VRI

2020

VRI YearBook

Research Projects

Unique Equipment

Cooperation with Practice

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Content

Dear readers,

You are browsing through the new edition of the Yearbook of the Veterinary Research Institute (VRI), which is the eighth in a row this year. In the Yearbook, we would like to present to you traditionally the most important scientific research activities, significant events and incidental institutional activities which took place in 2020.

The year 2020 was marked by an epidemic and restrictions that the Czech Republic has not seen in its history. Therefore, the VRI Yearbook is appearing in a difficult time, when almost each of us is struggling to cope with the arising crisis caused by the unfavourable epidemic situation.

Even though the mentioned pandemic limited the implementation of some activities to a certain extent, 2020 was a successful year for the Institute in terms of the achieved scientific results and their transfer to end users. By virtue of the support from the Institute's finances and special resources, 75 papers were published in peer-reviewed journals categorised in specific research fields as Q1/Q2, and it is necessary to underline the national and international patents awarded to the VRI and other results transferred to end users, including utility models and certified methodologies.

In the field of agricultural sciences, the VRI was evaluated according to Methodology 17+ as an executive institution, both in Module 1 and Module 2. In Module 2, the VRI achieves excellent results, e.g. in the number of publications produced in the first decile, and is better than the Czech Republic, EU15 and the world. In the field of natural sciences, the VRI also achieves high-quality results and, in biological sciences, the Institute is close to the EU15 average in the number of publications in the first quartile Q1.

Furthermore, acquiring national and international projects also plays an important role in producing high-quality results. In 2020, for example, the Institute was granted the following two important international projects: TBFVnet project (www.tbfvnet.eu) in which the VRI is the main partner. This project is funded by Norway Grants and aims to develop new diagnostic tools and antivirals for the treatment of tick-borne flavivirus infections. The second one is the ALEHOOP project (https://alehoop.eu/) funded from H2020 and is focused on alternative sources of protein production in the food and feed area.

The intensity of cooperation with our partners in the Czech Republic and abroad was also limited to a certain extent. Due to the fact that the epidemiological situation did not allow face-to-face meetings and events with a larger number of participants, the traditional professional seminars organized under the name VRI-Fest, now VRI-Academy, were held and conducted online in the form of webinars, while maintaining a high number of participants.

For farms, the VRI superintended preventive-medicine programmes implemented in animal herds and was engaged in the development of reproductive technologies; development of diagnostic kits and vaccines; monitoring of antibiotic resistance of pathogenic microorganisms and development of rapid diagnostic tests for its assessment; monitoring of toxic chemical pollutants and their impact on feed contamination and its consequent impact on the health status of farm animals, and other tasks.

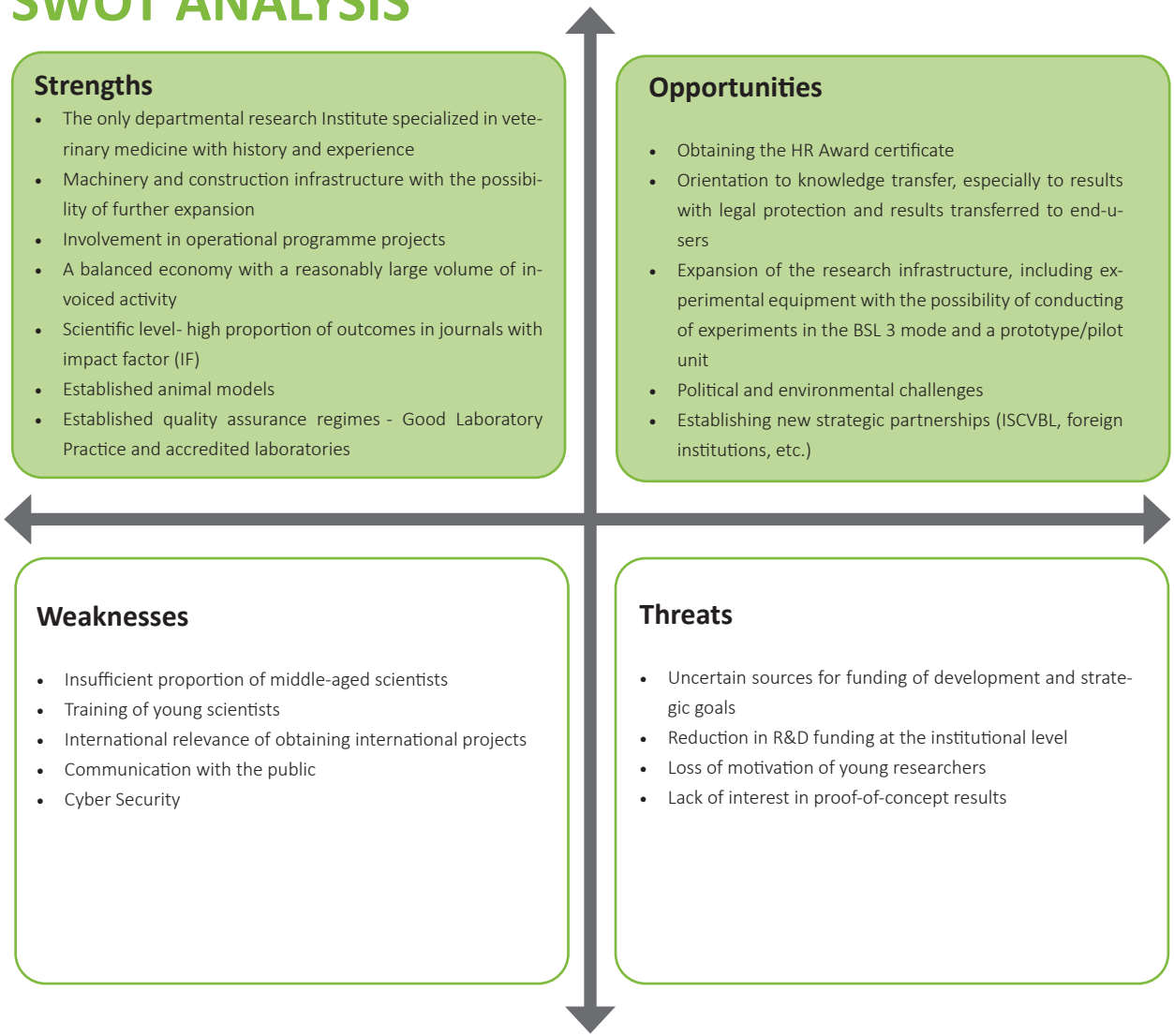
In the context with human resource management (HRM), the document "Endorsement of the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers (Charter and Code)" was sent to the European Commission in August 2020. Not only this activity is connected with the ongoing updating of internal documents that govern the internal operation of the Institute, i.e. Organisation Rules, Employment Rules, Code of Ethics, Bonus Rules and Salary Rules, GDPR rules, and electronic security.

The new major tasks for 2021 are to ensure the continuity of the development of scientific infrastructure capacity and level, and to strengthen the excellence of research teams, as well as to strengthen collaboration with agricultural and veterinary sector partners and other potential end-users of research results and expertise. My sincere thanks go to all employees of the Institute for their intensive work and efforts which, as I firmly believe, will bring the most outstanding results in the years to come.

MVDr. Martin Faldyna, Ph.D.
Director

2020 - 2030 and further on.....

SWOT ANALYSIS



Strengths

- The only departmental research Institute specialized in veterinary medicine with history and experience
- Machinery and construction infrastructure with the possibility of further expansion
- Involvement in operational programme projects
- A balanced economy with a reasonably large volume of invoiced activity
- Scientific level- high proportion of outcomes in journals with impact factor (IF)
- Established animal models
- Established quality assurance regimes - Good Laboratory Practice and accredited laboratories

Opportunities

- Obtaining the HR Award certificate
- Orientation to knowledge transfer, especially to results with legal protection and results transferred to end-users
- Expansion of the research infrastructure, including experimental equipment with the possibility of conducting of experiments in the BSL 3 mode and a prototype/pilot unit
- Political and environmental challenges
- Establishing new strategic partnerships (ISCVBL, foreign institutions, etc.)

Weaknesses

- Insufficient proportion of middle-aged scientists
- Training of young scientists
- International relevance of obtaining international projects
- Communication with the public
- Cyber Security

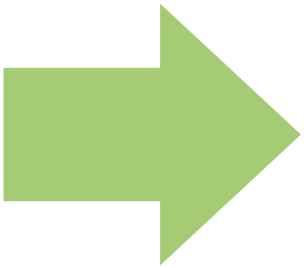
Threats

- Uncertain sources for funding of development and strategic goals
- Reduction in R&D funding at the institutional level
- Loss of motivation of young researchers
- Lack of interest in proof-of-concept results

Significance of the VRI´s existence and future

VISION

Conduct of high-quality research for application in veterinary medicine and agriculture, including in the international context



2030

MISSION

THE FOLLOWING VALUES ARE CONSIDERED AS CRUCIAL BY THE INSTITUTE´S MANAGEMENT:

Support for excellence and innovation- the Institute will support innovative and high-quality research, including transfer of results

Social responsibility- the Institute will appreciate suggestions from the professional and social public and will deal with clinically important needs

Partnership and cooperation- the Institute will conduct research in cooperation with domestic and foreign partners and ensure the dissemination of results

Respect and diversity- the Institute will strive to create an environment where each employee will feel respected and motivated

AIMS

From the point of view of the medium-term mission, it is necessary to intensify the key values and, regarding various sub--activities, it is necessary to take into account the following strategic priorities, which set the goals in areas that are crucial for us:

- A farmer-to-fork strategy for fair, healthy and organic food systems
- EU biodiversity strategy for 2030
- National Research, Development and Innovation Policy of the Czech Republic 2021+
- The Institute has the following medium-term goals:

The Institute has the following medium-term goals:

- **Scientific area**

  - Increase the number of publications in quality journals with an impact factor above the median of specialisations
  - Increase cooperation with commercial partners in order to use the applied results and to better target the defined research topics

- **Application area**

  - Increase the number of outcomes with legal protection and with granted licence
  - Increase cooperation with commercial partners in order to use the applied results and to better target the defined research topics

- **Project area**

  - Maintain the volume of financial resources from targeted support projects
  - Increase the number of special support projects obtained in cooperation with partners from the industry
  - Increase the volume of financial resources obtained by invoiced activities
  - Increase the volume of financial resources obtained from international cooperation

- **Development area**

  - Continue efforts to reduce the energy performance of buildings
  - Construction of new infrastructure

TOOLS

The following tools will be used to achieve the goals of the Institute:

- The Institute´s Internal system of evaluation of research teams
- Bonus Rules and Licence Rules
- Strategy of a follow-up project of the long-term conceptual development of the research institution
- Use of the institutional asset reproduction fund
- Use of funds from the National Recovery Plan and Operational Programme John Amos Comenius

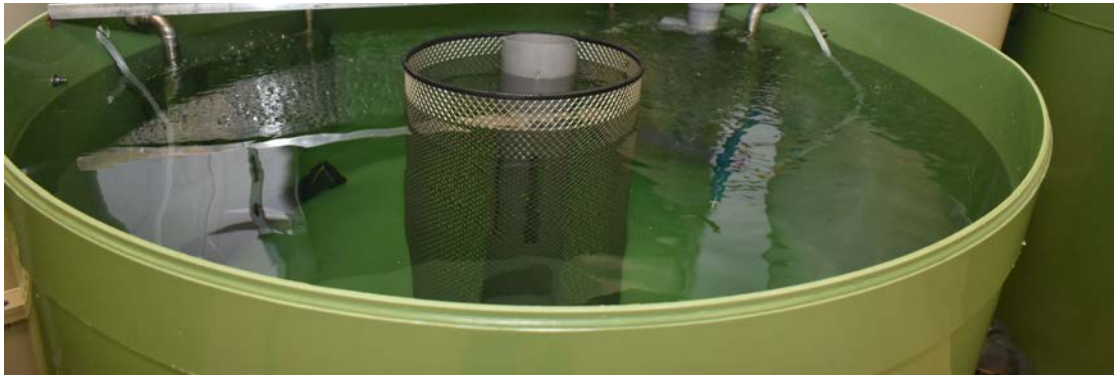
The Institute runs laboratories for performing experiments under infectious and non-infectious conditions equipped with cutting-edge instruments and also experimental animal facility for keeping experimental animals, including performance of experiments under BSL 3 regime.

The Institute´s premises offer considerable opportunities for further development and renovation of its infrastructure:

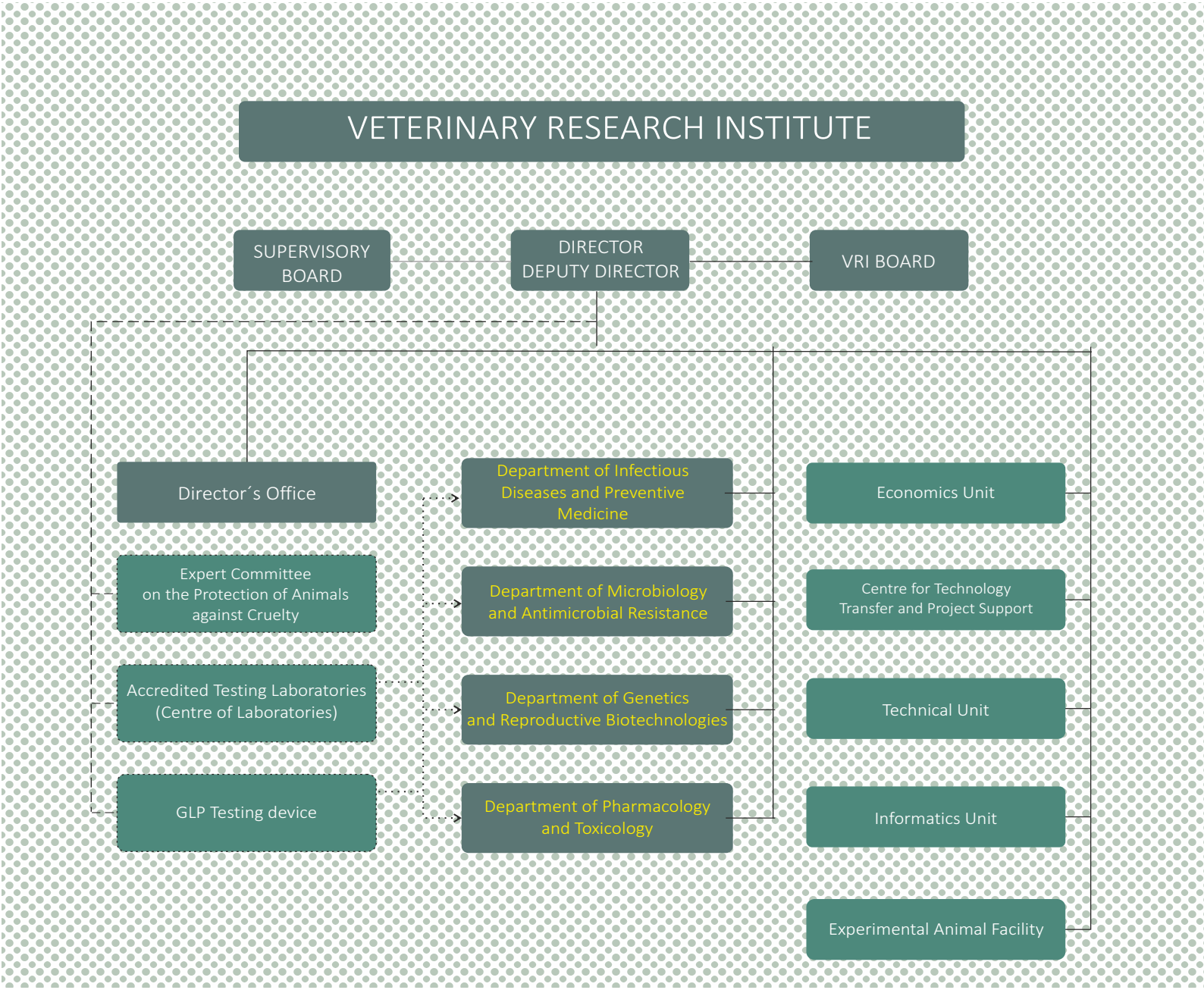
- In 2020, renovation of the wastewater treatment plant and sewerage system was completed.
- In 2020, the reconstruction of fish virology laboratories was completed; the process of its approval is expected in 2021.
- Project applications are being prepared for the use of subsidies from the Ministry of the Environment to reduce energy consumption in public buildings, including a photovoltaic power station.

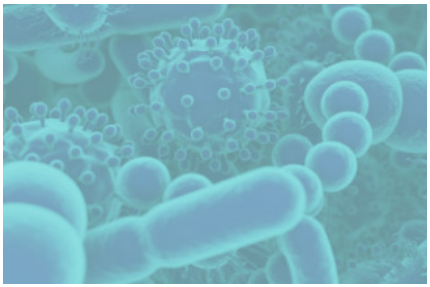
Strategic plans for scientific infrastructure development within the medium-term concept include the following:

- Further development of the experimental animal facility, consisting in their expansion, including the possibility of their use under BSL 3 regime
- Establishment of a pilot plant unit or a prototype workshop in GMP mode for proof of concept verification



New Organizational Structure of the VRI





Department of Infectious Diseases and Preventive Medicine

The Department is involved in the study of pathogenesis and epidemiology of infectious and non-infectious animal diseases, in the development of diagnostic methods and possibilities of preventive and therapeutic procedures, including the impact of nutrition and possibilities of non-specific and specific immunity stimulation.

Head of the Department:
MVDr. Ján MATIAŠOVIC, Ph.D.

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Department of Microbiology and Antimicrobial Resistance

The Department focuses on the diagnostics, epidemiology and prevention of bacterial infections in animals, including the study of intestinal microbiota and its impact on the resistance and production parameters in animals. Research is also devoted to food microbiology. The Collection of Animal Pathogenic Microorganisms is part of the Department.

Head of the Department:
Doc. RNDr. Ivan RYCHLÍK, Ph.D.

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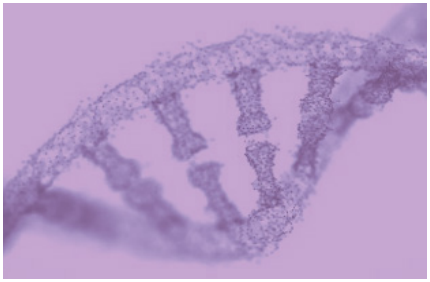


Department of Genetics and Reproductive Biotechnologies

The Department is involved in the study of genome structure and function in farm animals, and the study of physiology and pathology of reproductive system functions in animals in relation to infertility. Further scientific activities at the Department focus on the study of biology of gametes and early embryos of farm animals and the development of new reproductive biotechnologies.

Head of the Department:
Doc. MVDr. Martin ANGER, CSc.

Phone: +420 533 331 411
E-mail: anger@vri.cz

Department of Pharmacology and Toxicology

The Department is involved in the development of recombinant vaccines, adjuvants and carriers, the study of toxicological mechanisms of pharmacologically active substances and environmental pollutants and contaminants of foods and raw materials of animal origin, including their trace chemical analysis.

Head of the Department:
PharmDr. Josef MAŠEK, Ph.D.

Phone: +420 773 775 481
E-mail: masek@vri.cz

Significant Events in 2020

African swine fever is being comprehensively addressed at the VRI

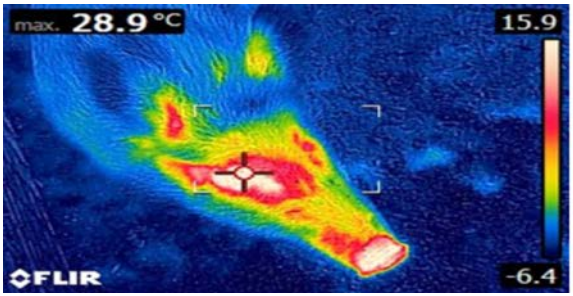
Both human and animal populations are currently under considerable infectious pressure, nowadays caused by COVID 19 in humans and by African swine fever (ASF) in wild boars and domestic pigs. The situation is slightly better in the ASF outbreak compared with the COVID 19 pandemic, as it was eradicated in the Czech Republic in 2019. However, the threat of transmission of the disease to our country is considerable and its consequences in pig production economy are far-reaching. We need to be prepared, as the situation in Europe is very serious and we have to expect the infection reintroduction into the Czech Republic. At the beginning of September 2020, the occurrence of African swine fever virus was confirmed in wild boar in Germany just 6 km from the Polish border and at a distance of less than 30 km to the nearest outbreak. Besides Poland and Slovakia, Germany is another country bordering on the Czech Republic where the disease has been confirmed. This fact further increases the importance of scientific and professional activities that are carried out at universities and departmental research institutes.

The Ministry of Agriculture of the Czech Republic, via the National Agency for Agricultural Research, supports a project entitled "African swine fever in the Czech Republic: A study of molecular epizootiology and biological properties of domestic isolates of the virus", which is implemented by researchers at the VRI in Brno.

The aim is to study the properties of domestic ASF strains obtained from wild boars, which were found dead, but also to gain knowledge transferable to end users, such as testing the effectiveness of disinfectants, optimizing biosecurity procedures and studying the survival of the infectious virus in the environment. The information obtained will be useful especially for gamekeepers. Another example of special support is the project focused on the safety of food of animal origin "African swine fever virus in meat and meat products - methods for detection and study of persistence", whose main goal is to develop a new and sufficiently sensitive method for rapid identification of the causative agent of African swine fever not only in meat and meat products. During the project implementation, information was also obtained on the survival of the causative agent in meat, meat products and during processing. "The project is being implemented for the second year out of a total of three years. The results are published at intervals, and the main part will be published next year." "They will be published, for example, as articles in peer-reviewed journals, and as a "Diagnostic kit for rapid detection of African swine fever virus in biological matrices," said Dr. Jana Prodělalová and Dr. Petra Vašíčková, project investigators. In terms of prevention and detection of infected animals, the VRI is also implementing a project entitled "Contactless identification of animals with altered temperature due to dangerous infection by thermovision", with Dr. Jan Bernardy as principal investigator.

The present results are very promising and a new innovative approach to prevention of the spread of African swine fever is being developed.

At the Veterinary Research Institute, the issue of African swine fever is addressed comprehensively. The preliminary results look very promising and will be processed as soon as possible for veterinary and animal husbandry purposes.



VRI and FNUSA-ICRC will join in research

The contract for the construction of a joint workplace of the International Clinical Research Center of St. Anne's University Hospital Brno (FNUSA--ICRC) and the Veterinary Research Institute (VRI), were signed by the representatives of these two institutions - Ing. Vlastimil Vajdák, Director of FNUSA and Prof. MVDr. Alfred Hera, CSc., Acting Director of the VRI.
The joint workplace will be located at the Veterinary Research Institute. With this step, both organizations have continued the existing successful cooperation. The new joint workplace will be based at the Veterinary Research Institute. This is an exceptional project which, thanks to the quality infrastructure and professional expertise of the research institute, will significantly expand preclinical research in the hospital, especially in the field of animal models and laboratory analyses. For example, new therapeutic approaches and new medical technologies for the treatment of cardiac patients will be tested within the project.
The development and implementation of studies using animal models for veterinary and human preclinical testing is one of the key goals of the medium-term concept of the VRI as a departmental research institution.

Photo (from the left): MVDr. Martin Faldyna, Ph.D., Pavel Iványi MBA, LL.M., Ing. Ildikó Csölle Putzová, Ph.D., MBA, Ing. Vlastimil Vajdák, Prof. MVDr. Alfred Hera, CSc., MVDr. Eduard Göpfert, Ph.D.

The newly reconstructed sewerage system and wastewater treatment plant at the VRI have been put into operation

On 15 December 2020, the reconstructed sewerage system and wastewater treatment plant at the Veterinary Research Institute was put into operation. The reconstruction was carried out under the operational programme of the Ministry of Agriculture - Support for construction and technical improvement of Infrastructure of Water Supply and Sewerage Systems II which covered about 68% of the work cost.
During the reconstruction, available modern technologies were used so that the resulting work complied with strict hygiene rules and regulations. Our thanks for the successful reconstruction go to the cooperating companies: Aqatis a.s., VHS Brno a.s., VHZ Dis s.r.o., Wombat s.r.o. and AP Investing s.r.o.

The VRI is involved in testing of wastewaters for the presence of RNA specific for SARS-CoV-2 virus

The Veterinary Research Institute staff in cooperation with the T. G. Masaryk Water Research Institute was involved in performing laboratory analyses of wastewater for the presence of RNA specific for the SARS-CoV-2 virus. Primary monitoring will last for two months and will take place anonymously. Afterwards, an assessment will be made as to whether this type of samples could be used as a tool for early warning of a possible further increase in cases of COVID-19 in the population.

Human resource management in research - preparation for the HR Award

In the second half of 2020, the Veterinary Research Institute adopted the principles included in the European Charter for Researchers and Code of Conduct for the recruitment of researchers and undertook to comply with them by means of the Human Resources Strategy for Researchers (HRS4R).
A public statement and a commitment made for the preparatory phase of the whole process took place on 3 August 2020. With an affirmed commitment, we decided to strive to obtain the prestigious European certificate HR Excellence in Research Award. This is awarded by the European Commission for excellence in human resources care in a scientific environment. Obtaining the award will confirm our commitment to implement the principles of strategic human resource management in the field of science and is one of the tools for economic growth and promoting sustainable development of the society. In connection with the implementation of the preparatory phase for the HR Award, working groups have been set up to cooperate on preparation, communication and monitoring at different phases of the process. In connection with the implementation progression, an information campaign was organized and the reasons for obtaining the European HR Award certificate were explained.

Due to the need to determine the current state of management and the functioning of the current processes, system of work and internal regulations at the Institution, a questionnaire survey of employees was conducted during October and November 2020. A detailed analysis of the current situation (GAP analysis) was carried out to identify any gaps in the current HR management of the Institution. The analysis, together with feedback provided by employees through the questionnaire survey, generated deep awareness of the actual state and extent of applicability of individual HR processes and the level of their perception by managers and employees during their implementation. Missing and inadequately described areas of work, including reserves and deficiencies, were identified. From the results of the GAP analysis, a detailed Implementation Action Plan will be developed in the first quarter of 2021, which will systematically map the identified gaps. For the areas that will be identified and designated as key areas for development, procedures will be set up for gradual improvement according to the needs of our research Institution and with regard to the most important topics identified during the initial analysis. Specific objectives and suggestions for improving the conditions will be based primarily on the findings obtained from all employees who participated in the questionnaire survey.

The European Commission awards the HRS4R quality label one year after the start of the process, taking into account the coherence of the action plan and its implementation with the aim to harmonise the strategies in different areas of work with human resources and compliance with the principles of the Charter and the Code.

HR EXCELLENCE IN RESEARCH

Outstanding Outcome Awards

Award of the Minister of Agriculture for the Best Young Scientists

Mgr. Tereza Kubasová, Ph.D. from the Veterinary Research Institute in Brno won 1st place and an Award of the Minister of Agriculture for the 2020 Best Young Scientists

During a celebratory event, extraordinary results of research and experimental development were announced and Awards of the Minister of Agriculture for the 2020 best research and experimental development result transferred to end-users were presented to young scientists on the National Agricultural Museum roof terrace on Thursday 1 October, 2020.

Mgr.Tereza Kubasová, PhD from the Veterinary Research Institute in Brno won 1st place for the peer-reviewed professional paper entitled „Contact with adult hen affects development of caecal microbiota in newly hatched chicks".

The study monitors the development of caecal microbiota in newly hatched chicks depending on the presence/absence of adult hen. The presence of hen contributes to faster development of the intestinal microbiota in chicks and thus leads to an increase in their resistance to Salmonella infection. Upon closer observation, it was found that only some groups of bacteria are transmitted and subsequently colonize the chick's intestines. The results of this study are of great benefit to the development of next generation probiotics for poultry.

Werner von Siemens Award for VRI Employees

Prestigious Werner von Siemens award in the category "The most important outcome of basic research" for the study entitled "Structure of tick-borne encephalitis virus and mechanism of its neutralization by monoclonal antibodies" was bestowed to a team of scientists in Brno on 5 March 2020.

Two employees of the Veterinary Research Institute are members of the team:

Mgr. Petra Pokorná Formanová, Ph.D.
Doc. RNDr. Daniel Růžek, Ph.D.

Projects in 2020

NEW NATIONAL PROJECTS - The main providers of research projects are the National Agency for Agricultural Research, Technology Agency of the Czech Republic, Ministry of Education, Youth and Sports, Agency for Health Research and the Ministry of Industry and Trade. In 2020, the subject matter of diagnostics and prevention of infectious and production diseases of farm ls predominated in veterinary medicine.

Food supplement for everyday consumption with hepatoprotective effect
Investigator at the VRI: MVDr. Martin FALDYNA, Ph.D.

The aim of the project is to develop a new probiotic food supplement, or food product for special purposes according to the legislative interpretation of the Ministry of Health, which will be based on the processing of stabilized probiotic cultures capable of degrading endogenous and exogenous toxins that are metabolized in the liver. This supplement should be developed by the end of 2022. This product will be intended for long-term supplementation of patients suffering from liver insufficiency and chronic or acute liver failure. The result of the project will bring an innovative and safe metod to support the treatment of liver diseases in a new modern way.

A mobile diagnostic system for reducing antibiotic consumption and proper use in the primary production of cow's milk
Investigator at the VRI: MVDr. Soňa Šlosárková, Ph.D.

The main goal of the project is to develop a mammary gland health control system for dairy cows, the ultimate goal of which would be to significantly reduce the use of antibiotics in treatment and prevention of infectious mastitis in cattle. Sub-goals: (1) Designing a system of continuous microbiological diagnostics on dairy farms; (2) Monitoring health and economic benefits resulting from the consistent application of the above system over a certain period; (3) Developing hardware devices for optical reading of distinctly coloured colonies of cultured microorganisms; (4) Developing software connected to a reading device for the analysis of the displayed microbial colonies; (5) Establish mutual connections between the reading device, its SW, system administrator and central database; (6) Performing a thorough test of the entire system functionality.

Development of new cosmetic and medical devices focused on burns and non-healing wounds in human and veterinary medicine
Investigator at the VRI: Mgr. Jan GEBAUER, Ph.D.

The project is motivated by the need to develop new products suitable for treatment of burns and non-healing wounds. In the products, the chemicals used so far will be replaced by microbial components of a healthy skin microbiome and environmental microorganisms providing natural protection. Furthermore, modern trends will be monitored with regard to absorbable biomaterials, nanomaterials with the ability to gradually release active substances and create a permanent cover at the application site.

The use of molecular cytogenetics for evolutionary and taxonomic studies in Cervidae
Investigator at the VRI: Mgr. Miluše VOZDOVÁ, Ph.D.

The Cervidae family groups together species with a growing economic potential and endangered species. Karyotypes and phylogenetic position of many deer species are uncertain due to the lack of detailed scientific data. The extensive variation in chromosome numbers (2n=6-70) and structure makes this family suitable for evolutionary studies based on interspecies molecular cytogenetic comparisons. In this project, we will perform a comparative analysis in a wide range of deer species, focusing on species lacking comprehensive data, including the genus Mazama and its cytotypes. We will determine karyotype differences and their impact on production of aneuploid spermatozoa and reproductive isolation, identify intrachromosomal rearrangements of the X chromosomes, and compare sequence similarities and chromosomal positions of satellite DNAs in various deer species. For this purpose, whole chromosome, BAC and satellite DNA probes for FISH will be constructed in a laboratory at the VRI. The obtained data will be used to improve taxonomic classification, and review phylogenetic relationships within ***Cervidae***.

Control of anaphase entry during early development
Investigator at the VRI: doc. MVDr. Martin ANGER, CSc.

Anaphase Promoting Complex (APC/C) is a ubiquitin ligase which is activated by CDC20 upon cell entry into mitosis or meiosis and, during anaphase, is responsible for the destruction of multiple proteins involved in the preceding metaphase. The transition between metaphase and anaphase is thus unidirectional and the APC/C should be activated only after correct assembly of the spindle and attachment of all chromosomes. In our project we would like to focus on mechanisms of regulation of APC/C in meiosis and also during the first mitoses after fertilization. Namely, we would like to study the relationship between the quantity of the Spindle Assembly Checkpoint (SAC) signal and the APC/C activity, whether the Separase controls APC/C activity and whether the levels of proteins important for APC/C regulation are affected by silencing of transcription during this part of development. We will use mouse and bovine oocytes and embryos, which will make our results more relevant to the human development. Our results will aid to our understanding of aneuploidy, which is frequently leading into termination of development or to severe developmental disorders.

Porcine reproductive and respiratory syndrome (PRRSV) virus alters thymocyte development and T cell repertoire
Investigator at the VRI: prof. MVDr. Miroslav TOMAN, CSc.

PRRSV is a major threat to global pork production because it causes pandemics and previous research has not yet revealed the exact causes of the pathology that allows the virus to survive in young piglets. This project proposes to verify our hypothesis that PRRSV infects thymic antigen presenting cells, which play a critical role in T cell development during the selection of their tolerant repertoire. Alternatively, PRRSV can directly affect the developing T cells and modify the repertoire of their T cell receptors. The result is a change in the thymocyte repertoire, during which PRRSV-specific T cells are eliminated, causing their absence in the periphery. This 'gap' in the T cell repertoire allows PPRSV antigens to be tolerated as the body's own, so that there is no specific immune response against the virus. Without corresponding T cells, selection of B cells capable of producing high-affinity neutralizing antibodies is impossible, as well as the production of cytotoxic T cells. This PRRSV strategy may clarify the reason for the observed immune dysregulation in this infection, which is still not satisfactorily explained

Biophysical characterization of guanine quadruplexes in the RNA genome of tick-borne encephalitis virus and elucidation of their role in the replication cycle of the virus Investigator at the VRI: RNDr. Luděk EYER, Ph.D.

Guanine quadruplexes (G4) represent a structurally very broad group of unusual nucleic acid arrangements. Recently, their in vivo presence has been confirmed and some of their cellular roles have also been elucidated. Compared to DNA, RNA quadruplexes are significantly more stable, which increases the likelihood of their in vivo formation and involvement in cellular processes. RNA quadruplexes have also been described in some RNA viruses, such as retroviruses and flaviviruses. The Flaviviridae group includes viruses with a single-stranded RNA genome, such as tick-borne encephalitis virus (TBEV), which are usually responsible for serious neural infections. Within the project, we would like to identify and characterize guanine quadruplexes in the TBEV virus genome, using biophysical techniques. Subsequent study of the effect of quadruplex-specific mutants and low molecular weight ligands and direct visualization of quadruplexes in the TBEV genome will help us elucidate the role of quadruplexes in the replication cycle of the virus. The data obtained will expand knowledge of the pathogenesis of TBEV and may also indicate new strategies for the treatment of TBEV infections.

Other project providers

MINISTERSTVO ŠKOLSTVÍ, MLÁDEŽE A TĚLOVÝCHOVY

MINISTERSTVO VNITRA ČESKÉ REPUBLIKY

MINISTERSTVO ZEMĚDĚLSTVÍ

PROGRAM ROZVOJE VENKOVA

Zemědělský svaz České republiky

MINISTERSTVO ZDRAVOTNICTVÍ ČESKÉ REPUBLIKY

9.F.i. Support for Agricutural Consultancz

During the period from 1 January 2020 up to and including 31 December 2020, 10,990 minutes, i.e. 183.166 hours, were provided by the VRI scientists and experts. A total of 260 consultations were conducted. Most consultations were provided by the VRI employees to dairy cattle farmers and, at the same time, to pig farmers, as well as sheep and goat farmers. The prevailing topics dealt with paratuberculosis and BVD control, as well as with the possibilities of diagnosing bacterial and viral diseases, antimicrobial resistance, eradication programmes and preventive measures against the occurrence of selected diseases and the possibilities of assisted reproductive technologies. Particular attention was also paid to keeping treatment records in the Diary of diseases and treatment system. In addition, consultations were provided on rearing young animals, colostrum and milk nutrition, and diseases of milk-fed animals.

The key areas in providing expert advice include the following topics:

- Development of procedures for paratuberculosis control in dairy and beef cattle
- Early and targeted diagnosis of mass diseeses, i.e. mainly infectious diseases of cattle and pigs
- Designing of systems of preventive measures to improve farm animal health • Claw and leg health in dairy cattle
- Rearing young animals (calves and piglets) and bringing their health disorders under control
- Reproduction in farm animals
- Antimicrobial use, cascade and antimicrobial resistance
- Recording of health data and their use in herd management

The guarantor of the 9.F.i. programme Professional Consultations is MVDr. Soňa Šlosárková, Ph.D.

PRO

SUSTAINABLE PRODUCTION OF HEALTHY FISH IN VARIOUS AQUACULTURE SYSTEMS

ABOUT THE PROJECT

- Study of relationships between fish, pathogens and environmental conditions affecting fish health and economic output from aquaculture production.
- Study of technological, animal husbandry and nutritional factors, the effects of environmental pollution and the use of antibiotics. Other activities will be aimed at the investigation of causative agents of infectious diseases and immune mechanisms.

PROJECT PARTNERS

Mendel University in Brno
University of South Bohemia in České Budějovice

Contact: MVDr. Martin Faldyna, Ph.D.
Phone: +420 777 786 695 E-mail: faldyna@vri.cz

EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research, Development and Education

MINISTRY OF EDUCATION, YOUTH AND SPORTS

HAIE

HEALTHY AGEING IN INDUSTRIAL ENVIRONMENT

ABOUT THE PROJECT

- The project addresses the effects of selected environmental and lifestyle risk factors on health and ageing of the population in an industrial area.
- Numerous studies are being conducted under four research programmes in different population samples (mortality, morbidity, molecular-epidemiological and genetic studies, cytogenetic studies, exposure studies, fertility studies, increased physical activity studies, socio-economic and psycho-social studies).

PROJECT PARTNERS

University of Ostrava
Institute of Experimental Medicine CAS
Faculty of Education, University of Ostrava

Contact: Prof. MVDr. Jiří Rubeš, CSc.
Phone: +420 72144 1493, E-mail: rubes@vri.cz

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MINISTRY OF EDUCATION, YOUTH AND SPORTS

CEREBIT

CENTRE FOR RECOMBINANT BIOTECHNOLOGIES AND IMMUNOTHERAPEUTICS

ABOUT THE PROJECT

- The project focuses on the development of recombinant high-affinity ligands, recombinant protein and DNA vaccines with corpuscular carriers and molecular adjuvants, which represents a new biotechnological trend in the development of recombinant vaccines, highly selective immunotherapeutics, diagnostics and theranostics.

PROJECT PARTNERS

UP Olomouc
IBT Prague
UCT Prague

Contact: PharmDr. Josef Mašek, PhD.
Phone: +420 773 775 481, E-mail: masek@vri.cz

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PROBIOTIKA

PROBIOTIC BACTERIA OF GUT MICROBIOTA AS THE BASIS OF ANIMAL HEALTH AND WELFARE

ABOUT THE PROJECT

- Selection of new bacterial isolates from poultry and pigs and determination of their complete genome sequence.
- Verification of the ability of these isolates to colonize the digestive tract of chickens and piglets.
- Testing the host response to colonization by selected bacterial isolates with probiotic potential.
- Identification of probiotic isolates which increase the natural resistance of chickens and piglets to infection with Salmonella, Campylobacter and pathogenic *E. coli*, including antibiotic-resistant clones.

Contact: Doc. RNDr. Ivan Rychlík, Ph.D.
Phone: +420 5 3333 1201, E-mail: rychlik@vri.cz

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PHARMACOLOGY, IMMUNOTHERAPY, NANOTOXICOLOGY

ABOUT THE PROJECT

- The main goal of the FIT project is to build a European research centre for nanomedicine and medicinal nanotechnologies with a unique infrastructure for research and development of recombinant vaccines and targeted drugs against infections and cancer diseases.

DEPARTMENTS INVOLVED IN THE PROJECT

Infectious Diseases and Preventive Medicine

Pharmacology and Toxicology

Contact: PharmDr. Josef Mašek, PhD.
Phone: +420 773 775 481, E-mail: masek@vri.cz

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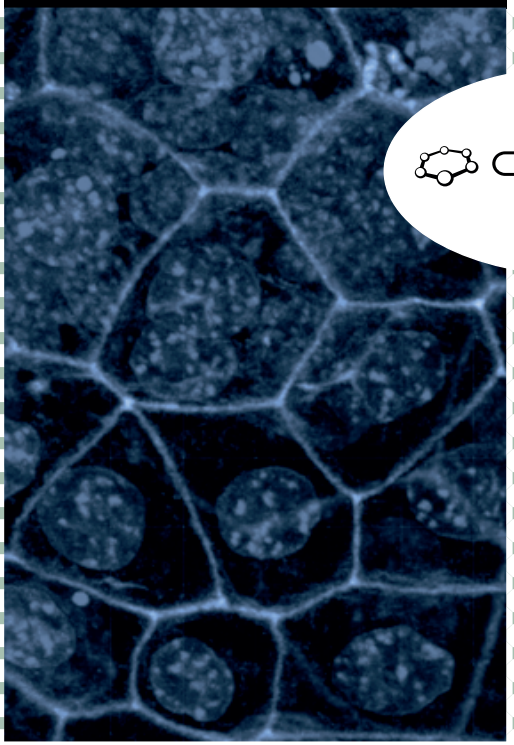

CENTRAL EUROPEAN INSTITUTE OF TECHNOLOGY

ABOUT THE PROJECT

- Research at the VRI within the framework of CEITEC is focused on basic and applied research in the field of reproduction, animal models and advanced light microscopy techniques.
- Our workplace is actively involved in a wide network of cooperation with national and international academic centers and at the same time participates in the production of results transferred to practical use.

PROJECT PARTNERS

Masaryk University
Czech Academy of Sciences
Mendel University in Brno
University of Veterinary and Pharmaceutical Sciences Brno
Brno University of Technology

Organisational CEITEC VRI Unit Director:
MVDr. Martin Anger, CSc.
Phone: +420 5 3333 1411, E-mail: anger@vri.cz

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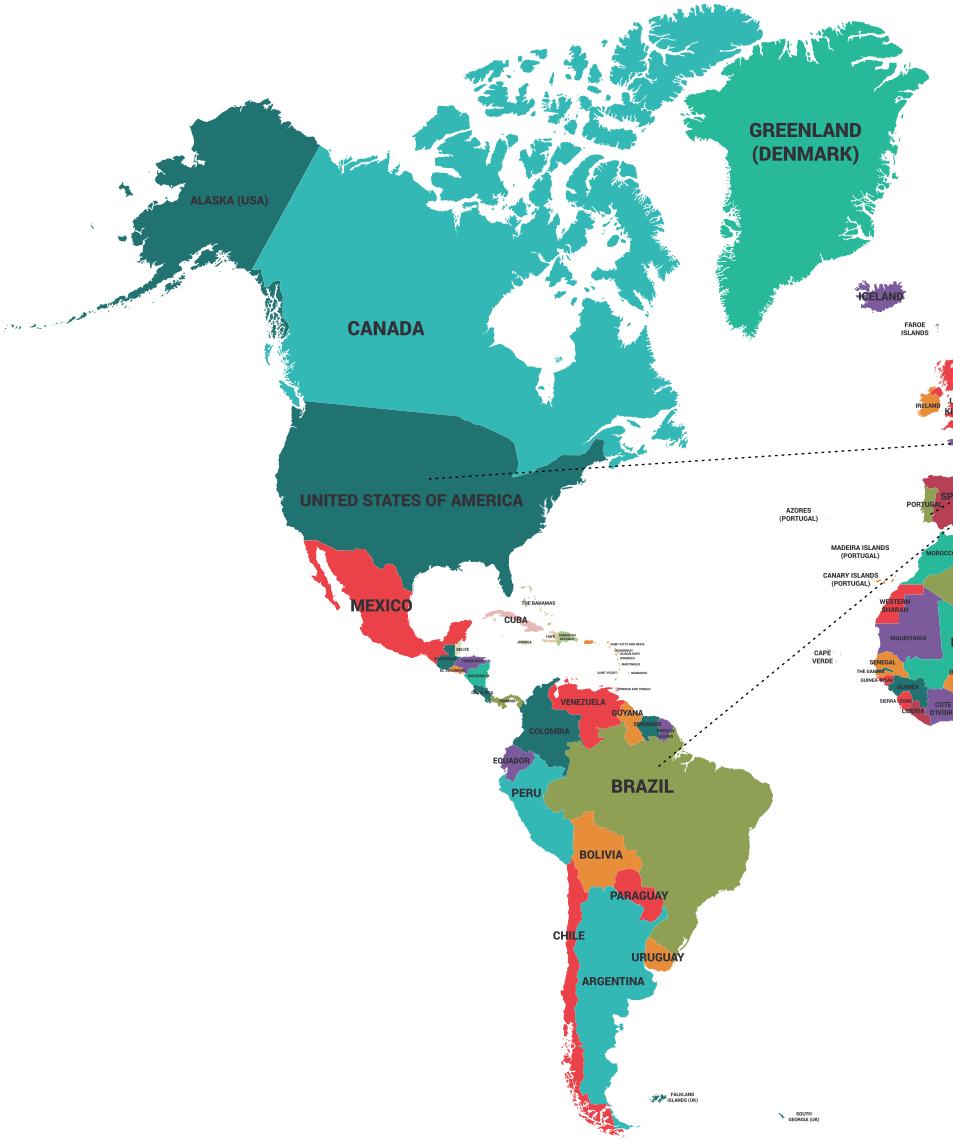
International Cooperation

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SOUTH AFRICA
AUSTRALIA
NEW ZELAND

TBFVnet - A NETWORK OF LABORATORIES THAT STUDY AND SURVEY TICK-BORN FLAVIVIRUSES

ABOUT THE PROJECT

TBFVnet is a joint research platform consisting of a network of associated laboratories to investigate the biology and pathogenesis of tick-borne encephalitis virus (TBFV) disease and to study novel antivirals. TBFVnet also aims to integrate research in this area by sharing common tools, expertise and best practices, and passing them on to neighboring countries.

PARTNERS: CONSORTIUM OF 6 PARTNERS

Contact: Prof. RNDr. Daniel Růžek, Ph.D.
Phone: +420 777 786 218, E-mail: ruzek@vri.cz

BIOREFINERIES FOR THE VALORISATION OF MACROALGAL RESUDUAL BIOMASSAND LEGUME PROCESSING BY-PRODUCTS TO OBTAIN NEW PROTEIN VALUE CHAINS FOR HIGH-VALUE FOOD AND FEED APPICATIONS (ALEHOOP)

ABOUT THE PROJECT

Obtaining cheap dietary proteins from biomass, algae and by-products in the production of legumes using biorefineries. This transforms biomass into alternative forms of proteins for a variety of uses, from animal feeds and food supplements to cutting-edge applications in nutritional awareness and health management.

PARTNERS: CONSORTIUM OF 16 PARTNERS

Contact: MVDr. Martin Faldyna, Ph.D.
Phone: +420 777 786 695 E-mail: faldyna@vri.cz

Interreg Rakousko-Česká republika

INTERREG CROSS-BORDER COOPERATION V-A AUSTRIA-CZECH REPUBLIC FOR PROGRAMMING PERIOD 2014- 2020

Initiative for the promotion of research and innovation capacity of veterinary service in poultry production

ABOUT THE PROJECT

The main goal of the project is to increase and improve poultry products in the region. The importance of this goal is reflected in the worldwide increased demand for poultry products, especially poultry meat. A prerequisite for increasing production is the health of the animals and the associated welfare.

PARTNER: Veterinärmedizinische Universität Wien

Contact: doc. RNDr. Ivan Rychlík, Ph.D.,
Phone.: 420 5 3333 1201, E-mail: rychlik@vri.cz

one HEALTH EJP

THE ONE HEALTH EUROPEAN JOINT PROGRAMME

ABOUT THE PROJECT

The aim is to create a sustainable European One Health framework by integration and alignment of medical, veterinary and food production research through joint programming of research agendas matching the needs of European and national policy makers and stakeholders.

The project includes:

- Foodborne Zoonoses (FBZ)
- Antimicrobial Resistance (AMR)
- Emerging Threats (ET)

PARTNERS:
CONSORTIUM OF 37 PARTNERS

anses

Contact: Doc. MVDr. Renáta Karpíšková, PhD.
Phone: 420 777 786 322, E-mail: karpiskova@vri.cz

Dr. Yael HALAAS from the USA paid a visit to our Institute

Our Institute was visited by Dr. Yael HALAAS, a renowned American surgeon, collaborating with the Czech company BTL, a leading global manufacturer of medical technologies. The aim of the visit was a meeting with the staff of the Department of Immunology. As part of contractual research, under the leadership of Dr. Jan Bernardy, Ph.D., they experimentally verify the effects of a new technology for muscle and subcutaneous structures reconstruction and cell apoptosis. The results of this collaboration were published in the prestigious professional periodical Journal of Cosmetic Dermatology (http://www.researchgate.net/.../338574879_Mechanism_of...).

Transfer of Results to End-users

Transfer of knowledge, technologies and their commercialization is a very important activity complementing the main mission of the Institute. The intellectual property protection policy is primarily focused on ensuring the use of the subjects created by the employees so that they produce maximum benefit for the VRI. The centre coordinating the activities related to the commercialization of new knowledge and technologies developed at the departments of the Institute is the Centre for Technology Transfer and Project Support (CTT PS). The main activities of CTT PS include monitoring of research activities and new knowledge, evaluation of commercial potential of the new knowledge, ensuring intellectual property protection of generated results, managing the intellectual property portfolio, consulting, providing contractual documents, preparing internal regulations, licensing policy, promoting the results, counselling services, analyses and providing of external legal services.

CTT PS manages the Institute's Intellectual property database. The VRI manages a total of 12 national patents, 28 utility models and 4 international patents. In the last 3 years, 22 utility models, 7 national patents and 2 international patents were registered. In 2020, the following patents were granted to the VRI: European patent EP3139951B1 "Vaccine for the prevention of Lyme borreliosis" in cooperation with Bioveta, a.s. and national patent CZ 308594: "Mucoadhesive particle carriers, method of preparation and use". One of the key tasks of the CTT PS in 2020 was to strengthen cooperation with agricultural and veterinary spheres and other potential recipients of research results and knowledge. Cooperation was established with the commercial and non-profit spheres in the form of applied research projects and expert activities devoting an effort to a long-term mutually beneficial relationship. A vaccine against Salmonella infections in pigs developed under the project NAZV QJ1210115 at the VRI Department of Immunology in cooperation with Bioveta a. s. was successfully registered in 13 countries of the European Union, including the Czech Republic. The vaccine is available under the name Biosuis Salm in Bioveta a. s. for field application.

In 2020, contracts were concluded with domestic and foreign partners from the application sphere at the amount of approximately CZK13.7 million. These collaborations were accomplished in the form of licensing agreements, contracts for contractual research and research to order.


(19) Europäisches Patentamt European Patent Office Office européen des brevets

(11) EP 3 139 951 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent: 09.09.2020 Bulletin 2020/37

(51) Int Cl.: A61K 39/02 (2006.01) C07K 14/20 (2006.01) A61K 39/00 (2006.01)

(21) Application number: 15727869.8

(86) International application number: PCT/CZ2015/000042

(22) Date of filing: 11.05.2015

(87) International publication number: WO 2015/169271 (12.11.2015 Gazette 2015/45)

(54) VACCINE FOR PREVENTION OF LYME BORRELIOSIS
IMPFSTOFF ZUR PRÄVENTION VON LYME-BORRELIOSE
VACCIN POUR LA PRÉVENTION DE LA BORRÉLIOSE DE LYME

(84) Designated Contracting States: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: 09.05.2014 CZ 20140320

(43) Date of publication of application: 15.03.2017 Bulletin 2017/11

(73) Proprietors:
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- Univerzita Palackého v Olomouci 771 47 Olomouc (CZ)
- Bioveta, A.S. 68323 Ivanovice na Hane (CZ)
- Ustav organicke chemie a biochemie AV CR, v.v.i. 166 10 Praha 6 (CZ)
- Fyzikální ústav AV CR, v.v.i.

- BITTNER, Libor 68201 Vyskov-Dedice (CZ)
- NEPERENY, Jiri 68201 Vyskov-Nosalovice (CZ)
- VRZAL, Vladimir 68323 Ivanovice na Hane (CZ)
- LEDVINA, Miroslav 18600 Praha 8 (CZ)
- KRATOCHVILOVA, Irena 18100 Praha 8-Troja (CZ)

(74) Representative: Hartvichova, Katerina et al HARBER IP s.r.o. Dukelskych hrdinu 567/52 170 00 Praha 7 (CZ)

(56) References cited:
WO-A1-95/12676 WO-A1-2011/143617
WO-A1-2014/018274 WO-A2-02/16422
WO-A2-2007/065098 WO-A2-2012/054580

Certified methodologies

Applied result No.	Title of the applied result	Authors
Certified methodology 123/2020 ISBN 978-80-88233-87-9	PCR-RFLP method for distinguishing Streptococcus suis serotype 1/2 from serotype 2 and serotype 1 from serotype 14.	Matiašovic, J., Zouharová, M., Nedbalcová, K., Králová, N., Matiašková. K., Šimek, B., Kucharovičová, I.,
Certified methodology 130/2020 ISBN 978-80-88233-08-4	Methods for detection, laboratory testing and antimicrobial susceptibility/resistance testing of Streptococcus uberis isolates from dairy cows with mastitis	Zouharová, M., Nedbalcová, K., Audová, E.,
Certified methodology 131/2020 ISBN 978-80-88233-07-7	Paratuberculosis- certification programme in dairy cattle farms	Kovařčík, K., Fleisher, P., Fichtelová, V., Šlosárková, S., Králová, A.
Certified methodology 136/2020 ISBN 978-80-88233-98-5	Contactless identification of animals with altered temperature due to dangerous infection by thermovision	Bernardy, J., Novák, P., Hodkovicová, N., Šťastný, K.,
Certified methodology 137/2020 ISBN 978-80-7672-000-8	Procedure for transport, storage and further handling of bacterial strains in the target laboratory	Reichelová, M.,

Functional samples

Applied result No.	Title of the applied result	Authors
Functional sample 4712 /2020 ISBN 978-80-7672-002-2	Technical solution: Isolation of African swine fever virus from soil by culture method	Prodělalová, J.
Functional sample 4713/2020 ISBN 978-80-7672-003-9	Technical solution: Determination of the virucidal activity of disinfectants against African swine fever virus by the surface test method under low and high bioburden conditions	Prodělalová, J.
Functional sample 4714/2020 ISBN 978-80-7672-004-6	Technical solution: Procedure for the detection of honey bee viruses from the waste	Prodělalová, J.

Prototype

Applied result No.	Title of the applied result	Authors
Prototype 5329/2020 ISBN 978-80-7672-001-5	Biothreat xMAP panel – a diagnostic tool for the simultaneous detection of bacteria exploitable as biological weapons, specifically: Bacilus anthracis, Yersinia pestis, Francisella tularensis and Brucella spp.	Volf, J., Jelínková, P., Hrdý, J., Reichelová, M., Rychlík, I.

Verified technology

Applied result No.	Title of the applied result	Authors
Verified technology 5107/2020 978-80-88233-99-2	Immunoenzymatic kit for screening of antibodies against Mycobacterium paratuberculosis in bovine serum, plasma and milk	Kovařčík, K., Králová, A.

Utility model

Applied result No.	Title of the applied result	Authors
Utility model 34033	Multiplex detection kit for DNA of farm animals	Králík, P., Piskatá, Z., Bořilová G., Dufková, M., Hulánková, R., Nesvadbová, M.

Patents

Applied result No.	Title of the applied result	Authors
Patent No. 308 594	Mucoadhesive particle carriers, method of preparation and use	Mašek, J., Lukáš, R.; Raška, M.; Turánek Knötigová, P., Pavlína; Lubasová, D., Turánek, J.;
Patent No. PCT/CZ2015/000042	Vaccine for Prevention of Lyme Borreliosis	Turánek, J.; Mašek, J.; Raška, M.; Weigl, E.; Krupka, M., Bittner, L.; Neperený, J.; Vrzal. V.; Ledvina M.; Kratochvílová Irena; 2015.

Incidental Institutional Activities

SCIENCE FESTIVAL 2020 BRNO - more than 500 visitors visited the VRI Brno exhibition!

The title of the VRI exhibition in 2020 was One Health. Children and adolescents could watch cells, which circulate in our blood, under a microscope and learn about their functions, observe the most common parasites that can infect humans and animals, and also learn about the function of enzymes in our digestive system, especially in relationship to gluten intolerance. In addition, surveys and quizzes of different difficulty levels were prepared, which could expand their knowledge in the areas of natural sciences. An equally interesting part of the exhibition was a demonstration of non-contact temperature measurement using thermal imaging, which is currently used, for example, in the Covid-19 epidemic. Those who wished, were given their "thermal portrait" as a gift. We were very pleased at the interest of young visitors, which refutes the claim that young people are not interested in anything but PC games. And that's good!

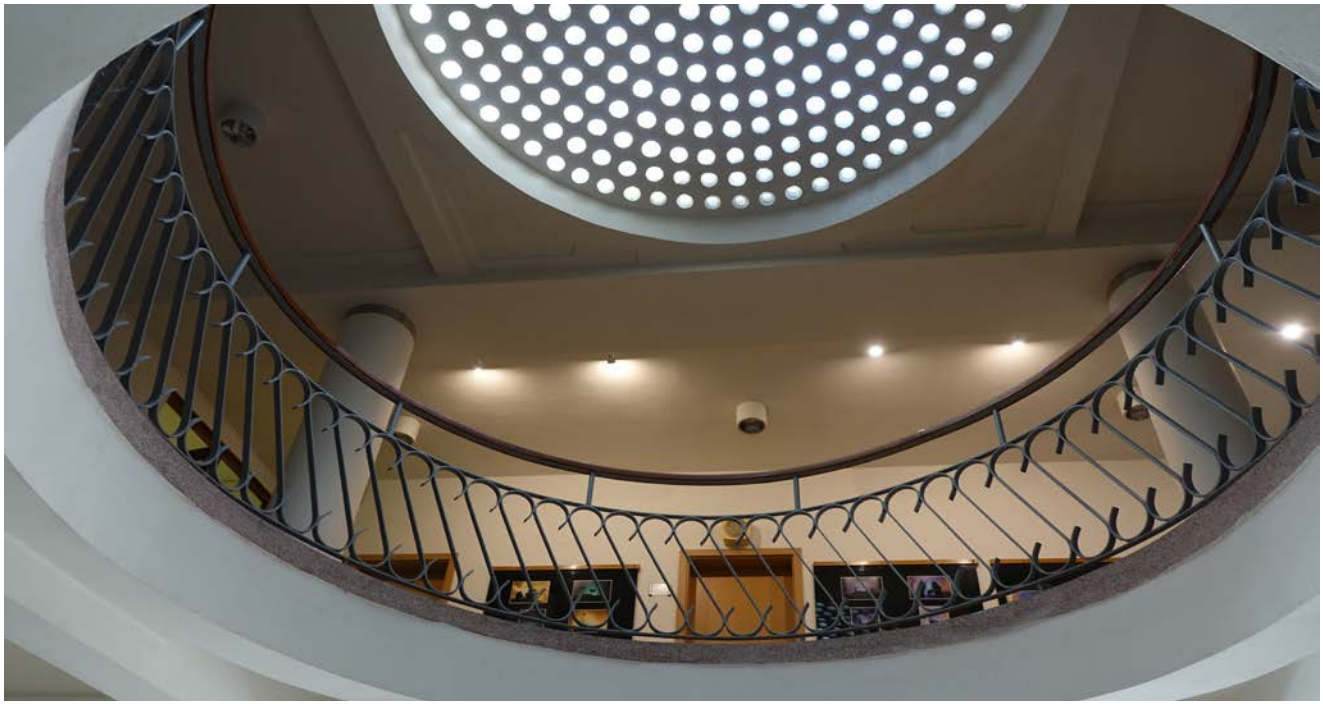
Small Art Gallery

In 2020, our Small Art Gallery hosted 7 exhibitions of photographs, graphic arts, wood engravings, paintings etc. Some artists organized private viewing to their exhibitions.

- Karel Baláč- “Beauty of detail“ photography
- Lukáš Orlita- “Symbols“ (of human life) Monotypes
- Isabela Wallo- “Wild“- paintings and drawings
- Helena Řezníčková- “Photos from travels“ photographs
- Six years of the magazine- “Reporter“- front pages
- Jan Mikolášek- “One day at the kitchen table“- photographs
- MVDr. Pavel Kulich, Ph.D.- “Electron microscopy“- photographs

The activity of the Small Art Gallery is provided by MgA. Sylva Tománková. For the history of exhibitions and current exhibitions please visit the following website: https://www.vri.cz/cz/o_nas/mala_galerie

MG Malá galerie



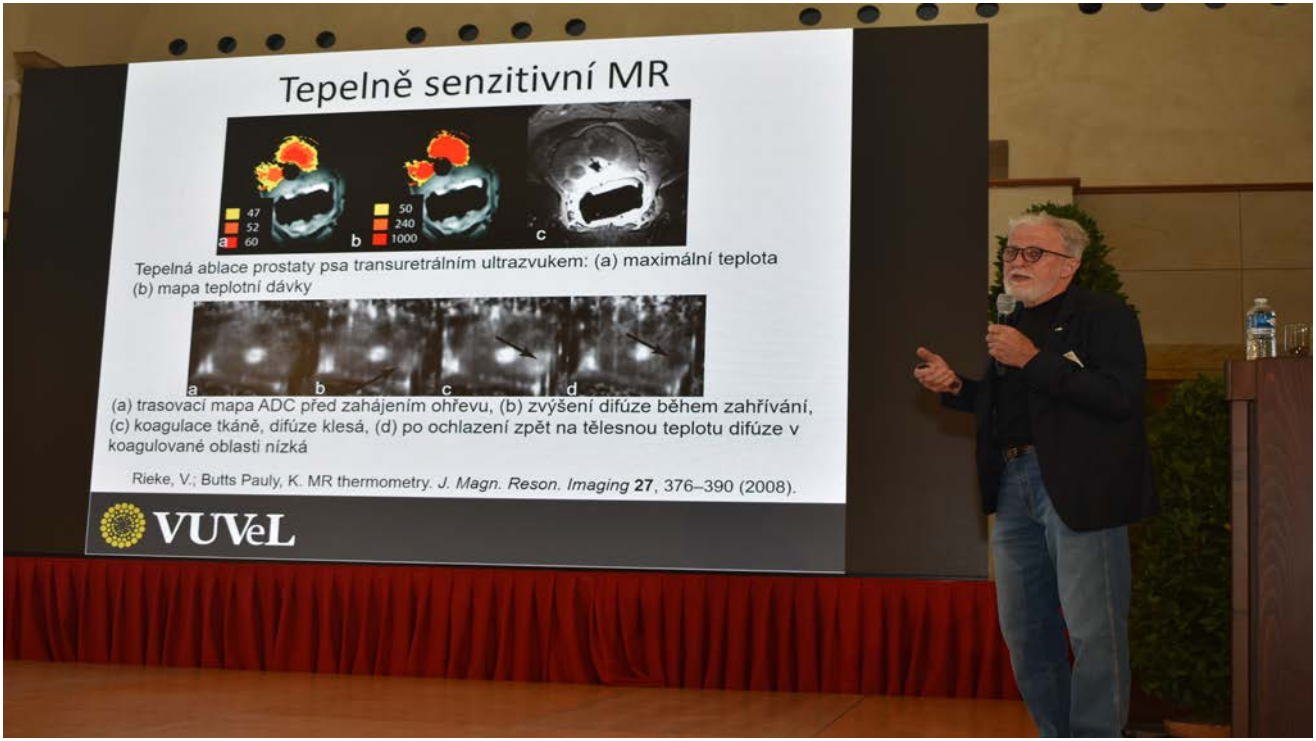
The Veterinary Research Institute resented at Prague Castle

Veterinary Medicine for Practice is an international scientific conference. Its 7th year took place on Saturday, 3 October, 2020 in the Ball Games Hall of Prague Castle. This year's topic was JULES VERNE in current veterinary medicine. The VRI was the partner of this event.

The futurological name indicated the topic areas of all presentations, emerging technologies, treatment approaches and plans for the future. The high level of lectures was guaranteed e.g. by Prof. Gad Baneth, DVM, Ph.D., Dipl. ECVCP from Israel, Prof. MVDr. David Modrý, Ph.D. and MVDr. Václav Ceplecha, Ph.D. The Veterinary Research Institute was represented by MVDr. Jan Bernardy, PhD. with a lecture entitled Remote measurement of body temperature in veterinary medicine. This innovative method is new in veterinary medicine and its use in the diagnostics of farm animal diseases has a future. The VRI presentation included an exhibition where the Institute staff presented their possibilities of cooperation with veterinary practitioners.

When asked how they evaluated the event, both Prof. MVDr. M. Svoboda, CSc., professional guarantor of the conference and Zdeněk Brych, Director of the organizing agency V.M.EST, a.s. answered in the same way: "We are very happy that even at this difficult time, about 100 participants came to Prague Castle and another 60 practitioners were connected online."

"The Veterinary Research Institute participated in our conference for the first time. We are very pleased by that and very much appreciate that veterinary practitioners could get acquainted with very interesting projects and services which they can use in their daily work," added Z. Brych.



Library

In 2020, the Library continuously updated its book fund and magazine fund, purchased books and periodicals, and provided bibliographic and library services, including book lending and providing papers published in journals from its own fund, as well as from other Czech libraries and from abroad. In addition, it also fulfilled the requirements of the Interlibrary loan services for other libraries in the Czech Republic. As well as in previous years, the online access to full-texts of requested papers in databases offered by Elsevier (ScienceDirect and Scopus), Springer, Wiley and Blackwell and to the abstract and citation database Web of Science (Web of Knowledge) was made possible for the VRI researchers. In addition to professional literature, the VRI Library also provides lending of belles-lettres books within the Employees' Library.

https://knihovna.vri.cz/#!/

VRI-hosted reunions of former employees pensioners

The participants of the reunion of former VRI employees which took place at the beginning of January had a pleasant afternoon.
This traditional event gives participants the opportunity to talk to both the former and current employees of the Institute. The attendees were greeted by Prof. MVDr. Alfred Hera, CSc., VRI director.

Additional Activities

THE VETERINARY COMMITTEE FOR FOOD SAFETY in 2020

The work of the Committee was carried out in 2020 according to the approved plan of activities. The professional activity of the Committee members and external experts, invited to assist in performing the tasks, was concentrated on making studies and giving opinions focused on the issues closely related to animal health, animal welfare, zoonoses, hygiene of farms, safety of animal products and animal feeds.

Member:

Chairperson of the Committee in 2020:

RNDr. Miroslav Machala, CSc. (VRI)

Secretary of the Committee: MVDr. Ivana Koláčková, Ph.D. (VRI)

Members:

MVDr. Pavel Alexa, CSc. (VRI, emeritus scientist)

Doc. MVDr. Jan Bardoň, Ph.D., MBA (SVI Olomouc)

Prof. MVDr. Ing. Petr Doležal, CSc. (MENDELU)

Prof. MVDr. Alfred Hera, CSc. (ISCVBM Brno)

MVDr. Václav Jordán (Agris Medlov, emeritus scientist)

Doc. MVDr. Renáta Karpíšková, Ph.D. (VRI/UVFS Brno)

Prof. MVDr. Zdeněk Pospíšil, DrSc. (UVFS Brno)

MVDr. Eva Renčová (ISCVBM Brno)

Prof. MVDr. Vladimír Večerek, CSc. (VFU Brno)

Prof. MVDr. Lenka Vorlová, PhD. (VFU Brno)

Professional activity of the Committee: In compliance with government regulations on travel and assembly restrictions, in connection with the occurrence of COVID-19, the Committee did not meet in person in 2020. Voting on study proposals and approval of the undertaken work was carried out by e-mail. An absolute majority of the Committee members commented on the points under discussion, and the result of the vote is therefore valid. Professional activity was focused on the elaboration of scientific studies as follows:

Lány P., Rosenbergová K., Tesa K., Ph.D., Zendulková D., Pospíšil Z.: Zoonotic potential of pandemic SARS-CoV-2 virus and possibilities of its diagnosis in domestic and farm animals

Vašíčková P., Hrdý J., Krzyžánková M., Krásna M.: Occurrence of selected viral agents in wastewater samples and in intermediate stages of the wastewater treatment process

Hera A., Vernerová E., Billová V.: Treatment of parasitoses in wild-living animals

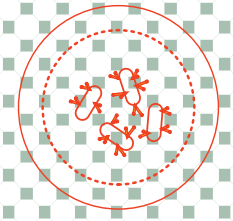
Vorlová L., Pospíšil J., Bartáková K.: New insights into the lactose content of dairy products in the context of lactose intolerant consumers

Gelbíčová T., Karpíšková R., Florianová M., Hlucháňová L.: Long-term survival of Listeria monocytogenes strains in food processing plants

Koláčková I., Alexa P., Vacková Z., Straková N., Kořená K., Karpíšková R.: Atypical Escherichia coli strains capable of producing Shiga toxin 2, subtype e, as causative agents of porcine oedema disease

OIE Reference Laboratory for paratuberculosis and OIE Reference Laboratory for avian tuberculosis

The VRI was entrusted by the Paris-based World Organization for Animal Health (OIE) to lead two world reference laboratories: The Reference Laboratory for paratuberculosis (since 2003; one of the three in the world) and Reference Laboratory for Avian Tuberculosis (since 2005; the only laboratory in the world). Both laboratories use methods accredited according to ČSN EN ISO/IEC 17025 based on methods of direct diagnostics (culture method, PCR based methods, Real Time PCR) and indirect diagnostics (serological methods) of the disease agents. At the same time, laboratory staff are also developing and improving these methods. Furthermore, both laboratories provide expertise, expert opinions, participate in the preparation of OIE documents and provide training in the detection and identification of mycobacteria.



National Reference Laboratory (NRL) for *Escherichia coli*

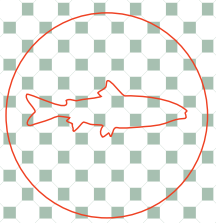
The National Reference Laboratory for *Escherichia coli* provides diagnostic and consulting services regarding *Escherichia coli* infections to breeders, veterinarians and routine laboratories, using accredited methods according to ČSN EN ISO/IEC 17025. The NRL performs:

- Laboratory testing to detect pathogenic types of *E. coli* from various sources (animals, foods, environment)
- Investigation of the presence of virulence factors in strains isolated from cattle, pigs and poultry (e.g. detection of genes for Shiga toxins, enterotoxins, adherence factors)
- Typing of isolates (e.g. detection of O-antigen, determination of Shiga toxin subtypes)
- Determination of resistance to antimicrobials

Regarding methodology, the National Reference Laboratory for *Escherichia coli* collaborates with the European Reference Laboratory, takes an active part in the development of analytical procedures, and organizes teaching and training events.

- Hosts workshops and seminars for professionals
- Organizes interlaboratory comparison tests regarding the detection and typing of *E. coli*
- Maintains a collection of reference strains of pathogenic *E. coli*
- Carries out research

Head of the NRL: MVDr. Ivana Koláčková, Ph.D. Contact: Phone: +420 778706138, E-mail: kolackova@vri.cz



National Reference Laboratory for Viral Diseases of Fish

The NRL provides diagnostic services and confirmation testing for the detection of viral diseases of fish for the needs of the State Veterinary Administration of the Czech Republic and breeders. These are mostly morbid conditions included in the list of communicable diseases by legislation (accreditation according to EN ISO 17 025), but also other viral diseases of fish.

Diseases included in the list:

- Epizootic haematopoietic necrosis (EHN)
- Viral haemorrhagic septicaemia (VHS)
- Infectious haematopoietic necrosis (IHN)
- Koi herpesvirus disease (KHV, CyHV-3)
- Infectious salmon anaemia (ISA)

Diseases that are not included in the list:

- Infectious pancreatic necrosis (IPN)
- Salmonid alphavirus (SA V) disease
- Spring viraemia of carp (SVC)
- Cyprinid herpesvirus infections caused by CyHV-1 and CyHV-2
- Carp edema virus disease (CEVD)

Other activities

- Collaboration with the EU Reference Laboratory in Copenhagen, participation in annual EU test rounds and organization of comparative testing for State Veterinary Institutes
- Consultancy services
- Research

Head of the NRL: MVDr. Ľubomír Pojezdal, Ph.D. Contact: Phone: +420 771 121 264, E-mail: pojezdal@vri.cz

Collection of Animal Pathogenic Microorganisms (CAPM)

• **Deposition of:**

- New bacterial and viral isolates into the CAPM
- Cultures of microorganisms for the purposes of patent procedures in the Czech Republic
- Storage in safe deposit (cultures remain the property of the depositor)

• **Areas of advisory services**

- Taxonomy of bacteria and viruses
- Growing bacterial cultures
- Isolation and growth of viruses in cell cultures and chicken embryos
- Detection of mycoplasma contamination in viral and cell cultures and its elimination
- Cryopreservation of bacteria, viruses and cell cultures
- Biosafety and biosecurity

• **Distribution of cultures of animal pathogenic bacteria and viruses**

- Database of available strains is accessible through the Internet at http://www.vurv.cz/collections/vurv.exe/search?lang=cz

• **Lyophilisation services**

Head: MVDr. Markéta Reichelová Contact: Phone: +420 5 33332131, E-mail: reichelova@vri.cz

Centre of Laboratories- Testing laboratory No. 1354

Accredited entity according to ČSN EN 1SO/IEC 17025:2005

01- Laboratory for Animal Health and Food Safety

Testing for mycobacterial infections in animals; detection of the etiologi agents of paratuberculosis, avian tuberculosis and the other mycobacterial infectiols; detection of the presence of specific DNA sequences by PCR; detection of human noroviruses, hepatitis A and E viruses.

02- Laboratory for Food and Feed Adulteration, Detection Methods

Detection of vegetable DNA in foods; identification of animal species and tissue specific DNA and mRNA; marine fish species identification (Gadidae, Scombridae and Clupeidae) in foods and biological material.

03- Laboratory for *E. coli* infections

Detection of Shiga-toxigenic *Escherichia coli* (ISO/TS 13136); typing of *E. coli* somatic antigen; detection of-Shiga toxins, adherence factor intimin, enterohemoLysin, enterotoxins and differentiation of stx2e.

04- Laboratory for Cytogenetics

Conventional cytogenetic testing of animals.

05 - Laboratory for Electron Microscopy

Detection of viruses using negative staining.

06 - Laboratory for Viral Diseases of Fish

Isolation of fish viral pathogens on cell lines; detection of viral fish pathogens by ELISA; determination of the presence of selected DNA and RNA sequences in fish viruses.

07- Laboratory for Spermatology and Andrology

Semen analysis; determination of the functions of male reproductive organs; biological safety testing of various materials for sperm.

08 - Laboratory for Viral Diseases of Cattle

Bovine viral diarrhoea (BVD) and infectious bovine rhinotracheitis (IBR) – detection of the viruses and antibodies by ELISA.

09 - Laboratory for Typing of Bacteria

Detection of *Listeria monocytogenes* (EN ISO 11290), *Salmonella* spp. (ČSN EN ISO 6579) and *Campylobacter* spp.; detection of Staphylococcus aureus by PCR; serotyping of *Listeria monocytogenes* and *Salmonella* spp.; phage typing of Salmonella; macro-restriction analysis of bacteria by PFGE.

Identifying Data

Identifying data
Identification No.: 00027162
Tax Identification No.:
CZ00027162
Address: Hudcova 296/70
621 00 Brno
Czech Republic
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Fax: +420 541 211 229
E-mail: vri@vri.cz
http://www.vri.cz
ID Data Mailbox: 3gsnh8r

Founder:
Ministry of Agriculture of the Czech Republic
Based in: Těšnov 17
117 05 Praha 1
Identification No.: 00020478

The Veterinary Research Institute location on the map
GPS Loc: 49°23728“N, 16°57948“E

The Institute was founded on the basis of the Deed of Establishment Ref. No.: 22970/2006 - 11000, in accordance with § 3 of Act No. 341/2005 Coll., on public research institutions. The Veterinary Research Institute has become a public research institution with effect from 1 January, 2007

From the Deed of Establishment of the Veterinary Research Institute, as of 8 February 2018. The register of public research institutions:
http://rvvi.msmt.cz/detail.php?ic=00027162

BASIC PERSONNEL DATA

Total number of employees on 31st December, 2020	296
FTE personnel on 31st December, 2020	230.91
Disabled personnel	12

The average gross monthly salary of VRI employees in 2020 was CZK 38,684. When compared with the previous year, this represents an increase of CZK 3,560 per month, which means that its year-over-year growth rate was 10.1%. The national average for Q 4 in 2020, published on the Czech Republic's Statistical Office website on 8th March, 2020, was CZK38,525. The average gross salary indicator is calculated as the arithmetic mean (this is not the salary of one employee) and includes bonuses, salary compensation and overtime paid to FTE employees. Gross salaries are paid net of income tax, statutory health and social security contributions, and any other deductions agreed with individual employees. After deducting all these contributions, the employee is paid net salary. Neither compensation nor other personal costs were included in the calculation of the average gross salary, i.e. the costs paid on the basis of non-employment agreements (work agreements) and bonuses paid to statutory bodies.

Long-term conceptual development of the research organization for 2019 – 2022

Decision No. MZE-RO 0518

Investigator: MVDr. Martin Faldyna, Ph.D.

A project supported from the VRI's finances entitled "Long--term conceptual development of the research organization for the period of 2018 – 2022" (DKRVO) was designed and approved in 2017 and thus in 2020, the third year of the implementation took place. Funds received by the Veterinary Research Institute in the form of institutional support were used for financing the activities in accordance with the Institution's Deed of Establishment focused on "the development of scientific disciplines of veterinary medicine, veterinary hygiene and ecology and related biomedical, agricultural and food sciences and providing tasks arising from agricultural, environmental needs and rural development to protect animal and human health.

From 1 July 2020, the internal organizational structure was changed by merging of the scientific departments into four new ones, but this change was not associated with the demise of

any topic at the Institute. The specific activities at the Institute within the Long-term conceptual development of the research organization were undertaken through the implementation of individual research plans, which with their focus covered the whole range of topics that VRI professionally deals with. These included various aspects of the study of infectious diseases, including molecular epidemiology, the possibility of direct or indirect detection of the causative agents of these diseases, testing of antiviral and antibacterial drugs, including resistance to their effects, development of preparations for active or passive immunization and their carriers or substances increasing the efficacy, including routes of administration, up to the study of intestinal microbiota and methods of handling it as a tool to improve health and production parameters up to the design and compilation of control programmes against economically important animal diseases. In the field of reproduction, research was focused on, for example, elucidating the mechanisms of formation of developmental abnormalities in oocytes and early embryos in order to investigate the possibilities of preventing these conditions, spermatological examination in males - whether breeding males or those exposed to environmental pollutants, comparative cytogenetic analysis. Regarding the impacts of chemicals – either polluting the environment or used as medical nanomaterials – the activities were aimed at studying the mechanisms of toxicity and determination of quantitative toxicological parameters, chemical analysis of real environmental complex samples and analysis of their toxicology and toxicological evaluation of the effects of nanomaterials or potential drugs. However, the topics of animal nutrition and reproductive biotechnologies as a prerequisite for the intensification of animal production were also significant. It should also be mentioned that the implementation of several specific experiments immediately reflected the emergence of the unfavourable coronavirus Covid-19 epidemic situation. Selected activities in this area are mentioned in the description of the implementation of activities - from the virus detection system in wastewaters to the systems for testing antivirals or disinfectants to the standardization of the use of MOL-PCR for qualitative detection of the virus. Recombinant proteins from this coronavirus have also been prepared with the aim to experimentally identify both antibody- and cell-mediated immunity. As a consequence of the above mentioned pandemic, the implementation of some activities was limited to a certain extent. Nevertheless, it was possible to reach higher values for all indicators in 2020 than planned. Instead of the planned 139 outcomes, 205 outcomes were achieved. For example, the employees of the Institute were authors or co-authors of 75 publications in journals with an impact factor above the median of the specialisations. Furthermore, 2 patents were granted in 2020.

Therefore, it can be stated that the VRI's finances were used efficiently and in accordance with the plan.

SUBJECT OF THE MAIN ACTIVITIES

Basic and applied research and development in veterinary medicine, veterinary hygiene and ecology and related biomedical, agricultural and food sciences:

- Involvement in international and national centres of research and development,
- Activities of reference laboratories,
- Operation of the Collection of Animal Pathogenic Microorganisms,
- Scientific, professional and educational cooperation,
- Transfer of research and development results, including new technologies, to end users,
- Verification and dissemination of research results within the Institute's authority,
- Hosting and holding of professional courses, seminars, and conferences, workshops and other professional events,
- Function of an information centre and support of publishing in the field of veterinary medicine and food safety,
- Experimentation,
- Agricultural activities.

OTHER ACTIVITIES

Other activities relate to the major activities in the fields of veterinary medicine, veterinary hygiene and ecology and related biomedical, agricultural and food sciences:

1. Activities under the National Programme of Conservation and use of genetic resources of plants, animals and microorganisms important for nutrition and agriculture in conformity with Act No. 148/2003 Coll., on conservation and use of genetic resources of plants and microorganisms important for nutrition and agriculture and on amending Act No. 368/1992 Coll., on administrative fees, as amended (Act on Genetic Resources of plants and microorganisms).
2. Activity of the Veterinary Committee for Food Safety on the basis of the Resolution of the Government of the CR No. 1320 of 10 December 2001 concerning food safety strategy in the Czech Republic.
3. Expert witness activities in the fields of healthcare and agriculture; zoonotic diseases and infections of farm animals.
4. Commercial, financial, organizational and economic consulting.
5. Holding of professional courses, training and other educational activities, including lecturing activities.
6. Providing software and consultancy in hardware and software.
7. Graphics and drawing services.
8. Publishing services.

COMPLEMENTARY ACTIVITIES

FREE TRADES:

1. Activities of business, finance, organization and economic consultants
2. Research and development in sciences, technology and social sciences
3. Providing software, and consultancy in hardware and software
4. Copying services
5. Graphic art services
6. Specialized retail-sale and mixed goods
7. Hosting professional courses, trainings and other education, including lecturing
8. Publishing
9. Production of food products
10. Accommodation services

NON-TRADE ACTIVITIES

1. Letting real estate, apartments and non-residential rooms. (Besides letting out, no other services are provided by the lessor than basic services ensuring proper operation of the real estate, apartments and non-residential rooms.)
2. Agricultural production, provision of works and services in agriculture, production and sale of animals and animal and vegetable products.
3. Expert witness activities in the fields of healthcare and agriculture – zoonotic diseases and infections of farm animals.

EXPERIMENTAL ACTIVITIES

Experiments with the use of live animal models are carried out on the basis of accreditation (58809/2014-MZE17214, valid until 22 March 2020). The goal is to create best conditions for experiments of the highest quality, corresponding to international standards with applying high ethical standards. Consideration is given to reducing the number of experimental animals used in approved experiments. All animal experiments are carried out according to the approved methodological procedure of the ordering party. The following animals are used in the experiments: cattle, sheep, goats, pigs, dogs, cats, rabbits, chickens, guinea pigs, rats, hamsters, mice and fish. In 2019, 10 projects dealing with the following areas were submitted for approval: Basic research, applied research, development, production or quality testing, efficacy and safety of pharmaceuticals, foods, feeds and other substances or products, and in the field of higher education or doctoral study with the aim to obtain, maintain or improve professional knowledge.

Both basic research and commercial experiments were carried out under the projects funded by AZV, the National Agency for Agricultural Research (NAZV), Czech Science Foundation (GAČR), Technology Agency of the Czech Republic (TACR) and the Operational Programme Research, Development and Education (OP RDE).

AGRICULTURAL ACTIVITIES

Part of the VRI agricultural area is designed for farm animal evacuation in case of fire or other emergency events. This area is inevitable and conforms to the current legislation.

THE VRI AUTHORITIES

Director - Statutory Representative of the VRI Brno
Prof. MVDr. Alfred Hera, CSc.
Acting Director up to 31 October 2020
MVDr. Martin Faldyna, Ph.D.
VRI Director from 1 November 2020

THE VRI BOARD

Member's name	Function	Organization
MVDr. Martin Faldyna, Ph.D. (up to 14 December 2020) RNDr. Jana Prodělalová, Ph.D. (from 14 December 2020)	Chairman	VRI Brno
RNDr. Jana Prodělalová, Ph.D. (up to 14 December 2020) Doc. MVDr. Martin Anger, CSc. (from 14 December 2020)	Deputy-Chairman	VRI Brno
Doc. MVDr. Martin Anger, CSc. (from 25 June 2020)	Member	VRI Brno
MVDr. Eduard Göpfert, Ph.D. (up to 22 May 2020)	Member	VRI Brno
MVDr. Kamil Kovarčík, Ph.D.	Member	VRI Brno
RNDr. Miroslav Machala, CSc. (up to 26 May 2020)	Member	VRI Brno
PharmDr. Josef Mašek, Ph.D.	Member	VRI Brno
MVDr. Ján Matiašovic, Ph.D.	Member	VRI Brno
RNDr. Petra Musilová, Ph.D.	Member	VRI Brno
MVDr. Kateřina Nedbalcová, Ph.D. (from 25 June 2020)	Member	VRI Brno
RNDr. Jana Prodělalová, Ph.D.	Member	VRI Brno
MVDr. Markéta Reichelová (from 25 June 2020)	Member	VRI Brno
Doc. RNDr. Daniel Růžek, Ph.D. (up to 3. June 2020)	Member	VRI Brno
Ing. Kamil Šťastný, Ph.D (from 10 March 2020)	Member	VRI Brno
Ing. Pavlína Adam, Ph.D.	External member	Ministry of Agriculture
MVDr. Martin Anger, CSc. (up to 4 June 2020	External member	Masaryk University, CEITEC
Prof. RNDr. Luděk Bláha, Ph.D. (up to 23 September 2020)	External member	Masaryk University, RECETOX
MVDr. Jiří Bureš	External member	State Control of Veterinary Biologicals and Medicines, Brno
Prof. MVDr. Břetislav Koudela, CSc.	External member	University of Veterinary and Pharmaceutical Sciences Brno
Doc. Dr. Ing. Josef Kučera (from 25 June 2020)	External member	Czech-Moravian Breeders Association, a.s. Českomoravská společnost chovatelů, a.s.

MEMBERS OF THE SUPERVISORY BOARD

Member's name	Function	Organization
Doc. MVDr. Milan Malena, Ph.D.	Chairman	(appointed for the period 29 July 2019 – 29 July 2024)
Mgr. Tomáš Jírů	Deputy-Chairman	Regional Veterinary Administration of the State Veterinary Administration CR for Pardubice region (appointed for the period 28 May 2019 – 28 May 2024)
Ing. Iva Blažková, Ph.D.	Member	Ministry of Agriculture CR (appointed for the period 26 May 2016–26 May 2021)
Mgr. Jaroslav Hejátko	Member	Ministry of Agriculture CR (appointed for the period 1 May 2019 – 1 May 2024)
Ing. Ondřej Sirko	Member	Ministry of Agriculture CR (appointed for the period 24 August 2016 – 24 August 2021) (dismissed on 12 November 2020)
MVDr. Martin Beňka	Member	State Veterinary Administration (appointed for the period 7 December 2017 – 7 December 2022)
Ing. Jan Vodička	Member	Ministry of Agriculture CR (appointed for the period 5 September 2019 – 5 September 2024)
Prof. MVDr. Alfred Hera, CSc.	Member	ISCVBM (appointed for the period 13 November 2020 – 13 November 2025)

DIRECTOR'S BOARD UP TO 30 JUNE 2020

Member's name	Department
Doc. RNDr. Daniel Růžek, Ph.D.	Virology
Doc. MVDr. Renáta Karpíšková, Ph.D.	Bacteriology
MVDr. Martin Faldyna, Ph.D.	Immunology
Doc. RNDr. Ivan Rychlík, Ph.D.	Food and Feed Safety
Doc. MVDr. Martin Anger, CSc.	Genetics and Reproduction
RNDr. Miroslav Machala, CSc.	Chemistry and Toxicology
PharmDr. Josef Mašek, Ph.D.	Pharmacology and Immunotherapy

DIRECTOR'S BOARD UP TO 1 JULY 2020

Member's name	Department
MVDr. Ján Matiašovic, Ph.D.	Infectious Diseases and Preventive Medicine
Doc. RNDr. Ivan Rychlík, Ph.D.	Microbiology and Antimicrobial Resistance
Doc. MVDr. Martin Anger, CSc.	Genetics and Reproductive Biotechnologies
PharmDr. Josef Mašek, Ph.D.	Pharmacology and Toxicology

Unit	Member's name
Centre for Technology Transfer and Project Support	Ing. Ildikó Csölle Putzová, Ph.D., MBA
Informatics Unit	Bc. Petr Maňásek (up to 31 October 2020) Ing. Vladimír Grof (1 November 2020 – 31 December 2020)
Economics Unit	Bc. Petra Borovcová
Experimental Animal Facility	Marie Sobotková (from 1 March 2019)
Technical Unit	Ing. Jiří Hošek
Safety Officer	Ing. Iva Stránská
Director's Office	Pavla Dvořáková
HR Officer	Mgr. Simona Hošková
HR Coordinator	Ing. Jiří Kolísek
Internal Auditor	Irena Smrčková, MSc.
Veterinary Trade Union	MVDr. Kateřina Nedbalcová, Ph.D. (from 13 December 2019)

THE ACTIVITIES OF THE VRI BOARD IN 2020

In 2020, five regular meetings were held by the VRI Board. One of them took place online via the Webex application. The VRI Board members at their meetings dealt with the following formal topics: The VRI Board members approved the Institute's budget for 2020 and approved the Annual Report of the Institute for 2019. The VRI Board members approved the dealing with the positive economic result after taxation.

The VRI Board members also discussed and approved modifications to the evaluation system for working groups and departments so that the parameters assessed include results transferred to end users in addition to publications in peer-reviewed journals with impact factor.

A large part of the meetings was devoted to the proposal to hold an open competition for the post of Director of the Institute, which took place in September 2020. Out of two candidates, MVDr. Martin Faldyna, Ph.D. was selected and nominated by obtaining 13 votes. At the last meeting in December 2020, the VRI Board members approved the updated versions of several internal documents - VRI Rules of Procedure, Organization Rules, Code of Ethics, Employment Rules. An update of the Internal Salary Rules was also approved. The VRI members elected a new Chairperson (Dr. Prodělalová) and Vice-Chairperson (Doc. Anger). Throughout the year, project proposals submitted for open calls from various providers were discussed.

VRI VETERINARY RESEARCH INSTITUTE

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