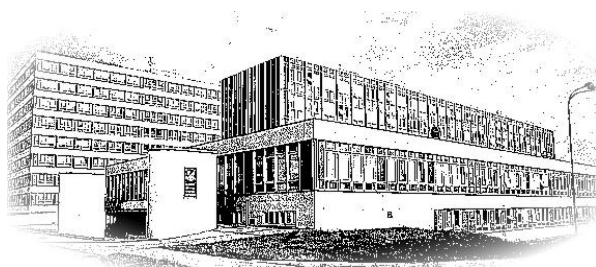


UNIVERSITY OF DEFENCE BRNO
FACULTY OF MILITARY HEALTH SCIENCES

ANNUAL REPORT

2017

HRADEC KRÁLOVÉ
CZECH REPUBLIC



Faculty of Military Health Sciences

Hradec Králové

EDITORIAL NOTES

Dear Reader,

This publication presents the main activities of the Faculty of Military Health Sciences of the University of Defence Brno in Hradec Králové.

The 26th Annual Report includes the principal research and educational activities of the 8 departments, so that it may act as a basis for internal and external evaluation respectively.

Should you require more detailed information about our Faculty, it is available on our website <http://fvz.unob.cz> or <http://www.pmfhk.cz>.

In case of any suggestions or comments to our activities, do not hesitate to contact us at the address listed below.

Vice-Dean for Research
LTC prof. RNDr. Miroslav POHANKA, PhD, DSc
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Our contact address in different languages is as follows:

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Faculty of Military Health Sciences Hradec Králové

Universität der Verteidigung Brno
Wehrmedizinische Fakultät Hradec Králové

Université de la Défense de Brno
Faculté de Médecine Militaire de Hradec Králové

Universidad de Defensa Brno
Facultad de Sanidad Militar Hradec Králové

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FOREWORD

The Faculty of Military Health Sciences of the University of Defence Brno in Hradec Kralove represents a center of medical education and research of the Czech Army with long-term history in the Czech Republic. The military medical education began in Hradec Kralove in 1951. The school was established by an order of the President of the Republic as the Military Medical Academy, and later a honorary title of "Jan Evangelista Purkyně" was added. Later on, the name was changed to the Military Medical Research and Postgraduate Institute, but the name was reverted back in 1988. In 2004, during professionalization of the army and reorganization of military education the University of Defence Brno was founded. Since then our Faculty has become an integral part of the University of Defence Brno and has been renamed, once again, the Faculty of Military Health Sciences. At present, the Faculty is the only institution, which provides a military medical education at the university level. The Faculty provides an education in one accredited Bachelor's study program (Military Paramedic), three Master's study programs (Military General Medicine, Military Dentistry, Military Pharmacy) and eight doctoral study programs. However, our role is not only to educate and train all medical, pharmaceutical and nursing specialists and to maintain scientific excellence, but also to provide a general support to the Military Medical Service.

The very fact that the Faculty has survived all reforms and other changes demonstrates its uniqueness, as well as its high educational, professional and research level. The specificity of our educational model lies in a close cooperation with other scientific and educational workplaces. Thus the Faculty enjoys close collegial relationships with the Medical and Pharmaceutical Faculties of Charles University, the University of Hradec Kralove, the Faculty of Health Studies in Pardubice, the Faculty Hospital in Hradec Kralove and the Military Medical Agency. Especially the two faculties of Charles University and the University of Pardubice cooperate closely with our school in providing the education to our students. As a result, our Master degree students graduate both from our Faculty and from the respective Faculty of Charles University. In 2012, the Central Military Hospital in Prague was declared the Military Faculty Hospital. This medical facility, which we cooperate very closely with, creates a good background for military medical practice for our students. Finally, our school could not thrive without a support from representatives of the city of Hradec Kralove, which our school enjoys ever since its foundation.

At present, the Faculty covers the needs of troops concerning medical professional training in all specializations, medical science and research. The Faculty has educated a lot of specialists who have been subsequently awarded key positions both at national and international levels. These positions have been held by former and present Faculty personnel in

FOREWORD

important international institutions such as the NATO Surgeon General Office in Europe, memberships in various NATO and EU bodies, United Nations Security Council, and World Health Organization boards. The Faculty members are engaged in many research projects awarded by both national and foreign military, as well as civilian research agencies. The laboratory compartment houses state-of-the-art laboratory technologies focused mostly on projects advancing our knowledge of protection against CBRN agents. The scientific results are published in many respected international journals, such as the Lancet.

In spite of continuously lowering financial budget and personnel reduction, we aim to continue and even to increase most of our activities. Our scientific production rate is the highest at the entire University of Defence Brno. The Czech (Medical Service) field hospitals are well-known around the world and highly valued among our NATO allies. Our approach is different from the majority of other services. Our training is both long-term and intensive, thus the students gain deeper knowledge and skills as well as awareness of a military life. Education, training and research should be joint and, to provide that, the Faculty strives to create a pool of excellent professors, scientists and teachers. The Faculty of Military Health Sciences is an open body for mutual cooperation with scientists and teachers from all democratic countries. In spite of changing priorities in the Czech Military, we have been still focusing on the specialization of the Czech Armed Forces in the nuclear, biological and chemical protection and we have been engaged in many humanitarian and military deployments of military medical services abroad. Our Faculty will play the key role in this demanding process. We will guarantee the research and fulfilment of training needs for medical corps, specialized forces and for some NATO countries. Nevertheless, our primary concern is to educate and train students and young physicians. This can be hardly possible without our closest partners, international collaborators and friends.

In conclusion, I would like to say that all results and successes I perceive as a consequence of the cooperation of teachers and students and other employees of our Faculty, developing relationships with our graduates and maintaining a close collaboration with our partners. The next period should, hopefully, bring us another step in the successful development of the Faculty and its dedicated employees.

Pavel BOSTIK, MD, PhD

Professor and Dean of the Faculty of Military Health Sciences

INTRODUCTION

HISTORY

The Faculty of Military Health Science has been a long-term educational and scientific centre of the Czech Army Medical Service. There has been a very long history of systematic education of military medical personnel in our country. Its beginnings lie, as in many European countries, in the 18th century. Large, permanent armies were being built and the military medical service became a normal part of these armies. In 1776 the War Council of the Vienna Court issued an administrative order which definitely prohibited the employment of field surgeons in the armed forces who had not studied anatomy and who had not had their knowledge officially examined. This can be considered the beginning of organized education of military medical personnel in our country. Six-month courses were organized for field surgeons at the Garrison Hospital in Gumpendorf near Vienna.

The fundamental milestone in the “Austrian” stage was, however, in 1785 with the establishment of the Military Medical (Surgical) Academy named the Josephinum after its founder, the enlightened monarch and father of many political and social reforms, Emperor Joseph II. He saw the mission of the school as fulfilling these tasks:

- education of qualified military surgeons (physicians)
- creation of a learned society for research in medical science
- creation of a permanent field sanitary commission for solving questions concerning combat casualty care.

A number of renowned physicians of Czech origin significantly contributed to nearly 90 years of the school’s history.

The foundation of the independent Czechoslovak Republic in 1918 meant at the same time the creation of a democratic army. The basic element of career military physician training was represented by the Military Medical School. Its establishment was the result of a decision by the Czechoslovak Republic government which by its resolution of 25 June 1926 defined the principles of recruiting professional medical and pharmaceutical personnel to the army. The Military Medical School provided professional training for military physicians and further qualification growth for the performance of higher command functions in the military medical service structure.

The development of the Czechoslovak Military Medical Service in our country was interrupted by the Second World War. When the army was disbanded a number of physicians and medical students participated in foreign and domestic resistance. The largest number of them were concentrated in England. The British government permitted medical students to complete their studies at British universities. They graduated from Oxford

HISTORY

University. The Czechoslovak Military Hospital was created at London Hammersmith Hospital. A few courses of the Medical and Pharmaceutical Reserve Officer School were taught in Leamington and Walton-on-the-Naze where the Czechoslovak Brigade's out-patients' department was situated. Thus, the tradition of the Czechoslovak military medical educational system maintained its continuity.

In 1945, the pre-war practice of recruiting professional personnel to the Military Medical Service was rebuilt. The Military Medical School in Prague was renowned. At the same time tendencies referring to the practice of some medical services of the world's leading armies which required the establishment of an independent military medical university were increasing. The results of the Second World War and the growth of new knowledge in the field of medicine and especially military medicine played a significant role in this.

In 1951, a new period began in the development of the Czechoslovak military medical educational system. This period has been permanently connected with Hradec Králové for 55 years. Rapid establishment of the Military Medical Academy (MMA) was possible only due to the fact that it was built on the basis of being a theoretical and clinical part of the Faculty of Medicine – a branch of Charles University established in 1945. Thanks to the reputation of its workers, a majority of whom became employees of the MMA, the school became an educational and scientific centre of the Czechoslovak Medical Service and within a short time gained a good reputation both at home and abroad. The MMA has educated a number of outstanding military medical specialists and the first steps of several contemporary top specialists of Czechoslovak medicine were connected with its existence.

Beginning in 1958 and for the next 30 years the military medical system was transformed into the form of the Purkyně Military Medical Research and Postgraduate Institute. Research tasks and activities in the area of further schooling and specialization of military physicians and pharmacists became a fundamental part of its activity. The main portion of a further basic task of the school – the pregraduate training of future military physicians – was taken over by the renewed Faculty of Medicine of Charles University in Hradec Králové. The development of mutual cooperation between these two partner schools, to which the Faculty of Pharmacy of Charles University in Hradec Králové joined in 1976 as a significant guarantee of the education of military pharmacists, has become a part of the military medical system.

In 1988, the school changed its name to the Purkyně Military Medical Academy which, institutionally, reflects more precisely the wide variety of its activities.

In November 1989, the school entered a qualitatively new period of development. It has passed through a transformation which has basically changed some military-professional teaching programs, the organizational

structure of the school, personnel support, the composition of the educational staff and so on.

The Academy has been included in the new university educational system and since 1993 (origin of the Czech Republic) has served as a training centre for Czech Army medical professionals. It has trained nearly 2600 military surgeons, dentists, and pharmacists till now.

After the transformation of the Purkyně Military Medical Faculty into the Faculty of Military Health Sciences (seated still in Hradec Králové) in 2004, the basic functions and tasks of the school focused on a specialized training of the Czech Army medical officers and research work in the area of military health service. The Faculty became a part of University of Defence Brno and the former Rector of school COL Assoc. Prof. Roman Prymula, MD, CSc, PhD was elected to be the first Dean of our school by the vote of the Academic senate.

The Faculty of Military Health Sciences is focused to provide university-level studies from medicine, stomatology, pharmacy and medical rescue. The Faculty has also accredited eight PhD programs and provides the upper form of education as well. Since its establishing, the Faculty of Military Health Sciences is a significant school providing not only graduates but also significant research like publications in journal or participating in scientific projects. The results from creative work can be learned just from this reports printing annually.

THE MAIN AIMS OF THE FACULTY IN 2017

The Faculty of Military Health Sciences (FMHS) of the University of Defence Brno in Hradec Králové represents a centre of medical education, training and research of the Army of the Czech Republic. It covers entirely the needs of the troops concerning medical professional training in all specializations, medical informatics, science and research.

1. Education

The main aims of the FMHS in the field of education were as follows:

- to provide university-level studies in the subjects of military general medicine (6 years), stomatology, pharmacy (5 years), and medical rescue (3 years)
- to provide postgraduate study for PhD degree (4 years) in the following accredited disciplines:

Epidemiology	Military Hygiene
Field Internal Medicine	Military Radiobiology
Field Surgery	Molecular Pathology
Infectious Biology	Toxicology
Medical Microbiology	Preventive Medicine and Public Health Protection

According to the needs of the Surgeon General of the Czech Armed Forces and the Military Medical Service Administration, the Faculty provides specialized and lifelong education of doctors, pharmacists and other military medical service personnel in specified branches of the Act No. 95/2004 of the Code about conditions of receiving professional qualification and specialized qualification to perform a medical profession as a physicians, stomatologist, and pharmacist. It unifies the system of their training with requirements of EU.

The Faculty organizes and provides training for medical personnel in the active duty, physicians and nurses. The Faculty provides professional refresher courses for medical staff, non-medical staff and non-medical personnel serving field medical units and individual units of the military

hospital base on select up-to-date topics. The school actively participates in continued training of physicians and health care personnel, who then serve in missions abroad. However, the unique military know-how is also attractive for people, who work out of the military health care sphere. The FMHS provides courses on the advanced first aid in the field not only for Military Medical Service personnel but also for non-medical professionals of Military Police units, reconnaissance and special units within the frame of the Czech Armed Forces, Rapid Reaction Units of the Czech Republic Police and others.

All soldiers selected for foreign missions attend special courses of an advanced first aid. Training in emergency life support in field conditions is required for medical personnel. The courses BATLS (Battlefield Advanced Trauma Life Support) and BARTS (Battlefield Advanced Resuscitation Techniques and Skills) for physicians and nurses or health care personnel include the problems of NBC protection as well and became a standard not only for the entire military medical staff, but also for many other specialists, who are enrolled in foreign missions.

Other courses concentrate on teaching and training of a comprehensive knowledge necessary for providing medical care within the frame of Disaster Medicine. The FMHS also provides other teaching and training activities determined by "The Plan of Courses and Professional Residencies Training of the Czech Armed Forces Medical Service" and "Notification of Director of Personal Section of the Ministry of Defence – Teaching Activities at Military schools and Training Facilities in the Czech Republic and Abroad". It participates in medical personnel training of medical and non-medical specializations under the methodical and professional leadership, in providing instructors for training of advanced categories of medical personnel and in teaching instructors of lower medical specialists training.

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2. Scientific and research work

The FMHS of the University of Defence Brno provides and solves research tasks for the Czech Armed Forces Medical Service. Well assembled scientific teams focus on individual research tasks using state-of-the-art technologies. Within the Faculty, complex laboratory technologies for scientific work are utilized for scientific advancements, which lead to the improvement of life force protection against CBRNE agents. The high scientific level and the achieved results in scientific and research activities of present teams have enabled scientific cooperation with foreign partners. The FMHS is a leading institution in the Czech Republic performing military research within the sphere of CBRNE issues in NATO and EU.

The high quality research capabilities and international recognition of the scientific teams form a solid base for scientific cooperation with partners in NATO countries, which is financed by the NATO and EU funds. Within the sphere of the science and research, the FMHS fulfilled strategic purposes of the Czech Armed Forces transformation by targeting the priorities of the Army (biological agents, chemical agents, military health care). Furthermore, it joined the appropriate institutions and organizational structures of NATO and EU countries and obtained original results in these critical areas. From the point of view of specialization and direction of the Czech Armed Forces,

the departments of the FMHS solve medical issues of biological, chemical and radiation protection. Previous and current scientific work focuses on medical aspects of the effects of NBC agents and several scientifically oriented departments within the FMHS work in collaboration in solving the specific tasks. This fully corresponds with set priorities in the field of scientific and research work of the Army of the Czech Republic. The military medical service organization and management, information systems, research activities of clinical and therapeutic preventive branches represent other important fields of scientific work.

Many invitations to international symposia and conferences as well as a number of publications prove that scientific knowledge is used in education. The FMHS personnel can publish achieved results of their research work, therapeutic preventive activities and educational activities in the journal *Military Medical Science Letters* - the oldest military specialized journal, which has been published since 1925. As of the last year, the journal is published fully in English. Together with professional scientific results the pedagogical activities are subject of an annual evaluation. Based on the results, the academic staff is successful in keeping a good level of publication activities in journals with impact factor and in other national and foreign journals. This, in turn, enables for relatively broad and successful training activities in the accredited doctoral study programs.

Scientific, research and development activities in the field of medical support include the prevention, diagnosis and treatment of sick and wounded. An integral part of this work is to improve the system of the medical equipment administration and supply support.

Research and development is carried out at 8 departments – Epidemiology, Military Medical Service Organization and Management, Radiobiology, Toxicology and Military Pharmacy, Military Surgery, Military Internal Medicine and Hygiene, Emergency Medicine and Military General Medicine, Molecular Pathology and Biology.

In 2017, scientific work at the Faculty departments focused on CBRNE protection research, projects on pathogenesis of infectious diseases and potential intervention means, prevention in the field of hygiene and epidemiology, topical problems of the field surgery and field internal medicine, topical problems of the organization, management, education and information technology in the Military Medical Service.

The continuous accreditation for proceedings to achieve professorships in the areas of Epidemiology, Medical Microbiology, Toxicology, Field Internal Medicine, Infection Biology and Molecular Pathology and the accreditation for habilitation (associate professorship) in the branches of Hygiene, Preventive Medicine and Epidemiology, Medical Microbiology, Toxicology, Field Surgery, Military Radiobiology, Field Internal Medicine, Infection Biology and Molecular Pathology gives the evidence about the

excellent level of achieved results in scientific and research activities of FMHS. In 2017, there were 10 professors (prof.), 13 associate professors (doc.), 3 doctors of science (DSc) and 46 Faculty members with research degrees (CSc, PhD) who carried out teaching and research tasks.

3. Therapeutic activities

Special therapeutic activities were provided especially at the departments of Field Internal Medicine, Field Surgery and General and Emergency Medicine. Close cooperation between these subjects and the health service establishments in the region have been continuously developed. Therapeutic medical care was provided especially in the fields of hematologic intensive care, traumatology, hepatobiliary surgery, plastic surgery at the Departments of internal medicine and surgery at the Teaching Hospital.

4. International cooperation

The main aims of international cooperation of the FMHS were to exchange scientific, educational and therapeutic information and to develop working contacts between military medical, medical educational and research institutions of the NATO and EU countries as well as civilian medical institutions with educational, defence research and development programs worldwide. Residency and exchange programs for numerous students, doctors and research workers took place at those institutions.

As for study programs, the Faculty keeps close relations with partner educational institutions above all in NATO and EU countries.

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5. Expert activities

The membership in work groups for coordination and cooperation of military medical research and professional training at NATO (COMEDS, BIOMEDAC, RTA/RTO) and at EDA (European Defence Agency), in work groups of government experts for the Convention on the prohibition of biological, bacteriological, and chemical weapons and their destruction in Geneva and UNO, organizing scientific conferences with international participation, and solving foreign research projects under the cooperation of the FMHS personnel are very important for the presentation of international cooperation results. The priority still remains in cooperation in the frame of the Human Factors Medicine of the NATO Research and Technology Organization and its work groups (TG, WG), CBRN and Human Factors cooperation within the frame of EDA and additional collaborative research projects with other foreign scientific institutions. Our aim is to intensify international cooperation in NATO focused on scientific support of the armed forces structure.

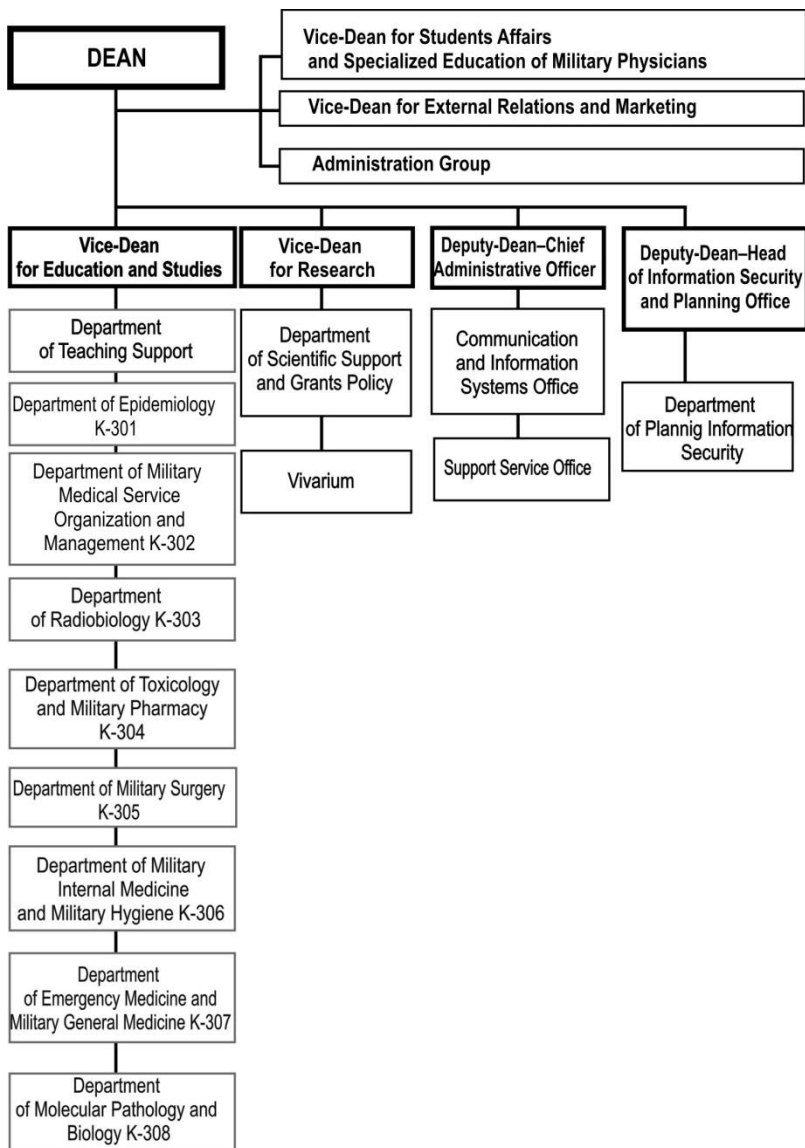
6. Scientific and educational information services

Scientific and educational information services that support the Medical Service of the Czech Republic Army were provided by the Department of Information and Communication Technologies. Numerous literature retrievals, courses, library and printing workshops and other information services support for students, teachers, scientists, postgraduates, doctors, nurses and other medical experts were carried out.

7. Foreign missions

The FMHS performed the preparation of health personnel for humanitarian and peacekeeping missions and members of the FMHS staff participated in several foreign missions.

THE STRUCTURE OF THE FMHS



THE DEAN OF THE FACULTY

Prof. Pavel BOSTIK, MD, PhD



Prof. Pavel Bostik, MD, PhD was born on November 17, 1965 and since then he lived in Hradec Kralove until 1984, when he graduated from the Gymnazium (secondary school). Then he continued his studies at the 2nd Medical School of Charles University in Prague, where he graduated in 1990 "magna cum laude" and received his MD degree. During his medical studies he worked as a student-assistant in a research group led by a renowned Czech chemist prof. Holý at the Czech Academy of Sciences. After performing his military service in 1991, prof Bostik worked at the Department of Experimental Virology of the Institute of Hematology and Blood Transfusion in Prague. There he was a member of a team led by prof. Vonka investigating the role of papillomaviruses in the development of cervical cancer. At this point the team was closely collaborating with professor Harald zur Hausen, who was awarded Nobel prize later on for his work in this field. Prof. Bostik continued his research on papillomaviruses at the Department of Pathology of the University of Iowa College of Medicine in Iowa City, IA, USA during the years 1994-1996. After that he moved to Atlanta, GA, where he joined the Department of Pathology and Laboratory Medicine of Emory University School of Medicine. His research there was focused on interactions between viruses and immune system, especially in the pathogenesis of HIV infection. In 2009 prof. Bostik was offered a position of a departmental head at the Faculty of Military Health Sciences. Subsequently he served as the Associate Dean for Research and in 2017 he was elected a Dean of the Faculty. Prof. Bostik has been interested in the pathogenesis of viral diseases, especially in the role of immune system interactions with infectious pathogens. He has a PhD in medical microbiology and in the same field he serves as a Professor since 2012. He has published more than 50 papers in international journals and regularly publishes also in the national scientific periodicals. He chairs a scientific committee in post-graduate program Medical microbiology and is a member of Scientific Boards of the Faculty, the University of Defence Brno in Brno and also of the Medical School of Palacky University in Olomouc. Prof. Bostik serves as a national representative in committees of NATO and the European Defense Agency focusing on CBRN defence.

THE DEAN OF THE FACULTY AND HIS DEPUTIES

Dean	BOŠTÍK Pavel (since 01 February 2017)	email: pavel.bostik@unob.cz
Interim Dean	HRSTKA Zdeněk (till 31 January 2017)	email: zdenek.hrstka@unob.cz
Vice-Dean of Studies:	FAJFROVÁ Jana (since 01 March 2017)	email: jana.fajfrova@unob.cz
Vice-Dean for Education:	HRSTKA Zdeněk (till 28 February 2017)	email: zdenek.hrstka@unob.cz
Vice-Dean for Research:	POHANKA Miroslav (since 01 February 2017)	email: miroslav.pohanka@unob.cz
Vice-Dean for Research:	BOŠTÍK Pavel (till 31 January 2017)	email: pavel.bostik@unob.cz
Vice-Dean for External Relations and Marketing:	ZÁRYBNICKÁ Lenka (till 31 May 2017)	email: lenka.zarybnicka@unob.cz
Vice-Dean for External Relations and Marketing:	BOŠTÍKOVÁ Vanda (since 01 June 2017)	email: vanda.bostikova@unob.cz
Vice-Dean for Student Affairs and Specialized Education of Military Physicians:	PLODR Michal	email: michal.plodr@unob.cz
Deputy-Dean – Chief Administrative Officer:	KOMÁREK Jan	email: jan.komarek@unob.cz
Deputy-Dean – Head of Information Security and Planning Office:	FLÉGL Václav	email: vaclav.flegl@unob.cz

MEMBERS OF THE SCIENTIFIC COUNCIL

ANZENBACHER Pavel	BOŠTÍK Pavel (Head of the Scientific Council) (since 06 February 2017)
BOŠTÍK Pavel (Vice-chairman) (till 05 February 2017)	BUBENÍK Zoltán
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FUSEK Josef	HORÁČEK Jan
HYTYCH Vladislav (since 06 February 2017)	CHLÍBEK Roman
JEBAVÝ Ladislav	JUN Daniel
KACEROVSKÝ Marian (since 06 February 2017)	KASSA Jiří
KOLÁŘ Milan (since 06 February 2017)	KROČOVÁ Zuzana
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PÁRAL Jiří (since 06 February 2017)	PÁRAL Jiří (Head of the Scientific Council) (till 05 February 2017)
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PRYMULA Roman	RŮŽEK Daniel (since 06 February 2017)
SALAVEC Miroslav (since 06 February 2017)	SLABÝ Antonín (till 05 February 2017)
STAŠOVÁ Leona (since 06 February 2017)	STULÍK Jiří (till 05 February 2017)
ŠILLER Jiří (till 05 February 2017)	ŠIMŮNEK Tomáš (since 06 February 2017)
ŠINKOROVÁ Zuzana	ŠPLÍŇO Miroslav
ŠUBRT Zdeněk	VÁVROVÁ Kateřina (till 05 February 2017)

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(till 31 May 2017)

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HORÁČEK Jan (Vice-chairman)

CHLÍBEK Roman
(since 24 October 2017)

JAKL Martin

JUN Daniel (Head of the Senate)

KRUTIŠOVÁ Pavla

KUBELKOVÁ Klára

LOCHMAN Petr

PAVLÍK Vladimír

ŠINKOROVÁ Zuzana

Student members

ČECHOVÁ Lenka

KOTEK Jiří (Vice-chairman)

MUSIL Vít

ODLOŽILOVÁ Šárka

SVOBODOVÁ Radka

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DLABKOVÁ Alžběta
(till 31 January 2017)

HEPNAROVÁ Vendula
(since 01 February 2017)

JAKL Martin

KUBELKOVÁ Klára
(since 01 February 2017)

POHANKA Miroslav
(till 31 January 2017)

PUDÍK Peter
(Head of the Education Commission)

SMETANA Jan

ŠUBRT Zdeněk

VOPLATKOVÁ Zdeňka

FAJFROVÁ Jana
(since 01 March 2017)

HRSTKA Zdeněk
(till 28 February 2017)

KRUTIŠOVÁ Pavla

MÍŠKOVÁ Zdena

POTÁČ Michal

ROHLENA Milan

STRÁTECKÁ Hana

TICHÝ Aleš

MEMBERS OF THE EDITORIAL COMMISSION

BOŠTÍKOVÁ Vanda
(since 01 June 2017)

FIDRANSKÝ Miroslav

POHANKA Miroslav
(Head of Editorial Commission)

VOPLATKOVÁ Zdeňka

FAJFROVÁ Jana

NOVÁKOVÁ Jana
(since 01 January 2017)

TICHÝ Aleš

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The Department of Epidemiology as the basic educational and research component of the Faculty of Military Health Sciences (FMHS) is divided into three groups: the epidemiology group; the microbiology, disinfection, disinsection and rodent control group; group of experimental biology.

The Department of Epidemiology has fulfilled the following main tasks:

It has provided undergraduate education at the FMHS and at the civilian Medical Faculty of Charles University in Hradec Králové, as well as postgraduate training and postgraduate doctoral studies. The teaching activities have been particularly aimed at general and special epidemiology with respect to the topical situation in the Czech Army and in the Czech Republic. The topics of "Emerging and Reemerging, Infectious Diseases", "Travel Medicine" and "Dangerous Pathogens" have also been emphasized. Two doctoral study programs (PhD – epidemiology and medical microbiology) are certified by the Czech Governmental Commission. Since 1990, more than 31 students have finished their PhD studies in the Department. The Department has state accreditation for habilitation and for professorial appointment in two medical branches: Hygiene, Preventive Medicine and Epidemiology; and Medical Microbiology.

The Department of Epidemiology plays an important role in education, training and consultancy related to biological threats/weapons and preventive medicine.

Members of the Department participate in training and education of medical and other personnel dispatched in military peacekeeping and humanitarian missions abroad. The aim is to inform them about any health risks during staying abroad, especially about prevention of infectious diseases, possibilities of vaccination or chemoprophylaxis. They also provide both consultancy service prior to the departure abroad and a practical realization of the respective measures. The Department of Epidemiology provides an epidemiological service for the Field Hospitals of the Czech Army.

Research activities have concerned seroprevalence studies (e.g. Pertussis, Viral hepatitis C, Measles, Mumps, Hantavirus, Q-fever), testing the antimicrobial activity of the new compounds, molecular genetic analysis of herpes viruses.

The members of the Department are members of journal's editorial boards (e. g. Epidemiologie, mikrobiologie a imunologie – prof. Splino; Military Medical Science Letters, Vaccines and Immunology, and Vakcinologie – prof. Chlibek; Annals of Infectious Disease and Epidemiology – doc. Bostikova), and they work as reviewers of international journals as well (Vaccine, Lancet Infectious Disease). Some of them work in a number of committees and boards: European Centre for Disease Control and Prevention (prof. Chlibek) or Central European Vaccination Awareness Group-CEVAG (prof. Chlibek).

The members of the Department are also members of NATO working groups and advisory committees for biological threats and weapons (BIOMEDAC – Biological Medical Advisory Committee – prof. Chlibek) and NATO-Research&Technology Organisation (prof. Chlibek). Prof. Bostik is a CZ representative to the EDA advisory Capability&Technology group CBRN and Human Factors and also an active member of the NATO LTSS HFM-273 group.

Disinfection, disinsection and rodent control are very important parts of the medical practice in the Czech Army. This Department is the only one of its kind in the Czech Army for the assessment of the antimicrobial efficacy of disinfectants or new antimicrobial agents.

RESEARCH PROJECTS

CLOSTRIDIUM – Colonization of the intestine of medical personnel with *Clostridium difficile* as a potential source of nosocomial infections

Hašková, K., Bošítková, V.

Supported by the Ministry of Education, Youth and Sports, 2014–2017 (Project No.: SV/FVZ201412)

Cohort study of potential colonization of the intestine of medical personnel with *Clostridium difficile*. The subject of the study is to figure out the percentage of medical personnel colonized with *Clostridium difficile* with the use of PCR detection of glutamate dehydrogenase. With this information in case of future nosocomial infections it will be possible to compare the subtypes of *Clostridium difficile* in the intestines of medical personnel and those in the intestine of patients. If a link will be found, there will be room to discuss the need of possible precautions that must be taken to avoid such route of transition, for example eradication of *Clostridium difficile* from the intestine of medical personnel with antibiotics. This is important due to the increase of incidence of *Clostridium difficile* infections in the Czech Republic from both a medical and economic perspective.

CLOSTRIDIUM – Development of methods of targeted proteomics for detection of *Clostridium perfringens* toxins

Đuráčová, M., Benková, M., Klimentová, J.

Supported by the Ministry of Education, Youth and Sports, 2015–2017 (Project No.: SV/FVZ201502)

The main aim of project, its a development of methods for the detection and quantification of the individual *C. perfringens* toxins (α , β , ϵ , 1A and 1B) using mass spectrometry, concretely by the method of parallel reaction monitoring (PRM). *Clostridium perfringens* is a Gram-positive anaerobic spore-forming bacterium that is widely distributed in nature, especially in soil and the intestinal tracts of humans and animals. Under natural conditions, this

bacterium is responsible for local outbreaks of food poisoning associated with eating contaminated food which was improperly heat treated. The bacterium is also a major cause of gas gangrene. It is a disease, associated with wound infection, with fatal prognosis in the case of treatment's delays. *C. perfringens* types B and D produce epsilon toxin considered to be the third most powerful bacterial toxin. Because of the ability to disperse the toxin as an aerosol and a lack of methods of treatment and prevention of poisoning possible factors it is a potential tool for bioterrorism.

CYTOMEGALOVIR – Development of a nanoparticle based therapeutic vaccine against CMV

Frydrychová, S., Boštík, P.

Supported by the Ministry of Education, Youth and Sports, 2015–2017 (Project No.: SV/FVZ201504)

Human cytomegalovirus is a herpetic DNA virus. Primoinfection with CMV is often asymptomatic and after that the virus establishes a life-long latency. The prevalence of CMV positivity is fairly high, reaching 60% of the population. During the latency the virus can reactivate and cause a wide spectrum of symptomatology. The reactivation is usually not a medical issue in immunocompetent hosts, but it poses a serious threat (together with the primoinfection) to the people experiencing immunosuppression. This condition can be induced by various means including an infection with some other pathogens, irradiation, immunosuppressive therapy, severe malnutrition and exhaustion and others. In these cases the CMV can cause serious symptomatology leading to a generalized infection and death. There is no vaccine currently available and antiviral therapy poses serious side-effects. The goal of this project is thus to develop a vaccine based on chitosan nanoparticles coated by the CMV antigen(s) and, possibly additional immunostimulatory molecules, which could be easily applied intra-nasally. Chitosan itself possesses immunomodulatory properties and careful selection of the CMV antigen(s) and other molecules is expected to bring additional benefits. Such a vaccine can be then easily delivered to those people/patients, which will be in a potential danger of the immunosuppression to boost their immune system against both their endogenous latent CMV and CMV primoinfection.

Development of novel disinfectants against pathogens occurring in the hospital environment

Soukup, O., Marek, J., Boštík, P., Boštíková, V., Sleha, R.

Supported by the Internal Grant Agency of the Czech Republic Health Service, 2015–2018 (Project No.: NV15-31847A)

In this project, we would like to develop new compounds based on quaternary ammonium salts with a strong disinfectant potential against

nosocomial infections in hospital environment, thus bacterial, fungal and viral pathogens. The project is designed for development of various (3-6) mixtures with strong disinfecting properties and wide spectrum of efficacy by combining individual agents with more specific efficacy. Developed mixtures also should not exert skin irritation at operating personnel, which will be ensured by in vitro and in vivo skin tests. Furthermore, variability of the mixtures and their alternating application should represent a tool for the controlling of microbial resistance. In this project, basic research (9%) represent the synthesis of novel compounds and the structure-biological activity relationship (SAR) evaluation. Applied research (91%) represents majority of the project, thus, the funnel-like selection of a drug candidates, their in vivo safety validation and subsequent patent protection application with subsequent application for patent protection.

The potential of xanthohumol and beta-bitter acids in the therapy of nosocomial infections

Boštík, P., Boštková, V., Čermák, P.

Supported by the Internal Grant Agency of the Czech Republic Health Service, 2017–2020 (Project No.: NV17-31765A)

The increasingly more prevalent bacterial resistance to antibiotics presents an important worldwide problem. Compounds of natural origin with a proven anti-bacterial effect may represent new resources in this area or serve as complimentary therapies utilized together with antibiotics. Certain compounds from hops, especially beta-bitter acids and xanthohumol possess strong inhibitory effects on Gram-positive (*Staphylococcus aureus*, including resistant variants such as MRSA) and anaerobic bacteria, namely *Clostridium perfringens* and *C. difficile*. Some of the other characteristics of these compounds, including their low solubility in water, low toxicity and low level of adsorption in the gastrointestinal tract (GIT), predispose them as useful tools for local infections of skin and GIT. Formulations containing these compounds, which will be developed and evaluated in this project, can thus represent much needed tools for a local therapy of infections caused by antibiotic-resistant strains of bacteria.

DEPARTMENT OF MILITARY MEDICAL SERVICE ORGANIZATION AND MANAGEMENT K-302

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The Department of Military Medical Service Organization and Management is the primary department which offers military and professional training for the students of the Faculty of Military Health Sciences, particularly in the field of military medical service support in operations, disaster medicine, crisis management, emergency planning and psychology. Other covered subject areas are military history, military tactics

& logistics, military communication, topography and CBRN defence. The Department organizes follow-up education for military doctors, stomatologists, pharmacists and bachelors in advanced courses. Likewise, it offers specialized training and refresher courses for paramedical personnel to the extent necessary to carry out required medical duties in military operations e.g. military medical service organization, medical evacuation and crisis intervention. It participates in preparation of non-medical personnel located within the HQ and staff of the military medical units and facilities. It carries out training in medical support planning, working with maps, deployment of field medical facilities, calculation of medical casualties and military medical units command, control and cooperation.

The subject „Organization and Tactics of the Medical Service“ makes students acquainted with terms and conditions of the medical service during wartime and in foreign operations, identifies tasks and principles of medical support and medical C2 issues that are fundamental to comprehension and correct application of knowledge in terms of other military medical branches. It familiarizes students with the principles followed from NATO documents and standardization agreements.

The Department's primary aim is to pass the knowledge on to students, develop their habits and skills to fulfill basic tasks and duties arising from their planned command functions. It is involved in preparation of medical personnel prior to deployment. The Department provides knowledge and passes previous experience on to control authorities and executive facilities of the medical services in crisis, a war or other emergency situations as well as in humanitarian missions. It applies the knowledge of military subjects to specific environment of medical service, respecting both military principles and requirements as well as the principles of International Humanitarian Law.

The research work of the Department focuses on improving the quality and efficiency of organization and management of the medical service in accordance with military doctrine of the Czech Republic. It contributes in optimization process of the organizational structure of the medical units, departments and facilities, elaborating principles of their operations and methods of their control during a war. It develops materials and proposals from these areas for conceptual authorities of the ACR Medical Service, including NATO STANAG assessment reports in terms of their ratification and options of implementation.

The Department is an expert guarantor in the field of military medical service organization and management. It provides expert statements for the Ministry of Defence and Military Medical Agency and gives consultations to managers of all military medical service levels.

DEPARTMENT OF RADIOBIOLOGY K-303

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The Department of Radiobiology was established at Purkyně Military Medical Research and Postgraduate Institute on September the 1st 1963.

The first chief of the department became Colonel Prof. MUDr. Josef Mráz, CSc., who was in 1968 appointed the first professor of military radiobiology of Charles University. The main tasks of the department are teaching and research activities, which are closely connected.

In the field of research, the experimental work includes histology and cytology, in vitro methods, methods of proteomic analysis and methods of flow cytometry. Individual technological units allow in vitro and in vivo observation of post-radiation mechanisms on molecular, cellular, and organ levels.

Military research is focused on early diagnosis and therapy of post-radiation damage as the main objective of the Department. The aim of investigation in the medium-term horizon is discovery and practical introduction of biodosimetric markers, study of molecular mechanisms of radiation-induced DNA damage repair and autophagy, development of radioprotection agents as well as continuous renewal of decontamination agents for the Army of the Czech Republic. Mutual cooperation with other NBC research workplaces world-wide also remains an integral part of our research activities. Cooperation with civilian workplaces at the Faculty of Medicine and the University Hospital in Hradec Králové is focused on radiation oncology.

The Department of Radiobiology takes part in military medical-specialist education in the form of pre-gradual and post-gradual education mainly in doctoral studies. The main educational activity is lecturing military radiobiology. The main topics are: the nuclear weapons effects on the living organism, the possibilities of the protection and medical treatment of irradiated persons. Other specific military issues are disaster medicine, CBRN protection etc., which are taught at the Faculty of Military Health Sciences, including the topics, which are presented by the instructors of our Department.

RESEARCH PROJECTS

CILIA – Primary cilia as an indicator of cell stress

Filipová, A., Šinkorová, Z.

Supported by the Ministry of Education, Youth and Sports, 2017–2019 (Project No.: SV/FVZ201703)

Cellular stress is regarded as a pathophysiological damage mechanism in terms of homeostasis; it is triggered by diverse stimuli such as radiation, starvation, or chemical effects (e.g. cytostatics). Proliferating cells more sensitive to stress stimuli, particularly during cell division. From a homeostatic point of view, subliminal stimuli often induce repair mechanisms, and supra-threshold stimuli may induce apoptosis. The qualitative assessment of these processes is challenging and requires a comprehensive

approach including both molecular biology and functional cell assays. Cellular stress could be defined as a complex system involving different levels of cell organization, i.e. genetic information, cytoskeleton structure, metabolism, and cell-to-cell contact. Cytoskeleton stability is an important indicator of cellular stress; therefore, an appropriate analysis of these changes could provide further insight on the development, and consequences, of cellular stress, its environment and homeostasis. In this sense, ionizing irradiation is a known source of cellular stress as it often induces centrosome multiplication in addition to DNA double strand breaks; centrosomes are essential for correct chromosome segregation during the cell cycle as they anchor the mitotic spindle, these centrosomes are formed from the mother centriole which is also the basal body of primary cilia. Primary cilia are membrane bound structures which are dynamically regulated during the G0/G1 phase and absorbed before entry into mitosis; therefore, ciliogenesis is closely associated with centrosome duplication during the cell cycle. Under normal conditions, centrosome duplication occurs only once within the cell cycle; however, the effect of radiation on primary cilia has not been studied to sufficient extent. The objective of this project is to describe and evaluate the suitability of primary cilia as an indicator of cytoskeletal instability due to cellular stress, induced by ionizing irradiation, in proliferating fibroblasts.

CYTOKINE – Determination of cytokine profile after whole body and parcial irradiation of experimental models

Lierová, A., Němcová, M., Šinkorová, Z.

Supported by the Ministry of Education, Youth and Sports, 2015–2017 (Project No.: SV/FVZ201507)

The concept of this work is aimed to investigate the effects of ionizing radiation on cytokine production in the body and find a suitable cytokine profile which would be directly linked to tissue damage after irradiation. Also, new method for the determination of cytokines will be tested, using commercially available detection kits for flow cytometry. In this project, we also want to determine cytokine levels in relation to lung damages – radiation pneumonitis (2-6 weeks after irradiation) and radiation fibrosis (6-24 months after irradiation). Diagnosis of serum markers is often used in patients with lung cancer, which allows for better prevention and more effective treatment. An animal model was selected, for our investigation, a strain of C57BL / 6J mice. In this part of the project, mouse samples will be evaluated on a flow cytometer and changes in the lungs histologically, due to the detection of characteristic damages in the lung tissue. In case of positive results from mouse models and methodologies well set on a flow cytometer, it is planned to establish contact with the Oncology department of FN HK and used the cytokine profile in cancer patients. The last intention of this project is the inhalation application of nanoparticles. We would like to use the extensive spectrum of application of nanoparticles even in the case of pulmonary

damage due to irradiation and to compare their effectiveness with existing radioprotective agents.

Development of novel radioprotective agents based on small molecular inhibitors

Šinkorová, Z., Marek, J.

Supported by the Czech Republic Grant Agency, 2017–2019 (Project No.: GA17-13541S)

Radiotherapy is a very important modality for treating cancer. Its therapeutic potential is however limited by normal tissue damage, which leads to a wide range of symptoms (impeding quality of life of oncologic patients), prevents delivery of intended dose and reduces the tumor-eradicating effect of the therapy. Both acute and chronic radiotoxicity have been associated with cell death. Whereas multiple cell death pathways are executed in cancer cells after irradiation, in radiosensitive tissues such as bone marrow or gastrointestinal tract, the cell death is dominantly mediated via apoptosis. Since a pro-apoptotic protein PUMA plays a key role in this process, its inhibition increases resistance against radiation. Inhibitors of PUMA seem therefore very promising in selective modulation of normal tissue damage during radiotherapy. Their clinical utilization could be very wide due to PUMA involvement in pathogenesis of myocardial reperfusion injury and neurodegenerative diseases.

ELECTROCHEMISTRY – Electrochemical detection of DNA damage after gamma irradiation

Jeličová, M., Němcová, M., Šinkorová, Z., Metelka, R.

Supported by the Ministry of Education, Youth and Sports, 2016–2018 (Project No.: SV/FVZ201602)

A main aim of this work is a detection of nucleic acid structural damage particularly double-strand breaks in a lymphocytes, which are induced by ionizing radiation (IR). Newly developed electrochemical method enables retroactive determination of received dose in a peripheral blood of irradiated people. Electrochemical detection is a method, which monitors electron transfer of redox compounds, that are bind to the DNA molecules on an electrode surface. Subsequently, acurrentdistinctive signals, which are related to the structure of the complex are recorded. Based on these data the structure of nucleic acids can be studied in detail. A blood of an animal models and blood of an oncology patients later on, will be used for the experiments. The dose range is 0.5 - 5 Gy at the time intervals of 1, 4 and 24 hours after irradiation. Quantification of DNA damage by basic biodosimetric method (micronucleus assay) and detection of γ H2AX by flow cytometry will be used for comparison. Electrochemical detection provides unparalleled, simple, low-cost and quick way for solving the problematics without the need

of sample evaluation by a qualified, pre-trained staff. Up to date, there is no fast and significant biodosimetric method usable within 24 hours after irradiation, making the proposed approach unique. Currently, a classic cytogenetic analysis allows retrospective assessment of received dose for only a few irradiated individuals. Besides, it is not only financially, but also time-demanding. Hence, an improvement of this process comes to the forefront.

KGF – Evaluation of therapeutical modulation of ionizing radiation-induced lung tissue damage by Keratinocyte growth factor (KGF)

Kmočová, A., Pejchal, J.

Supported by the Ministry of Education, Youth and Sports, 2017–2017 (Project No.: SV/FVZ201709)

The aim of this study is to reduce irradiated lung tissue damage by the keratinocyte growth factor (KGF). A single dose of 8-10 Gy to the lungs leads to the development of acute (radiation pneumonitis, RP) and / or chronic (radiation fibrosis, RF) inflammation with characteristic morphology, depending on the dose of ionizing radiation (IR) and the length of time elapsed. RP occurs from 1 to 6 months after the lung irradiation and is defined as an exudative inflammation of the alveoli caused by pneumocytes and endothelial cells damage. RF usually manifests from 6 months after irradiation and longer. These syndromes can occur both in radiotherapy (5-15% of irradiated individuals), as well as in radiation accidents where the development of RP and RF can be considered as a prognostic limiting factors. The possibilities of RP and RF therapy are limited. Currently, growth factors are becoming economically available, that can affect radiation damage and subsequent regeneration. The factors closely related to the epithelial tissues include KGF. Positive effects of KGF were demonstrated in the irradiated salivary gland of mice, where the treatment of KGF for 4 days before and / or after irradiation caused proliferation and thus an increase in the number of saliva / progenitor cells of the salivary gland. Due to the presence of KGF receptors in lung tissue, positive effects can be expected. First, we want to test different doses of IR in the mouse (Balb / c) locally irradiated on the lungs with and without treatment with KGF (5 mg / kg). Then we will focus on KGF ability to influence the development of RP. From a methodological point of view, we want to examine the effect of KGF on histopathological changes in the irradiated lung tissue, as well as on lung tissue infiltration by immune cells and cytokines.

New approaches in diagnostics and therapy of irradiated persons

Tichý, A.

Supported by the Czech Republic Ministry of Internal Affairs, 2017–2020
(Project No.: VH20172020010)

The aim of the project is identification and quantification of proteins by mass spectrometry. Subsequent bioinformatic data analysis will select significant plasma proteins that are quantitatively different in serum samples of leukemic patients before and after whole body irradiation. The result will be a list of proteins with a demonstrable relationship to exposure to ionizing radiation. Furthermore, we aim to identify new irradiation indicators by flow cytometry. First, we aim to quantify changes in hematological parameters (leukocytes, thrombocytes, hematocrit) of an experimental mammalian model including LD50/30 as a basic indicator of the severity of an acute radiation syndrome (ARS), to classify irradiated subjects into one of the five Radiation Categories. Furthermore, the radiosensitivity of the major lymphocyte populations and their decrease in peripheral blood will be determined as a significant indicator for determining the dose range needed to distinguish the severity of ARS development. Quantitative changes in the leukocyte cytoplasm will be analyzed for accurate sorting. The result will be a panel of biological indicators that allow, on the basis of predefined parameters, to determine whether or not an individual was exposed to ionizing radiation and to estimate ARS development depending on RC categorization. In the last part of the project we will focus on testing of new ways of ARS therapy by growth factors. The goal is to test several combinations of clinically available growth factors for more complex bone marrow stimulation in ARS. The tested factors will include: peg-G-CSF, KGF and IGF-1. In addition to the determination of experimental survival curves, the efficacy of treatment by histopathological examination of selected tissues will be assessed and we expect the treatment to be verified with the most appropriate combination of growth factors in the higher mammalian model. The results will be recommendations for the application of growth factors and the evaluation of the benefits for ARS therapy.

RADIOSENSIBILIZATION – Radiosensibilization of cancer cells: Importance of autophagy modulation

Čecháková, L., Ondrej, M., Tichý, A.

Supported by the Ministry of Education, Youth and Sports, 2015–2017
(Project No.: SV/FVZ201501)

This project is focused on characterization of two potential virulence factors in *Francisella tularensis*, namely glyceraldehyde-3-phosphate dehydrogenase (GAPDH) and transcription factor HU. The aim of the project is confirm virulence and immunoprotective effects of these potential virulence factors. GAPDH will try to find out whether it has other so-called "moonlighting" functions and clarify its role in pathogenesis. Another goal of

the project is to elucidate the mechanism of HU protein interaction with the DNA molecule, including the identification of HU regulon. Involvement of both GAPDH and HU in virulence of this pathogenic bacterium will be test in vivo and in vitro.

THYMOCYTES – Effect of radioprotection in the development of thymocytes after whole body irradiation

Němcová, M., Šinkorová, Z.

Supported by the Ministry of Education, Youth and Sports, 2016–2018 (Project No.: SV/FVZ201606)

Thymocytes are a heterogeneous group of T cells with a key role in the immune system. While the development of the majority of hematopoietic cell lineages progress in bone marrow, differentiation and maturation of T cells is completed in the thymus from bone marrow precursors. Changes in the migration process of hematopoietic cells and their differentiation in thymus can induce immunological disorder, autoimmune reactions or outbreak of cancer.

DEPARTMENT OF TOXICOLOGY AND MILITARY PHARMACY K-304

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The Department of Toxicology was established in 1951. Since then, as an integral part of the Faculty of Military Health Sciences, it has been involved in education and scientific research work on chemical warfare agents for defensive and protective purposes only.

The Department of Toxicology and Military Pharmacy was established on the 1st September 2014 by integration of the Department of Toxicology, the Centre of Advanced Studies and the Department of Public Health. It comprises two groups – the military pharmacy group (biochemical laboratory, laboratory of organic synthesis, analytical laboratory, decontamination laboratory) and a the toxicology group (toxicological laboratory, pharmacological laboratory, neurophysiological laboratory, neurobehavioral laboratory, laboratory of cell toxicology). This structure permits a complex study of highly toxic substances including chemical warfare agents with aims to determine their action on biochemical, neurobehavioral, histochemical, pharmacological and neurophysiological level, to study and develop antidotes, to analyze all types of samples with respect to the presence of known chemical warfare agents, to test decontamination effectiveness of developed and field decontamination kits. Present scientific research projects are focused on therapeutic, prophylactic and protective measures against the most toxic chemical warfare agents. Special attention has been paid to the most recent and most dangerous nerve agents and mustards.

The main educational activity task was to give lectures for in undergraduate and post-graduate studies dealing with problems of biological effects of real and potential chemical warfare agents, the possibilities of the medical and chemical protection against them and the approaches to medical care of for persons intoxicated with chemical warfare agents, especially nerve agents. The Department provides and guarantees the teaching master's degree program, Military Pharmacy and also participates in the teaching of toxicology in Disaster Medicine.

In 2017, the Department of Toxicology and Military Pharmacy has continued in the cooperation, started by with the Swedish Defence Research

Agency, in Umea (Sweden), the Armed Forces Biomedical Research Institute in Brétigny-sur-Orge (France), the Institute for Medical Research and Occupational Health in Zagreb (Croatia), the Korea Research Institute of Chemical Technology in Daejeon (South Korea), WIHE in Warsaw (Poland), the Sahlgrenska Academy, the University of Goteborg (Sweden) – in the field of development of prophylactic and therapeutic means against nerve agents and organophosphorus insecticides. The cooperation has been mostly characterized by the exchange of scientific information. The cooperation with the Department of Organic Chemistry, Institute of Chemistry, P. J. Šafárik University in Košice (the Slovak Republic), the University of Bologna (Italy), the School of Biology, the Environmental Sciences and Chemistry (Spain) and the University Bourgogne Franche-Comté (France) is continuing in the field of the development of new potential therapeutic means against Alzheimer's disease.

RESEARCH PROJECTS

ACETYLCHOLINESTERASE – The evaluation of the toxicological parameters of substances modulating activity of acetylcholinesterase in interaction with cell lines in vitro

Můčková, L., Jun, D.

Supported by the Ministry of Education, Youth and Sports, 2015–2017 (Project No.: SV/FVZ201508)

The drug safety is an important part of pharmaceutical countermeasure research. Preclinical laboratory evaluation of synthesized molecules plays a crucial role in this process. The objective of the project is to study interactions of cells cultured in vitro with acetylcholinesterase (EC 3.1.1.7, AChE) inhibitors and reactivators. In this project, we will measure the cytotoxicity of tested compounds on different cell models and the changes in levels of reactive oxygen species (ROS) in the cells and determine the apoptosis markers. The result of the project will be the database of AChE reactivators and inhibitors containing the data obtained from the tests.

BETA-SECRETASE – Expression and purification of human recombinant protein beta secretase (BACE1) and validation of colorimetric method for the determination of their activity

Hrabínová, M., Jun, D.

Supported by the Ministry of Education, Youth and Sports, 2015–2017 (Project No.: SV/FVZ201506)

The aim of the research is to introduce expression and purification enzyme beta-secretase (BACE1) and validation simple biochemical colorimetric assay for the development of potential drugs affecting the central nervous system. BACE1 is the important markers involved in the pathogenesis of neurodegenerative diseases (e.g. Alzheimer's disease). Developer's method

will be used for screening assessment of substances proposed as potential drugs for these diseases.

Centrally acting antidotes for the treatment of organophosphorus poisoning

Soukup, O., Jun, D.

Supported by the Internal Grant Agency of the Czech Republic Health Service, 2017–2017 (Project No.: NV17-32801A)

Inactivation of acetylcholinesterase (AChE) in nerve and muscle by organophosphates is the toxic mechanism common to both nerve agents and pesticides. Standard countermeasures against OP poisoning involves muscarinic inhibition and the use of oxime – a reactivator. The latter, however, is limited by a versatility of oximes and by a low penetration of reactivators into the brain. The aim of this project is to develop oxime reactivators with better penetration of the blood brain barrier (BBB). Namely, monoquaternary oximes with balanced physico-chemical properties containing selected nucleophile capable of AChE reactivation and a ligand of peripheral anionic site ensuring the binding to the enzyme. Unique reactivators will be prepared and by application of series of in vitro and in vivo tests the compounds will be evaluated and described. The best candidate of preclinical development with practical potential will be identified.

Concept of non-quaternary reactivators AChE as the antidotes of organophosphorus poisoning – a new hope or a blind way?

Kuča, K., Jun, D.

Supported by the Czech Republic Grant Agency, 2015–2017 (Project No.: GA15-16701S)

Acetylcholinesterase (AChE) reactivators based on pyridinium aldoximes (obidoxime, HI-6) are used as causal antidotes in case of nerve agent or pesticide poisonings. Due to the presence of quaternary nitrogen, they have low blood-brain barrier (BBB) permeation and thus they are not capable to fully reactivate AChE in the central nervous system, where nerve agents or pesticides can be responsible for chronic neural disorders. For this reason, development of novel centrally acting non-quaternary reactivators that can more efficiently cross BBB is one of the most promising strategies. However, from the practical point of view, several drawbacks of physico-chemical, pharmacological and toxicological origin are expected for these non-quaternary antidotes. In this project, all the benefits and negatives of non-quaternary AChE reactivators will be investigated to decide whether this new strategy is a really a promising approach or just another blind way in the search for the new type of antidotal therapy.

CHOLINERGIC RECEPTORS – Development of novel modulators of cholinergic receptors

Pham, N., Korábečný, J., Nepovimová, E.

Supported by the Ministry of Education, Youth and Sports, 2017–2019 (Project No.: SV/FVZ201705)

The aim of this project is design, synthesis and analysis of novel modulators of M1 muscarinic receptors as potential therapeutics in treatment of neurodegenerative and cognitive disorders. Subsequently, these compounds will be evaluated in vitro for their biological potential.

KGF – Evaluation of therapeutical modulation of ionizing radiation-induced lung tissue damage by Keratinocyte growth factor (KGF)

Kmochová, A., Pejchal, J.

Supported by the Ministry of Education, Youth and Sports, 2017–2017 (Project No.: SV/FVZ201709)

The aim of this study is to reduce irradiated lung tissue damage by the keratinocyte growth factor (KGF). A single dose of 8-10 Gy to the lungs leads to the development of acute (radiation pneumonitis, RP) and / or chronic (radiation fibrosis, RF) inflammation with characteristic morphology, depending on the dose of ionizing radiation (IR) and the length of time elapsed. RP occurs from 1 to 6 months after the lung irradiation and is defined as an exudative inflammation of the alveoli caused by pneumocytes and endothelial cells damage. RF usually manifests from 6 months after irradiation and longer. These syndromes can occur both in radiotherapy (5-15% of irradiated individuals), as well as in radiation accidents where the development of RP and RF can be considered as a prognostic limiting factors. The possibilities of RP and RF therapy are limited. Currently, growth factors are becoming economically available, that can affect radiation damage and subsequent regeneration. The factors closely related to the epithelial tissues include KGF. Positive effects of KGF were demonstrated in the irradiated salivary gland of mice, where the treatment of KGF for 4 days before and / or after irradiation caused proliferation and thus an increase in the number of saliva / progenitor cells of the salivary gland. Due to the presence of KGF receptors in lung tissue, positive effects can be expected. First, we want to test different doses of IR in the mouse (Balb / c) locally irradiated on the lungs with and without treatment with KGF (5 mg / kg). Then we will focus on KGF ability to influence the development of RP. From a methodological point of view, we want to examine the effect of KGF on histopathological changes in the irradiated lung tissue, as well as on lung tissue infiltration by immune cells and cytokines.

MDCK – The development and validation of new in vitro methodology based on MDCK cell lines for the study of the penetration of potential drugs across the blood brain barrier

Kobřilová, T., Herman, D., Soukup, O.

Supported by the Ministry of Education, Youth and Sports, 2017–2019
(Project No.: SV/FVZ201708)

The organophosphates are considered as one of the most dangerous abusable toxic substances. The mechanism of action of organophosphates is inhibition of acetylcholinesterase enzyme. The treatment of intoxication included anticholinergics, anticonvulsants and reactivators of acetylcholinesterase. One problem of reactivators effect is poor penetration into the central nervous system in sufficient amount. It is necessary to develop compounds which will be able to cross the blood-brain barrier without a serious side effect. The penetration across the BBB is necessary to determine. The in vivo methods are expensive, time and animals consuming. One of the screening methods PAMPA, which was introduced in our laboratory, uses the lipidic membrane for simulation of BBB. The mechanisms present in live organisms are not included in the PAMPA method. The aim of this project is to develop a new methodology for assessing the BBB penetration which uses the MDCK cell line. A special kind of these cells can express transporters, e.g. P-glycoprotein. The method will be validated by standardly used drugs. The parameters of antidotes will be established for both organophosphates poisoning and new synthesized potential drugs. The national and international cooperation is expected due to the high demand for such methods.

ORGANOPHOSPHATE – Development and preparation of novel acetylcholinesterase reactivators as potent antidotes against organophosphorous intoxication

Górecki, L., Kučera, T., Korábečný, J., Musílek, K.

Supported by the Ministry of Education, Youth and Sports, 2016–2018
(Project No.: SV/FVZ201601)

Chemical warfare agents (CWAs) are one of the big threats in the modern civilization. This fact is supported by the expanded power of terrorism which endangers any country worldwide. The most toxic CWAs are nerve agents, chemically classified as organophosphorus compounds. Organophosphates act as irreversible inhibitors of the enzyme acetylcholinesterase that may lead to death. Mono- and bis-pyridinium aldoximes are the only causal antidotes that are designated for the treatment of such life endangering intoxication. Efficiency of these causal antidotes is insufficient and hampered with several major drawbacks. The goal of this project is introduction of novel reactivators that would exceed activity of the standards and also surpass their drawbacks. Initially, we will perform silico screening of potent candidates and on these bases we will start synthesis of leading candidates.

The structures of such compounds will be mostly based on a dual site binding strategy. On these bases we will propose series of mono-quaternary or non-quaternary reactivators that will be further tested for their biological activity.

ORGANOPHOSPHATES – Design and synthesis of novel butyrylcholinesterase reactivators as potential antidotes in organophosphates intoxication

Nguyen, T., Korábečný, J.

Supported by the Ministry of Education, Youth and Sports, 2017–2019 (Project No.: SV/FVZ201706)

The project will be focused on synthesis of novel compounds potentially able to reactivate inhibited butyrylcholinesterase, thus may be used as antidotes against organophosphate intoxication. Structural properties will be determined by physicochemical methods and all of these compounds will be subsequently tested in vitro for their reactivation potential and cytotoxicity.

TENSIDES – Development of decontamination substances against chemical warfare agent based on surfactants

Matula, M., Jun, D.

Supported by the Ministry of Education, Youth and Sports, 2017–2019 (Project No.: SV/FVZ201702)

Decontamination of chemical warfare agents (CWA) is one of the possibilities of an efficient prophylaxis of poisonings. The Czech army has several decontamination mixtures mainly for the decontamination of equipment except of IPB-80 which can be used for skin decontamination. The aim of this study is to develop in vitro methods for evaluation of decontamination efficacy of decontamination mixtures. Subsequently, we will propose new mixtures and carry out evaluation of their effectiveness on CWA simulants and selected CWAs. The result would be the mixture which is capable to decontaminate nerve agents and also mustard gas.

WARFARE AGENTS – Determination of selected chemical warfare agents and toxins in complex matrices by liquid and gas chromatography

Herman, D., Jun, D.

Supported by the Ministry of Education, Youth and Sports, 2015–2017 (Project No.: SV/FVZ201505)

The project is focused on development of analytical methods for determination of chemical warfare agents and toxins. The work is aimed at a design, optimization and validation of methods for identification and quantification of these compounds in environmental samples and biological

matrices. These methods will be used for warfare agents and toxins evidence in environment and biological matrices and for purity evaluation.

DEPARTMENT OF MILITARY SURGERY K-305

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Structure and main tasks of the Department

1. *Division of General Surgery*
Šubrt Zdeněk – Head of the Division
2. *Division of Traumatology and Burns Treatment*
Lochman Petr – Head of the Division

Main tasks

- Undergraduate education of medical students
- Postgraduate training of military surgeons and other medical specialists
- Expertise and referential work for needs of the Czech Armed Forces
- Research in Military Surgery
- Preparation of medical health-care personnel before foreign missions of the Army of the Czech Republic

At present, **the Department of Military Surgery** consists of two divisions – the Division of General Surgery and the Division of Traumatology and Burns Treatment. Besides working at each Division of the Department of Surgery of the Teaching Hospital in Hradec Králové, members of the Department perform both, undergraduate courses in field surgery for students of the Faculty of Military Health Sciences, and postgraduate training of military physicians for their specialization exams in surgery and general medicine. The Department also participates in teaching of the Battlefield Advanced Trauma Life Support (BATLS) courses, disaster medicine and the first aid courses, organized by the Faculty of Military Health Sciences for the Czech Army members. Members of the Department participate in several specialised NATO working groups according to their expertise. Moreover, they are consultants of Surgeon General of the Czech Armed Forces. In the last several years, the Department has played important role in education and training of personnel of field hospitals operating in foreign missions (Yugoslavia, Bosnia-Herzegovina, Albania, Iraq, Afghanistan). Members of

the Department also took part in those missions. Research and publication activities are also essential part of the Department members' work.

Participation in a foreign mission

- J. Páral – 11th Field Hospital, ISAF, Kabul, Afghanistan, 2002, 2011 (TSF)
- J. Páral – British Field Hospital, Op TELIC, Shaibah, Iraq, 2004
- P. Lochman – British Field Hospital, Op TELIC, Shaibah, Iraq, 2004
- J. Páral – Czech Field Surgical Team, International Medical Treatment Facility (Role 3) KAIA, Kabul, Afghanistan 2012
- J. Šimek – Czech Field Surgical Team, International Medical Treatment Facility (Role 3) KAIA, Kabul, Afghanistan 2012

National textbooks

- Small atlas of dressing techniques (Páral), 1st ed. Prague: Grada Publishing, 2008. 240 p. ISBN 978-80-247-2255-9
- Acute mesenteric ischemia - Modern diagnostics and treatment of acute bowel ischemia (Páral), 1st ed. Prague: Grada Publishing 2012. 112 p. ISBN 978-80-247-3996-0
- Handbook of surgery (Šubrt), 2nd ed. Prague: Grada Publishing 2015. 512 p. ISBN 978-80-247-1005-1

International textbooks

- Gastrointestinal Stromal Tumors (Páral) in *Aperelho Digestivo* (Coelho), Editora Atheneau, Sao Paulo, Brasília, 2012, p. 325–336. ISBN 978-85-388-0296-9

RESEARCH PROJECTS

DIAPHYSEAL FRACTURES – Operative treatment of clavicle shaft fractures by intramedullar vs. extramedullar internal fixation

Šimek, J., Dědek, T.

Supported by the Ministry of Education, Youth and Sports, 2015–2017 (Project No.: SV/FVZ201511)

A prospective randomized study comparing clinical and functional outcomes of treatment clavicle shaft fractures, minimally invasive intramedullary nailing by open reduction and internal fixation plate and screws.

Nanofibrous biodegradable small-diameter vascular bypass graft

Lukáš, D., Páral, J., Kaláb, M.

Supported by the Internal Grant Agency of the Czech Republic Health Service, 2015–2018 (Project No.: NV15-29241A)

Materials that are currently used to fabricate vascular prostheses are non-degradable and thrombogenic. The aim of this project is to develop new tubular degradable scaffold made of nanofibers with three-dimensional double-layered structure. Biodegradable polymers will be electrospun to obtain nanofibrous vascular graft with desired properties. Inner layer will be made from thin fibers that will facilitate endothelial cell spreading from adjacent vessel. Outer layer will be composed of thicker fibers to enable smooth muscle cell infiltration into the 3D structure as in native vessel. These double-layered scaffolds will be tested mechanically to meet all requirements for vascular replacement in terms of tensile strength, elongation and suture retention. The graft will be tested in vitro in static and dynamic conditions in bioreactor using endothelial and smooth muscle cells. The tissue remodeling process following the implantation will be predicted by macrophage polarization testing. Further in vivo tests will be carried out to investigate the patency of produced grafts.

SURFACTANT – Intrabronchial administration of surfactant in lung injury required thoracotomy

Flášar, J., Páral, J.

Supported by the Ministry of Education, Youth and Sports, 2016–2017 (Project No.: SV/FVZ201604)

DEPARTMENT OF MILITARY INTERNAL MEDICINE AND MILITARY HYGIENE K-306

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The Department is divided into the group of Military Internal Medicine and the group of Military Hygiene.

Military Internal Medicine

The group of Military Internal Medicine is the clinical part of the department systematically focused on specialized part of Internal Medicine – Military Internal Medicine. Military Internal Medicine as a sub-speciality of Internal Medicine has been progressively developed into a recent shape and purpose in accordance with latest trends of military health support and modern therapeutic approaches. Military Internal Medicine provides knowledge of and practical experience with treatment of life-threatening non-surgical impairment in specific conditions of the military, especially during the armed conflicts. Nowadays, Internal Medicine is also of increasing importance in postoperative care, where multidisciplinary approach leads to improved prognosis of the most severe surgical affections. Furthermore, the knowledge of and practical experience with Military Internal Medicine are useful also in peacetime, especially in large-scale disasters – catastrophes. In fact, most of the skills obtained by Military Internal Medicine training are useful in a novel and progressive branch of medical specialization – **Disaster Medicine**.

Military Internal Medicine has been further developed into 3 basic branches: therapeutic-preventive, pedagogical-educational and research-scientific.

The therapeutic-preventive branch is the essential part of Military Internal Medicine. It provides specialized knowledge of and experience with treatment of the most severe medical affections. The group of Military Internal Medicine cooperates with internal departments of the University Hospital in Hradec Kralove, which provides its therapeutic and educational background.

Military Hygiene

The branch of Military Hygiene monitors the living and working conditions of troops with the aim to develop, propose and assert measures for health protection and promotion of military professionals in order to maintain a good health state of troops and combat capability of the Army of the Czech Republic personnel in difficult conditions of military environment. In accordance with this function, the activity of the group of Military Hygiene is aimed at monitoring the impact of environmental factors on the organism, at evaluating their risk in working and living environment and at setting effective preventive measures to protect and promote health of soldiers.

Currently, the group of Military Hygiene complexly covers the basic issues of the relation of life and job environment to health of the individual.

The group can provide the analysis of selected physical and chemical factors of external environment in the conditions of the Army of the Czech Republic. It studies the possibilities of use of chemical substances for disinfection effects. The group is focused above all on response of the organism to work in protective clothing and severe climatic conditions and on evaluation of the degree of risk connected with environment contamination.

In the area of group of Military Hygiene, attention is paid namely to the incidence and prevalence of risk factors of non-infectious diseases of mass incidence, rational food, catering of troops in peacetime and wartime conditions – emergency food rations, assessment of the proper received and consumed energy.

Cooperation

- Charles University, Faculty of Medicine in Hradec Kralove
- University Hospital in Hradec Kralove
- Institute for Postgraduate Medical Education in Prague
- Central Military Hospital – Military University Hospital Prague
- Military Medical Agency of the Army of the Czech Republic
- Health Institute in Hradec Kralove
- Hygienic Station in Liberec
- Military Health Institute in Prague
- Training Command – Military Academy in Vyškov
- Agricultural University in Nitra, Slovakia

TEACHING

Military Internal Medicine

The pedagogical-educational branch activities in Military Internal Medicine are closely related to therapeutic-preventive care. The department provides comprehensive education of Internal Medicine and Military Internal Medicine in both undergraduate and postgraduate degree programs. Almost all military medical specialists in Internal Medicine, including both Czechoslovakian and Czech Army members, completed their postgraduate education of Internal Medicine at our department and gained specialization degree in Internal Medicine. We are proud to announce that during the history of our department, we assisted more than 1500 physicians in gaining the specialization degree in Internal Medicine.

Nowadays, the educational process involves undergraduate education in the program of Military Internal Medicine, Military Dentistry, Military Pharmacy and Military Health Assistant. The group of Military Internal Medicine participates actively in teaching in specialized courses, such as BATLS (Battlefield Advanced Trauma Life Support) and also provides medical support during specialized training operations of various units of the Army of the Czech Republic. In cooperation with the Internal Department of the Military University Hospital in Prague and internal departments of other military hospitals, the department provides necessary background for physicians in the military in order to gain the medical postgraduate certification in Internal Medicine.

Important and highly demanding assignment of the department is management and support of doctoral study program of Military Internal Medicine. This study program has been accredited since 1993. The department is also accredited for associate professor and professor degrees proceedings in the field of Military Internal Medicine.

Military Hygiene

The group of Military Hygiene takes part in pregraduate education of military hygiene and preventive medicine for all military students of the Faculty of Military Health Sciences included civilian students of the Faculty of Health Sciences in Pardubice.

The group members participate in teaching at Charles University, the Faculty of Medicine in Hradec Kralove and cover the final exam in hygiene, military hygiene and epidemiology.

The group can provide education of hygiene and preventive medicine in the doctoral study program Preventive medicine and health care.

The group is engaged in education of hygiene and preventive medicine of civilian and military doctors and nurses including education of members of NATO missions.

The group cooperates with the Military Academy in Vyskov and ensures education and special training of the employees of the Ministry of Defence in the field of occupational hygiene , occupational medicine and risk prevention.

RESEARCH

Military Internal Medicine

The scientific-research branch is the third main part of the group of Military Internal Medicine. In general, the department is focused on clinical research in internal medicine and its implementation in specific military practice. The research is aimed to cover requirements of the Army of the Czech Republic including field and foreign military operations.

The shape of our recent research activities was formed together with the development of organization structure of the department. The long history and development of our department was connected with the development of public society, the Army and both schools in Hradec Kralove, the University of Defence Brno, the Faculty of Military Health Sciences and Charles University, the Faculty of Medicine.

Main topics are:

- New trends in transplantation of hematopoietic stem cells and supportive care
- Optimization and individualization of treatment of disorders involving bone marrow and hematopoiesis, especially research in acute leukemias as a “model disease“
- Monitoring of side effects during treatment of hematologic disorders using various novel biochemical markers, especially for evaluation of cardiac toxicity
- Cardiovascular research with focus on acute coronary syndromes, heart failure and valve disorders
- The role of enteral and parenteral nutrition in intensive care
- Participation in international clinical trials, especially in fields of hematology and cardiology

Cooperation in clinical research

1. Hematopoietic stem cell transplantation (HSCT), transplant-related complications and supportive care, the role of cytokines, cytokine receptors and adhesion molecules in HSCT and acute leukemias – the project has continued.
2. Complex monitoring of cardiotoxicity of antitumorous treatment, mainly cardiac biomarkers – the research project has continued.
3. New biochemical markers of cardiac injury (natriuretic peptides, cardiac troponins, heart-type fatty acid binding protein, glycogen phosphorylase BB) – clinical and laboratory evaluation has continued.
4. Analysis of transplantation activities, indications and results in the Czech Republic – the National Stem Cell Transplantation Registry – the project has continued.
5. A study on application of enteral and parenteral nutrition in intensive metabolic care – the research project has continued.
6. International randomized clinical trials (PRAN-16-52, REACH 3, ASTRAL SGI-110-07, OPTIC 2L, CABL 001, ROBUST).
7. Academic studies of the Czech Hematology Society and the Czech Leukemia Study Group – for Life.

Military Hygiene

Scientific research is focused on primary prevention of chronic diseases and relation of life and job environment and life style. Realization of intervention study and project is focused on healthy status of professional soldiers.

Main topics are:

- Epidemiological studies of non-infectious diseases
- Evaluation of nutritional and healthy status
- Evaluation of energetic and metabolic requirements
- Combat rations in different climatic conditions
- Evaluation of response of the organism to work in unfavourable environmental and working conditions
- Evaluation of working energy expenditure
- Evaluation of physiological function in protective suits

- Elaboration of proposals for working and rest regimes, energy, fluids and minerals as a prevention of diseases

RESEARCH PROJECTS

MICROBIOM – Gut microbiom at Czech subpopulation

Fajfrová, J., Vymáčilová, L.

Supported by the Ministry of Education, Youth and Sports, 2017–2017
(Project No.: SV/FVZ201704)

In recent years, gut microbiome have gained a growing interest as an environmental factor that may affect the predisposition toward adiposity. The microbiome is capable of secreting or altering the production of molecules that affect both energy balance (weight gain or loss) and energy stores (fat mass). The microbiome may, in this context, be regarded as a responsive entero-endocrine organ composed of more cells and genes than the host. In gut of health people we can find up to 500 different species of microbes, which we can identify by modern gene sequencing methods. Aims of our work are analysis of gut microbiome at obese people and follow the changes due to changes in dietary habits within complex program of weight reduction.

PARENTERAL NUTRITION – The use of parenteral nutrition with a specific dose of glucose and lipids in patients on intensive care unit

Skořepa, P., Horáček, J.

Supported by the Ministry of Education, Youth and Sports, 2015–2017
(Project No.: SV/FVZ201510)

Glucose is the main carbohydrate in mammals, almost all of the dietary carbohydrates are converted to glucose, which is essential, not only for the intermediate metabolism. Specific changes in metabolism occur in critical ill patient. Autonomic nervous system together with hormone production to maintain adequate glucose metabolism is in the critical ill essential. Nutritional support is an important part of a comprehensive care for critically ill. Although historically a glucose and currently the only used carbohydrate parenteral nutrition and nutritional aid in, the questions of the experts brought about stress hyperglycaemia, importance of insulin resistance, adequate of glucose dose or their adverse effects still remain unclear. In specific research project we want to assess the effect of specific glucose and lipid quantity in parenteral nutrition in critically ill patients to the metabolic, nutritional, epidemiological and anthropometric parameters by comparing with normally used amounts of macronutrients in parenteral nutrition in critical ill patients.

DEPARTMENT OF EMERGENCY MEDICINE AND MILITARY GENERAL MEDICINE K-307

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History of the Department started in 1983 at the J. E. Purkyně Military Medical Research and Postgraduate Institute. First as a Group of Military Medical Service Organization in Peacetime which was a part of the Department of Military Medical Service Organization. With increasing demands on training of the military health personnel, the Department of General Medicine was established. First Specialization Exams in this new basic specialization branch were held in February 1985. 525 military doctors passed the Specialization Exam in General Medicine at the Department of General Medicine till 31st December 2004. Now the Department collaborates in Specialization Exam with the Institute of Postgraduate Medical Education in Prague, the Chamber of Medicine, professional medical societies and associations in postgraduate training and specialized activities. It participates in establishing standards for special therapeutic care.

Since 1997, the work at this Department has focused more on pre-hospital emergency care and teaching the First Aid and Emergency Medicine. At the same time a significant modernization and a proper subdivision of teaching premises according to the type of courses were carried out there. Now the Department is equipped with modern teaching models and simulators for teaching pre-hospital care, including the possibility of interactive teaching aids. Current innovations of medical material and equipment are applied in teaching process.

The Military Medical Service after the entry into NATO was one of the main contributors of the Czech Armed Forces to this international military organization. The Department of General Medicine and Emergency Medicine has been charged with specialization training of the military health personnel deployed on foreign mission. The extension of teaching activities in this new field called for changes in table posts at the Department. In 2001, the Healthcare Education and Training Group was established and other workers were engaged to teach the first aid. Since 2003, regarding the extension of teaching, the Department has had a new name – the Department of General and Emergency Medicine.

A new period of the Department started in 2014. After restructuring of the University of Defence Brno and the Faculty of Military Health Science together with prevailing teaching topics in urgent medicine, the Department was renamed on **the Department of Emergency Medicine and Military General Medicine**. It consists of two groups – the Group of Emergency Medicine and the Group of General Medicine.

The main mission of the Department is education and training of medical officers in casualty medical care in both combat and disaster situations. For this purpose, the principles and procedures of emergency care in field conditions are taught at the Department through BATLS/BARTS (Battlefield Advanced Trauma Life Support/Battlefield Advanced Resuscitation Techniques and Skills) courses. In the same area, the Department participates in training of medical personnel before their departure to foreign missions. The next important mission of the department is education and training of non-medical personnel in first-aid care. The most of the soldiers are trained in the Battlefield First-Aid Courses, some of them are trained in consequential Combat Life Saver Courses. This course offers a lot of useful knowledge and skills, e.g. control life-threatening external hemorrhage, airway management and decompress the chest.

The Department of Emergency Medicine and Military General Medicine is the main department providing military-professional training in the subject called Military Medical Service Organization in Peacetime for students of the Master's Study Program in branches of General Medicine and Military Pharmacy, and for students of the Bachelor's Study Program in the branch of Military Medical Management and in various types of training and courses. It also provides further education for military doctors, pharmacists and other

personnel of the Military Medical Service through refresher courses and specialization courses.

The subject called Disaster Medicine makes students acquainted with principles of emergency medicine and operation of individual parts of integrated rescue system in conditions of serious accidents, natural disasters and catastrophes. In connection with this training, the Department provides its participants with knowledge and experience of the operation of the Military Medical Service institutions and facilities in crisis, in combat or other extraordinary situations. It applies the knowledge of military and military-professional subjects into specific conditions of operation of the Military Medical Service respecting both military principles and requirements as well as the principles of humanity, law and especially Geneva Conventions.

The Department is a co-ordinating centre in the branch of Military Medical Service Organization in Peacetime, Social Medicine, Emergency Medicine and Disaster Medicine. It participates in increasing the quality of organisational structure of medical units, formations and facilities. It elaborates their operation procedures and principles of their management in peacetime as well as in emergency situations. The Department provides expert activities and elaborates data and proposals from these areas for concept-making bodies of the Medical Service of the Armed Forces of the Czech Republic. The Department analyzes NATO regulations and directives and recommends their introduction in practice as well as in teaching process. It provides consultations for field leading officers of the Military Medical Service. The Department cooperates with civilian institutions, namely, with the bodies of the Ministry of Health of the Czech Republic in the issues concerning the cooperation between civilian and military medical services in extraordinary situations. It ensures publication activities focused on educational work requirements and on presenting scientific information. The Department is in charge of the education of talented students within the framework of students' scientific and professional activities. It participates in the solution of assignments within the organizational structure of the military health care in peacetime. It is the consultation and expert workplace in the branch of General and Emergency Medicine for the Armed Forces of the Czech Republic.

DEPARTMENT OF MOLECULAR PATHOLOGY AND BIOLOGY K-308

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The Department of Molecular Pathology and Biology is a research and educational centre focused on application of advanced technologies of functional genomics in bio-medical defence research. Scientific work is preferably aimed at the studies of the host-pathogen interactions at the molecular level. The objectives of this research are divided into three main areas: bio-molecular signatures of biological agents potentially abused for the military, terrorist attacks or bio-crime acts, intracellular fate of ingested microbes and finally the modulation of host cell signalling and gene expression by ongoing infection. The favourite microbial model is the live vaccine strain of *Francisella tularensis*, a gram-negative facultative intracellular bacterial pathogen from the gamma subdivision of Proteobacteria. The laboratories of the Department are currently equipped with:

- the tissue culture and microbiological labs for preparing samples for subsequent analyses,
- 2-D electrophoresis, liquid chromatography and mass spectrometers for realization of complete classical and shotgun proteomic analyses,
- PCR, RT-PCR and quantitative real-time PCR technologies for the basic search of gene expression and the mutant construction,
- light and fluorescent microscopy, ELISA, Western blot and flow cytometry for the study of bacterial or bacterial component impact on the host.

The established technologies enable researchers, PhD., and undergraduate students to realize complex studies oriented on the analyses of living system response to external (and internal, modulatory) signals encompassing the chemicals, biologically active bio-molecules, physical influences (temperature, radiation, etc.), and microorganisms. The Department traditionally cooperates with the research facility in Sweden (the Department of Clinical Bacteriology and the Laboratory for Molecular Infection Medicine of the Umea University) on identification of new factors of virulence of *Francisella tularensis*, molecular mechanisms of suppression of interferon beta production in host cells infected by *Francisella tularensis* and on the analysis of possible interaction between host and bacterial proteins. Further important collaborations concern the U.S. Army Medical Research Institute of Infectious Diseases (Fort Detrick, USA) on preparation and testing of bacterial proteins with immunostimulatory potential, the Department of Microbiology and Parasitology of the University of Rijeka on microscopic analysis of microbial intracellular trafficking, proteome analysis of phagosomes isolated from infected host cells, and, finally, the Aquila Bioscience Ltd. of the National University of Ireland in Galway on identification of glycan or lectin structures recognizing bacterial carbohydrate structures with the aim of new decontamination tools development. Within the frame of the Czech Republic, the Department has developed beneficial contacts with the Institute of Microbiology and the Institute of Molecular Genetics of the Czech Academy of Science in Prague, the Faculty of Science of Charles University in Prague, the Faculty of Medicine and the Faculty of Pharmacy of Charles University in Hradec Králové, the University Hospital in Hradec Králové, the Department of Pharmacology of the Faculty of Medicine in Hradec Králové, the Department of Oncological and Experimental Pathology of Masaryk Memorial Cancer Institute in Brno and the Veterinary Research Institute in Brno. The financial support for research activities performed in collaboration with the above-mentioned institutes comes from the programs and projects of the Czech Grant Agencies, the Ministry of Education, and Youth and Sports and the Ministry of the Interior. Currently, the Department of Molecular Pathology and Biology has 15 full-time employees, 12 scientists, 2 technicians and 1 administrative worker. Four scientists are supported by the grant agencies. The Department has

currently 14 PhD students and, furthermore, several undergraduates have been working on their diploma thesis at the Department.

RESEARCH PROJECTS

BACTERIA FT – Innate immune recognition of *Francisella tularensis*

Plzáková, L., Kročová, Z.

Supported by the Ministry of Education, Youth and Sports, 2017–2017 (Project No.: SV/FVZ201707)

Intracellular bacterial pathogens such as *Listeria monocytogenes*, *Mycobacterium tuberculosis*, or *Francisella tularensis* cause diseases in humans and animals. *F. tularensis* is in the same time a highly infectious aerosolizable intracellular pathogen that is capable of causing a debilitating or fatal disease with doses as low as 25 colony-forming units. And is a major concern to the public as a bacterium classified into Category A of bioterrorism agents. To this day unfortunately haven't been developed an effective vaccine licensed for human use against *F. tularensis*. One of reasons of this fact that the pathogenesis of intracellular pathogens is not fully understood and, more generally, to a gap in understanding innate immune recognition processes responsible for the induction of adaptive immune response. Recent evidence supports the concept that the immune response to external stimuli in the form of bacteria is guided by the host cell and its receptor(s) which primarily interact with the bacterium. The aim of our project is being to develop an alternative infection model for studying the primary interaction of *F. tularensis*, as a model bacterium, with the host.

BIOSENSORS – Development of biosensors for determination of glucose and the other markers of poisoning using 3D printing and nanotechnologies

Martinková, P., Pohanka, M.

Supported by the Ministry of Education, Youth and Sports, 2016–2017 (Project No.: SV/FVZ201605)

Biochemical markers such as glucose, reduced glutathione, ascorbic acid, uric acid etc. are substances naturally occurring in human body and body fluids and their deviation out of physiological levels may indicate severe states of organism including poisoning. Current determination of these markers is often financially or technically demanding and time-consuming which leads to late diagnosis and it may worsen patient's outcomes. Biosensor as small devices present solution to these problems and their construction offers new possibilities of diagnosis. Current use of nanotechnologies enables increase of accuracy, sensitivity and specificity of analytical methods and use of 3D printing simplify construction of biosensors

made-to-measure. Biosensors for determination of basic biomarkers make diagnosis more available and affordable to field-detection of poisoning and they facilitate work of medical staff.

CLOSTRIDIUM – Development of methods of targeted proteomics for detection of *Clostridium perfringens* toxins

Đuráčová, M., Benková, M., Klimentová, J.

Supported by the Ministry of Education, Youth and Sports, 2015–2017 (Project No.: SV/FVZ201502)

The main aim of project, its a development of methods for the detection and quantification of the individual *C. perfringens* toxins (α , β , ϵ , iA and iB) using mass spectrometry, concretely by the method of parallel reaction monitoring (PRM). *Clostridium perfringens* is a Gram-positive anaerobic spore-forming bacterium that is widely distributed in nature, especially in soil and the intestinal tracts of humans and animals. Under natural conditions, this bacterium is responsible for local outbreaks of food poisoning associated with eating contaminated food which was improperly heat treated. The bacterium is also a major cause of gas gangrene. It is a disease, associated with wound infection, with fatal prognosis in the case of treatment's delays. *C. perfringens* types B and D produce epsilon toxin considered to be the third most powerful bacterial toxin. Because of the ability to disperse the toxin as an aerosol and a lack of methods of treatment and prevention of poisoning possible factors it is a potential tool for bioterrorism.

Decontamination by carbohydrate lectin affinity wipes

Stulík, J., Kubelková, K., Macela, A., Myslivcová, A., Kročová, Z., Schmidt, M.

Supported by the European Defence Agency, 2015–2017 (Project No.: A-1152-RT-GP)

The DCLAW strategy will fill the need for a highly man-portable, broadly-specific and high throughput decontamination method that is safe, and presents minimal risk to military and defence equipment and personnel. We will deliver a novel, environmentally-friendly system based on known sugar-based capture mechanisms used by many types of biotoxins and microbes. The DCLAW system will utilize this innovative strategy to decontaminate physical and biological surfaces and capture the pathogens and toxins using sugar-protein coated self-contained applicator cloth or wipes.

FRANCISELLA T – The role of glyceraldehyd-3-phosphate dehydrogenase and transcription factor HU in the virulence of the pathogenic bacterium *Francisella tularensis*

Kopečková, M., Stojková, P., Pávková, I., Špidlová, P.

Supported by the Ministry of Education, Youth and Sports, 2016–2018
(Project No.: SV/FVZ201603)

This project is focused on characterization of two potential virulence factors in *Francisella tularensis*, namely glyceraldehyde-3-phosphate dehydrogenase (GAPDH) and transcription factor HU. The aim of the project is confirm virulence and immunoprotective effects of these potential virulence factors. GAPDH will try to find out whether it has other so-called "moonlighting" functions and clarify its role in pathogenesis. Another goal of the project is to elucidate the mechanism of HU protein interaction with the DNA molecule, including the identification of HU regulon. Involvement of both GAPDH and HU in virulence of this pathogenic bacterium will be test in vivo and in vitro.

MICROORGANISMS – Isolation of enzymes from unique microbial species and their practical application

Válek, T., Martinková, P., Pohanka, M.

Supported by the Ministry of Education, Youth and Sports, 2017–2019
(Project No.: SV/FVZ201701)

Enzymes are necessary in all of types of organisms and they have a lot of functions in physiological and pathological conditions. Most of enzymes used in industry or medicine are produced by microorganisms like bacteria or fungi, because of easy production and specific abilities. Some of microorganisms are able to catalyze in extreme conditions such as warm, cold, low or high pH. Psychrophilic organisms live in cold environment and their biological activity is also high in temperatures around 0 °C. This ability is very useful in biosensor construction, so, biosensor containing enzymes from psychrophilic organism can be used in abnormal conditions. Biosensors based on microbial enzymes with unique properties present innovative tool in diagnostic methods appropriate for use in clinical practice or battlefield.

Preparation of a standard collection of biologically important toxins - EBLN (European Biodefence Laboratory Network)

Dresler, J., Kročová, Z., Myslivcová, A., Klimentová, J., Sheshko, V., Řehulková, H., Dresler, J.

Supported by the Czech Republic Ministry of Internal Affairs, 2017–2020
(Project No.: VH20172020012)

The subject of the public contract is the creation of a collection of standards of difficult to obtain toxins using modern vector cultures / bacterial, insect or plant lines) that would allow the development and testing of targeted and highly specific techniques, where so far forensic analytical approaches are not available. Furthermore, the implementation and verification of procedures for working with difficult to cultivate agents / *Coxiella* spp./ whose detection

and identification capabilities are not sufficient at present in most of the security units in the Czech Republic.

Study of the secretion of outer membrane vesicles in *Francisella tularensis* and their role in the interaction with the host

Stulík, J., Klimentová, J., Pávková, I., Kubelková, K.

Supported by the Czech Republic Grant Agency, 2017–2019 (Project No.: GA17-04010S)

Francisella tularensis is a gram-negative intracellular bacterium causing a severe disease known as tularemia. As one of the most infectious pathogens (as few as ten bacteria can initiate the disease) it has been classified as a potential biological warfare agent. Outer membrane vesicles secreted by gram-negative bacteria play an important role in bacterial physiology as well as in virulence and host-pathogen interaction. Isolated vesicles of number of bacteria have also been studied for their immunomodulatory potential. *F. tularensis* secretes vesicles of unusual tubular structure. The project aims to study the relationship of vesiculation and virulence in *F. tularensis*. The major goal presents the characterization of these vesicles and nanotubes composition, their production and description of their fate during interaction with the host cell. Consequently, their potential protective effect in vivo will be studied. The acquired information will help elucidating their role in the host-pathogen interaction and extend our knowledge about mechanism of virulence of *Francisella tularensis*.

The study of interaction of dendritic cells with intracellular pathogen *Francisella tularensis*

Stulík, J., Fabrik, I., Řehulka, P., Pávková, I., Sheshko, V., Kročová, Z., Špidlová, P., Putzová, D., Plizáková, L.

Supported by the Czech Republic Grant Agency, 2015–2017 (Project No.: GA15-02584S)

Tularemia represents renewed health problem due to its re-emergence in geographic areas with no previous tularemia experience and because of its bioterrorism threat. Disease is caused by a facultative intracellular pathogen *Francisella tularensis* that enters phagocytic cells or nonphagocytic cells in which successfully survive and multiply. However, the molecular mechanisms important for *F. tularensis* virulence are mostly unknown. Our goal is to employ the high-throughput “omics” techniques to identify host factors whose expression and posttranslational modification reflect re-programming process of dendritic cells by tularemic infection. The biological importance of identified components in host cell defense response will be verified using RNAi gene silencing. The acquired results should contribute to development of new strategies for diagnostics and therapeutics of tularemia.

TULAREMIA INFECTION – Protein-protein interactions important for pathogenesis of *F. tularensis* infection

Prokšová, M., Lenčo, J.

Supported by the Ministry of Education, Youth and Sports, 2015–2017 (Project No.: SV/FVZ201509)

The intracellular, gram negative bacteria *Francisella tularensis* is a causative agent of tularemia. Because of its very high infectivity, ability to cause disease upon inhalation and absence of a vaccine approved for human use, the pathogen is classified as a potent biothreat agent. It is well known that *F. tularensis* is able to survive and replicate within host macrophages which is essential for its virulence; nevertheless, information about crucial molecular interactions during the infection are not known. The aim of the project is to identify Francisella proteins which interact with host proteins inside the eukaryotic cell. We assume that such protein-protein interactions control the whole infection process with respect to pathogen benefits. A minimalistic experimental approach was chosen to unearth these protein-protein interactions. Specific genes from the Francisella pathogenicity island known from the literature to be secreted using the type VI secretion system are fused with FLAG-tag epitope, cloned into inducible expression vector and expressed in eukaryotic cells HEK 293T. Expression of the proteins in eukaryotic cells can be confirmed by Western blotting and immunodetection targeting the tag. FLAG-tag epitope further enables purification of the proteins by immunoprecipitation. With fusion proteins are co-purified strongly interacting eukaryotic partners. These protein complexes are identified by proteomic analysis via nanoHPLC-MS/MS. This approach may results in a long list of potentially interacting proteins. To distinguish between false positive interacting partners and real interacting partners we plan to employ SILAC. The wild type HEK293T cell line cultured in heavy SILAC media will be used for this purpose. New findings gathered during this project could elucidate the molecular mechanism of Francisella virulence.

VIVARIUM

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The Vivarium at the Faculty of Military Health Sciences of the University of Defence Brno fulfils science, research and teaching tasks of the departments and specialized workplaces of the Faculty of Military Health Sciences. The vivarium is subordinated to the Vice-Dean for Research.

The separate vivarium for mice and sewer-rats is a part of the Department of Toxicology and Military Pharmacy.

From the point of view of the capacity the Faculty of Military Health Sciences is able to carry out experiments, place and take care of laboratory mice, sewer-rats, guinea-pigs, rabbits, pigs or mini pigs. In the area of the vivarium there are also laboratory workplaces and operating theatres, which are equipped for experiments on laboratory animals. All studies have to be allowed by the Ethical Board of the Faculty of Military Health Sciences fully in compliance with the legal standards of the protection against cruelty to animals.

The Vivarium with the operating block is intensively used above all for experiments on large experimental animals. The courses BATLS and BARTS are held there. During the courses different model situations and cases of emergency medicine are performed for military doctors and participants of foreign mission including war injuries on dead and live experimental animals.

On December 2015, the Vivarium was accredited for use again for 5 years (till January 2021) by the Central Board for Animal Protection.

VIVARIUM

The above-mentioned range of the activities shows that it is necessary to time work and also co-ordinate it personally including permanent presence of a veterinary surgeon, veterinary technicians and breeders of laboratory animals.

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The Communication and Information Systems Office provides the top quality information service to ensure efficient scientific, research and teaching activities for teaching and research staff as well as under- and postgraduate students of our Faculty.

The Communication and Information Systems Office provides the operation of the Faculty network, enables access to army, specialized and public information systems and supplies the needs of the Faculty with modern information technologies. Main activity is ensuring the access to INTERNET and to specialized information systems. Management of data network, central management of software, servicing as well as specialized support of users is also provided.

Part of the Communication and Information Systems Office are also graphic services that create graphic documents and posters for presentations, make arrangements and changes of drafts for printing, make digital pictures and do other associated work. It also provides the operating and updating of the web site of the Faculty (<http://fvz.unob.cz>).

COMMUNICATION AND INFORMATION SYSTEMS OFFICE

The printing-office of the Communication and Information Systems Office is able to cover reprographic and printing needs of the Faculty by its own sources in limited extent.

The library provides students, research and teaching staff of the Faculty of Military Health Sciences and members of the Czech Army Medical Service with scientific and information services. The main information services are provided by the library with 80 000 library units concerning medicine as well as associated branches.

Information sources in the field of military medicine, emergency medicine and disaster medicine are specificity of this library. The library enables access to various information databases (WoK, ScienceDirect, SCOPUS, SpringerLink, BiblioMedica, etc.) and provides systematic help when being used.

The library participates in teaching activities in the doctoral study programs and scientific education (Ph.D.) by giving lectures in Basics of Informatics focused on retrievals, processing and publication of scientific information.

VISITORS TO THE FACULTY OF MILITARY HEALTH SCIENCES

Austria

- MAYRHOFER Corina (Vienna) – Talks on the scientific cooperation, 28 August 2017–29 August 2017

Jordan

- BG Dr. SALIM Ahmad Jamil Eid Es, BG Dr. ALZAWAHER Salem Moh'd Jaber, LTC Dr. KHASAWNEH Ramihamdi M., MAJ Dr. QABAHA Anan Hassan Masoud, MAJ Dr. IKWAYLEH Zuhier Ali Alhamad, CPT Nrs. ALZYOUUD Essam Ibrahim Ahmad, CPT Nrs. QASAYMEH Ala'Mohammad Hussein, CPT Nrs. ALQATAMIN Omar Tawfiq Mousa, LT Nrs. ALSWAITI Gassan Taleb Abdallah, LT Dr. MATAR Ramez A. A., LT Nrs. AL-HASSAN Ayman Mohammed Ahmad, LT Nrs. MAKABLEH Ayman Atef Saleem (Amman) – BATLS Course, 09 October 2017–11 October 2017

Russian Federation

- Prof. EREMIN Sergei A. (Moscow) – a scientific lecture, 13 March 2017–13 March 2017

Serbia and Montenegro

- LTC Assoc. prof. Ing. KARKALIĆ Radovan (Belgrade) – Bilateral negotiations on CBRN projects, 15 March 2017–15 March 2017
- COL Prof. Dr. JOVIĆ Nebojsa, Assoc. Prof. DJORDJEVIĆ Snezana, MD (Belgrade) – Bilateral negotiations on scientific collaboration, 24 May 2017–26 May 2017

Ukraine

- COL BONDAREVSKYI Andrii, MJ KISHCHUK Kostiantyn, 1Lt SALAMASHCHAK Volodymyr, 1Lt ZIMYCH Oleh, 1Lt YAREMENKO Andrii, 1Lt DENYSIUK Mykola, 1Lt KARPENKO, Kostiantyn, 1Lt LISEVYCH Olha, 1Lt LABUZOV Volodymyr, 1Lt VOVK Mykhailo, MSG FOMINA Nataliia (Kiev) – BATLS Course, 20 February 2017–22 March 2017

Vietnam

- LTG TỰƠNG Nguyễn Ngọc, COL NHO Lê Văn, COL CÁC Bùi Văn, COL CẨM Đình Ngọc, MG DŨNG Phạm Tiến, COL BỘ Phạm Đình, COL TRUNG Lê Quang, COL PHƯƠNG Nguyễn

VISITORS TO THE FACULTY OF MILITARY HEALTH SCIENCES

Danh, MG THẮNG Phạm Ngọc, COL NAM Trần Xuân, LTC HIỆU Đặng Quang, COL HỮU Vũ Đức, LTC HIỀN Nguyễn Đình, COL HƯNG Phạm Xuân, LTC NHẠM Vũ Khắc, LTC BẮNG Nguyễn Trọng (Hanoi) – Visit of the Faculty of Military Health Sciences, presentation of the study and work, 09 November 2017–09 November 2017

VISITS ABROAD

Austria

- Kučera, T. (The creation of chemical informatic standards for sharing chemical information, Vienna, 08 February 2017–10 February 2017)
- Plodr, M. (Workshop of Dispatch Center of Emergency Medical Service of Lower Austria, Sankt Pölten, 23 January 2017–23 January 2017)

Belgium

- Boštík, P. (CapTech CBRN EDA, Brussels, 18 October 2017–21 October 2017)
- Kassa, J. (40th NATO CBRN Medical Working Group Meeting, Brussels, 29 January 2017–03 February 2017)
- Pejchal, J. (40th NATO CBRN Medical Working Group Meeting, Brussels, 30 January 2017–03 February 2017)

Brazil

- Kotek, J. (Specialized Stay, Santarém, 29 June 2017–02 September 2017)

Finland

- Herman, D. (International Workshop on Analysis of Chemical Warfare Agents to Mark the 20th Anniversary of the CWC, Helsinki, 11 December 2017–13 October 2017)
- Váňová, N. (International Workshop on Analysis of Chemical Warfare Agents to Mark the 20th Anniversary of the CWC, Helsinki, 11 December 2017–13 December 2017)

France

- Kassa, J. (2nd International Conference CBRNE – Research & Innovation, Lyon, 29 May 2017–02 June 2017)
- Pohanka, M. (30th ECNP Congress (European College of Neuropsychopharmacology), Paris, 02 September 2017–06 September 2017)
- Tichý, A. (NATO HFM-291 Research Task Group „Ionizing Radiation Bioeffects and Countermeasures“ meeting, Paris, 13 November 2017–15 November 2017)

Germany

- Ďuráčová, M. (A work meeting with the aim to arrange a long-term internship at a department of the Technical University in Vienna, Vienna, 05 February 2017–06 February 2017)
- Dušek, T. (ESCP's 12th Scientific and Annual meeting, Berlin, 20 September 2017–22 September 2017)
- Fink, M. (NATO Emergency Medical Multinational Team Course, Hamburg, 19 November 2017–24 November 2017)
- Jošt, P. (16th International Medical Chemical Defence Conference, Munich, 04 April 2017–07 April 2017)
- Kassa, J. (16th International Medical Chemical Defence Conference, Munich, 04 April 2017–07 April 2017)
- Púdělka, L. (International Medical Modelling and Simulation Conference, Munich, 27 March 2017–31 March 2017)
- Tichý, A. (Bundeswehr Institute of Radiobiology, Munich, Germany, 25 June 2017–27 June 2017)
- Vašek, T. (2nd NATO Medical Lessons Learned Team Meeting, Munich, 25 September 2017–29 September 2017)

Greece

- Kročová, Z. (14th International Conference on Innate Immunity, Heraklion, 19 June 2017–24 June 2017)
- Kubelková, K. (14th International Conference on Innate Immunity, Heraklion, 19 June 2017–24 June 2017)

Iraq

- Vašek, T. (Operation Inherent Resolve, Iraq, CZE FST, Al Asad, 05 December 2016–17 June 2017)

Israel

- Kolář, B. (73rd Board Meeting, Tel Aviv, 26 November 2017–04 December 2017)

Italy

- Boštík, P. (20th Annual Meeting of the ESCV, Stresa, 13 September 2017–17 September 2017)
- Górecki, L. (Internship – Synthesis of Agents, Bologna, 18 March 2017–23 June 2017)
- Kubelková, K. (1st Scientific International Conference on CBRNE 2017, Rome, 22 May 2017–24 May 2017)

Japan

- Korábečný, J. (World Congress of Neurology, Kyoto, 16 September 2017–21 September 2017)

Norway

- Hepnarová, V. (Laboratory Workshop at the Norwegian Defence Research Establishment (FFI), Kjeller, 24 September 2017–06 October 2017)
- Hepnarová, V. (Laboratory Workshop at the Norwegian Defence Research Establishment (FFI), Kjeller, 27 March 2017–29 March 2017)

Poland

- Jeličová, M. (JSAC Cytometry Workshop 2017, Warsaw, 12 May 2017–14 May 2017)
- Lierová, A. (JSAC Cytometry Workshop 2017, Warsaw, 12 May 2017–14 May 2017)

Portugal

- Odložilová, Š. (ERASMUS+ Internship Program, Coimbra, 04 July 2017–05 September 2017)
- Pohanka, M. (1st International Caparica Conference in Translational Forensics, Caparica, 20 November 2017–23 November 2017)

Russian Federation

- Jeličová, M. (21st International Scientific Conference of Young Scientists and Specialists (AYSS-2017), Dubna, 02 October 2017–06 October 2017)

Serbia

- Lekeš, J. (Surgery Internship, Belgrade, 06 August 2017–01 September 2017)
- Vacková, M. (Surgery Internship, Belgrade, 06 August 2017–01 September 2017)

Slovakia

- Blažek, P. (ERASMUS+ Internship Program, Žilina, 01 July 2017–30 September 2017)
- Fajfrová, J. (Negotiations with representatives of the Office of Human Resources and the Office of the Chief Medical Officer of the Armed Forces of the Slovak Republic, Trenčín, 11 December 2017–11 December 2017)
- Chlíbek, R. (12th Slovak Pediatric Congress, Martin, 22 November 2017–25 November 2017)
- Jeličová, M. (39th Radiation Protection Days, Stará Lesná, 06 November 2017–10 November 2017)

VISITS ABROAD

- Kulich, M. (Specialized course in military climbing for chief instructors of special physical training, Liptovský Mikuláš, 11 September 2017–15 September 2017)
- Lierová, A. (39th Radiation Protection Days, Stará Lesná, 06 November 2017–10 November 2017)
- Ondrej, M. (69th Summit of Chemists, Vysoké Tatry, 11 September 2017–15 September 2017)
- Pavlík, V. (ERASMUS+ Internship Program, Nitra, 20 November 2017–24 November 2017)
- Pavlík, V. (25th International Conference Life Conditions and Health, Nový Smokovec, 18 September 2017–20 September 2017)
- Šubrt, Z. (17th Days of Young Surgeons, Senec, 08 June 2017–09 June 2017)
- Vymlátilová, L. (6th Central European Congress on Obesity (CECON) and 15th Slovak Congress on Obesity, Bratislava, 05 October 2017–07 October 2017)

Spain

- Blažek, P. (5th International Work-Conference on Bioinformatics and Biomedical Engineering, Granada, 26 April 2017–28 April 2017)
- Horáček, J. (22nd Congress of the European Hematology Association (EHA), Madrid, 21 June 2017–25 June 2017)
- Klimentová, J. (EMBO conference Bacterial networks (BacNet17), Sant Feliu de Guixols, 09 September 2017–14 September 2017)
- Páral, J. (Colorectal Mini-Fellowships, Madrid, 25 April 2017–28 April 2017)
- Pávková, I. (EMBO conference Bacterial networks (BacNet17), Sant Feliu de Guixols, 09 September 2017–14 September 2017)

Sweden

- Pohanka, M. (Sensors & Actuators Conference, Stockholm, 08 October 2017–11 October 2017)
- Vašek, T. (NATO Lessons Learned Staff Officer Course, Stockholm SWEDINT, 06 November 2017–10 November 2017)

Switzerland

- Dušek, T. (11th European Colorectal Congress, St. Gallen, 04 December 2017–07 December 2017)

- Páral, J. (11th European Colorectal Congress, St. Gallen, 04 December 2017–07 December 2017)

Taiwan, Chinese province

- Hájková, Z. (Internship in Surgery and Pediatrics, Taipei, 03 July 2017–31 July 2017)
- Páral, J. (3rd Asian Congress of Robotic and Endoscopic Surgery, Taipei, 22 November 2017–27 November 2017)

The Netherlands

- Kubelková, K. (Investigators` Final Meeting of the DCLAW EDA Project, Amsterdam, 24 April 2017–26 April 2017)
- Stulík, J. (Investigators` Final Meeting of the DCLAW EDA Project, Amsterdam, 24 April 2017–26 April 2017)

Ukraine

- Kohoutová, Š. (Participation in the commemoration of the 90th anniversary of the Battle of Zborov, Kalynivka, 01 July 2017–02 July 2017)
- Vinklerová, K. (Participation in the commemoration of the 90th anniversary of the Battle of Zborov, Kalinivka, 01 July 2017–02 July 2017)

United Kingdom

- Filipová, A. (Laboratory Intership at the University of Hull, Kingston upon Hull, 21 September 2017–26 November 2017)
- Kupsa, T. (Combined European Investigators` Meeting, London, 07 September 2017–10 September 2017)
- Pham, N. (Internship – Determination of Physical and Chemical Properties of Substances, Forest Row, 12 March 2017–07 April 2017)
- Skořepa, P. (Intership at the University Hospital, Queen`s Medical Centre, Nottingham, 31 August 2017–15 December 2017)

United States

- Boštík, P. (NATO HFM 273 LTSS, Washington, D.C., 04 December 2017–09 December 2017)
- Górecki, L. (2017 Chemical and Biological Defense Science & Technology (CBD S&T) Conference, Long Beach, 28 November 2017–30 November 2017)
- Hepnarová, V. (2017 Chemical and Biological Defense Science & Technology (CBD S&T) Conference, Long Beach, 28 November 2017–30 November 2017)

- Horáček, J. (59th ASH Annual Meeting & Exposition, Atlanta, 07 December 2017–13 December 2017)
- Hrabínová, M. (2017 Chemical and Biological Defense Science & Technology (CBD S&T) Conference, Long Beach, 28 November 2017–30 November 2017)
- Jun, D. (2017 Chemical and Biological Defense Science & Technology (CBD S&T) Conference, Long Beach, 28 November 2017–30 November 2017)
- Korábečný, J. (2017 Chemical and Biological Defense Science & Technology Conference, Long Beach, 28 November 2017–30 November 2017)
- Marek, J. (2017 Chemical and Biological Defense Science & Technology (CBD S&T) Conference, Long Beach, 28 November 2017–30 December 2017)
- Sleha, R. (Laboratory Workshop at the University of Louisiana at Lafayette, Lafayette, 25 September 2017–10 November 2017)
- Šinkorová, Z. (32nd Congress of the International Society for Advancement Cytometry, Boston, 10 January 2017–14 January 2017)

WORKSHOPS, COURSES, RESIDENCIES AT THE FACULTY IN 2017

Radiobiology

- Specialized course – Radiation protection legislation in the Army of the Czech Republic and in the Czech Republic, 16 October 2017–18 October 2017
- Specialized course – Radiation accident – protection and measures, 15 May 2017–16 May 2017

Military Hygiene

- Specialized basic course – Teaching on foodstuff I, 27 March 2017–28 February 2017
- Specialized follow-up course – Teaching on foodstuff II, 29 May 2017–30 May 2017, 20 November 2017–21 November 2017
- Specialized course – Evaluation of workload and health protection at work, 30 October 2017–31 October 2017
- Specialized course – Overweight and obesity, diagnosis, prevention and therapy, 06 November 2017–07 November 2017

Language Courses

- Terminology course for medical personnel 2, 06 February 2017–17 February 2017
- Combined language courses – English (STANAG 3), 05 September 2016–26 May 2017, 04 September 2017–01 June 2018
- Combined language courses – English (STANAG 2), 05 September 2016–26 May 2017, 04 September 2017–01 June 2018
- Terminology course for medical personnel 1, 20 November 2017–01 December 2017
- Terminology course for non-medical personnel, 12 June 2017–23 June 2017

Military Medical Service Organization

- Specialized course – MS PowerPoint, 23 January 2017–25 January 2017

WORKSHOPS, COURSES, RESIDENCIES AT THE FACULTY IN 2017

- Specialized course – Aeromedical evacuation, 30 May 2017–01 June 2017
- MEDEVAC refresher course - Use of helicopter, 02 October 2017–06 October 2017
- Specialized course – MS Excel, 13 March 2017–15 March 2017
- Specialized course – Prevention of burn-out syndrom, 06 February 2017–08 February 2017, 06 November 2017–08 November 2017

Military Epidemiology

- Specialized course – Incidence and risks of infectious diseases in the Army of the Czech Republic and in the Czech Republic, 06 November 2017–08 November 2017
- Specialized course – Vaccination in adulthood, 20 March 2017–21 March 2017
- Specialized course – Highly dangerous infections, new infectious diseases, 16 January 2017–18 January 2017

General Medicine

- Specialized course – Transportation of casualties in the field, 26 June 2017–30 June 2017
- Special course – Extended first aid in the field (CLS Course), 30 January 2017–10 February 2017, 12 June 2017–23 June 2017, 20 November 2017–01 December 2017
- Special course – Repetitory of extended first aid in field conditions (R-CLS Course), 15 May 2017–19 May 2017
- Specialized course – Battlefield Advanced Trauma Life Support (BATLS), 29 May 2017–31 May 2017, 04 December 2017–06 December 2017
- Specialized course – First aid in field conditions for military paramedics, 26 July 2017–28 July 2017
- Specialized course – Battlefield Advanced Resuscitation Techniques and Skills (BARTS), 29 May 2017–31 May 2017, 04 December 2017–06 December 2017
- Specialized course – Battlefield Advanced Resuscitation Techniques and Skills (BARTS) for foreign armies (Ukraine, Jordan), 20 February 2017–22 February 2017, 09 October 2017–11 October 2017
- Specialized course – Defibrilators and their operation, 23 March 2017–23 February 2017, 14 September 2017–14 September 2017

WORKSHOPS, COURSES, RESIDENCIES AT THE FACULTY IN 2017

- Special course – Extended first aid in the field (CLS Course) for military paramedics, 28 August 2017–08 September 2017
- Specialized course – Battlefield Advanced Resuscitation Techniques and Skills (R-BARTS), 18 April 2017–20 April 2017, 11 September 2017–13 September 2017
- Special course – Extended first aid in the field for the Police of the Czech Republic (CLS Course), 03 April 2017–13 April 2017
- Specialized course – Retention – Battlefield Advanced Trauma Life Support (R- BATLS), 18 April 2017–20 April 2017, 11 September 2017–13 September 2017
- Special course – Health training for Military High School Moravska Trebova, 24 April 2017–27 April 2017, 02 May 2017–05 May 2017, 09 May 2017–12 May 2017, 22 May 2017–25 May 2017
- Specialized course – First aid in field conditions, 09 January 2017–13 January 2017, 16 January 2017–20 January 2017, 13 February 2017–17 March 2017, 02 October 2017–06 October 2017, 06 November 2017–10 November 2017
- Specialized course – First aid in the field for Police of the Czech Republic, 13 March 2017–17 March 2017
- Special course – Repetitory of extended first aid in field conditions (R-CLS Course) for Police of the Czech Republic, 23 October 2017–27 September 2017

Molecular Pathology

- Specialized course II – advanced – Collection and transport of biological samples, 30 January 2017–03 March 2017
- Specialized course – Detection and identification of biological agents, 05 June 2017–09 June 2017
- Specialized course I – basic – Collection and transport of biological samples, 29 May 2017–09 June 2017

Military Toxicology

- Specialized course – Dealing with extremely dangerous poisons, drugs and psychotropic substances, 06 March 2017–09 March 2017, 18 April 2017–21 April 2017, 07 August 2017–10 August 2017, 09 October 2017–12 October 2017

Multidisciplinary Studies

- Preparatory course for entrance examination, 12 June 2017–17 June 2017

WORKSHOPS, COURSES, RESIDENCIES AT THE FACULTY IN 2017

Military Pharmacy

- Specialized course – Basis of pharmacology and self-treatment, 20 February 2017–23 February 2017

INTERNATIONAL COOPERATION

Cooperation at the military medical facility level

France

- Armed Forces Biomedical Research Institute, Brétigny-sur-Orge

Germany

- Institute of Microbiology of Federal Armed Forces Medical Academy, Munich

Norway

- Norwegian Defence Research Establishment – FFI, Kjeller

Poland

- Military Institute of Hygiene and Epidemiology – WIHE, Zakład Farmakologii i Toksykologii, Warsaw

Slovakia

- Central Military Hospital, Ruzomberok

Sweden

- Swedish Defence Research Agency, Department of Threat Assessment, Division of NBC Defence, Umea

United Kingdom

- Defence Medical Services Training Centre Keogh Barracks in Aldershot, Ash Vale

Scientific cooperation with civilian institutions abroad (on the basis of individual agreements and joint projects)

Austria

- Institute of Chemical Technologies and Analytics, Vienna University of Technology, Vienna

Croatia

- Department of Microbiology and Parasitology, University of Rijeka, Rijeka
- Institute for Medical Research and Occupational Health, Zagreb

INTERNATIONAL COOPERATION

France

- University of Burgundy – Franche-Comté, Besançon

Germany

- Department of Solid States Nuclear Physics, University of Leipzig, Leipzig
- Bundeswehr Institute for Radiobiology, Munich
- German Cancer Research Center, Heidelberg

Italy

- University of Bologna, Bologna

Mongolia

- National Research Center for Infectious Diseases, Ministry of Health, Ulaanbaatar

Republic of Korea

- Korea Research Institute of Chemical Technology, Daejeon

Slovakia

- P. J. Safarik University, Kosice
- Faculty of Medicine, Comenius University in Bratislava
- Agricultural University in Nitra, Nitra

Spain

- University of Alcalá, Enviromental Sciences and Chemistry, School of Biology, Department of Organic Chemistry and Inorganic Chemistry, Alcalá de Henares

Sweden Spain

- Sahlgrenska Academy, University of Goteborg, Goteborg
- University of Umea, Umea

United States

- Emory University, Atlanta
- MMRHVLB/CCID/CDC, Atlanta

Participation in international projects and networks

Ireland	European Defence Agency, Galway
Sweden	European Programme for Intervention Epidemiology Training, European Centre for Disease Prevention and Control, Stockholm
Switzerland	European Study Group on Nosocomial Infection,
United States	U. S. Army Medical Research Institute of Infectious Disease, Fort Detrick

Other international activities

- P. Boštík – national coordinator for CBRN in Cap Tech ESM04 EDA
- P. Boštík – member of NATO LTSS HFM 273
- P. Boštík – member of the European Society of Clinical Virology
- P. Boštík – member of Regional Cooperation for Health Science and Technology
- P. Boštík – member of the Association of UICC Fellows
- P. Boštík – member of the American Association of Immunologists (AAI)
- P. Boštík – member of the Federation of American Societies for Experimental Biology
- P. Boštík – member of the American Society of Microbiology
- P. Boštík – member of Editorial board of „*the Open Infectious Diseases Journal*“
- V. Boščíková – member of the International Board for the Investigation and Control of Influenza and Other Epidemic Diseases
- V. Boščíková – member of the European Society of Clinical Virology
- V. Boščíková – member of Editorial board of „*Journal of Clinical Virology*“
- V. Hepnarová – member of the Joint Assessment Team (JAT) of NATO Response Force (NRF)
- J. Horáček – member of the European Society for Blood and Marrow Transplantation (EBMT)
- J. Horáček – member of the European Society of Hematology
- Z. Hrstka – Military Psychologists Association of European Federation of Psychologists' Associations (EFPA)
- R. Chlábek – European Centre for Disease Control (ECDC) – member of Potential shortages of Vaccines and treatment for rare communicable diseases in Europe Group

INTERNATIONAL COOPERATION

- R. Chlíbek – European Centre for Disease Control (ECDC) – member of Expert Panel Hepatitis A
- R. Chlíbek – member of the Global Pertussis Initiative(GPI)
- R. Chlíbek. – member of NATO – Biological Medical Advisory Committee
- R. Chlíbek – member of NATO HFMP (Human Factor Medicine Panel)
- R. Chlíbek – supervisor of the Central European Vaccination Awareness Group (CEVAG)
- R. Chlíbek – member of the Central and Eastern Europe Pertussis Awareness Group
- R. Chlíbek. – member of C.O.P.E. – Consensus on Pertussis Booster Vaccination in Europe
- R. Chlíbek – member of the European Society of Clinical Microbiology and Infectious Diseases
- M. Jakl – member of the European Society of Cardiology
- L. Jebavý – member of the European Group for Blood and Marrow Transplantation (EBMT)
- L. Jebavý – member of the Multinational Association of Supportive Care in Cancer (MASCC)
- L. Jebavý – member of the European Study Group on Nosocomial Infections (ESGNI)
- J. Kassa – member of NATO CBRN Medical Working Group
- J. Kassa – member of the European Society for Neurochemistry
- J. Kassa – member of Editorial board of „*Journal of Medical Chemical, Biological and Radiological Defence*“
- J. Kassa – member of Editorial board of „*Challenge Medical CBRN Defense International*“
- L. Klein – member of the Academic Council on the United Nations System (ACUNS)
- L. Klein – Secretary General, Committee of the International Association for Humanitarian Medicine Chisholm - Gunn (IAHM)
- L. Klein – Honorary member of the United States Army Medical Department Regiment
- L. Klein – member of the International Society for Burn Injuries (ISBI)
- L. Klein – member of the Mediterranean Council for Burns and Fire Disasters (MBC)
- L. Klein – Executive Committee member of the European Burns Association (EBA)
- L. Klein – Assistant Secretary General, International Committee of Military Medicine (ICMM)
- L. Klein – member of Editorial board of „*Annals of Burns and Fire Disasters*“
- Z. Kročová – member of NATO Bio EDEP Project 3

- Z. Kročová – member of NATO Response Force (NRF)
- K. Kubelková – member of the European Radiation Research Society
- J. Lenčo – member of the Human Proteome Organization (HUPO)
- M. Link – member of the Human Proteome Organization (HUPO)
- P. Lochman – member of the European Society of Surgical Oncology
- P. Lochman – member of the European Wound Management Association
- P. Lochman – member of the FACS – American College of Surgeons
- J. Misík – member of the Society for Neuroscience
- A. Myslivcová – member of the Human Proteome Organization (HUPO)
- V. Pavlík – member of NATO RTO HFM-154
- J. Pejchal – member of the CBRN Joint Assessment Team
- M. Pohanka – member of Editorial board of *„Mini Reviews In Medicinal Chemistry“*
- M. Pohanka – member of Editorial board of *„Interdisciplinary Toxicology“*
- M. Pohanka – member of Editorial board of *„Journal of Biosafety“*
- M. Pohanka – member of Editorial board of *„Journal of Biosensors and Bioelectronics“*
- M. Pohanka – member of Editorial board of *„Journal of Bioterrorism and Biodefense“*
- M. Pohanka – member of Editorial board of *„Journal of Obesity & Weight loss Therapy“*
- M. Pohanka – member of Editorial board of *„BioMed Research International“*
- M. Pohanka – member of Editorial board of *„International Journal of Drug Discovery“*
- M. Pohanka – member of Editorial board of International *„Journal of Health, Safety and Environments“*
- M. Pohanka – member of Editorial board of *„Journal of Clinical Trials“*
- M. Pohanka – member of Editorial board of *„Microbial and Biochemical Technology“*
- M. Pohanka – member of Editorial board of *„Journal of Pharmaceutics and Drug Development“*
- M. Pohanka – member of Editorial board of *„MOJ Proteomics and Bioinformatics“*
- M. Pohanka – member of Editorial board of *„Journal of Mellomics and Nanotechnologies“*
- M. Pohanka – member of Editorial board of *„American Journal of Bioterrorism, Biosecurity and Biodefense“*

INTERNATIONAL COOPERATION

- M. Pohanka – member of Editorial board of „*International Journal of Bioweapons, Biocrimes and Bioterrorism*“
- M. Pohanka – member of Editorial board of „*Machines Review*“
- M. Pohanka – member of Editorial board of „*JSM Enzymology and Protein Science*“
- M. Pohanka – member of Editorial board of „*Austin Journal of Bioorganic and Organic Chemistry*“
- M. Pohanka – member of Editorial board of „*Journal of Immune Research*“
- M. Pohanka – member of Editorial board of „*Symbiosis Journal of Veterinary Sciences*“
- M. Pohanka – member of Editorial board of „*Austin Biomarkers and Diagnosis*“
- M. Pohanka – member of Editorial board of „*Global Journal of Allergy*“
- M. Pohanka – member of Editorial board of „*Austin Journal of Biosensors and Bioelectronics*“
- M. Pohanka – member of Editorial board of „*Jacobs Journal of Enzymology and Enzyme Engineering*“
- M. Pohanka – member of Editorial board of „*Journal of Clinical Microbiology and Case Reports*“
- J. Smetana – member of the International Society for Infectious Diseases
- O. Soukup – member of the Society for Neuroscience
- H. Střítecká – member of Editorial board of „*Journal of Obesity & Weight loss Therapy*“
- H. Střítecká – member of Editorial board „*Journal of Food Security*“
- J. Stulík – member of Editorial board of „*Frontiers in Cellular and Infection Microbiology*“
- Z. Šinkorová – member of NATO CBRN Medical Working Group
- Z. Šinkorová – member of the NATO RTO HFM - 222
- Z. Šinkorová – member of the European Radiation Research Society
- P. Špidlová – member of the American Society for Microbiology
- M. Šplíňo – member of the European Study Group on Nosocomial Infection
- M. Šplíňo – member of the International Board for the Investigation and Control of Influenza and Other Epidemic Diseases
- M. Šplíňo – member of the International Biographical Centre - Advisory Council
- M. Šplíňo – member of the American Biographical Institute
- M. Šplíňo – member of the International Society for Tropical and Travel Medicine
- M. Šplíňo – member of the International Society for Infectious Diseases

- A. Tichý – member of the CBRN JAT
- A. Tichý – member of the NATO HFM Panel RTG-291
- A. Tichý – member of the American Society for Mass Spectrometry
- A. Tichý – member of the European Society of Radiation Biology
- A. Tichý – member of the European Society for Radiotherapy and Oncology (ESTRO)
- L. Zárybnická – member of the European Radiation Research Society

SCIENTIFIC AND RESEARCH ACTIVITIES

Completed full professorships

Horáček Jan

Department of Military Internal Medicine and Military Hygiene, Faculty of Military Health Sciences, University of Defence Brno, Hradec Králové

area of specialization: Military Internal Medicine

professor's lecture: Concept of scientific work and training in the field of Military Internal Medicine

Bopegamage Shubhada

Enterovirus Laboratory and NRC, Faculty of Medicine, Slovak Medical University in Bratislava, Bratislava

area of specialization: Medical Microbiology

professor's lecture: Concept of scientific work and training in the field of Medical Microbiology

Completed associate professorships

Janoutová Jana

Center for Epidemiological Research, Department of Epidemiology and Public Health, Faculty of Medicine, University of Ostrava, Ostrava

area of specialization: Hygiene, Preventive Medicine and Epidemiology

habilitation thesis: Risk factors of Alzheimer's disease

habilitation lecture: Alzheimer's disease prevention

Dissertation defences

Filipová Alžběta

Department of Radiobiology, Faculty of Military Health Sciences, University of Defence Brno, Hradec Králové

Department of Medical Biochemistry, Faculty of Medicine in Hradec Králové, Charles University in Prague

study programs: Medical Chemistry and Biochemistry

dissertation: Primary cilia and its importance in cell response to ionizing radiation exposure and chemotherapy drugs

Voborníková Irena

Police of the Czech Republic, Hradec Kralove

study programs: Toxicology

dissertation: Development and testing of methods for determination of oxidative stress

Pohnán Radek

Department of Surgery, Second Faculty of Medicine, Charles University and Central Military Hospital - Military University Hospital, Prague

study programs: Field Surgery

dissertation: Laparoscopic versus open left pancreatectomy: surgical stress response comparison in the porcine model

Špilovská Katarína

Department of Toxicology and Military Pharmacy, Faculty of Military Health Sciences, University of Defence Brno, Hradec Králové

study programs: Toxicology

dissertation: Preparation of cholinesterase inhibitors and their in vitro evaluation

SCIENTIFIC AND RESEARCH ACTIVITIES

Pejchal Jaroslav

Department of Toxicology and Military Pharmacy, Faculty of Military Health Sciences, University of Defence Brno, Hradec Králové

study programs: Toxicology

dissertation: Study of non-specific effects of nerve agents

Coufalová Monika

Department of Medical Microbiology, Thomayer Hospital, Prague

study programs: Medical Microbiology

dissertation: Diagnosis of mycobacteria and resistant strains of *Mycobacterium tuberculosis* molecular biological methods

Doležel Radek

Department of Surgery, Second Faculty of Medicine, Charles University and Central Military Hospital - Military University Hospital, Prague

study programs: Field Surgery

dissertation: Evaluation and verification of safety of transluminal endoscopic surgery (notes) on a large laboratory animal

Andrš Martin

Department of Toxicology and Military Pharmacy, Faculty of Military Health Sciences, University of Defence Brno, Hradec Králové

study programs: Toxicology

dissertation: Investigation of compounds affecting the neoplastic cell changes

Dušek Tomáš

Department of Surgery, Faculty of Military Health Sciences, University of Defence Brno, Hradec Králové

study programs: Field Surgery

dissertation: Neopterin, Kynurenine and tryptophan as new biomarkers for early detection of rectal anastomotic leakage

Hobzová Lenka

Department of Hospital Hygiene, University Hospital Hradec Králové

study programs: Epidemiology

dissertation: The occurrence of resistant bacterial strains in conditions of University Hospital In Hradec Králové

Nepovimová Eugenie

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study programs: Toxicology

dissertation: Design and development of novel therapeutics for cognitive enhancement within neurodegenerative diseases

Pavlíková Růžena

Fire Rescue Service of Moravian-Silesian Region, Ostrava-Zábřeh

study programs: Toxicology

dissertation: Design and in vitro testing of new decontamination mixtures

THE REVIEW OF RESEARCH PROJECTS CARRIED OUT AT THE FACULTY OF MILITARY HEALTH SCIENCES IN 2017

THE INTERNAL GRANT AGENCY OF THE CZECH REPUBLIC HEALTH SERVICE

Principal investigators

Pavel Bošík

(NV17-31765A) The potential of xanthohumol and beta-bitter acids in the therapy of nosocomial infections

Co-investigators

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(NV15-29241A) Nanofibrous biodegradable small-diameter vascular bypass graft

Pavel Bošík

(NV15-31847A) Development of novel disinfectants against pathogens occurring in the hospital environment

Vanda Bošíková

(NV15-31847A) Development of novel disinfectants against pathogens occurring in the hospital environment

Radek Sleha

(NV15-31847A) Development of novel disinfectants against pathogens occurring in the hospital environment

Jan Marek

(NV15-31847A) Development of novel disinfectants against pathogens occurring in the hospital environment

Vanda Boštíková

(NV17-31765A) The potential of xanthohumol and beta-bitter acids in the therapy of nosocomial infections

Daniel Jun

(NV17-32801A) Centrally acting antidotes for the treatment of organophosphorus poisoning

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THE CZECH REPUBLIC GRANT AGENCY

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(GA15-02584S) The study of interaction of dendritic cells with intracellular pathogen *Francisella tularensis*

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(GA17-13541S) Development of novel radioprotective agents based on small molecular inhibitors

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(GA17-04010S) Study of the secretion of outer membrane vesicles in *Francisella tularensis* and their role in the interaction with the host

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(GA15-16701S) Concept of non-quaternary reactivators AChE as the antidotes of organophosphorus poisoning – a new hope or a blind way?

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(GA15-02584S) The study of interaction of dendritic cells with intracellular pathogen *Francisella tularensis*

Pavel Řehulka

(GA15-02584S) The study of interaction of dendritic cells with intracellular pathogen *Francisella tularensis*

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THE REVIEW OF RESEARCH PROJECTS CARRIED OUT AT THE FMHS

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(SV/FVZ201505) WARFARE AGENTS – Determination of selected chemical warfare agents and toxins in complex matrices by liquid and gas chromatography

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(SV/FVZ201707) BACTERIA FT – Innate immune recognition of *Francisella tularensis*

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(SV/FVZ201605) BIOSENSORS – Development of biosensors for determination of glucose and the other markers of poisoning using 3D printing and nanotechnologies

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(SV/FVZ201708) MDCK – The development and validation of new in vitro methodology based on MDCK cell lines for the study of the penetration of potential drugs across the blood brain barrier

Ondřej Soukup

(SV/FVZ201708) MDCK – The development and validation of new in vitro methodology based on MDCK cell lines for the study of the penetration of potential drugs across the blood brain barrier

RESEARCH AIMS

Daniel Jun

A long-term organization development plan 1011 – Health problems of the weapons of mass destruction

Jiří Páral

A long-term organization development plan 1011 – Clinical fields

ARTICLES IN JOURNALS WITH IMPACT FACTOR

1. ABDULWASYA, A., VOJÁČEK, J., ALBAHRI, Z., JAKL, M., STAŠEK, J. Mortality benefit of primary transportation to a PCI-capable center persists through an eight-year follow-up in patients with ST-segment elevation myocardial infarction. *Journal of Interventional Cardiology*. 2017, **30**(6), 522–526. ISSN 0896-4327. IF **1.880**
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14. FEDOTOVA, J., KUBATKA, P., BUSSELBERG, D., SHLEIKIN, A., CAPRNDÁ, M., DRAGASEK, J., RODRIGO, L., POHANKA, M., GASPAROVA, I., NOSAL, V., OPATŘILOVÁ, R., QARADAKHI, T., ZULLI, A., KRZULIAK, P. Therapeutical strategies for anxiety and anxiety-like disorders using plant-derived natural compounds and plant extracts. *Biomedicine and Pharmacotherapy*. 2017, **95**(September), 437–446. ISSN 0753-3322. IF **2.759**
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