messerli
Research Institute

Annual Report 2016

messerli Foundation

vetmeduni vienna

MEDICAL UNIVERSITY OF VIENNA

universität wien

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Statements 2016

Reinhold Mitterlehner

Vice Chancellor and Minister of Science, Research and Economy

The Messerli Research Institute represents expertise and interdisciplinary collaboration. Together with its national and international partners, it has become a renowned centre of excellence and is an essential part of the Austrian research landscape. High quality, a broad range of topics and an international focus attract experts from Austria and abroad. This is a story of success for Austria as a research location. I wish the institute much success for the future.

Petra Winter

Rector of the University of Veterinary Medicine, Vienna

The Messerli Research Institute team continued in 2016 to work intensively on the topic of human-animal interaction, and together with advocacy groups pursued future- and goal-oriented lines of inquiry. In this way, they have followed a successful path which contributed greatly to raising awareness in society for a respectful relationship with animals. Numerous new third-party funded projects support this undertaking, including the first project which comprises sociology, philosophy, and veterinary medicine. This once again brings the Messerli Research Institute to the forefront of interdisciplinary research.

Markus Müller

Rector of the Medical University of Vienna

The Messerli Research Institute is a good example of how cooperation between universities in one location can lead to an outstanding centre of excellence. The Messerli Research Institute has become an essential part of the Austrian research landscape and a model for a successful bridge between human and veterinary medicine, as well as between humanities and natural sciences.

Heinz W. Engl

Rector of the University of Vienna

By investigating the relationship between humans and animals and its foundations in the fields of Cognition and Animal Behaviour, Comparative Medicine, and Ethics, the Messerli Research Institute provides a scientific basis for a critical look at the responsible treatment of animals. Research in these fields will be extended with the fourth chair of Psychology in Human-Animal Interaction (joint chair of the University of Vienna and the University of Veterinary Medicine, Vienna), also regarding international visibility. The appointment is almost finalised.

Heinz Schweizer

President of the Messerli Foundation

The Swiss Messerli Foundation chose the collaboration of three universities in Vienna under the leadership of the Universityof Veterinary Medicine, Vienna in an international competition to establish and run an interdisciplinary institute for research into human-animal interactions. Research and teaching at the Messerli Research Institute have been going on for six years now. The high level and the broad range of activities become visible in several publications which document new findings and influence the treatment of farm and laboratory animals. We thank the Rectorate of the University of Veterinary Medicine and all members of the institute for this successful support of our vision.

Peter Sandøe

Chair of the Scientific Advisory Board

It is great to see the manifold research into animals and their relations to humans. Besides excellent scientific work, also collaborations across the disciplines are evolving to provide a fuller picture of the complex issues studied. Finally, there is a constant focus on ensuring benefits for both animals and the humans they interact with. Important new findings by the institute include a focus on behavioural medicine, work on allergies in a true one-health perspective, and studies of veterinary ethics. In the coming years, there is hope for new developments both in the field of the relationship between humans and animals and concerning collaborations with animal welfare science.

Editorial

2016

Shaping the change

Herwig Grimm
Spokesperson of the Messerli Research Institute

The year 2016 showed clearly that what we considered guaranteed and stable in our societies is neither guaranteed nor stable. Political decisions, wars and tragic attacks changed our way of looking at the future. In times of change, the burning question arises of how we can shape the future if everything is in motion. Concerning this, we can learn from science because one point is beyond question for a scientist: Science represents change. All knowledge can be criticised, must be verifiable, and must not withdraw from justified doubt. At the end, arguments and facts are what count. What is up to date now may be obsolete tomorrow. This fuels continuous scientific development. Those who cannot deal with change are not suitable candidates for a career in science, because the distinguished characteristic of scientific progress is that it catches our attention with innovations and enters unknown territories.

But what about human-animal interactions? Did this topic fade into the background and out of our focus in a year like 2016? The answer is a clear no. Animals play such an important role in our society that even the global political events of 2016 did no harm to the interest in our work. We gained knowledge and published it. This knowledge could help shape the changing relationship between humans and animals so that it becomes based on reflected scientific findings. There was a clear demand for this kind of work this year, just as in the years before.

Of course, human-animal interactions are only one part of our society that deserves consideration. But, in the words of Milan Kundera in The Unbearable Lightness of Being:

“The true moral test of humanity [...] lies in its relations to those who are at its mercy: the animals.”

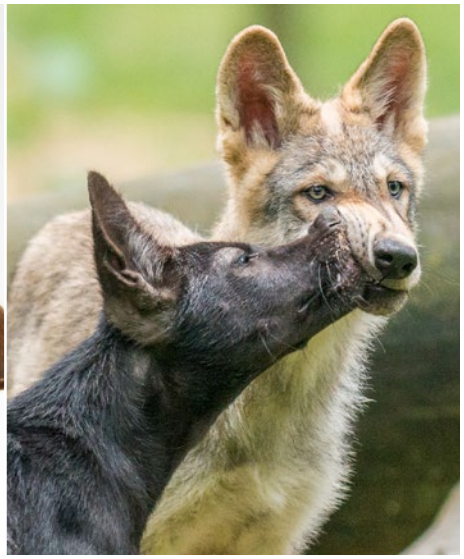
According to our mission statement, we at the Messerli Research Institute have worked to understand the responsibility to animals a bit better. This annual report provides a short overview of our work. We again look back on a successful year in which the institute continued to develop. Innovative power is essential, but also conservation of what has proved useful. We succeeded in doing so in 2016. It is our pleasure to provide a brief insight into what has been achieved this year.

The Messerli Research Institute at a glance

2016

The Messerli Research Institute was founded in 2010, with support from the Messerli Foundation (Sorenberg, Switzerland), under the management of the University of Veterinary Medicine, Vienna, in cooperation with the Medical University of Vienna and the University of Vienna. The professors for the first three units (Comparative Medicine, Comparative Cognition, Ethics and Human-Animal Studies) were appointed in autumn 2011. In March 2012, the institute was officially opened. The work at the Messerli Research Institute has four cornerstones:

- **Research:** The research is devoted to the interaction between humans and animals, as well as its theoretical principles in animal cognition and behaviour, comparative medicine and ethics.
- **Teaching:** Research findings are an integral part of the academic curriculum in our Master's programme, and are also designed to provide guidelines for the responsible and acceptable treatment of animals.
- **Interdisciplinarity:** The institute's work is characterised by its broad interdisciplinary approach (biology, human medicine, veterinary medicine, philosophy, psychology, law) and strong international focus.
- **Practice:** Thus, the Messerli Research Institute considers it one of its main responsibilities to provide scientific information to aid people responsible in the field of human-animal interactions.



Photos: Fotolia.com © Andy Dean (Mitte) | © roobertbayer (rechts)

Organisation chart

The Messerli Research Institute was established at the Vetmeduni Vienna. It is associated with the rectorate and represented by its spokesperson. It comprises three units, each headed by a fully employed professor. The professors have double appointments at the Vetmeduni Vienna and at one of the partner universities (Medical University of Vienna and University of Vienna). Furthermore the sub-units „dog trainers in accordance with animal welfare“, „assistance and therapy dogs“ and „Animal Law“ are associated with the Messerli Research Institute. Several associated centres work in cooperation with the partner universities.

The Team

Each of the three units of the Messerli Research Institute has one chair, scientific assistant positions, one administrative assistant position and – at the two natural science units – technical posts. Furthermore, there is an IT office and one administrative assistant supporting all three units. The Unit of Comparative Medicine has one administrative position for the Unit “Comparative Immunology and Oncology” at the Medical University of Vienna. By the end of 2016, the staff comprised 41 people on a full-time equivalent basis, of which 16 were permanently employed, and 25 were financed by third-party sources. Further scientists, who are not counted at this point, work at the institute’s associated centres under the direction of the Messerli professors.

The Foundation Board

From left to right:

- Heinz Schweizer, President of the Messerli Foundation
- Hans Hengartner
- Dominique Ammann
- Ulrich Fässler
- Adrian von Segesser

Scientific adviser of the Messerli Foundation

Sabine Werner has been a member of the Scientific Advisory Board of the Messerli Foundation since 2015 and of the Scientific Advisory Board of the Messerli Research Institute since 2016. She heads the Institute of Molecular Health Sciences of the Swiss Federal Institute of Technology in Zurich (ETH), Switzerland.

The Scientific Advisory Board

From left to right:

- Peter Sandøe (University of Copenhagen, Denmark), Chair of the Scientific Advisory Board
- Nikola Biller-Andorno (University of Zurich, Switzerland)
- Christine Nicol (University of Bristol, UK)
- Sabine Werner (Swiss Federal Institute of Technology in Zurich, Switzerland)
- Georg Wick (University of Innsbruck, Austria)

Obituary Frauke Ohl

We were deeply shocked to receive the notice at the beginning of the year that Frauke Ohl had passed on at the age of 50 on 28 January 2016, after a brief but serious illness. Frauke Ohl had been a member of the Scientific Advisory Board of the Messerli Research Institute since 2013 and a member of the Scientific Advisory Board of the University of Veterinary Medicine, Vienna since 2011.

The zoologist had headed the Department “Animals in Science & Society” at the Faculty of Veterinary Medicine of the University of Utrecht since 2006. She had held her chair “Animal Welfare & Laboratory Animal Science” since 2004. Before her call to the University of Utrecht, she had worked at the Primate Center in Göttingen and at the Max Planck Institute of Psychiatry in Munich.

The Messerli Research Institute lost an excellent scientific consultant, an enthusiastic contributor to the interdisciplinary scientific profile of the institute, and an intellectual person full of appreciation.

Targets

The Messerli Research Institute develops and broadens scientific findings pertaining to the cohabitation of humans and animals. Current questions about the complex relationship between humans and animals and its principles are investigated from a biological, medical, and ethical perspective.

Research in Context

The Messerli Research Institute works at the interface between three universities in Vienna: the University of Veterinary Medicine, the Medical University and the University of Vienna. It integrates the universities' existing knowledge and expertise into its own work. Alternatively, research and teaching at the three universities benefit from the institute's research findings and results.

Interdisciplinary research

The institute's three units have their own specific research agenda with a considerable number of projects funded by competitive grants. Interdisciplinary research cooperation between the units is strategically important. Interdisciplinary work and high specialisation shape the institute's unique profile. In the following, selected examples will detail the research topics at each unit.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Comparative Cognition

Comparative cognition promotes empirical knowledge about cognitive, emotional and social skills in non-human animals, and lays the natural scientific foundation for animal welfare and human-animal interaction. In 2016, the three research priorities of the unit – (1) cognition, emotions and cooperation in dogs and wolves, (2) social and technical manipulation in kea and (3) socio-cognitive abilities of farm animals (pigs) – were broadened by new projects which underline the various forms of intelligent and flexible behaviour in animals: tool use in Goffin's cockatoos and flexible brood care behaviour in poison frogs. Besides highly controlled tests in the labs in Vienna, the researchers investigate the natural behaviour of selected species in Morocco, Indonesia and French Guiana.

Staff

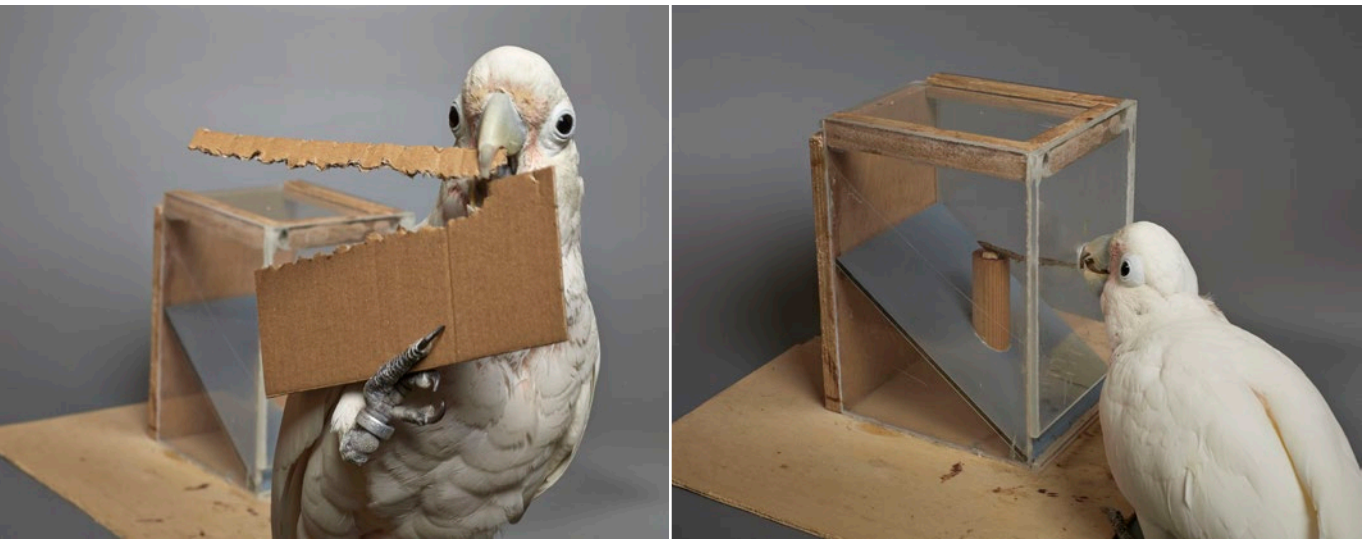
http://www.vetmeduni.ac.at/en/messerli/science/cognition/staff/

Research projects – highlights

Tool use in Goffin's cockatoos

The ability to use tools or even produce them is very rare in the animal kingdom. Even for animals using tools in the wild, we hardly know if tool use has an innovative aspect or if it is a congenital, stereotypical behaviour. Therefore, Alice Auersperg and her team investigate the question of creativity and cognitive capacity of tool use in animals which are not known to use tools in the wild. In two new projects funded by the Austrian Science Fund (start April 2016), they investigate these abilities in Goffin's cockatoos. This Indonesian parrot is an opportunistic feeder and does not use technical aids to search for food. Nevertheless, these birds showed amazing abilities when they were challenged in their aviaries: One bird started spontaneously fishing for objects with a little stick. Other animals in the group copied this behaviour by social learning. Later on, these birds were able to produce their own tools, even using totally different materials (branches, wooden boards, cardboard). They produced little sticks in a targeted way by breaking them off bit by bit, until they were the right width and length to get through the food hole and reach the reward. But also other objects such as balls can be used as tools and serve different functions. These enormous technical skills did not only attract the attention of experts (publications in *Scientific Reports, Biology Letters*) but questioned again the exceptional position of humans as *Homo faber*.

Clever birds: A Goffin's cockatoo prepares a little stick made of cardboard and uses it then to reach for a nut.



Photos: © Bene Croy

Flexible behaviour in frogs

Studies about flexible behaviour in non-human animals mainly refer to mammals, birds and fish. They hardly refer to amphibians because these animals are assumed to show only instinctively controlled, stereotypic behaviour. Thus, it is not surprising that hardly anything is known about possible cognitive processes in amphibians such as strategic planning and flexible behaviour. But this is not at all justified, as Eva Ringler and her team have shown in their research into poison frogs. In a new project funded by the Austrian Science Fund, they proved surprisingly flexible behaviour in *Allobates femoralis*. This poison frog species shows very diverse brood care behaviour. Experiments with animals living in the wild in French Guiana have shown that the frogs trace back to acquired spatial knowledge when transporting tadpoles in order to find adequate water holes for their offspring. Further, they use their sense of smell to discover new, unknown waters. Controlled tests in the frog lab in Vienna proved that male and female frogs follow different rules when distinguishing between their own and unrelated offspring. Male frogs are rather unselective. They care for all clutches, also for unrelated ones, within their territories. Females, however, precisely remember the place where they have deposited their eggs and only regard clutches at these places as their own offspring. The researchers assume that these differing strategies reflect costs and risks of wrongly directed brood care – taking care of unrelated offspring. Both studies were published in the journal *Animal Behaviour*.

Brood-caring frogs: Male frogs of the species *Allobates femoralis* transport tadpoles on a river island in French Guiana

Photo: © Andrius Pašukonis

Photo: © Walter Hödl

Comparative Medicine

Similar immune mechanisms in humans and animals

Sickness-inducing environments, food, and stress affect humans as well as animals and can unbalance our immune systems. The consequences are allergies, autoimmunity or cancer. Whereas in medicine it is common to compare humans and mice, we also consider domestic animals that have fallen sick naturally. In 2016, we decisively and productively continued the interdisciplinary dialogue of medical doctors, veterinarians and biologists: Systematic comparisons of the most frequent diseases in humans and their favourite animals – dogs, cats and horses – showed surprising parallels. Recognition of our strategy on a European level motivates us to continue our dedicated work.

Staff

http://www.vetmeduni.ac.at/en/messerli/science/comparative-medicine/staff-members/

Research projects – highlights

We have been working on mimotopes for years in the Unit of Comparative Medicine. Mimotopes are artificial structures of tumour antigens which can, as a vaccination, lead to a long-term immune response in cancer patients.

In contrast, a passive immune therapy with specific anti-tumour antibodies has been clinically applied for some time. The immune system does not react in this therapy – it remains passive. The antibodies have to be administered repeatedly. A vaccination with mimotopes, however, effects an active and long-term immune protection through production of endogenous antibodies against the growth factor HER2, a tumour antigen in about 30 per cent of breast tumours.

Mimotopes for several kinds of cancer have already been selected from a collection of many different structural imitations, so-called libraries. So far, the mimotopes gained have been bounded chemically to a carrier. But this proved to be a disadvantage because the structure of the mimotope may change retroactively, leading to reduced efficiency of the vaccination. The team of researchers, therefore, used adeno-associated viral particles (AVV particles) as carriers. The particles do not cause a disease but a strong immune response. Mimotop libraries can already be established together with the AAV particles. With the new AVV library, mimotopes for the growth factor HER2 could be produced directly at these AAV carrier particles without chemical aftertreatment and used as a specific vaccine. The efficiency of the vaccination was proven in animal tests. Mice vaccinated with mimotope were significantly protected against growth of tumours with the HER2 tumour antigen. The control group without the vaccination developed breast tumours.

In the future, the new cancer vaccines could be used as a prophylaxis for high-risk patients or breast cancer patients who have already received a therapy. Similar to other vaccinations, the immune system remembers the administered structures. If a protein occurs to a greater extent on the cell surface of tumour cells, the immune system is already sensitised and reacts. The results were published in the journal *OncoImmunology* (Singer et al. 2016) and reported to the lay press. Josef Singer also got the Wolfgang Denk Award of the Austrian Society for Haematology and Oncology (see page 33) for his work.

From mice to humans to dogs. The scientists of the Unit of Comparative Medicine aimed to make the AAVLP vaccine developed in mouse experiments applicable for humans and animals.

Photos: Fotolia.com © efmukel

Vaccine is also suitable for dogs

The new vaccine is not only suitable for humans but also for dogs. A test showed a concurrence of 90 per cent of the HER2 in humans with the structures of the relevant growth factor in female dogs. Thus, the found HER2 mimotopes, together with the adeno-associated viruses as carriers of the active agent, could be used in both human and veterinary medicine. Both would benefit, as the group reported in *Oncology Letters* (Fazekas et al., 2016).

Even dogs develop tumors,
against which AAVLP vaccine can work.

Photo: Fotolia.com © michaeljung

Ethics and Human-Animal Studies

The main focus of the unit is a philosophical reflection of the responsibility for animals in practice and its foundations. We discuss the responsibility of veterinarians, as well as questions about the agricultural use of animals, animal testing, and keeping of domestic animals. Furthermore, we also focus on fundamental questions such as the ethical relevance of animal cognition or new approaches in the ethics of human-animal interaction. In 2016, we clarified our profile in the field of veterinary ethics. We are proud to report that we could raise funding for two new projects in this field and further develop our focus with the topics “Teaching veterinary ethics” and “High-tech in veterinary medicine”.

Staff

http://www.vetmeduni.ac.at/en/messerli/science/ethik/staff/

Research projects – highlights

FWF
Der Wissenschaftsfonds.

Project funded by the Austrian Science Fund (P29974): High-tech in veterinary medicine. New possibilities and growing responsibilities of veterinary professionals

Artificial hip joints, dialysis, cardiac pacemakers, diagnostic imaging and the flourishing field of oncology have become essential parts of today's veterinary medicine. In this project, against the background of new possibilities in diagnosis and therapy, we discuss to what extent the moral self-image of the veterinary profession is subject to changes caused by high-tech options. The focus is on the fact that veterinarians and animal keepers are faced with new challenges because of new technical opportunities and moral uncertainties.

In the first part of the project, we develop a theoretical foundation, focusing on the relationship between veterinarians, animal keepers and animal patients, medical concepts of veterinary interventions (e.g. diagnosis and therapy) and external factors (e.g. financial resources of the animal keeper). In the second empirical part of the project, we will carry out a focus group study and a questionnaire study among Austrian veterinarians in order to describe the "internal morality" of veterinarians referring to high-tech veterinary medicine in an empirically informed way and analyse it, based on the collected attitudes and convictions. Consequently, this project shall contribute to a better and empirically informed understanding of existing conflicts and ethical dilemmas veterinarians are faced with. Furthermore, the results will not only make a contribution to the scientific debate but also be of interest for teachers in the field of veterinary ethics.

High-tech in the clinic

Vethics e-portfolio: Professional Ethics for veterinary officers

The project “Vethics e-portfolio: Professional Ethics for veterinary officers” started in 2016, funded by the Austrian Federal Ministry of Health. The project will transfer the contents on the promotion of ethical reflection in the professional practice of veterinary officers developed in the previous project into an online ethics course, making use of online education tools at the interface of practice and ethics and evaluating them. The “Vethics e-portfolio” is should familiarize veterinary officers with fundamental position of ethics, help them identify and better understand moral conflicts in their profession, analytically clarify terms such as responsibility of professional ethos, and finally provide assisting tools for a morally reflected dealing with the dilemmas of their professional field. These priorities and aims directly follow the previous project “Vethics for Vets” which was carried out at the Messerli Research Institute from 2012 to 2015. The core results can be found, among others, in the book “Ethik in der amtstierärztlichen Praxis. Ein Wegweiser”. The book was published in 2016 at Harald Fischer Verlag. The experience gained in the new project, as well as findings on the potential of e-learning tools to promote ethical reflection will also be useful for teaching veterinary ethics at the University.

Workshop with veterinary officers

Karl Weissenbacher

Audit Center

Dog trainers in accordance with animal welfare

The Audit Center has become an integral part of the public sector as an information centre for print and online media, as well as radio and TV stations in the entire German-speaking world. Offices of animal welfare ombudspersons, regional governments and ministries also request information regarding dogs and their keeping. This is underlined by several contributions, talks and statements.

In the core field, conducting examinations, 40 trainers were examined in 2016, eight of which failed. Furthermore, one trainer was deprived of the quality seal due to violations of the quality guidelines and the Animal Welfare Act.

Assistance and Therapy Dogs

The past year was characterised by an abundance of teams to be examined. The planned number was exceeded many times over. 40 assistance dog teams completed the exam, five of which failed. An incredible 643 therapy dog teams were successfully examined.

The Austrian legislation, along with the examination at the Messerli Research Institute, has raised awareness all over Europe. It was, for example, the initiative of the Coordinating Office to discuss the topic for the first time in a panel discussion at the Canine Science Forum in Padua in which the Head of the Coordinating Office, Karl Weissenbacher, participated. There were also requests from the German Federal Government regarding assistance dogs, resulting in talks in Berlin and Hamburg. Furthermore, a committee was established to develop a European standard, in which the Coordinating Office was significantly involved.

Conferment of the certificates with Alois Stöger, Minister of Social Affairs, and Vice-Rector Doblhoff-Dier

University Course of Applied Cynology

The fifth edition of the University Course started in March 2016 with 28 students. 17 students from the fourth course completed their studies in October, with several excellent theses among them. Thus, the total number of graduates has increased to 85.

Animal Law at the Messerli Research Institute

Animal Law is part of teaching and research at the Messerli Research Institute, focusing on general animal welfare legislation and animal testing legislation. Regina Binder, who also heads the Information and Documentation Office for Animal Welfare and Veterinary Law at the Vetmeduni Vienna, is responsible for this field. The Unit of Ethics and Human-Animal Studies and the Unit of Comparative Medicine have several areas of interdisciplinary collaboration with this field. This collaboration comprises mainly teaching in the Master's programme IMHAI and the scientific discussion of questions arising from current publications and projects. The normative foundations of the various forms of human-animal interaction and their relationship to empirical findings in natural science are central in this cooperation.

Interdisciplinary Master in Human-Animal Interactions (IMHAI)

One of the major targets of the institute is the appropriate training of young experts who are able to ethically reflect on human-animal interactions and their responsibility on a scientific basis. Therefore, the three units of the Messerli Research Institute, together with the Institute of Animal Husbandry and Animal Welfare, designed an international Master's programme in spring 2012 that is unique in its broad interdisciplinary approach. The curriculum comprises aspects of natural sciences, humanities and law in the context of human-animal interaction. The research-oriented programme qualifies graduates for both academic careers and careers in all fields of human-animal interaction.

http://www.vetmeduni.ac.at/en/messerli/teaching/

Six graduates completed their studies in 2016:

Annika Huber "Empathic-like responding in dogs (Canis familiaris) to emotional sounds of humans and conspecifics." (Supervisors Ludwig Huber, Corsin Müller, Judith Benz-Schwarzburg)

Lisinka Summer "Do domestic dogs show visual preferences for particular species and breeds in a free choice test? A touchscreen study." (Supervisor Ludwig Huber)

Judit Berczik "Long-term consistency in the behavior of pet dogs: Test-retest reliability of a personality test battery." (Supervisors Borbála Turcsán, Zsófia Virányi)

Patricia Käfer "Talking about animal on its own terms: A critique of languages as a defining momentum in understanding animal' states." (Supervisors Herwig Grimm, Martin Huth)

Katrina Rosenberger "The effect of milk allowance on solid feed intake, growth and behaviour of Holstein dairy calves." (Supervisors Susanne Waiblinger, Marina von Keyserlingk)

Eleonore Haußner "Apples and oranges: achieving comparability between non-invasive strain and the needle criterion in animal experimental procedures of Directive 2010/63/EU." (Supervisors Herwig Grimm, Regina Binder)

Further courses

Staff members of the Messerli Research Institute did not only teach in the Interdisciplinary Master's in Human-Animal Interaction, but also in the programmes at the University of Veterinary Medicine, Vienna, as well as at other universities and schools. This contributes to the institute's visibility and network, especially with its partner universities. Cooperation for teaching leads to permanent and intense exchange with the partner universities.

Staff of the Comparative Cognition unit taught courses at the University of Veterinary Medicine (veterinary diploma, modules laboratory animal and experimental animal science, university course Applied Cynology) as well as at the University of Vienna (Bachelor level Biology, Master's level Behaviour, Neurobiology and Cognition Research). Additionally, several Master's and PhD projects were supervised at both universities.

18 Master and diploma theses in total were completed in 2016 in the Comparative Cognition unit.

Comparative Medicine was taught in the medical and veterinary medical curricula, in the laboratory animal module of the veterinary diploma with "Animal models of human diseases", as well as in the PhD programmes Immunology, MCCA, CCHD and the IMHAI programme.

The Comparative Medicine unit was also involved in the mentoring programme for first year students at the University of Veterinary Medicine. Isabella Pali, an experienced mentor, continued this class in 2016 and introduced the students to science.

The first mentoring class of the Comparative Medicine unit, initiated by Erika Jensen-Jarolim.

Team members from Ethics and Human-Animal Studies taught courses in the veterinary medical curriculum (science in veterinary medicine, ethics in veterinary medicine, ethics of animal welfare, ethics and animal experimentation), as well as at the Institute of Philosophy of the University of Vienna in the area of practical philosophy. Additionally, they took part in the university course Applied Cynology, the university course Horse- and Ungulate Shoes, the education of animal welfare speakers (Tierschutz macht Schule) and the training of veterinary officers in Bavaria.

The unit Ethics and Human-Animal Studies presenting at the University of Utrecht (Netherlands).

PhD and doctoral students

The Unit of Comparative Cognition supervised 14 PhD projects in 2016, three of which were successfully completed: Lisa Wallis, Mylène Quervel-Chaumette and Mark O'Hara. Further PhD projects focus on domestic dogs (Anjuli Barber, Soon Young Park, Désirée Brucks, Durga Chapagain), wolves and dogs (Rachel Dale, Jennifer Essler, Akshay Rao, Giulia Cimarelli), pigs (Marianne Wondrak), kea (Amelia Wein) and Goffin's cockatoos (Theresa Rössler). The doctoral students were supervised by Ludwig Huber, Friederike Range, Zsófia Virányi and Alice Auersperg.

The Unit of Comparative Medicine excelled by virtue of its mobility in 2016: Lukas Einhorn (FWF doctoral programme MCCA) spent a semester at the Tokyo University of Agriculture & Technology, studying with Prof. H. Matsuda/ Prof. A. Tanaka. In return, Kazuki Nakamura from Tokyo came to us. Judit Fazekas (doctoral programme CCHD) worked with Prof. SN. Karagiannis at the King's College; Jelena Gotovina (CCHD) worked with Prof. J. Marshall, Dalhousie University, Halifax, Canada; Ina Herrmann (PhD programme of the University of Veterinary Medicine) with Dr. W. Bäumer, State University, College of Veterinary Medicine, North Carolina. Sherienne M.M. Afify came to us in a joint PhD programme of the Egyptian Ministry of Higher Education.

In the Unit of Ethics and Human-Animal Studies, Herwig Grimm supervised a total of six researchers in different graduate programmes in 2016: Kerstin Weich and Samuel Camenzind from the PhD programme of the University of Veterinary Medicine, Vienna, Svenja Springer and Anne Zintzsch from the doctoral programme of the University of Veterinary Medicine, Vienna, Andreas Aigner from the graduate programme of the Department of Philosophy at the University of Vienna and, as a co-supervisor, Matthias Eggl from the PhD programme of the University of Zurich.

Mylène Quervel-Chaumette successfully defended her PhD thesis.

Judit Fazekas, PhD student in the CCHD programme, presents her work generated at the King's College, London, in a Comparative Medicine Seminar.

2016

Engagement in committees

Highlights

Members of the Unit of Comparative Cognition have been engaged in national and international committees. At the University of Veterinary Medicine, Vienna, Ludwig Huber has been elected as a member of the Senate and been appointed again to the Curriculum Commission for several study programmes (including IMHAI), to the Scientific Advisory Board of the Animals for Therapy curriculum, and to the Coordination Board of the Teaching and Research Farms Kremesberg (LFG). On an international level, he is a member of the Scientific Advisory Board of the Institute for Advanced Sciences Berlin (WIKO) and, among other tasks, involved in the assessment and selection of fellows. Friederike Range and Zsófia Virányi headed the Wolf Science Center and the association “Clever Dog Lab”. Together with Ludwig Huber they are involved in the international Canine Science Forum.

Isabella Pali (Comparative Medicine) as an allergy expert was a member of the codex commission “Edible insects” of the Federal Ministry of Health. A special focus in 2016 was the appointments commission for the fourth Messerli chair, consisting of members from the University of Vienna and the University of Veterinary Medicine, Vienna. Under the leadership of Erika Jensen-Jarolim, the work of the commission was successfully completed in 2016. Further activities comprised advising in the

Meeting of the Teaching Ethic Networks in Utrecht (Netherlands)

Center for Regenerative Medicine and Orthopedics at the Danube University Krems. In October 2016, Erika Jensen-Jarolim's almost ten-year period in the WWTF board of trustees ended.

The staff of the Ethics and Human-Animal Studies unit were engaged in panels at local, national and international levels in 2016. Since 2015, Herwig Grimm has been the speaker for the Messerli Research Institute. In 2016, he headed the appointments commission "Animal Welfare Science" and was a member of the extended leadership team and the graduate programme of the Department of Philosophy at the University of Vienna. Furthermore, he is in the advisory boards of international projects such as ANIMPACT and of journals such as *Food Ethics*, ATLA and *Praktische Philosophie*. Samuel Camenzind is a member of the editorial board of *EurSafe News*. Judith Benz-Schwarzburg continued her involvement as a founding member of Mining Animals Germany.

Young and adult wolves at the Wolf Science Center in Ernstbrunn

Photo: © roobertbayer

Grants and Awards 2016

- Sarah Marshall-Pescini was awarded by the Vienna Science and Technology Fund (WWTF) in a highly competitive selection procedure for a research project of over EUR 500,000 on “A new look at domestication: The role of oxytocin in wolves’ and dogs’ social relationships with conspecific and human partners”.
- Eva Ringler received the Gertrude Pleskot Award (7000 €) from the University of Vienna.
- Alice Auersperg won the 2016 competition for young scientists of the University of Veterinary Medicine, Vienna for the highest raised third party funding.
- Sabrina Karl won the poster competition of the University of Veterinary Medicine, Vienna with her poster “Training Dogs for Accurate Eye-Tracking”.

Sarah Marshall-Pescini at her fieldwork

Alice Auersperg (first one from the right) at the award ceremony for the most successful researchers of the University of Veterinary Medicine, Vienna

Dog trainer Sabrina Karl (middle) won the competition with her poster.

Annika Huber got the Rupert Riedl Award for her interdisciplinary thesis.

- Annika Huber received the Rupert Riedl Award (Vienna) for her Master's thesis on "Empathic-like responding in dogs (Canis familiaris) to emotional sounds of humans and conspecics". It was awarded by the Club of Vienna at the Diplomatic Academy on 20 October 2016.
- Josef Singer received the Wolfgang Denk Award of 2016 for his publication on a new vaccine against breast cancer which he had published as a lead author in the top journal OncoImmunology 5 (7) in April 2016.
- Karin Hufnagl et al. received an Outstanding Abstract Award at the World Allergy Organization Scientific Conference, Jerusalem, Israel, 6–9 December 2016.
- Lukas Einhorn received the AAAAI 2016 In-Training Member International Travel Grant Scholarship and a competitive Travel Grant for the 14th EAACI Immunology Winter School in Cortina d'Ampezzo, Italy.
- Judit Fazekas was awarded an EAACI Short-Term Research Fellowship for her three-month stay at King's College, London.
- We are also proud to present a cover for our article about the concept of the allergen-associated molecular patterns (AAMPs) in the top journal Current Opinions in Immunology, drawn by cartoonist Oliver Stern.

- Samuel Camenzind was awarded funding for young researchers by the University of Veterinary Medicine, Vienna for scientific work abroad. He worked at the Department of Philosophy at the New York University.

Josef Singer got the Wolfgang Denk Award of 2016.

Samuel Camenzind as a guest scientist at the New York Department of Philosophy

1) Pali-Schöll I, Jensen-Jarolim E. The concept of allergen-associated molecular patterns (AAMP). Curr Opin Immunol. 2016 Sep 9;42:113-118. doi: 10.1016/j.coi.2016.08.004. [Epub ahead of print]

Cooperation & International Engagement

The most important partners in 2016

Associated Centres

Institute for Pathophysiology and Allergy Research at the Center for Pathophysiology, Infectiology, and Immunology of the Meduni Vienna

The Unit of Comparative Medicine is an integrated part of this important immunology centre at the Medical University of Vienna. Erika Jensen-Jarolim heads Department 1 of the Institute for Pathophysiology and Allergy Research. A second administrative office of the unit is part of the institute.

Most partners in the new FWF special research programme on allergies (spokesperson R. Valenta) and in the new doctoral programme MCCA (Molecular, Cellular and Clinical Allergology; spokesperson W. Pickl) work at the IPA and at the centre. Ideal research cooperation and excellent equipment facilitate the establishment of the research focus “comparative allergology”.

Photo: Fotolia.com © Evgenia

A comparative allergologist investigates the bidirectional exchange of allergens between humans and animals.

Clever Log Lab

Four projects (2 x FWF, 2 x WWTF) were completed in the Clever Dog Lab in 2016, two were continued (ERC, RC) and two started (WWTF, ÖAW). As a highlight of these projects, two papers about empathy and two about prosocial behaviour in dogs were published. Further publications include a comparative study between domestic and laboratory dogs at the sight of human faces, two studies on the role of experience and inhibition control in problem solving tasks, a study on aversion to unequal treatment, and a study on cognitive aging in dogs. It was particularly surprising that dogs show prosocial behaviour only towards familiar other dogs, but not towards familiar humans. Further tests are necessary to verify these surprising results. Numerous guided tours and media reports confirmed that the Clever Dog Lab is visible and attractive.

Research Station Haidlhof

The Research Station Haidlhof has become an international flagship since its foundation in 2010 together with the Department of Cognitive Biology of the University of Vienna for research into cognition in birds (kea and ravens) and farm animals (pigs and chicken). It has attracted many students from Austria and abroad to work on their theses, but also young scientists who started their own projects on ravens, kea or pigs at the Haidlhof. In particular, researchers from France successfully studied cooperation and coordination in kea, mother-chick interaction in kea, the vocal behavior of kea, as well as sound production in pigs. After completion of the infrastructure at the so-called Sägeacker and reaching the intended size of the pig herd in 2016, the project on free-ranging pigs is now running at full capacity. We would like to thank Gyula Gajdon who was one of the key persons in the establishment of the research station – in particular in building the kea aviary – and headed the kea lab until 2016.

Dogs at the touchscreen

Raoul Schwing in the kea aviary

Photo: © KarinBayer/VetmeduniVienna

Photo: © Karin Bayer/Vetmeduni Vienna

Wolf Science Center

The greatest event at the Wolf Science Center (www.wolfscience.at) in 2016 was the arrival of five wolf puppies in May. Two puppies came from a wolf park in Canada and three from a zoo in Russia. They all have very different personalities. As always, raising the puppies as well as their training require a lot of energy from the entire team, but especially from our trainers who took care of the newcomers 24 hours a day for the first four to five months. We still continued to run various experiments with our dogs and wolves to investigate their cooperative abilities, prosocial attitudes, social relations and hormone levels. Further scientific highlights are the papers we published in a greater number than in any other year so far. One study showed that wolves are more risk-prone than dogs (Frontiers in Psychology). Two studies, published in PLoS One, investigated play behaviour and described that wolves do not play ”fairly” but their play behaviour rather mirrors their dominance relations. In another study, Marianne Heberlein demonstrated that both wolves and dogs can show hidden food to a cooperative human whereas they avoid showing the location to a competitive human (Animal Behaviour). Yet another paper found that wolves and dogs follow the gaze of their packmates in a similar way (Journal of Comparative Psychology) and training interactions with a familiar person reduce the cortisol level of both dogs and wolves (*PLoS One*).

The heads of the Wolf Science Center with the new wolf puppies in 2016

Photo: © roocbertbayer

Department of Philosophy of the University of Vienna

The Institute of Philosophy of the University of Vienna is highly visible on the international level. It relies on the many areas of competence of its members, who impart knowledge with a wide-range of courses and high standards of specialization. Due to the double-appointment and corresponding teaching and research activities of Herwig Grimm, and the teaching activities of Martin Huth, there is intense exchange and regular cooperation in the area of teaching with the Department of Philosophy of the University of Vienna. Outside of teaching, team members are also involved in research, conferences, the graduate programme and the extended leadership team at the Department of Philosophy.

Cooperation with our partner universities

University of Veterinary Medicine, Vienna

- Animals for Therapy/Center of Science and Training
- Clinical Unit of Anaesthesiology and Perioperative Intensive-Care Medicine
- Clinical Unit of Diagnostic Imaging
- Equine University Clinic
- Institute of Animal Husbandry and Animal Welfare
- Institute of Laboratory Animal Science
- Institute of Medical Biochemistry
- Institute of Population Genetics
- Konrad Lorenz Institute of Ethology
- University Clinic for Small Animals
- University Clinic for Swine
- VetCore

University of Vienna

- Department of Behavioural Biology and Human-Animals Relationships Research Group
- Department of Cognitive Biology
- Department of Integrative Zoology
- Department of Philosophy
- Cognitive Science Platform
- Faculty of Psychology

Medical University of Vienna

- Center for Pathophysioloy, Infectiology and Immunology
- Center for Biomedical Engineering and Physics
- Comprehensive Cancer Center
- Department of Child and Adolescent Psychiatry
- Department of Dermatology
- Department of Psychiatry und Psychotherapy
- Department of Radiology and Nuclear Medicine
- Department of Surgery
- Immunology Research Cluster
- Preclinical Imaging Cluster

Further national partners

- Austrian Academy of Sciences
- Catholic-Theological Private University Linz
- Network Berufliche Assistenz, Vienna
- Technical University of Vienna
- University of Natural Resources and Life Sciences Vienna
- Zoo Schönbrunn

Further international partners

In 2016, members of the Comparative Cognition unit collaborated with scientists in Belgium (Ghent), Germany (Berlin, Leipzig), France (Rennes, Strasbourg), French Guiana (Saut Pararé), United Kingdom (Bristol, Edinburgh, Exeter, Lincoln, Oxford), Indonesia (Cibinong, West Java), Italy (Milan, Padua, Parma, Rom and Rovereto), Japan (Tokyo), New Zealand (Christchurch, Auckland), Norway (Trondheim), Sweden (Lund), Hungary (Eötvös Loránd and Semmelweis in Budapest) and the USA (Duke, Minnesota, Nebraska and Atlanta). On an institutional level, a cooperation contract between the University of Veterinary Medicine, Vienna and the Research Center for Biology of the

Photo: © Karin Bayer/VetmeduniVienna

Indonesian Academy of Sciences was signed. It secures field research into Goffin's cockatoos in Tanimbar for the coming years.

The Comparative Medicine unit is in cooperation with international partners in the following organisations: World Allergy Organization (WAO), European Academy of Allergy and Clinical Immunology (EAACI) and the American Academy of Allergy, Asthma and Immunology (AAAAI). In all these academies, the group is active as members, board members or chairs in different sectors, interest groups and task forces.

The Unit of Ethics and Human-Animal Studies is in cooperation with scientists at university organisations in, among others, Germany (Ludwig-Maximilian University Munich, FU Berlin – Department of Veterinary Medicine) and Switzerland (ETH Zurich, Universities of Zurich and Basel), with the main research priorities being veterinary medical ethics and animal ethics. In 2016, in particular the cooperation with the Institute of Biomedical Ethics and History of Medicine (Prof. Biller-Andorno) was intensified in a project on the ethical responsibility in animal experiments (supported by the Messerli Foundation). Papers were published together with, among others, colleagues from Winchester, Karlsruhe and Zurich. Conferences were organised, for example, on veterinary ethics together with the Faculty of Veterinary Medicine of the University of Utrecht and on Moral Agency together with the Institute TTN at the LMU Munich at the Protestant Academy of Tutzing.

Cooperation with networks and societies

Members of the Comparative Cognition unit are connected with groups from European countries (Ethological Society, Canine Science Forum), the USA (Comparative Cognition Society) and New Zealand (Kea Conservation Trust). A strong network is the Canine Science Forum in which members of the unit have been involved from its start. This network is now also active in North America and Australia.

A strong scientific presence in the national allergy networks is important for the Unit of Comparative Medicine, like in the special research programme funded by the Austrian Science Fund (F4606-B28), as well as in the doctoral programmes MCCA (Molecular, Cellular and Clinical Allergology; W1248-B13) and CCHD (Cell Communication in Health and Disease; 1205-B09).

In the Unit of Ethics and Human-Animal Studies there are collaborations with platforms and associations in the field of ethics in human-animal interaction, including the Research Initiative for Animal Theory (FITT), the Colloquium

Meeting of the Research Initiative for Animal Theory in Bochum (Germany)

of Bündnis Mensch und Tier, the European Society for Agricultural and Food Ethics, the European Academy of Arts and Sciences, Minding Animals Germany, Minding Animals International, Tierschutz macht Schule, Interspecies Rights Initiative and the Forum Animals and History.

Frans de Waal (Emory University, Atlanta, USA) visited the Kune-Kune pigs at the Research Station Haidlhof.

Guest researchers at the Messerli Research Institute

The successful research teams and the excellent infrastructure in the laboratories of the Comparative Cognition unit – the Clever Dog Lab, the Wolf Science Center and the Haidlhof – are very attractive for numerous guest researchers from all over the world to carry out their projects. Among others, they came from Brazil, Germany, England, France, Italy, Croatia, the Netherlands, Poland, Portugal, Sweden, Switzerland, the Czech Republic, Hungary and the USA.

The Comparative Medicine unit welcomed two guest researchers from Egypt and Japan in 2016.

Several researchers took the opportunity to work in the Unit of Ethics and Human-Animal Studies in the interdisciplinary environment of the Messerli Research Institute in 2016.

Matthias Eggel from the University of Zurich worked on his PhD project on the ethical justifiability of animal testing. Susana Monsó from the UNED Madrid worked on the capability of empathy in animals as a criterion in animal ethics.

Kazuki Nakamura from Japan gave lovely origami art – all animals – to the Comparative Medicine staff at his farewell.

Society & Public Relations

2016

The Messerli Research Institute is committed to continuous knowledge transfer to the public sphere, in line with its principles as defined in its mission statement. The institute maintains cooperation with partners from different fields. Thus, the institute contributes to the promotion of a scientifically sound and ethically acceptable treatment of animals in our society.

Media highlights

A detailed documentation of the institute's media coverage can be found on www.vetmeduni.ac.at/en/messerli.

Research in the Clever Dog Lab, at the Wolf Science Center and at the Haidlhof attracted a lot of media attention also in 2016. Highlights were reports about intelligence tests in kune-kune pigs, prosocial behaviour in domestic dogs, their ability to interpret human action and emotions, tolerance and the ability to cooperate in wolves, coordination in keas, tool production in Goffin's cockatoos, as well as flexible brood care in poison frogs.

A French film team visiting the kune-kune pigs at the Haidlhof

An ORF camera team filming a dog discriminating human emotions on a touchscreen for a ZIB1-report.

Photo: © KarinBayer/VetmeduniVienna

In the Comparative Medicine unit, the public relations highlights in 2016 included the press conference and the releases on poll allergies, and the event of the International Day of Immunology. The releases were followed by several reports in the most important media outlets. An allergy sketch by Erika Jensen-Jarolim can be found in Barbara Stöckl's book "wissenschaf[f]t.bilder". As an allergy expert, she was a guest in the "Barbara Karlich Show" in December, reporting that pets also have allergies, but stays at farms can protect them from allergies.

The work of the Unit of Ethics and Human-Animal Studies gained a lot of media attention. Judith Benz-Schwarzburg was interviewed for "Almost Human Rights" in BBC Radio 4 (broadcasted on 20 December 2016) and the supplement "Forschung Spezial" of the daily newspaper Der Standard (published on 7 September 2016) on "The myths of health benefits of dolphins. Among other popular scientific media, the magazine GEO Ernährung interviewed Herwig Grimm in detail about the question of whether vegans are better people.

Entry about Erika Jensen-Jarolim in Barbara Stöckl's book "wissenschaf[f]t.bilder"

Erika Jensen-Jarolim in the Barbara Karlich Show

Herwig Grimm at the animal welfare conference on 4 October 2016 in Graz

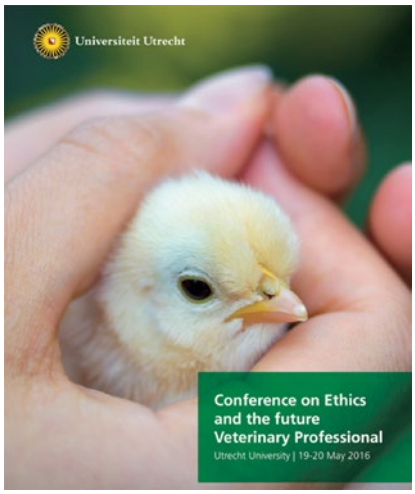
Events

2016

Members of the Messerli Research Institute were again involved in several national and international conferences in 2016. They acted as hosts, co-organisers, committee members etc. Thus, they contributed to the institute's visibility in Austria and abroad and promoted the network of researchers in the field of human-animal interaction.

EAACI Task Force meeting on AllergoOncology in Utrecht (Netherlands)

Conference "Ethics and the future Veterinary Profession" in cooperation with the University of Utrecht, Netherlands (19–20 May 2016)



Conference "Moral Agency in der Beziehung von Mensch, Tier und Maschine" in cooperation with the Institute TTN at the LMU Munich and at the Protestant Akademy Tutzing (12–13 October 2016)

The Comparative Medicine unit was involved in the organisation of numerous meetings of the World Allergy Organization Journal where Erika Jensen-Jarolim is the Editor in Chief. They also chaired and organised Workshops of the EAACI AllergoOncology Task on the position paper “AllergoOncology – The impact of Allergy in Oncology. Ein EAACI Position Paper” (Jensen-Jarolim E et al. Allergy 2016, doi: 10.1111/all.13119).

Jim McGetrick giving a seminar for children at the Children’s University Almtal.

Members of the Society of Austrian Biologists at a guided tour in the Clever Dog Lab

Series of lectures in the Working Group Human-Animal Interaction

Lecture about bite prevention for children with the co-organization of Messerli employees

Panel discussion with Herwig Grimm at the 3rd Biologicum Almtal

Infrastructure

The two laboratories of the Comparative Medicine team bridge human and veterinary medicine. In our new laboratory on the campus of the University of Veterinary Medicine, Vienna, blood and epithelial samples from canine patients are collected by the collaborating veterinary dermatologists. The samples can be freshly isolated, assessed in FACS and brought into culture. Here, also serum samples from the veterinary patients can be tested on our custom-designed allergen microchip and read by laser scanner.

Our laboratory at the Medical University Vienna, on the other hand, is excellently equipped with high-end devices needed for molecular allergen work, like last generation real-time PCR, surface plasmon resonance, CD spectrometry and live cell microscopy. Mouse facilities enable in-vivo murine studies, supported by an experimentally trained mouse keeper.

In both laboratories, histology is advanced by Tissue FAXS technology based on automated quantitative and qualitative analysis from stained tissue sections, supported by an expert tissue FAXS operator working half-time for our group.

Members of the Comparative Medicine unit in our lab at the University of Veterinary Medicine

Photo: © KarinBayer/VetmeduniVienna

Rodolfo Bianchini works with immune cells at the flow cytometer.

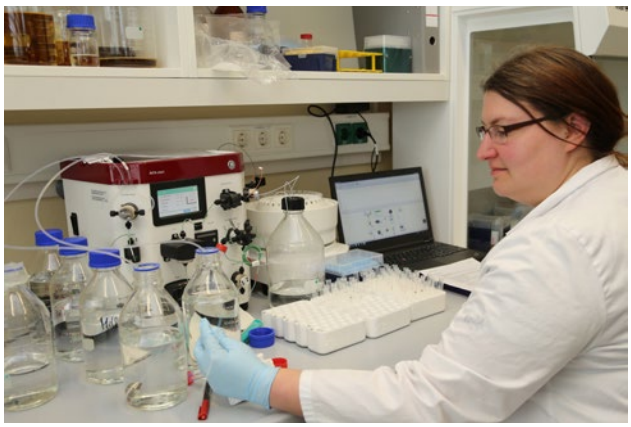


Photo: © KarinBayer/VetmeduniVienna

Gerlinde Hofstetter purifies “homemade” recombinant allergens at the FPLC.

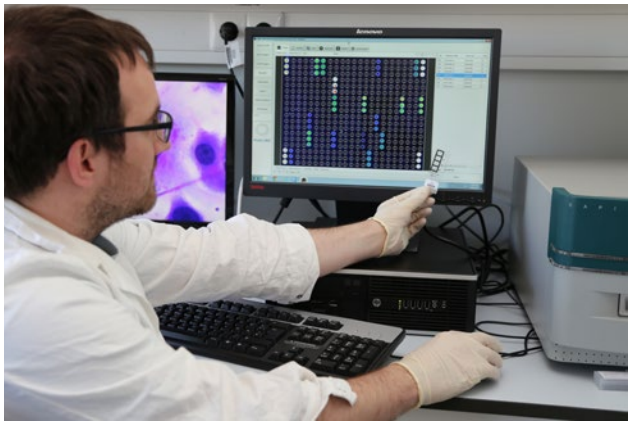


Photo: © KarinBayer/VetmeduniVienna

Lukas Einhorn with an ISAC allergen microchip at the laser scanner.

Social Events 2016

The Comparative Medicine unit invited guests for punch and cookies.

Erika Jensen-Jarolim participated in the run at the American Academy AAAAI with Amal Assa'ad and Sebastian Jensen.

PhD student Lukas Einhorn from the Comparative Medicine unit was fascinated by this model of a house dust mite at the AAAAI Annual Conference in Los Angeles, CA, USA

Carnival at the Clever Dog Lab

Messerli retreat in Gols

Jim McGetrick and his team won the Street Soccer tournament at the University of Veterinary Medicine, Vienna.

Herwig Grimm gave a speech at the Christmas party of the Messerli Research Institute.

messerli
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