methods and analyses. Most of the classes are organized as practicals in which the students independently resolve problem tasks in the field of epidemiology and population medicine, using epidemiological and statistical programs.



The mandatory course Economics of Veterinary Medicine and the elective courses Management and Marketing in Veterinary Practice and Rural Economics and Development in particular are characterised by interactive classes between professors and students. In this group of courses, students are given the knowledge they need for work in the organization and economics of the veterinary service, the economics of production and the economics of herd health, aligned to the needs of public and private business entities.

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The scientific and professional activities of the Department include researching trends in diseases, conducting supervision of diseases, and risk analysis. An important activity of the Department is aimed at assessing the spread of disease, using various simulation techniques and programs. For example, in recent years staff from the Department have been working on creating simulation models of classical and African swine plague, and bird 'flu.



Bird's-eye view of the Faculty clinics











## 8. Clinics Division

### 8.1. Department of Veterinary Pathology

The Department of Veterinary Pathology was founded in 1921 and its first Head was Prof. Ljudevit Jurak. Although initially a human pathologist, through additional education in Vienna and Dresden, he developed into an experienced veterinary pathologist, and by passing on his knowledge and experience to younger generations, he was the founder of this branch of veterinary medicine in this country.

The Department was located at first in the building of the former Farrier School which was given to the Veterinary High School in Savska Street, and in 1959 it moved to the new location of the Faculty in Heinzelova Street. Within the Department there is a separate necropsy hall. The Department has a Museum of pathological and anatomical preparations, which in terms of the wealth of its exhibits may be included as one of the largest pathological-anatomical collections in Europe (about 3000 preparations), not only in numbers but also with many rare cases. The Department also has enviable documentation in the form of necropsy and histology protocols.

Today the Department has a modern pathohistological, cytological, immunohistochemical and immunocytochemical laboratory with a separate room with air-conditioning and ventilated digesters for the preparation and short-term storage of wet preparations. The Department has stepped into the field of molecular pathology by purchasing the rtPCR. The sectional hall has been completely redesigned and modern desks, air conditioning systems, a cold storage chamber for carcasses and modern sanitary conveniences with bathrooms have been installed in 2008 and 2009. The lecture-practice hall is suitable for holding lessons for a smaller number of students and at the same time serves as a microscopic practice hall.

According to the first complete curriculum for studies in veterinary medicine from 1922, the course General Pathology was taught in the 4<sup>th</sup> semester and the course Pathological Anatomy in the 5<sup>th</sup> and 6<sup>th</sup> semesters. The structure of the courses and their positions in terms of semesters changed, and following the reorganization of the integrated undergraduate and graduate study according to the Bologna Process in the 2005/2006 academic year, professors from the Department now

teach the compulsory courses General Veterinary Pathology in the 5<sup>th</sup> semester and Special Veterinary Pathology in the 6<sup>th</sup> semester. In the Department, as part of the Integrated study in veterinary medicine, the following elective courses are taught: Basics of Molecular Pathology and Histology of Tumours and Metastasis in the 9<sup>th</sup> semester, and Diagnostic Veterinary Cytology in the 11<sup>th</sup> semester. Professors at the Department are also associates in teaching the elective course Veterinary Laboratory Diagnostics in the 9<sup>th</sup> semester. In the study track Farm Animals, they participate in teaching the compulsory elective courses Diseases and Treatment of Horses in the 10<sup>th</sup> semester, and Diseases and Treatment of Farm Animals in the 11<sup>th</sup> semester, and in the study track Companion Animals, the compulsory elective course Diseases and Treatment of Dogs and Cats I in the 10<sup>th</sup> semester, and Diseases and Treatment of Pet Birds, Exotic Pets and Laboratory Animals in the 11<sup>th</sup> semester. Within these courses professors from the Department hold classes in selected chapters related to the pathology of individual animal species. It should be pointed out that in the 2016/2017 academic year the integrated undergraduate and graduate study in veterinary medicine was introduced in English, and so all classes are also taught to foreign students in that language. The wide-ranging activities related to conducting the graduate study in veterinary medicine required a great deal of work by professors, writing teaching materials. At first, they developed literature for teaching specific topics in the form of study notes, and then they published more complex literature in the form of university textbooks. The latest textbook was published in 2017 under the title Basic Dissection of Domestic Animals.

In the 1964/1965 academic year professors from the Department organized a postgraduate study in Pathological Anatomy, lasting three semesters. That study was extended in the 1973/1974 academic year to four semesters and was treated as a study for attaining a Master of Science degree. Apart from this study, in 1985 a postgraduate specialized study was also founded in Breeding and Pathology of Laboratory Animals. In the entire period from the beginning of the



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1960's, when the postgraduate study was launched, professors at the Department took part in other postgraduate studies at the Faculty of Veterinary Medicine, in teaching classes in general and special veterinary pathology. With the further development of the Faculty and University, and the introduction of the Bologna Process, the scientific degree, Master of Science was abolished and in the 2005/2006 academic year the university PhD study in Veterinary Sciences was created. As part of that study, professors at the Department participate in teaching the compulsory course Methods of Scientific Research Work, and several branch specific courses. In that same period the specialist postgraduate study in Breeding and Pathology of Laboratory Animals was reorganized. The aim of this specialist study is to acquaint students with theoretical and practical knowledge in good breeding techniques, and professional and independent work in preventive work, pathological diagnostics and treatment of laboratory animals. In 2013 permission was granted for the new postgraduate specialist study in Veterinary Pathology, with the aim of training students for independent work in the field of veterinary pathology, and passing on new, primarily professional, but also scientific insights which are not sufficiently present in the graduate study. In addition to these studies, professors at the Department participate at their mother Faculty in teaching classes in five other specialist studies.

So far, professors and scientists from the Department of Veterinary Pathology have made a major contribution to basic and applied research in the field of veterinary medicine. At first research was conducted to a modest extent. The scientific topics and their treatment stemmed primarily from the pathological and anatomic material collected during dissection in the early years. From the material collected in this way, the first scientific discussions arose, whether in the form of dissertations or scientific discussions between professors and teaching assistants. In the time that followed, professors at the

Department led a series of national projects in the field of veterinary pathology, and recently they have headed bilateral international projects and have been associates on other international projects. The intensive scientific work has resulted in many new insights, mainly in the field of comparative oncology and the very numerous relevant, accompanying international publications. In terms of the tumours researched, it is necessary to point out in particular tumours of the mammary glands of dogs and cats, mastocytomas, hepatocellular carcinomas, tumours of testicles in dogs, and recently there has been intensive work on researching molecular aspects of melanomas and melanocytomas in dogs. Although the same tumours are researched in animals and people, it was found that regardless how similar they are in histological terms, there are molecular differences characterised by the expression of the tumour markers, which will certainly be the subject of intensive research in future studies.

Apart from research into tumours, at the Department today research is being conducted in the field of veterinary pathology of infectious diseases of domestic animals, wild and exotic animals and fish. Papers related to diseases of wild animals stem from research into the wolf and bear populations in the Republic of Croatia, and contribute to an understanding and maintenance of the silvatic cycle of individual protozoan pathogens, including presentations of pathology and epidemiology in the population of animals where man does not have any direct influence on the clinical course and outcome of the disease. Prof. Dr. Željko Grabarević took part in discovering and research into the importance and action of pentadecapeptide BPC 157 in various diseases in people and animals, using experimental animal models. The results of this research to date have been internationally recognized, published by the team of researchers in more than 200 publications, in high-ranking journals, and international and world patents have been awarded.



Allowing multiple users to observe the same specimen using separate eyepieces, the discussion microscope system is ideal for both teaching and consulting, as well as for reviewing difficult cases with other pathologists and colleagues, and discuss the diagnoses.

Prof. Dr. Križan Čuljak from our Department and Prof. Dr. Mladen Belicza from the Department of Clinical Pathology from the Clinical Hospital Sestre milosrdnice started an international scientific meeting of comparative pathology in 1991 which was held for the 27<sup>th</sup> time in 2018 under the title International Symposium of Comparative Pathology Prof. Ljudevit Jurak.

Professors from the Department participate in the national and international congresses and symposiums. Close collaboration with the European Society of Veterinary Pathology (ESVP) resulted in the organization of 26<sup>th</sup> European Veterinarian Pathologists Symposium in Dubrovnik by the Department (2008).

After the foundation of the Department, beneficial pathological anatomy and histology with diagnostics developed gradually. The relatively small number of dissections and histological tests increased over the decades to several thousand tests per year. At first mainly farm animals and poultry were sent for dissection, but more recently dogs and cats have been more numerous, with 1000 to 1500 dissected carcasses per year. Apart from the work in the prosectura of the Department experts have often performed field work especially for diagnostic purposes for the needs of veterinary and other livestock institutions. Today, most of the work is done in the necropsy hall of our Department since the necropsy of animals outside the well arranged necropsy halls is conditioned by the provision of adequate conditions that are difficult to achieve on the field. The necropsy of classic domestic animals, the necropsy of exotic animals from zoos, and laboratory animals is often done for health control.

Histological analysis of different materials is increasingly intense, not only for the needs of scientific work by professors at the Department, but also for the needs of the Faculty and other experts who use histological documentation in their research. This work at the Department is increasingly extensive, and it is important and useful work, especially

from a professional and scientific point of view, both for the experts at the Department and other professional and scientific workers. Apart from pathohistological diagnostics, the Department recently introduced cytological tests and immunohistological and immunocytochemical diagnostics, without which in some cases it is impossible to set the correct diagnosis of a tumour. Over the last few years the number of biopsies delivered, either from the clinics of the Faculty or from veterinary stations and ambulances throughout Croatia, has increased considerably. Thus, in 2016 a total of 463 cytological samples were searched and 1150 pathohistological biopsy analyses performed.

The Department possesses equipment for macrophotography and microphotography. All scientific and professional studies include macrophotographs or microphotographs as documentation. Many other studies from the Clinics, Departments or external scientific institutions also contain photographic documentation created at this Department. Apart from professional and scientific studies, we use macrophotography and microphotography for documentation of occasional interesting cases, especially forensic cases, which are also used at times in teaching.

The staff from the Department have been on short or longer training visits abroad (Switzerland, Finland, Spain, Germany and Ireland). There is particularly good cooperation with the Department of Veterinary Pathology of the Vetsuisse Faculty, University of Zurich, Switzerland, where all our young experts have attended specialized courses in veterinary pathology.

Today all professors at the Department are members of the association the European Society of Veterinary Pathology, ESVP, and Assoc. Prof. Dr. Andrea Gudan Kurilj, is a member of the European College of Veterinary Pathologists, ECVP. At our Department she set up a training centre for education of pathologists to take the final ECVP Diplomate examination.



Immunohistochemistry is a common additional diagnostic test routinely performed in the Laboratory. The staining with antibodies is performed in the automated AutostainerPlus, while rehydration and dehydration is done by hand.



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Immunohistochemistry uses antibodies to detect specific antigens important in diagnosis of tumours and infectious diseases. Automated pipettes are important for preparation of adequate antibody solution.

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Histopathology is a routine diagnostic method used for diagnosing neoplastic, inflammatory and other lesions in domestic animals, and is routinely performed as part of the Department's clinical work.



The tissue for histopathology is prepared in the Preparation room for Histopathology, which follows all safety procedures to minimize toxic and potentially infectious effects of the chemicals and the processed tissue.



All necropsies of domestic, wild, laboratory and exotic animals are performed in the necropsy hall. Apart from dissecting animals upon owner's or veterinarian's request, necropsies are also performed as part of teaching, thus training the students to be able to perform the necropsy on their own once they finish their veterinary study.





## 8.2. Department of Forensic and State Veterinary Medicine

The Department of Forensic and State Veterinary Medicine was founded in 1936 as a teaching unit known as the Seminar for Forensic Veterinary Medicine, and the first Head was the parasitologist, Prof. Dr. Ivo Babić. In 1941 it was expanded to the Seminar for Forensic and State Veterinary Medicine, and in 1978 the Department of Forensic and Administrative Veterinary Medicine was created, as a scientific and teaching organizational unit within the Faculty.

In 1945 Mato Winterhalter was appointed assistant, having trained in the field of forensic and state veterinary medicine, and he was appointed as the first full-time lecturer at the Seminar.

Immediately after its foundation, the Seminar was located in the premises of the Department of Parasitology at the old location of the Faculty in a rented building at Savska Street no. 23. In 1940 the main building was built at the present location of the Faculty in Heinzelova Street, and the Seminar moved to premises on the first floor, opposite the Dean's office, where the Department is today. The premises of the Seminar, now the Department, consisted of practice rooms with about fifty work stations, a library, the Head's study, a room for assistants, a hall in which the Museum of the History of Veterinary Medicine was housed, and utility rooms. From 2016 to 2017 construction work was undertaken at the Department, whereby the assistants' room, and the museum hall were converted into a single space, bringing together the chemical toxicology, molecular and cellular laboratories of the Department. The museum collection was temporarily moved to the newly decorated hall way until a special space will be created to unite all museum collections in a single Faculty museum.

Since December 2017 the Forensic Laboratory, under a decision by the Minister of Agriculture, has been authorized as the official laboratory for veterinary activity in analyses for genotypization of animals, using test methods for establishing the unique DNA profile of animals (dogs, cattle, ungulates, sheep and goats), by multiplication of the short tandem repeat polymerase chain reaction (STR, PCR) according to the recommendations of the International Society for Animal Genetics. The laboratory consists of 6 rooms with a total area of 90 m<sup>2</sup>.

The first lectures in the two related compulsory courses, Forensic Veterinary Medicine and Veterinary Regulation were held in the 8<sup>th</sup> semester of the 1923/1924 academic year. Over the course of history the title of the course, its position in terms of semesters, and the number of hours taught changed, and in the latest curriculum for integrated undergraduate and graduate study of veterinary medicine, dating since 2005/2006 academic year, classes in the compulsory course Veterinary Legislation and Regulatory Affairs are taught in the 10<sup>th</sup> semester, and the compulsory course Forensic Veterinary Medicine in the 11<sup>th</sup> semester. In this curriculum professors from the Department also teach the elective course Responsibilities in Veterinary Medicine in the 11<sup>th</sup> semester, and Biological Traces and Evidences in Forensic Veterinary Medicine in the 12<sup>th</sup> semester. Since 2013/2014 academic year, Prof. Dr. Petar Džaja, due to the retirement of the previous historian Prof. Dr. Vesna Vučević Bajt, was appointed head of the compulsory course Introduction to Veterinary in the 1<sup>st</sup> semester, and the elective courses History of Veterinary Medicine and Veterinary Ethics in the 2<sup>nd</sup> semester.

Dr. Kristina Starčević, senior research associate, becomes a staff member and head of the Forensic Laboratory (ForensicLab) in 2018. In addition to conducting research project *Dietary lipids, sex and age in pathogenesis of metabolic syndrome* (Croatian Science Foundation) she also participates in the professional work of the Department and in a practical classes in laboratory. Since 2019 she becomes assistant professor at the Department of Chemistry and Biochemistry and remains associate of the Department.

The staff from the Department have taken part over its history in teaching many postgraduate studies at the Faculty of Veterinary Medicine. At the end of 2013, Prof. Dr. Petar Džaja and Prof. Dr. Krešimir Severin filed a request to the University to adopt a new curriculum for a specialised postgraduate study in Forensic Veterinary Medicine, and the first generation of students enrolled in the 2014/2015 academic year. The study is primarily intended for future and current expert witnesses in the field of veterinary medicine, veterinary



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inspectors, and other staff from the competent state bodies of the Ministry of Agriculture, environmental protection inspectors from the Ministry of Environment Protection and Nature, veterinary experts employed in veterinary organizations, animal shelters and insurance companies, and veterinarians providing professional assistance to crime investigators. Completion of the study leads to the academic title of Master in Forensic Veterinary Medicine. The teaching staff at the Department participate in teaching other specialised postgraduate studies at the Faculty of Veterinary Medicine and university PhD study in Veterinary Sciences. Prof. Dr. Krešimir Severin, as part of the PhD study, participates in teaching the compulsory course Methods of Scientific and Research Work and several branch-oriented courses. Since the 1950's, the teaching staff in forensic veterinary medicine have taken an active part in scientific research work. In recent years they have been included in conducting several projects. Prof. Dr. Petar Džaja and Prof. Dr. Krešimir Severin were associates on the international project: *Contribution to Implementation of the CITES Convention in BiH* (CTR:2016/376-796) financed by the European Union (2016-2018). Members of the Department have participated in the realization of other scientific research projects headed by the staff from other Departments, primarily the Department of Veterinary Pathology. Also, they have been part of project teams of the Assist. Prof. Dr. Kristina Starčević and Prof. Dr. Tomislav Mašek. The teaching staff from the Department have taken part in the lifelong education of veterinary experts through training courses. In recent years, Prof. Dr. Petar Džaja took part within the Croatian Veterinary Chamber in teaching a Training Course for drivers/attendants of Live Animals (since 2009) and the lifelong training courses in Inspection of the Meat of Poultry, Game, Sheep, Goats, Rabbits and Ungulates and Inspection of Poultry Meat (since 2012). Prof. Dr. Petar Džaja and Prof. Dr. Krešimir Severin take part in teaching the lifelong learning course in Liability in Veterinary Work and The Scene of Incidents of Interest for Forensic Veterinary Medicine (since 2014). Prof. Dr.

Krešimir Severin has also participated in teaching the Training Course for Work with Experimental Animals and Animals for Production of Biological Preparations in the field of the ethical principles and legislation related to using experimental animals, since it was founded (2012). It is organized by the Faculty of Veterinary Medicine on the basis of authorization by the Office for Veterinary Medicine and Food Safety at the Ministry of Agriculture.

The staff from the Department of Forensic and State Veterinary Medicine, since it was founded and right up to the present day, have undertaken professional activities including work as permanent expert witnesses in forensic veterinary medicine. In order to resolve many civil, administrative or criminal court cases, they present expert explanations using findings and their own opinions, as veterinary expertise and/or court testimony, and all these cases have been carefully stored and archived since 1924, and they are important teaching material for educating students on graduate and postgraduate courses. Currently the Department has more than 500 different court cases, reports and inquiries. Both current members of staff, Prof. Dr. Petar Džaja (since 2006) and Prof. Dr. Krešimir Severin (since 2014) have been appointed as permanent expert witnesses, and every year take part in resolving about ten court cases.

The staff from the Department have spent time on short-term or long-term professional and study visits or training abroad: Prof. Dr. Petar Džaja in Bosnia and Herzegovina (Faculty of Veterinary Medicine of the University of Sarajevo; 2006), Prof. Dr. Krešimir Severin in Slovenia (Faculty of Veterinary Medicine, Ljubljana; 2005 and 2018), United Kingdom (Staffordshire University, Stoke on Trent; 2014) and Bosnia and Herzegovina (Faculty of the Veterinary Medicine of the University of Sarajevo; 2012). Prof. Dr. Krešimir Severin also attended a series of workshops related to the use of forensic methods to analyze traces and scenes of incidents of interest for forensic veterinary medicine, of which the most important is the annual scientific and professional course run by the British Veterinary Forensic Law Association (2013-2017).

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During the Forensic and State Veterinary Medicine courses, the students present the essential features of the topics discussed in their written seminars in the field of animal health protection and expert evaluation of importance for veterinary medicine. The topics are analyzed separately or in groups, and the students give their opinion and draw conclusions on the topics in accordance with the currently effective legal regulations. They form their opinion based on the knowledge gained during the course of the veterinary medicine study and learnt from the professional literature.



Practical classes in identification of vertebrates are performed in the Laboratory. Practicals are carried out in groups of 6 students who independently carry out the extraction of DNA from different sample types (blood, blood clots, dried blood, saliva, etc.) and the restriction digestion and electrophoresis of DNA samples (DNA Fingerprinting). Students also learn how to ensure the integrity of the analyzed sample through whole process.



The field of animal protection, i.e. the assessment of the pain and suffering suffered by animals often is the subject of the present veterinary-medical expertise. The employees of the Department on numerous occasions emphasize the importance of veterinary staff in the protection of animals and the implementation of numerous regulations through professional training courses or promotion of the area of the forensic veterinary medicine (Photo courtesy of Assist. Prof. Dr. Daniel Špoljarić).



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In 2017, a decision was made to launch a Forensic Laboratory (ForensicLAB). The need to launch such a laboratory arises from the demands of the contemporary forensic veterinary medicine for routine implementation of methods from the area of identification of vertebrates, the analysis of material evidence gathered from the crime scene, and the like. This decision has come to the fore after the establishment and implementation of the postgraduate Specialist Study for Forensic Veterinary Medicine, for which a Forensic Laboratory became a necessity.

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Preparation of samples of controversial and undisputable biological traces for multiplex PCR reaction. After the administrative procedure was carried out on December 19<sup>th</sup> 2017, the Veterinary and Safety Directorate issued a decision authorizing us as an official laboratory in the field of veterinary activities for genotyping of animals (dogs, cattle, ungulates, sheep and goats) by applying the method of short tandem repeats analysis using polymerase chain reaction (Short Tandem Repeat Polymerase Chain Reaction-STR PCR).





Conducting expertise is a very important activity for the Department. The members of the Department's scientific-teaching staff are regularly expert witnesses appointed by the court that has jurisdiction over a certain case, and they participate in solving numerous cases at the request of the court or within the scope of the administrative matters of the veterinary inspection.



Crime scene investigation and fieldwork in which experts work together with the investigative bodies, and determine the facts and circumstances under which a crime was committed, and also find the material evidence (in this case, the expert participates in the dissection of the carcass and provides the material evidence of the deformed bullet). The cases are mostly about animal abuse and torture, predator attacks, collisions of motor vehicles and game animals or illegal killings, as in the case shown in this photograph.





## 8.3. Department of Radiology, Ultrasound Diagnostic and Physical Therapy

The Department of Radiology and Physical Therapy was founded in 1930, followed by the construction of the Department's building at the Savska Street two years later. At the end of 1933 the building was completed and from 1935 to 1938 the Department was modernly equipped with an X-ray device and physical therapy devices. The Department's construction and equipping were financed in a good part by the Faculty Foundation and at that time the Department was considered to be one of the largest and the most modern radiological Departments in the world.

Classes and diagnostic work were conducted at the old location of the Faculty until 1957, and then the Department was moved to a specially built and appropriately equipped building for radiology and physical therapy as part of the Faculty in Heinzlova Street. In 1995 a course was founded within the Department in Ultrasonic Diagnostics by Prof. Dr. Mensur Šehić who began teaching, scientific and professional work in this modern field of medicine. In the same year the Department was renamed the Department of Radiology, Ultrasound Diagnostics and Physical Therapy. At its beginning the Department of Radiology, Ultrasound Diagnostics and Physical Therapy performed diagnostic and therapeutic procedures helping the Clinics. Since 1936/1937 academic year the compulsory course Radiology and Physical Therapy was introduced in the 6<sup>th</sup> semester. By the curriculum from 1954 previous courses were separated into the compulsory course Physical Therapy in the 7<sup>th</sup> semester and elective course Radiology in the 8<sup>th</sup> semester. That is how it was until 1970 when the unique compulsory course Radiology and Physical Therapy in the 7<sup>th</sup> and 8<sup>th</sup> semesters was reformed. By the curriculum in the 1977/1978 academic year these two fields were separated again in the compulsory course Physical Therapy in the 6<sup>th</sup> semester and compulsory course Radiology in the 7<sup>th</sup> semester.

As a part of the Integrated undergraduate and graduate studies today this field of veterinary medicine is divided into the courses General and Clinical Radiology in the 7<sup>th</sup> semester and Methods of Physical Therapy and Diagnostics in the 8<sup>th</sup> semester whereby the diagnostics refers to the ultrasound diagnostics.

The program of the courses General and Clinical Radiology is focused on explaining the formation of the X-ray image and on the harmful effect and the protection from X-rays.

Students are trained in radiography, to read the roentgenogram and establish the diagnosis on their own.

The program of the course Physical Therapy is designed so the students get acquainted with different methods of physical therapy and their effect on the organism. Students are trained to be able to apply certain methods considering the clinical picture and determine the duration of therapy, to evaluate the success of physical therapy as a method of treatment in relation to the surgical procedure. Within the course program students learn about the basics of ultrasonic diagnostics of various organic systems.

Professors at the Department participate in teaching some of the classes in the study track Companion Animals, in the compulsory elective course Diseases and Treatment of Dogs and Cats I in the 10<sup>th</sup> semester. They also participate in teaching within the study track in Farm Animals and Horses the compulsory elective courses Diseases and Treatment of Horses in the 10<sup>th</sup> semester and Diseases and Treatment of Farm Animals in the 11<sup>th</sup> semester.

The Department of Radiology, Ultrasound Diagnostics and Physical Therapy is responsible for the intra-disciplinary postgraduate specialist study entitled Pathology and Breeding of Domestic Carnivores. The aim of this study is to equip students for independent work in veterinary outpatients' clinics and small animal clinics, in the diagnostics, treatment and prevention of diseases in domestic carnivores. Also, within their fields in veterinary medicine, they take part in the postgraduate specialist studies in Breeding and Pathology of Exotic Pets and Surgery, Anaesthesiology and Ophthalmology with Veterinary Dentistry.

In the long history of the Department its scientific research work has been very fertile and conducted in several scientific fields. A prominent place in scientific work is given to the application of diagnostic contrast methods in various fields of veterinary medicine,



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osteoarthropathy, densitometry of meat and meat products, radiology and ultrasonography procedures, and the use of physical therapy in general. The results of this research are seen in the many published papers and university textbooks, which cover the course matter of the classes held at the Department. The field of general radiology was covered in two textbooks (1995 and 2009), clinical radiology in five textbooks (1990, 2000, 2002 and two in 2004), physical therapy in two books (1997 and 2014), and ultrasound diagnostics in one textbook (2006). A major part of the scientific studies in these textbooks stems from recent research conducted by Professors Mensur Šehić, Vladimir Butković, Damir Stanin et al. As a result the textbooks are very valuable scientific material, not only for graduate courses but also for postgraduate scientific teaching and professional education.

Digital radiography provides many advantages over conventional radiography. The most important advantage is primarily the reduction of irradiation of patients and staff working in the ionizing radiation sphere. Therefore, the Department has a digital device CR 30-X, Agfa which is considered to be one of the more modern devices.

Assist. Prof. Dr. Zoran Vrbanac from the Department was one of the founders of the Veterinary European Physical Therapy and Rehabilitation Association, VEPPRA) which was founded in 2009. This is a relatively new field in veterinary medicine, which the Department plans to develop and improve in order for it to be used in everyday practice with small and large animals. To this end, Assist. Prof. Dr. Zoran Vrbanac has undergone training in physical therapy and rehabilitation around the world (Italy, Israel, the United Kingdom, Austria, Luxembourg, China, the USA) and in 2016 he successfully passed the examination in the USA to attain the title of *Diplomate* of the American College of Veterinary Sports Medicine and Rehabilitation (ACVSMR). In this way he attained the requirements to use a more contemporary approach to physical therapy and rehabilitation in his professional work at the Department with domestic animals.

Alongside the existing therapy using microwaves and ultrashort waves, equipment was procured for electro-therapy, magneto-therapy, ultrasound therapy, laser therapy, and moving belts and hydrotherapy pools, and this form of physical therapy and rehabilitation is already being used successfully for domestic carnivores.

Along with the radiology and physical therapy the ultrasonic diagnostics is performed in the Department for the past 25 years. As a non-invasive method of soft body part contouring it is a very important segment in the veterinary diagnostics of various pathomorphological processes in organs and organic systems of dogs and cats. Thorough ultrasonic examinations require knowledge on the physical bases of diagnostic ultrasound. Ultrasonography is often used in combination with radiography. Ultrasonic scans often require tremendous effort and flexibility in achieving good images. Along with the portable ultrasound device the Department purchased in 2016 a new model of diagnostic ultrasound device MIDRAY Z-6 Vet Color Doppler for urgent ultrasound diagnostics and one of the most modern ultrasonic devices Color Doppler PHILIPS AFFINITY 50 G.

Following the world trends in developing new methods of early diagnostics of Hip Dysplasia in dogs Assist. Prof. Dr. Hrvoje Capak has passed the certification program and has been included in the PennHIP Veterinarian Network. Therefore, the Department of Radiology, Ultrasound Diagnostics and Physical Therapy has been listed in the PennHIP Program (Pennsylvania Hip Improvement Program) as a parent institution.

The teaching staff at the Department, in their teaching, scientific and professional work, today work together with many veterinary faculties in the region, such as in Belgrade, Novi Sad, Sarajevo, Skopje and Ljubljana. In their professional work they also work with all veterinary clinicians in Croatia, and help to advance their work through their knowledge and wealth of experience. This is reflected in the fact that 10,000 patients were treated in 2016.



The waiting room of the Department of Radiology, Ultrasound Diagnostic and Physical Therapy of the Faculty of Veterinary Medicine in Zagreb. Small animals' owners waiting for an X-ray or an ultrasound scan. Written on the door are warnings about the harmfulness of ionizing radiation, and a no entry sign for those who do not participate in the diagnostic procedures. At the right wing is the physical therapy waiting room entrance, and the rooms in which various physical therapy procedures are performed (Photo courtesy of Prof. Emeritus Mensur Šehić).



Radiography is carried out in an isolated room protected from ionizing radiation. The auxiliary staff, helping with the patient, must wear protective lead aprons and gloves. When doing an X-ray, one must make sure that the patient does not move during the exposure. Sometimes it is necessary to sedate a patient, especially when making an X-ray of the jaw and teeth. A special trough was created for making the hip X-rays.

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In the room where the CR device is located there is neither a chemical developer nor a chamber. Instead, the cassette that was exposed is placed in a reader that sets it in motion and scans it with a laser. Only one cassette is inserted into the CR reader, which is first read by a laser, and then the tape is erased and prepared for the next exposure. After reading the cassette, an image of the photographed area appears on the screen, and is then sent to other networked rooms for analysis (Photo courtesy of Prof. Emeritus Mensur Šehić).



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Radiography practice classes are done in small groups. Students have at their disposal consultation meetings with their professors. Selected images are available to students for an X-ray analysis for their Radiology exam. They can also use digital images that they can process and view on the screen. As part of these practice classes, the students write reports, and in these medical reports the order in which the roentgenograms are interpreted is important.

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Beside X-ray imaging, ultrasound diagnostics is performed on a daily basis, often carried out as an addition to the roentgenography. As a result of Color Doppler, sonographic tests are of high quality. In their practice classes, students rotate the ultrasonic probe in various directions, in order to see the desired imaging area. In this way, they gain the practical experience of the thoracic and abdominal sonography. With the help of their professors, the students perform the sonogram analysis (Photo courtesy of Prof. Emeritus Mensur Šehić).





In the physical therapy room, there is various equipment for performing physical therapy procedures (electrotherapy, laser therapy, magnetotherapy, ultrasound therapy, extracorporeal shock wave therapy, light therapy, hydrotherapy, veterinary treadmill, therapeutic exercises and massages). In the rehabilitation of patients, several existing forms of hydrotherapy include a pool with a whirlpool and an underwater treadmill.

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For strengthening of leg muscles, rungs and centrally inflated plastic podium can be used simultaneously. This podium can be used to assist the patient to perform proprioceptive positioning on his front or back legs only. Stimulated by rewards, the dog alternately puts pressure on his front and back legs (Photo courtesy of Prof. Emeritus Mensur Sehić).





## 8.4. Clinic for Surgery, Orthopaedics and Ophthalmology

The history of the Clinic for Surgery, Orthopaedics and Ophthalmology is directly connected with the foundation of the Veterinary High School, and it registered its first patients on the 16<sup>th</sup> of October 1922. A decisive role in the foundation and organization of the Surgical Clinic was played by Prof. Eugen Podaubsky, who was its first professor and Head. Right up until 1959 it was housed at the old location of the Faculty in Savska Street no. 16, and then it moved into the newly built clinical building in Heinzelova Street. At the beginning of the work of the Surgical Clinic, the most frequent patients were horses, but in line with the development and increase in the population of the city of Zagreb, the development of motor cars in traffic, since 1950's dogs and cats were increasingly received as patients with traumatic injuries to the soft tissue and bone fractures. At the beginning of 1976, following a proposal by the then Head, Prof. Dr. Eduard Vukelić, the Centre for Experimental Surgery was founded as a department of the Surgical Clinic, with the aim of gathering together scientists from surgical and related scientific disciplines, so that technical achievements, tried and scientifically proven methods and the results of experiments could be applied in human medicine, and so correctly apply the ethical principles of the medical vocation, and completely preserve the dignity of human beings. The refurbishing of the Clinic and procurement of more contemporary equipment began at the time when Prof. Dr. Željko Matičić was Head (1985-1998) and the Clinic was officially opened in the autumn of 1999. At that time, with the support of the then Head, Prof. Dr. Antun Brkić (1999-2005) work began to be organized via activities on the basis of specializations. From March 2006, through the efforts of the then Head, Prof. Dr. Dražen Matičić (2005-2012), more intensive activities began in the teaching of staff and Assistants at the Clinic in relation to training abroad through residential programmes run by ECVS and ACVS, and study stays in centres of veterinary excellence in Europe and the USA. Prof. Dr. Dražen Matičić established the cooperation with Dean, Prof. Sheila W. Allen, Diplomate ACVS from the College of Veterinary Medicine, University of Georgia, Athens, USA, during the visit of the

delegation from the University of Georgia, Athens, USA, to the Faculty of Veterinary Medicine in 2009. In April 2011 Prof. Dr. Dražen Matičić and two assistants of the Faculty of Veterinary Medicine (Dr. Marko Stejskal and Dr. Marin Torti) went to the United States where further co-operation and familiarization with modern veterinary practice were planned. The clinic is also visited by the Head of the Hospital for Small Animals from the University of Georgia, Athens, Prof. Spencer. A. Johnston, ACVS Diplomate.

In 2009, an agreement was signed on the financing of the development project: The Centre of Excellence of Veterinary Surgery at the Faculty of Veterinary Medicine of the University of Zagreb, between the City of Zagreb, the University of Zagreb and the Faculty of Veterinary Medicine. Under the leadership of Prof. Dr. Dražen Matičić, the Clinic, within that project, was completely refurbished and equipped with state-of-the-art apparatus, and it is today one of the most modern and well-equipped surgical clinics in this part of Europe.

In the last twenty years the Clinic participated in pro bono work in the various programs of treatments of the abandoned and wounded animals. The Clinic has received several awards from various animal protection associations for these activities.

According to the first curriculum of the Veterinary High School for the 1<sup>st</sup> and 2<sup>nd</sup> semesters, from 1920 courses in Horse care were taken as a surgical discipline in the 2<sup>nd</sup> semester. In the time that followed, a curriculum was developed in the field of surgery for several disciplines, and according to the curriculum from 2005, where courses were organized as undergraduate and graduate studies in veterinary medicine, the previous three-semester course in Surgery, Orthopaedics and Ophthalmology was transformed into three one-semester courses as Surgery, Orthopaedics and Ophthalmology I, II and III. In the 7<sup>th</sup> semester the courses contain content on general surgery and anaesthesiology, in the 8<sup>th</sup> semester special surgery and ophthalmology, and in the 9<sup>th</sup> semester orthopaedics and neurosurgery. The emphasis is on practical work by students, who take part in small groups in the everyday work of the Clinic for Surgery,



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Orthopaedics and Ophthalmology. Professors at the Clinic have been engaged throughout its history in translating the contemporary textbooks of their time, to teach the course matter on surgery, and the first Croatian university textbook written by professors from the Clinic was published in 2010, under the title *Veterinary Surgery and Anaesthesiology*.

The inclusion of professors from the Clinic in postgraduate classes began in the 1971/1972 academic year, with the foundation of a postgraduate specialized study in Diseases of Domestic Carnivores. In the 1986/1987 academic year a postgraduate scientific study was introduced in Surgery Orthopaedics and Ophthalmology, which students could enrol in up until the 2003/2004 academic year, when the reorganization of postgraduate studies began into a single PhD study in Veterinary Sciences and postgraduate specialized studies. In the 2008/2009 academic year, a postgraduate specialized study in Surgery, Orthopaedics and Ophthalmology with Anaesthesiology was founded, and in 2012 Prof. Dr. Dražen Matičić reorganized and renamed the programme as the postgraduate specialized study in Surgery, Anaesthesiology and Ophthalmology with Veterinary Dentistry. The change in the name of the study placed the emphasis on four specialist areas recognized by the European Board of Veterinary Specialisation (EBVS). In teaching, since by these changes a course in English was also organized for foreign students, certified specialists became involved from European and American colleges with different specializations, and in that way the postgraduate study became internationally recognized. Therefore, in the last few generation of the study, doctors of veterinary medicine from 14 countries and three continents have enrolled.

The scientific work at the Surgical Clinic began at the beginning of the 1930's, on the basis of clinical materials which came into the Clinic from a very wide range of pathological cases. This research mainly covered causal presentations and analysis of interesting individual

cases. From the middle of the 1950's professors at the Clinic led national scientific research teams financed from the state budget, and in the new millennium, international scientific projects as well. Here, Prof. Dr. Dražen Matičić has been particularly outstanding, as a researcher and head of animal experimentation on the FP7 project BIOCOMET entitled: *Bioreactor based Clinically Oriented Manufacturing of Engineered Tissues* (2011-2015). Moreover, he is head of research in the veterinary part of the project BIO-CHIP (*Bioengineered grafts for Cartilage Healing in Patients*) (2015-2019), the EU programme Horizon 2020, and head of research for the veterinary part of the project OSTEOproSPINE (*Novel Bone Regeneration Drug Osteogrow: Therapeutic Solution for Lumbar Back Pain*) (2018-2022), in the EU programme Horizon 2020. On the basis of the results of the scientific work so far, Prof. Dr. Dražen Matičić was elected in 2014 as an associate member and in 2018 as a full member of the Croatian Academy of Sciences and Arts, in the Department for medical sciences.

To date at the Clinic for Surgery, Orthopaedics and Ophthalmology, Prof. Dr. Dražen Vnuk has completed the ECVS residency programme, Assist. Prof. Dr. Marko Stejskal studied for his specialization from January 2012 to July 2015 at the Veterinary Teaching Hospital, College of Veterinary Medicine, University of Georgia, Athens, Georgia, USA. Having passed the specialization examination in 2016, he attained the title of Diplomate, American College of Veterinary Surgeons-Small Animal (DACVS-SA).

Over the past few years, in the term of the Head Prof. Dr. Boris Pirkić and Assist. Prof. Dr. Marko Stejskal, new surgical techniques have been introduced in neuro-surgery, ophthalmology and orthopaedics, and at the same time investments are being made into the education of new generations of teaching assistants and teaching staff in the field of veterinary dentistry, anaesthesiology, ophthalmology and equine surgery.



At the surgical prep area, the students and the staff of the Surgery, Orthopedics and Ophthalmology Clinic are preparing a patient for the induction of anesthesia, and preparing the patient's operative area before entering the operating room. In this manner, the students acquire the necessary practical knowledge on how to prepare different animals for the induction of anesthesia, and how to induce anesthesia.





Students in the Integrated Veterinary Medicine Study, and students enrolled in the postgraduate specialist study “Surgery, Anesthesiology and Ophthalmology with Veterinary Dentistry” practicing the skin preparation techniques on a surgical patient, learning how to handle surgical instruments and learn about the inhalation anesthesia procedures at the area where practice classes are held (Photo courtesy of Academician Dražen Matičić).

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For the purpose of acquiring practical knowledge and skills, the 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> semester students, monitored by the chief surgeon, assist in the surgical procedures. One part of the clinical group of students acquires anesthesiologic skills, and the other part assists in the laparotomy of a dog, performed at the soft tissue surgical unit (Photo courtesy of Academician Dražen Matičić).



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The equine and other large animals' operating theater is fitted with the state-of-the-art equipment, including a mobile crane, and a special operating table for horses. The equipment for inhalation anesthesia, monitors, electric cauterizer, infusion pumps, suction device, and other equipment provide the basis for a professional approach to the medical treatment of animals (Photo courtesy of Academician Dražen Matičić).

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Colic surgery in horses is the most common surgical procedure in which inhalation anesthesia in this animal species is used. The students participate in all aspects of preparation for an operation; they take part in surgery as well, and are always monitored by their professors. In the area of the Surgery, Orthopedics and Ophthalmology Clinic designated for equine surgery, there is also a special area for horse examination, and an area for anesthetic induction (Photo courtesy of Academician Dražen Matičić).





The ophthalmologic surgery operating room is fitted with the cutting-edge equipment and instruments that enable performance of advanced surgical techniques. The phacoemulsification cataract surgery in dogs and cats is also performed at the Clinic.



Osteosynthesis, *Luxatio Patellae* surgery, and TPLO and TTA techniques for surgical treatment for cranial cruciate ligament injuries are the most common surgical procedures performed in the Orthopedic operating room. In it are all the necessary machines and instruments, including arthroscopic and diascopy equipment, and the digital radiography workstation.





## 8.5. Clinic for Obstetrics and Reproduction

The Clinic for Obstetrics of Domestic Animals was mentioned in 1919 in the Decree on the Foundation of the Veterinary High School in Zagreb. In 1926 a clinical building was built at the old location in Savska Street, where it was located until 1959, when it moved to its present facilities in Heinzelova Street. Up to 2002 there were no significant architectural or organizational changes. Then the new laboratory for assisted reproduction was set up, with a library and rooms for staff members and a meeting room. In view of the contemporary scientific, teaching and professional needs, which were primarily reflected in a significant increase in the number of patients in the so-called “small practice”, that is, companion animals over the past fifteen years, and a decreasing number of farm animals and horses. In 2010 the Clinic was refurbished once again according to global standards, and it now includes modern and highly sophisticated equipment that serves for educational and scientific purposes, and professional clinical work. It should be pointed out here that the Clinic is organized and divided into work in so-called “small practice” and work with farm animals and horses. Today within the Clinic there is a laboratory for assisted reproduction, which is equipped with the most up-to-date apparatus, such as CO<sub>2</sub> incubators, three microscopes, micromanipulators, three centrifuges, an osmometer, photometer, immuno-chemical analyser using ELFA technology, a Laminar flow cabinet from Forma Scientific Inc., apparatus for ultra pure water, apparatus for freezing cells MiniCool 40 PC Air Liquide, and three halls, equipped with state-of-the-art diagnostic, surgical and anaesthesiological equipment produced by Storz, Medison, Esaote, Olympus, Datex Ohmeda, Berchtold, Aesculap, KLS Martin, Erbe Elektromedizin, Arthrex. Lectures in the course Midwifery and Special Pathology and Therapy of Mothers (clinic) with practical work, began in the 1923/1924 academic year, and were held in the 7<sup>th</sup> and 8<sup>th</sup> semesters. The curriculum changed often over the course of time, and the last change took place in the 2005/2006 academic year, with the adoption of the curriculum for the integrated undergraduate and graduate study in veterinary medicine in line with the Bologna Process, when the previous compulsory three-

semester course Obstetrics of Domestic Animals in the 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> semesters was divided into one-semester courses. The last changes were in the 2012/2013 academic year, when the course Obstetrics and Reproduction I was placed in the 8<sup>th</sup> semester, and the course Obstetrics and Reproduction II in the 9<sup>th</sup> semester. At the Clinic, apart from these courses, the following elective courses are also taught according to the current curriculum: Diseases and Reproduction of Sport and Working Animals in the 10<sup>th</sup> semester, and Assisted Reproduction in Veterinary Medicine in the 11<sup>th</sup> semester. All the courses have been supplemented with new content and contemporary literature.

The first national university textbook, *Obstetrics of Domestic Animals* was written by Academician Božidar Oklješa (1957) and over the past fifteen years professors at the Clinic have published as many as seven university textbooks and one university handbook in the field of breeding domestic animals and diagnostics and therapy of mastitis. The postgraduate study in Physiology and Pathology of Cattle with Artificial Insemination, organized in the 1967/1968 academic year, is one of the first postgraduate studies organized at the Faculty of the Veterinary Medicine of the University of Zagreb. In the 1995/1996 academic year, the title of the study was changed to Theriogenology. Today the Clinic for Obstetrics and Reproduction is responsible for two postgraduate specialist studies: Theriogenology of Domestic Mammals and Reproductive Health Management in Dairy Cows, and the latter was launched in 2014. The purpose of the study in Theriogenology of Domestic Mammals is to train students for independent work in the field of reproduction of domestic mammals, in line with the regulations of the profession and on the basis of the latest insights. The aim of training students is to acquaint them with the biotechnology of reproduction, contemporary approaches to diagnostics of pregnancy, and prevention of infertility in domestic mammals. The purpose of the study Reproductive Health Management in Dairy Cows is to supplement knowledge and skills by acquainting potential students with new insights in the field of reproduction of cattle and their practical application in everyday work. The study offers students



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theoretical and practical education in essential areas of reproduction, with particular emphasis on prevention and treatment of reduced fertility, or infertility, and includes a multi-disciplinary approach and offers knowledge, skills and procedures in management, selection, feeding, animal welfare, prevention and treatment of metabolic, reproductive and other disorders, prevention and treatment of diseases of milk glands, infectious diseases, protection of the health of calves and all other factors, in order to improve reproduction and production. When the Clinic became independent at the beginning of the 1930's, its research work was initially focused on Brucellosis, trichomoniasis, puerperal paresis and the causes and forms of infertility in cows and bulls, and mares. In that initial period of scientific research work at the Clinic, the work of Prof. Dr. Božidar Oklješa was particularly outstanding. In 1958 he was elected as a full member of the Yugoslav Academy of Sciences and Arts in the medical sciences class. In the period that followed research continued in the field of spermatology and mastitis in ruminants. At the Clinic systematic research was regularly conducted regarding the value and effectiveness of new therapeutic models for treating endometritis and mastitis and other gynaecological diseases of domestic animals. It is important to emphasise that the first successful and controlled artificial insemination (AI) was performed at the Clinic in 1943, which was also the first artificial insemination of cattle in Croatia. The first artificial insemination in Croatia, then federal republic in the former Yugoslavia, of a dog (1950) and of a goat (1952) was also performed at the Clinic. In the time that followed the first international project was run at the Clinic, entitled *The relation of the function of the liver and some endocrine glands to sterility in cattle*, which was financed by the United States Department of Agriculture and led by Prof. Dr. Srđan Rižnar (1969-1974). This was followed by the studies of Prof. Dr. Zdenko Makek and associates on Cattle Embryotransfer funded by the Ministry of Science of the Republic of Croatia resulting in the establishment of the Laboratory for Assisted

Reproduction (1992). Standard protocol for maturation, fertilization and growth of the bovine embryos *in vitro* was established. After the transfer of *in vitro* produced embryos into the recipients, the first *in vitro* produced calf was born in Croatia in April 2001 and this was a remarkable achievement. Foundations of the exploiting the benefits of this biotechnology in the livestock production of our country were established with these studies. Still today the teaching staff from the Clinic, alongside national scientific research projects relating to the field of obstetrics and reproduction, also take part in work on international projects such as the COST Action Project *Epigenetics and Periconception Environment-EPICONCEPT*, with associates Prof. Dr. Juraj Grizelj and Prof. Dr. Nikica Prvanović Babić (2013-2016).

At the beginning of the professional clinical work at the Clinic the number of patients was small, amounting to only about 100 animals treated per year, and then it began to increase gradually, and by the beginning of the 1950's it reached 3000 patients. The largest number of patients are farm animals and horses, whilst companion animals account for only 5-10% of the patients. That was how it was until the beginning of the 1990's, when the structure of patients changed significantly, and today companion animals dominate with a share of more than 90%. In view of the major competition in terms of diagnostics and treatment of various gynaecological conditions in pets, the Clinic, in order to remain competitive and to ensure a sufficient number of patients for the needs of teaching, is today equipped with state-of-the-art apparatus (an incubator for raising foetuses, a micromanipulator with a microscope, a table for working in sterile conditions and the most modern diagnostic, surgical and anaesthesiology equipment, manufactured by: Storz, Medison, Esaote, Olympus, Datex Ohmeda, Berchtold, Aesculap, KLS Martin, Erbe Elektromedizin, Arthrex) and equipment (for deep freezing dog sperm and foetuses) and it provides unique and increasingly sought-after services such as surgical laparoscopic procedures, and deep

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The stalls in the Reproduction and Obstetrics Clinic-learning about the clinical method of rectal examination of cattle. This examination is still the most frequent method used for diagnosing pregnancy in cows and heifers because it is easy to use, cheap and quite reliable.

freezing and storage of dog sperm. In this way the number of pets as patients has increased and also teaching has improved along with the reputation and position of the Clinic in the veterinary profession, as well as in society as a whole.

The Clinic has a long and rich tradition within its professional work of running courses for the lifelong training of doctors of veterinary medicine. After the end of the Second World War, hundreds of courses were held on infertility, artificial insemination and treatment of mastitis in ruminants, and today the lifelong education of experts in the field is aimed at the areas of embryo transfer and *in vitro* fertilization in cattle, physiology and pathology of the puerperium in cows, sterilization of dogs and cats, ultrasound diagnostics of physiology and pathology of breeding mares, and protocols for induction and synchronisation of oestrus in sows.

The teaching staff from the Clinic have been on professional and study visits and trainings, and have taken part in teaching in other institutions around Europe, the USA and in Libya. They have taken part in teaching at other educational institutions in this country and abroad, such as the Faculty of the Veterinary Medicine, University in Skopje, Macedonia, the Agricultural University in Tirana, Albania, the Department of Biology and Immunology of Reproduction in Sofia, Bulgaria, and the Faculty of Veterinary Medicine of the University of Ljubljana, Slovenia. In addition, they have organized many seminars, conferences, workshops, round tables and were members of organizational and scientific boards of national and international scientific and professional conferences. In 2012 they organized an international summer school entitled *Reproduction in Ruminants* in co-organization with the Faculty of Veterinary Medicine of the University of Zagreb, the European Society of Domestic Animal Reproduction (ESDAR) and the European College for Animal Reproduction (ECAR), with eminent and world-famous lecturers from all over the world, and PhD students and ECAR candidates/residents from the most prestigious European veterinary faculties.



Practical microscope work-interpretation the results of vaginal cytology for determination optimal time for mating.



Early ultrasound diagnostics and monitoring of pregnancy in female dogs are becoming more important from day to day. Using ultrasound we diagnose pregnancy in a dog at only 20 or so days, whilst the heartbeat of the embryos can be detected at between 24 and 28 days of pregnancy.



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Minimally invasive laparoscopic ovariectomy surgery has been performed at the Reproduction and Obstetrics Clinic since 2004. Initially the procedure was performed on larger and heavier dogs, whilst now it can be easily performed on patients who weigh only 1.5 kg. This procedure is one of the procedures most frequently requested by owners, due to its many advantages for the pet.

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Work with students-diagnostics using endoscopic examination of the uterus of a mare in order to detect pathologies, as part of the Reproduction and Obstetrics I course, during which the students with their teachers undertake diagnostics procedures on patients, plan their treatment and the outcome of the disease.



During the Reproduction and Obstetrics I course, students learn to perform andrological examination. The examination also includes testing the sperm, and students learn how to collect ejaculate from male animals correctly using artificial vaginas, which are displayed on the table in the classroom. Examination of ejaculate is extremely important because in that way we assess the fertility or infertility of the male animals.

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Preparations for microscopic examination of the sperm of a boar-supravital staining of the sperm according to Bloom. Using this method for assessing the vitality of the sperm, in their practical work, the students can see the percentage of live and active sperm, and the percentage of dead sperm in fresh or diluted ejaculate. Red eosin dye passes through the membrane of the dead sperm, but not through the membrane of live sperm.





## 8.6. Clinic for Internal Diseases

The Clinic for Internal Diseases is a specialized veterinary health institution which works systematically within the framework of the Faculty of Veterinary Medicine in teaching and scientific work in the field of internal diseases of domestic animals. It acts as a single organizational unit and in its organizational form to day it grew out of the Clinic for Internal Diseases of Ungulates and Carnivores, which was founded in 1921 by Prof. Dr. Lovro Bosnić, and the Clinic for Internal Diseases of Ruminants, Pigs and Poultry, the Buiatric Clinic, which was founded in 1922 by Prof. Mile Rajčević. In 1935, the Department of Internal Clinical Propaedeutics moved into a separate space from the Medical Clinic, and its leadership was entrusted to Assist. Prof. Dr. Aleksandar Sutlić. In 1951 these three organizations were merged into a single Clinic for Internal Diseases. In this way progress was achieved in linking the clinical pathology and therapy of domestic animals on the basis of universal principles, because until that time organ pathology had been fragmented in relation to different types of domestic animals, or by individual species. In the further course of the development of the clinic this point of view was reflected in its teaching, leading to the need to link teaching materials together on the basis of comparative treatment, and in the character of its scientific work. In the same year the Haematology Laboratory was founded within the clinic, which, as part of the future Central Clinical Laboratory, served the needs of other clinics at the Faculty of Veterinary Medicine as well.

Under more or less unchanged working conditions, the Clinic for Internal Diseases continued its professional, teaching and scientific work at the old location of the Faculty in Savska Street until the autumn of 1959, when it was moved to new clinical buildings as part of the Faculty of Veterinary Medicine in Heinzlova Street. The Clinic for Internal Diseases is housed today in buildings which were originally intended only for the Surgical and Obstetrics Clinic, and in the final phase of construction they were partially adapted for that clinic as well. The planned construction of the Clinic for Internal Diseases was not realized because the Faculty did not later succeed in purchasing part

of the plot intended for construction. Today the Clinic takes up almost the entire ground floor and part of the basement of the building, in the front and in the inside wings on both sides of the courtyard.

Lectures and practicals in Methods of Internal Clinical Examination of Ungulates and Carnivores (propaedeutics) began in the 1921/1922 academic year, in the 4<sup>th</sup> semester, and classes in Special Pathology and Therapy of Internal Diseases of Ungulates and Carnivores with practical work (the Medical Clinic) began in the 1922/1923 academic year, in the 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> semesters. Classes in Special Pathology and Therapy of Internal Diseases of Ruminants, Pigs, Rabbits and Poultry (the Buiatrics Clinic) began with lectures in the winter semester of the 1922/1923 academic year, in the 7<sup>th</sup> and 8<sup>th</sup> semesters, whilst classes in Methods of Internal Clinical Examination (propaedeutics) for that type of animal were held in the 7<sup>th</sup> semester. The veterinary medicine curriculum for 1948 combined together both forms of propaedeutics into the course Internal Clinical Propaedeutics, which was taught in the 5<sup>th</sup> and 6<sup>th</sup> semesters. The Medical and the Buiatrics Clinic joined together in a new course: Internal Diseases of Domestic Animals in the 7<sup>th</sup> and 8<sup>th</sup> semesters. From 1958 there was a single course entitled Internal Diseases in the 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> semesters. In the period that followed the position of the course changed in terms of semester, and since 2005/2006 academic years, after 50 years the separate course Clinical Propedeutics returned to the curriculum in the 7<sup>th</sup> semester, and the two-semester course Internal Diseases in the 8<sup>th</sup> and 9<sup>th</sup> semesters. Since 2012/2013 academic year the course Clinical Propedeutics has been taught in the 6<sup>th</sup> semester, and the course Internal Diseases has become a single semester course, with classes condensed into the 7<sup>th</sup> semester.

In 1987 a professor from the Clinic, Prof. Dr. Mario Bauer, introduced the elective course Cynology in the 9<sup>th</sup> semester. According to the curriculum for 2005, professors at the Department, apart from the extended elective course of Cynology and Felinology in the 8<sup>th</sup> semester, also ran and taught other elective courses: Positive Impact of Animals to Human Health in the 2<sup>nd</sup> semester, Fundamentals of



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Holistic Medicine in the 6<sup>th</sup> semester, and Veterinary Emergency and Critical Care Medicine in the 12<sup>th</sup> semester. Professors at the Clinic took part in teaching classes in the study track Companion Animals as part of the compulsory elective courses Diseases and Treatment of Pet Birds, Exotic Pets and Laboratory Animals in the 11<sup>th</sup> semester, Diseases and Treatment of Dogs and Cats II. in the 12<sup>th</sup> semesters, in the study track Farm Animals and Horses as part of the compulsory elective courses: Diseases and Treatment of Horses in the 10<sup>th</sup> semester and Diseases and Treatment of Farm Animals in the 11<sup>th</sup> semester.

Since 1971/1972 academic year a postgraduate study was opened at the Clinic for specialization in the subject of Internal Diseases of Domestic Animals, lasting four semesters. Since 1986/1987 academic year the study was re-organized for scientific training. Since 1995/1996 academic year the study was up-dated and organized as a two-year Master's study or a three-year PhD study. In the same academic year the postgraduate professional study in Internal Diseases was also founded. This study, according to the programmes of that time, could be taken up to the 2003/2004 academic year. Then pursuant to the Act on Scientific Work and Higher Education of 2003, the previous professional study in Internal Diseases was reorganized, and since 2005/2006 academic year it has been a specialized study lasting four semesters. From that same academic year professors from the Clinic took part in teaching six more specialized studies, and ran and taught one compulsory and 11 branch related courses as part of the PhD study in Veterinary Sciences.

In the time from the founding of the Faculty of Veterinary Medicine up to 1930 the conditions of work at the Medical Clinic were modest and were merely used for dealing with individual cases. In that period there was outstanding research into horse mange, and nasal application of medication in horses (Lovro Bosnić). Clinical research from 1930 up to the end of the Second World War primarily dealt with the application of simple methods in clinical diagnostics. In that period, nasal probes

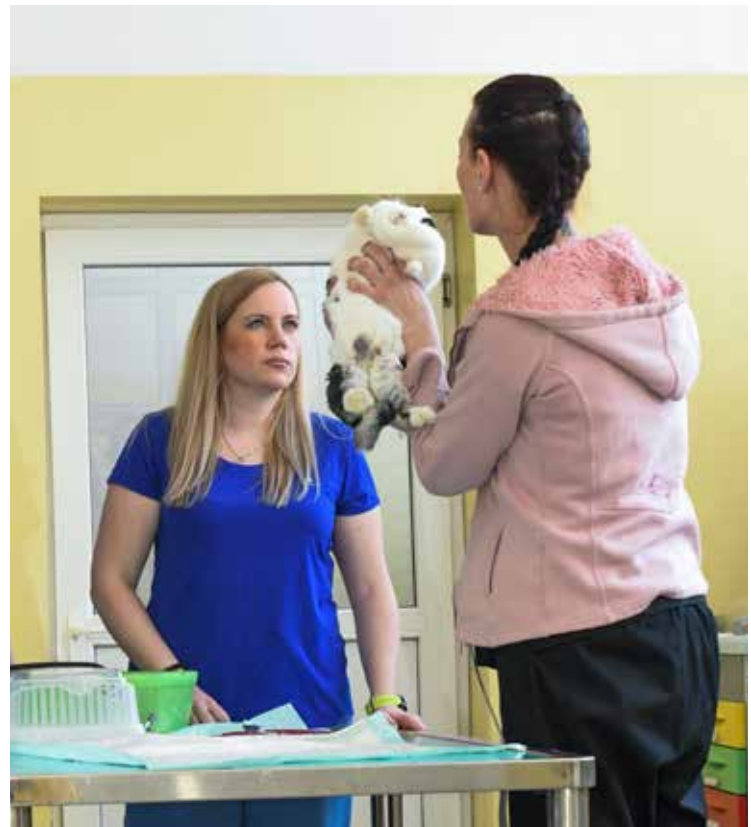
for horses were introduced into broad use and digital percussion began to be used successfully in the Clinic for large domestic animals amongst the first in the world (Lovro Bosnić and Aleksandar Sutlić). Just before the Second World War a prototype fumigation chamber was created and used to treat many horses with mange during the war. In that period an effort was made to introduce diagnostic procedures using finer clinical and chemical diagnostics, such as testing kidney function, the source of jaundice etc. In the post-war period up to 1960, casuistry was less often used as a subject of scientific processing, and systematic research in the field of clinical diagnostics and pathology became dominant, in relation to the practical problems of the time. Amongst other things, at the Clinic for Internal Diseases complex chemical and morphological diagnostics of the liver were introduced amongst the first in the world, and they permitted exact research into applied and actual pathologies of the liver, first of all in horses, and then other animals, and research of importance from the point of view of comparative and human medicine. In this and later periods, Prof. Dr. Sergej Forenbacher stands out in particular in terms of his scientific work. In 1960 he was elected as a corresponding member of the Yugoslav Academy of Sciences and Arts in the medical science class, and in 1975 he became a full member. In the period that followed teaching staff from the Clinic ran many national projects in the field of internal diseases, and more recently they have been co-workers and heads of international projects as well. In this context, Prof. Dr. Vladimir Mrljak stands out as the coordinator of the VetMedZg project *Upgrading research performance in molecular medicine at the Faculty of Veterinary Medicine University of Zagreb* (2014-2019). The main aims of this upgrading project are to develop and increase research capacities and improve scientific excellence in the field of molecular veterinary medicine at the Faculty of Veterinary Medicine in Zagreb, in order to be granted competitive projects in the future and achieve a more successful integration into the European research area.



The reception of the Internal Diseases Clinic. Sometimes 50 animals per day pass through the reception (dogs, cats, exotic animals).

The professional activities of the Clinic are conducted through out-patient work with patients. For this work the Clinic has an organized professional service which functions 24 hours per day, with the possibility of sick animals being transported in from the wider area of the City of Zagreb (from up to 50 km). The Clinic also keeps and breeds large and small experimental animals, it cooperates with the Ambulatory Care Clinic of the Faculty of Veterinary Medicine, veterinary institutions and industrial livestock farms. The Clinic today has contemporary equipment (haematology analyser-Vet abc™ Horiba; biochemical analyser-ABBOT-Architect plus c 4000; analyser for blood clotting tests and determining blood groups-Quick Vet, Diamond SmartLyte Electrolyte Analyzer; centrifuge-Hettich EBA 20, micro-centrifuge Hettich; ultrasound apparatus with colour Doppler-Esaote MyLab 40 VET), with which the professional staff are able to diagnose and successfully treat the most complex cases. Considering the dynamics of the development of cardiovascular ultrasound diagnostics in veterinary cardiology the most modern ultrasound device EPIQ CVx of producer Philips was procured for the Clinic's needs in January 2019 and by its procure new diagnostic methods were introduced into the daily ambulatory work primarily in terms of 4D ultrasound heart examination. Since 2019 24-hour electrocardiographic examination have been introduced to the regular ambulatory work.

Most of the teaching staff at the Clinic have spent short or longer periods of time in training abroad (Germany, the United Kingdom, Switzerland, Austria, Belgium, The Netherlands, the USA). Recently, the teaching staff have enrolled in international specialized programmes to attain the status of *Diplomate*. So far Prof. Dr. Nikša Lemo has attained that status in the field of veterinary dermatology from the Ecole Nationale Veterinaire D'Alfort-ENVA (2006). In 2009 he attained the requirements prescribed to complete his specialization successfully (Credential-European College of Veterinary Dermatology, ECVD). He now leads a specialized programme approved by the ECVD and takes part in specialised training of students within ECVD.



A student in the Internship Program takes part in the examination of a rabbit, performed by the expert associate Gabrijela Jurkić Krsteska, a specialist for exotic animals.



Teaching assistant Filip Kajin registering a patient, a Dalmatian dog (one of the seven Croatian autochthonous dog breeds currently recognized by the FCI) in the Ambulatory Care Protocol. Prof. Dr. Ivica Harapin is to thank for introducing the Clinical Protocol Application (*Vef Protocol*) used in the Clinics since 2002.



### III. DIVISIONS



Prof. Dr. Damjan Gračner teaches the “Propedeutics of Domestic Animals” course to the third-year students in the Clinical Classroom.

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Students at the Equine Clinic attending clinical practice classes. Horses from all over the Republic of Croatia are examined here. The treatment of colic, endoscopy, special dermatological tests and diagnostics of all other internal diseases of ungulates are performed at this clinic.



Clinical practice classes in the “Propedeutics of Domestic Animals” course at the Bovine Clinic. Diagnosis and treatment of all internal diseases in domestic ruminants are performed here.



Assist. Prof. Dr. Martina Crnogaj at the Small Animals Ultrasound Clinic doing an abdominal examination on the ESAOTE MyLab 40 Vet. Until the beginning of 2019 this machine was used for all ultrasound scans, and then a special machine for the Cardiology Clinics was purchased. It is now primarily used for ultrasound examinations of the abdominal cavity.



### III. DIVISIONS



Teaching Assistant Filip Kajin and expert associate Karol Šimonji with the students in the Internship Program deciding on diagnostic procedures and therapy for stationary patients.

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Undergraduate students and a student in the Internship Program preparing a dog for an endoscopic examination. In the academic year 2006/07 Prof. Dr. Dalibor Potočnjak introduced endoscopic examination of the domestic animals' digestive tract as a routine examination.



Valerija Benko, DVM, at the Hematology Laboratory in which a few dozen hematology and cytology tests are done every day, and where students are introduced to the laboratory work. Prof. Dr. Ljiljana Bedrica and the Head of the Hematology Laboratory dipl. ing. Jadranka Foršek have advanced the work in the laboratory by introducing the first hematology counter that was donated to the Clinic by Dr. Josip Kajfeš.

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Dr. Blanka Beer at the Biochemical Laboratory in which biochemical blood tests, coagulation tests, tests for determination of blood groups, urine screening tests, etc. are done every day. Prof. Dr. Mario Bauer made it possible for the first biochemistry analyzer (Tehnicon RA 1000) was procured for the Clinic. Prof. Dr. Ivica Harapin helped him introduce the machine for routine examinations.



SVEUČILIŠTE U ZAGREBU  
VETERINARSKI FAKULTET

U službi jednog zdravlja



## 8.7. Ambulatory Care Clinic

The Ambulatory Care Clinic was founded in 1952 to provide clinical classes in the field, so that students could become acquainted with and prepare for the conditions of field work, and to establish a close connection with the field veterinary services, whereby the Faculty got a direct insight into veterinary and livestock problems, and was able to participate in resolving them.

Classes at the Ambulatory Care Clinic were attended by students in the 9<sup>th</sup> and 10<sup>th</sup> semesters of the 1953/1954 and 1954/1955 academic years, and in the 8<sup>th</sup> to the 10<sup>th</sup> semesters in the academic years from 1955/1956 to 1957/1958, followed by attendance in the 7<sup>th</sup> to the 9<sup>th</sup> semesters until 2005. With the introduction of the new integrated undergraduate and graduate study, classes in the course Ambulatory Care Clinic began to be held in the 10<sup>th</sup> and 11<sup>th</sup> semesters.

For many years the Ambulatory Care Clinic had its own teaching staff, in line with the policies of the Faculty. In addition to their teaching obligations and the specific nature of field work, the responsibility of the members of the Ambulatory Care Clinic was to work in home clinics when they were not involved in field teaching. Since 2005 the teaching staff for field work at the Ambulatory Care Clinic were given their own home clinics.

Until 1959 classes were held exclusively in veterinary outpatients' clinics with livestock kept in extensive conditions, and with animals in large farms with intensive breeding after that year. In this way students were acquainted with the many health problems of animals originating from different types of breeding, as well as housing conditions, nutrition and use of animals, characteristic for extensive and intensive animal husbandry. From the foundation to-date, each associate veterinary out-patients' clinic or farm is visited on the same day of the week, so that veterinarian colleagues are able to ensure in good time a sufficient number of different patients. One professor worked with a group of eight students, and the treatment of clinically rare and interesting cases was conducted with all the students. The professors would go out with the students to the field using Faculty buses, to veterinary organizations and farms within a circle of about 50 km from Zagreb.

More recently, due to the decrease in the number of livestock, there has been a decrease in the number of patients treated, and the casuistry structure became significantly narrower. The number of students in the classes remained constant, but the number of patients per student became insufficient. Since the number of patients was small, and the groups of students large (about 24 students), very often the owners of the animals would refuse to allow the Out-patients' Clinic class to visit their farms, despite the fact that our services to the owners were free of charge. In the desire to improve the situation at the Out-patients' Clinic, the management of the Faculty decided in 2018, under the leadership of the Dean Prof. Dr. Nenad Turk and following the example of many European faculties, for classes to be held with a smaller number of students per professor and patient. To this end, four new vans were procured with the intention of making classes more dynamic, quicker and more efficient. A professional associate was employed as the organizer of field visits, whose task is to contact the associate veterinary stations and out-patient clinics on a daily basis, and send professors purposefully to each individual clinic to planned and prepared patients. After one semester under the new organization, the initial results have been very good. Individualization of the classes has been achieved, to the satisfaction of the students and the teaching staff, of the farmers due to the reduced loss of time and disturbance to their animals, and of other veterinarians due to the quality and efficient cooperation with the Faculty.

Due to the previously mentioned structural changes in agricultural production and consequently in the veterinary practice the Faculty and its professors are facing great challenges in the planning and implementation of the farm animals' lessons at the Clinics of the Faculty of Veterinary Medicine as well as at the Ambulatory Care Clinic. In this context, the emphasis should be put on raising the competence of all Clinic's professors to make the students well prepare for acquiring new knowledge and skills that are characteristic of the demanding field veterinary practice before taking classes at the Ambulatory Care Clinic.



### III. DIVISIONS

The teaching activities of experts at the Ambulatory Care Clinic came especially to the fore during the implementation in the study programme of 2005 of the new compulsory course Herd Health and the compulsory elective course Diseases and Treatment of Farm Animals, as part of the study track Farm Animals and Horses. Today the staff and equipment of the Ambulatory Care Clinic are indispensable in conducting and these courses.

The many years of good quality professional clinical work of the Ambulatory Care Clinic with field veterinarians is reflected in the fact that the quality of the work of experts in veterinary stations and out-patient clinics has been raised, whereby many methods for testing and treatment, which were previously only applied at the Faculty, have been introduced to field work. A particular form of cooperation of the Faculty, realized through the Ambulatory Care Clinic, are the teams researching various forms of breeding and health problems in livestock.

The professional work of the Ambulatory Care Clinic, from its very foundation, is also seen in the training of field veterinarians through courses. There has been a great deal of interest in students on courses in practical conduct of surgical procedures, the diagnostics and prevention of diseases of various aetiology, and laboratory tests applicable in everyday practice. The courses have resulted in raising the quality of the work in field clinics, to the satisfaction of the beneficiaries of their services. This form of education of veterinarians is conducted today through cooperation between the Faculty and the Croatian Veterinary Chamber.

Regarding the remaining activities of the Ambulatory Care Clinic, first of all it is necessary to point out the organization and implementation of the transport of students and teaching staff from almost all the departments and clinics of the Faculty to all forms of the field work. This role has been particularly prominent over recent years, given that the total number of visits to field work in other courses has far exceeded the number of visits for classes in the Ambulatory Care Clinic.



When making a clinical examination, clinical samples are often taken, e.g. by drawing blood from the tail vein of cattle.

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Before starting their work on the patients, the students attend a short work meeting at which they get the basic information about the patients. This is followed by obtaining an accurate and detailed medical history and then by clinical examination of the animal.





Taking blood from a pig from the *v. jugularis* for diagnosis of infectious diseases.

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At the Ambulatory Care Clinic, within Surgery, Orthopaedics and Ophthalmology course, students often have an opportunity to participate in the castration of domestic animals. In this photograph: castration of a boar.



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