BIOMEDICAL RESEARCH CENTER OF THE SLOVAK ACADEMY OF SCIENCES

EVALUATION BY THE INTERNATIONAL PANEL OF EXPERTS

21-09-2022

AGENDA:

13:30 – 13:35	Opening and introduction, Section II Vice President and Evaluation Panel Chair
13:35 – 14:25	Presentation of the BMC SAS and its activities (director and/or representatives of selected research teams)
14:25 – 15:10	Discussion to the presentation and to the evaluation questionnaire
15:10 – 15:40	Discussion with the research community of the BMC SAS
15:40 – 16:20	Discussion with PhD students and young scientists (closed session)
16:20 – 16:50	Presentation of the BMC SAS infrastructure
16:50 – 17:00	Conclusions (closed session)
17:00 –	Informal post-evaluation gathering of the BMC SAS community to share thoughts

BIOMEDICAL RESEARCH CENTER OF THE SLOVAK ACADEMY OF SCIENCES

EVALUATION BY THE INTERNATIONAL PANEL OF EXPERTS

21-09-2022

EVALUATION PANEL MEMBERS:

Prof. Toivo Maimets, Panel Chair, University of Tartu, genetics
Prof. Taina Pihlajaniemi, University of Oulu, biomedicine
Prof. Imre Vass, Biological Research Center, Szeged, biology
Prof. Kristian Vlahovicek, Zagreb university, bioinformatics
Prof. Jaak Järv, Tartu University, chemistry
Dr. Gemma Modinos, King's College London, expert for early carrier researchers

SAS REPRESENTATIVES:

prof. Karol Marhold, Section II Vice President
prof. Juraj Koppel, Vice President for Budget and Legislation
prof. Peter Samuely, Vice President for Science, Research and Innovation, and Chair of the SAS Accreditation Committe
Dr. Mária Omastová, Evaluation Coordinator
Dr. Daniela Antolová, SAS Assembly
Dr. Tomáš Michalek, Minutes of the meeting

BMC SAS RESEARCH COMMUNITY

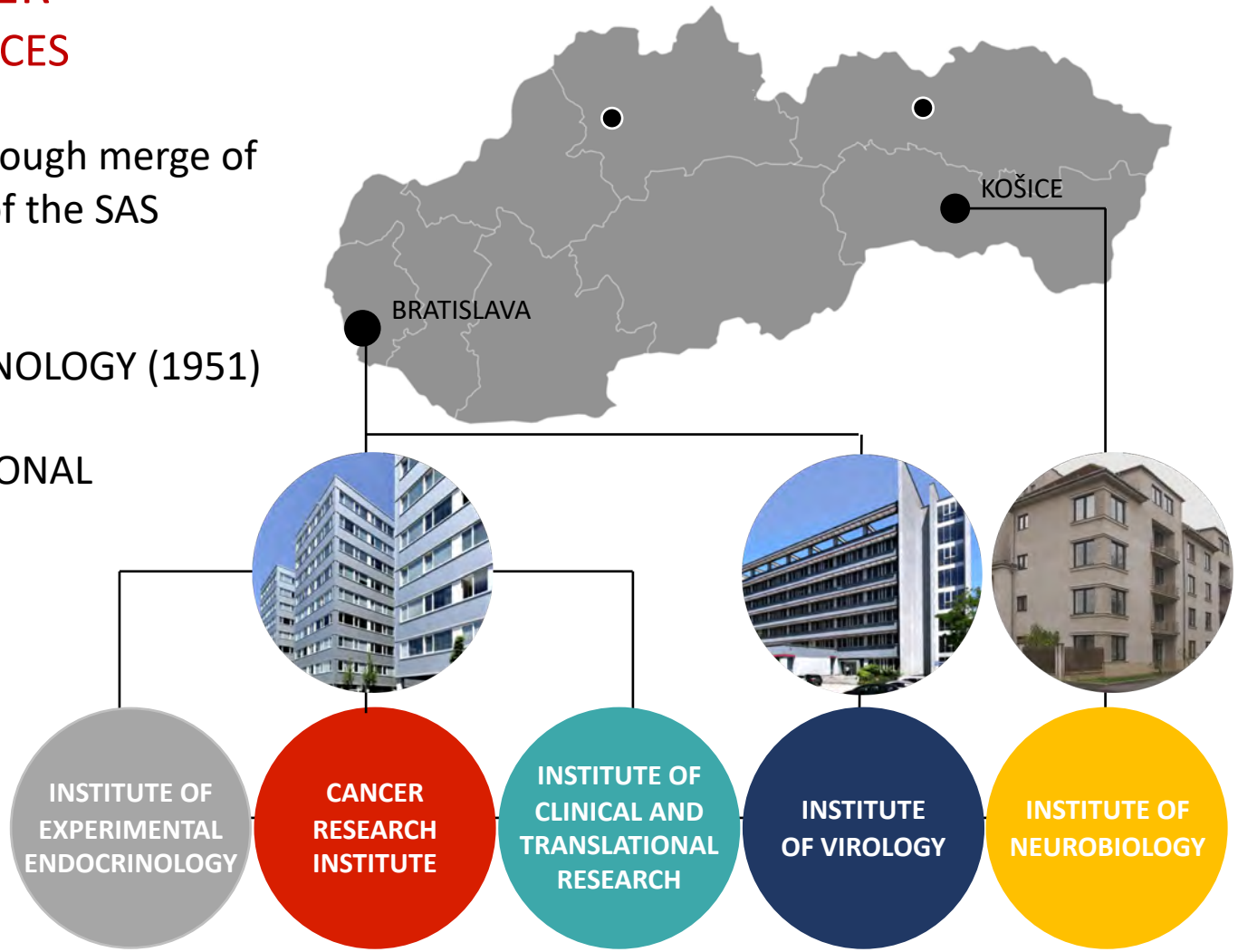
BIOMEDICAL RESEARCH CENTER
OF THE SLOVAK ACADEMY OF SCIENCES

Silvia Pastoreková
Director

BIOMEDICAL RESEARCH CENTER
OF THE SLOVAK ACADEMY OF SCIENCES

was established on January 1st, 2016 through merge of four previously independent institutes of the SAS located in Bratislava:
CANCER RESEARCH INSTITUTE (1946)
INSTITUTE OF EXPERIMENTAL ENDOCRINOLOGY (1951)
INSTITUTE OF VIROLOGY (1953)
INSTITUTE OF CLINICAL AND TRANSLATIONAL RESEARCH (former Centre of Molecular Medicine, 2007)

From January 1st, 2018 BMC SAS was joined by the
INSTITUTE OF NEUROBIOLOGY (1964) located in Košice.



MISSION, VISION AND VALUES

OUR MISSION

Is to perform:

- basic, translational, and clinical **RESEARCH IN BIOMEDICINE**, particularly in the areas of endocrinology, oncology, virology and microbiology, neurobiology, physiology, genetics, immunology, molecular biology, biochemistry and biophysics
- **EDUCATION** of students and **TRAINING** of young researchers
- **COOPERATION** with research institutes, universities, and private sector in Slovakia and abroad (projects and research contracts)
- **EDITORIAL** and **DISSEMINATION** activities (publishing, popularization, building awareness)
- **CONSULTING** and **EXPERT** activities (including studies and expert opinions for decision-makers)

OUR VISION

is to become nationally leading and internationally recognized biomedical research institution known for its discoveries and impact on society.

RESEARCH FOR DEEPER KNOWLEDGE AND BETTER HEALTH

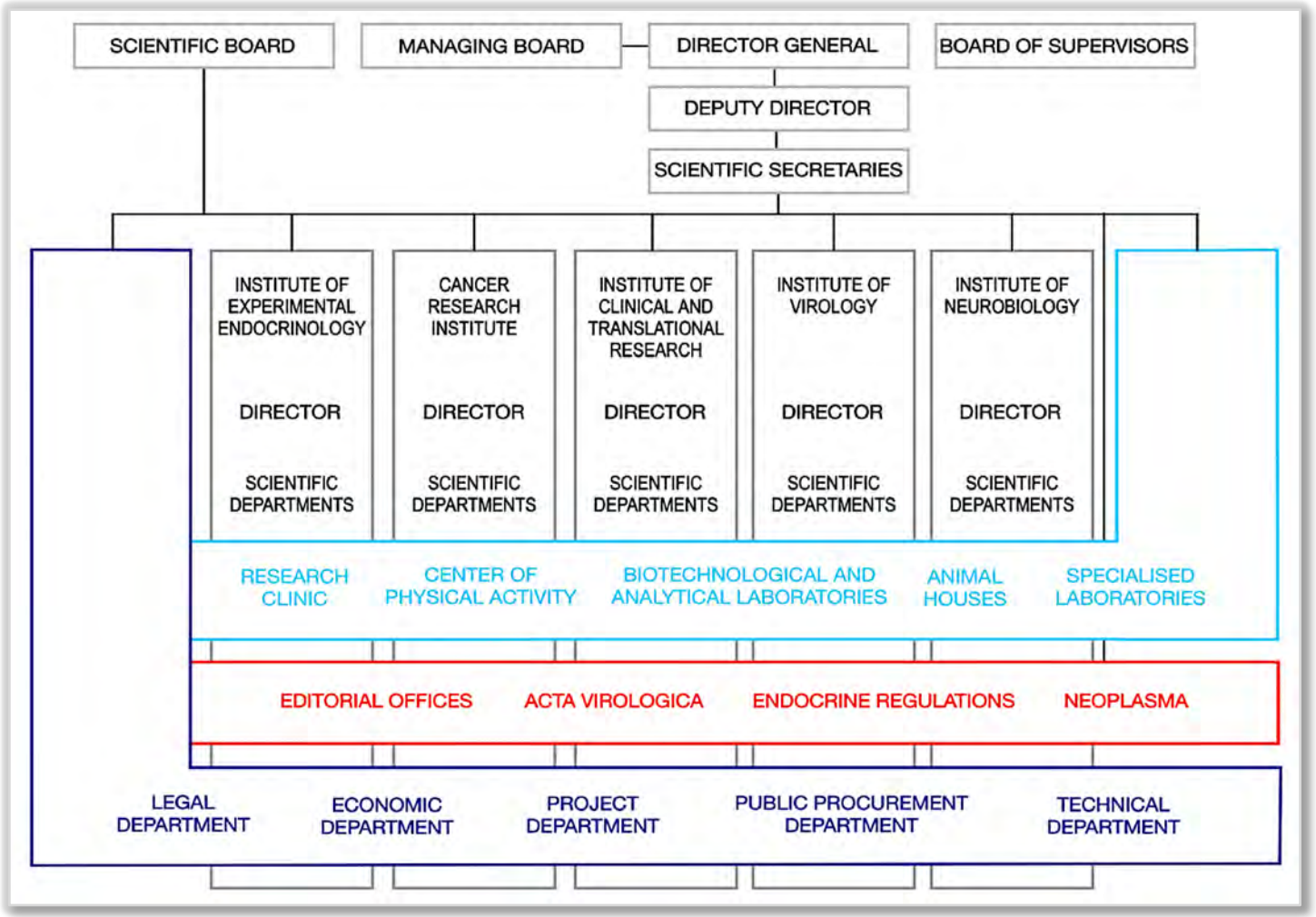
OUR VALUES

are:

- high research **QUALITY** and good inter/national **REPUTATION**
- **CULTURE** of excellence, enthusiasm and collegiality
- **INTEGRITY**, humanity, fairness and openness
- interdisciplinarity, innovation and **TRANSFER OF KNOWLEDGE**
- **NETWORKING** across BMC and with outstanding teams and institutions in Slovakia and abroad
- **EQUAL OPPORTUNITY** in recruitment and personal development, **CAREER PROMOTION** of talented young and middle generation
- **VISIBILITY** to public and decision-making authorities with impact on healthcare and society
- **SUSTAINABLE DEVELOPMENT** and good working conditions

STRUCTURE AND MANAGEMENT

ORGANIZATION STRUCTURE

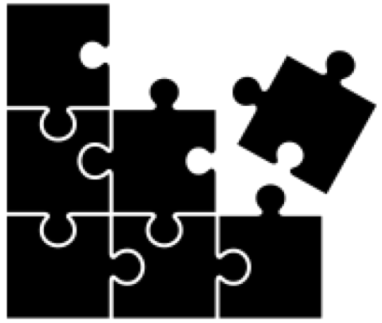


The institutes as the main organization units are horizontally integrated at the operational level through unified rules, joint budget, shared infrastructures and common support units.

GOVERNANCE

MANAGING BOARD

DIRECTOR GENERAL: **Silvia Pastoreková**, prof. DSc.
IEE DIRECTOR: **Daniela Gašperíková**, DSc. (Stefan Zorad, PhD.)
CRI DIRECTOR: **Miroslav Chovanec**, PhD. (Lucia Kučerová, DSc.)
ICTR DIRECTOR: **Miroslav Vlček**, MD., PhD.
IV DIRECTOR: **Juraj Kopáček**, MVD, DSc.
INB DIRECTOR: **Jan Gálik**, PhD.
HEAD OF SCIENTIFIC BOARD: Boris Klempa, DSc.
(Ján Sedlák, DSc., Richard Imrich, DSc.)
SCIENTIFIC SECRETARY 1: Marián Grman, PhD.
SCIENTIFIC SECRETARY 2: Terézia Valkovičová, PhD.
(Silvia Schnidtová, PhD., Jozef Ukropec, DSc.)
HEAD OF LEGAL DEPT: **Iveta Šárniková**, JUDr.
HEAD OF ECONOMIC DEPT: **Hana Krasoňová**, Mgr.
HEAD OF PROJECT DEPT: **Jana Blahová**, PhD.
HEAD OF PUBLIC PROC DEPT: Tatiana Elanová, Ing.
HEAD OF TECHNICAL DEPT: Kornal Dobročka



COMMITTEES FOR ETHICS, HEALTH PROTECTION AND SAFETY (Heads)

RESEARCH INTEGRITY AND ETHICS COMMITEE:
Iveta Šárniková, JUDr.
ETHICS COMMITTEE FOR RESEARCH USING ANIMAL MODELS, BIOMEDICAL AND TRANSLATIONAL RESEARCH:
Ladislav Roller, PhD. (Institute of Zoology SAS)
ANIMAL FACILITY WELLFARE COMMITTEES :
Lucia Borszéková Pulzová, MVD, PhD.
Ivo Vanický, MVD, PhD.
COMMITTEE FOR SAFETY AT WORK:
Ingeborg Režuchová, PhD.

SCIENTIFIC BOARD

21 MEMBERS (14 INTERNAL + 7 EXTERNAL)

HEAD: **Boris Klempa, DSc.** (IV)

INTERNAL MEMBERS

Jozef Ukropec, DSc. (IEE)
Nataša Hlaváčová, PhD. (IEE)
Boris Mravec, prof. MD., DSc. (IEE)
Andrea Bábelová, PhD. (CRI)
Miroslava Matúšková, PhD. (CRI)
Božena Smolková, PhD. (CRI)
Oľga Križanová, prof. DSc. (ICTR)
Žofia Rádiková, MD., PhD. (ICTR)
Tatiana Betáková. DSc. (IV)
Miroslav Glasa, DSc. (IV)
Ľudovít Škultéty, DSc. (IV)
Petra Bonová, PhD. (INB)
Nedežda Lukáčová, DSc. (INB)

EXTERNAL MEMBERS

Jozef Masarik, prof. DSc., vice-rector, Comenius University (CU)
Peter Šimko, prof., PhD., rector, Slovak Medical University
Peter Fedoročko, prof. PhD., vice-rector, University PJ Šafárik
Juraj Šteňo, prof. DSc., dean, Faculty of Medicine (FM), CU
Peter Fedor, prof., DSc., dean, Faculty of Natural Sciences, CU
Peter Valkovič, prof., DSc., Faculty of Medicine, CU
Peter Celec, assoc. prof., DSc., Head, Inst of Mol Biomedicine, FM, CU

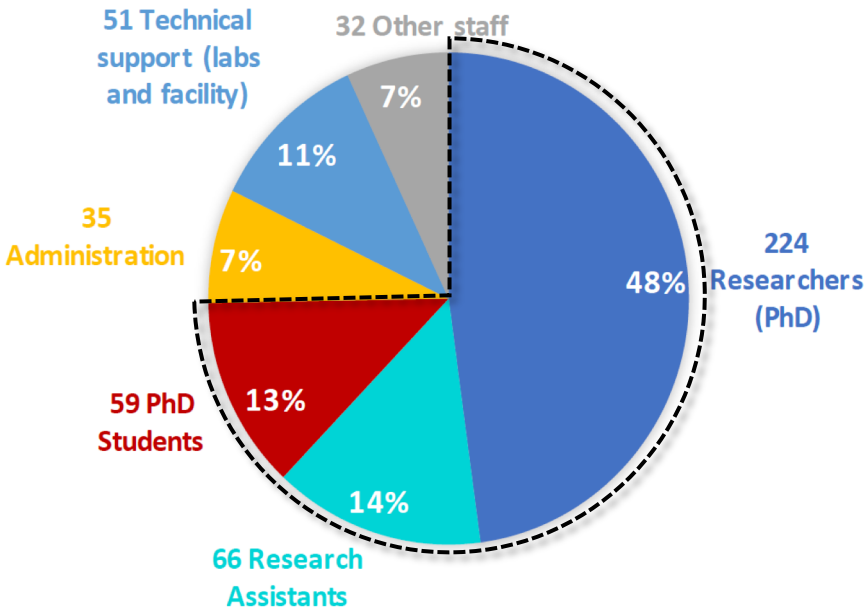
INTERNATIONAL SCIENTIFIC ADVISORY BOARD

prof. Seppo Parkkila, University of Tampere, Finland (Head),
prof. Christian Drosten, Charité-Berlin, Institute of Virology, Germany
Dr. Mária Dušinská, Norwegian Institute for Air Research, Norway
prof. Peter Kovacs, University of Leipzig Medical Center, Germany
prof. Jan Motlik, Institute of Animal Physiology and Genetics, Czech Academy of Sciences, Czech Republic

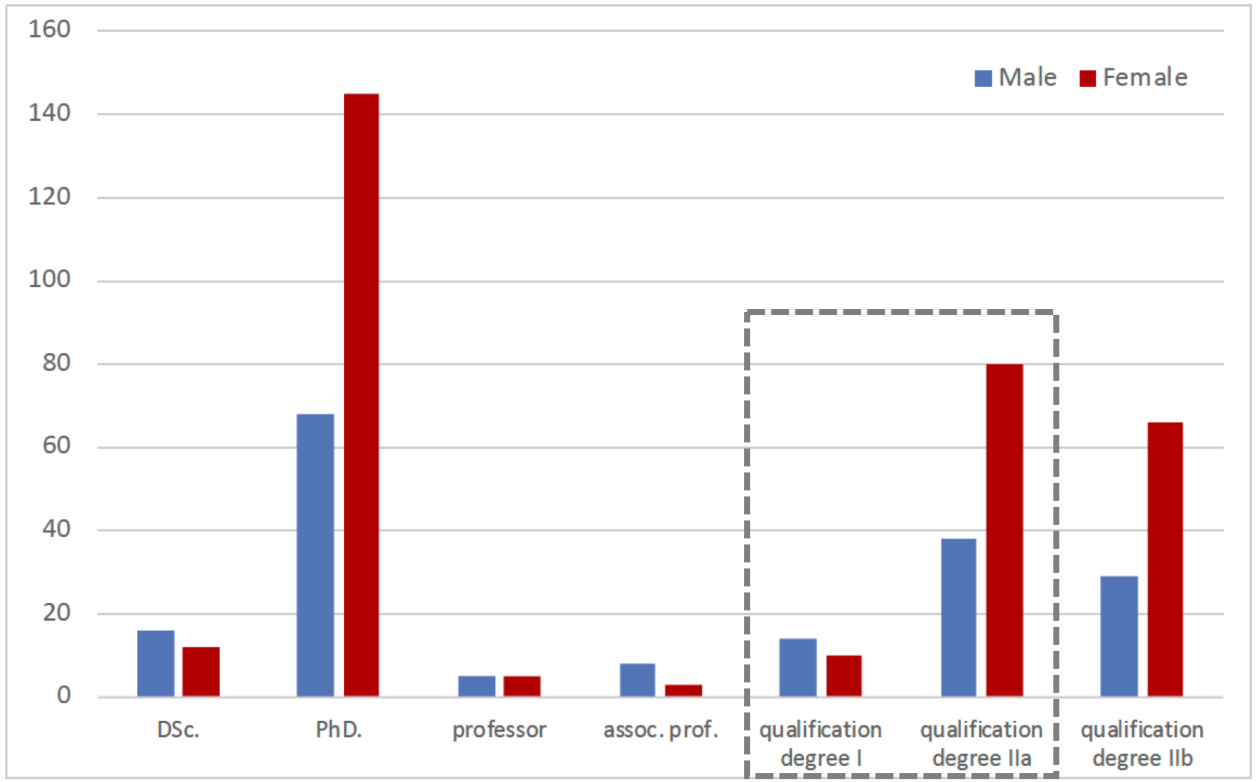
FACTS & FIGURES

HR COMPOSITION AND QUALIFICATION STRUCTURE

75 % researchers
25 % supporting staff



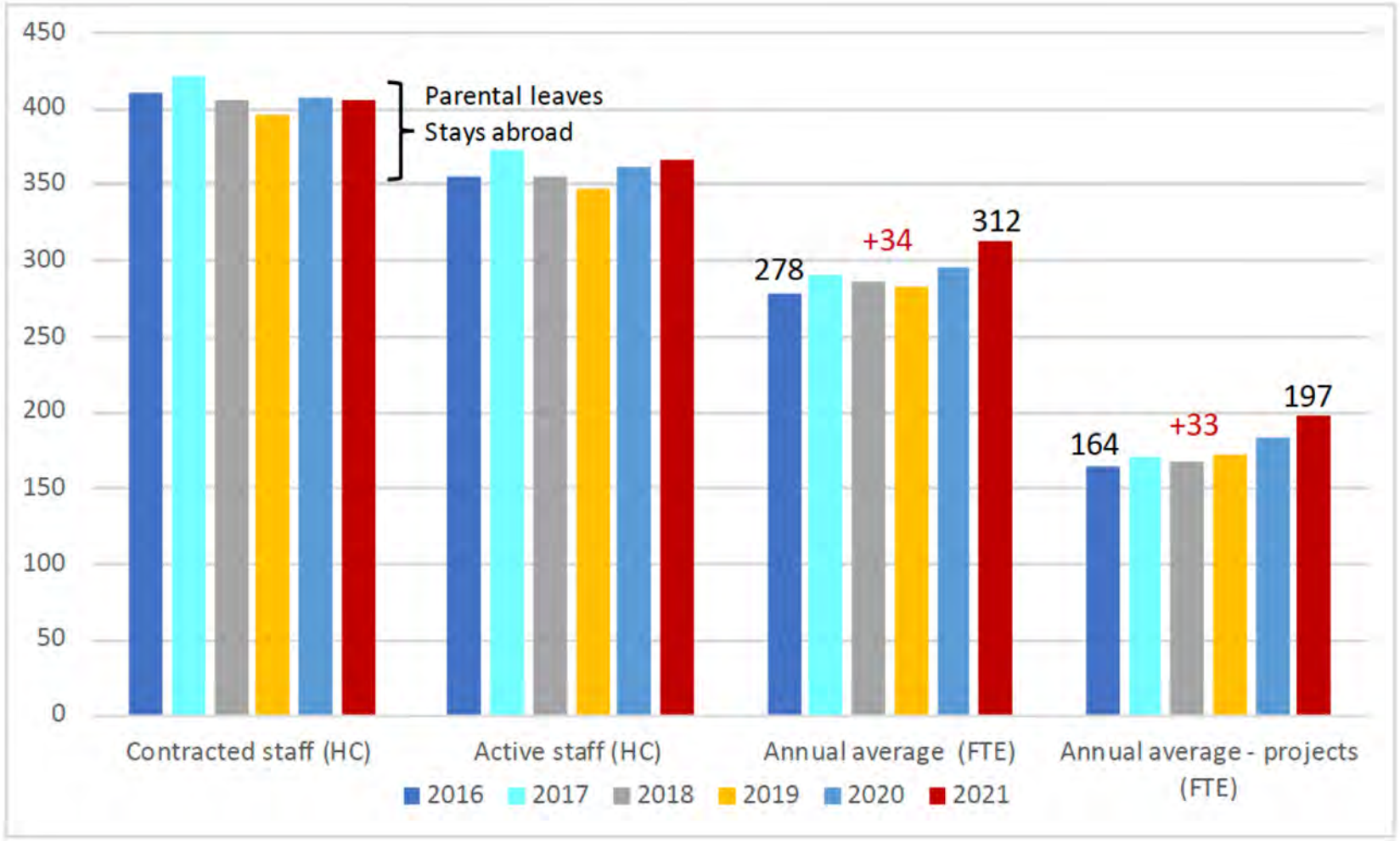
All numbers correspond to headcounts



Since 2016 – 4 new DSc. holders (average age 47) and
45 new PhD holders – internal postdocs plus incoming researchers

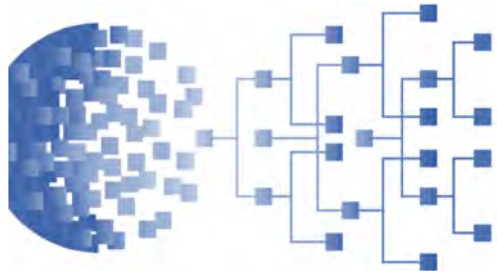
STAFF DEVELOPMENT

Maintaining stable number of contracted staff with increasing proportion of researchers



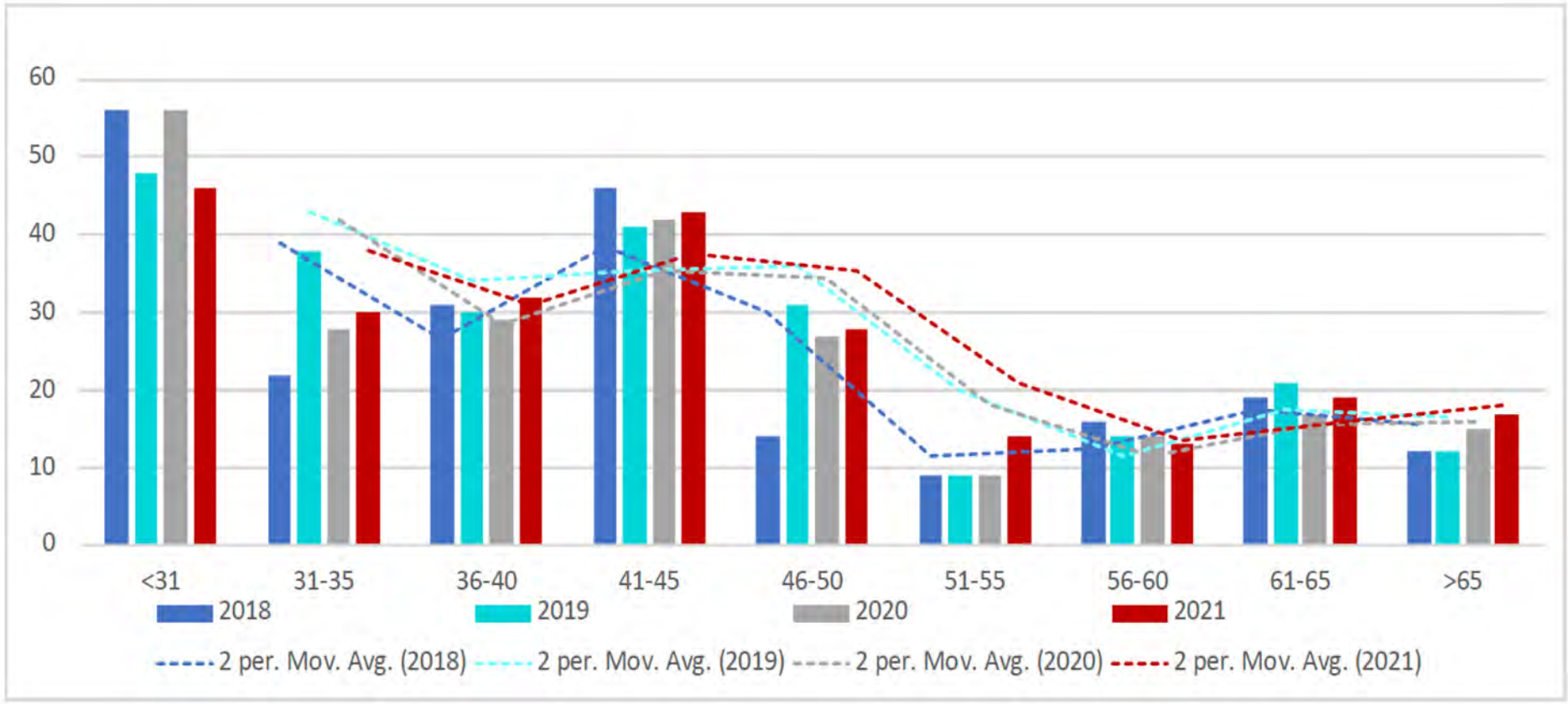
2018 SYSTEMIZATION OF POSITIONS

to regulate number, occupancy, and qualification structure



AGE DISTRIBUTION OF RESEARCHERS

Closing the gap in middle-age generation of researchers

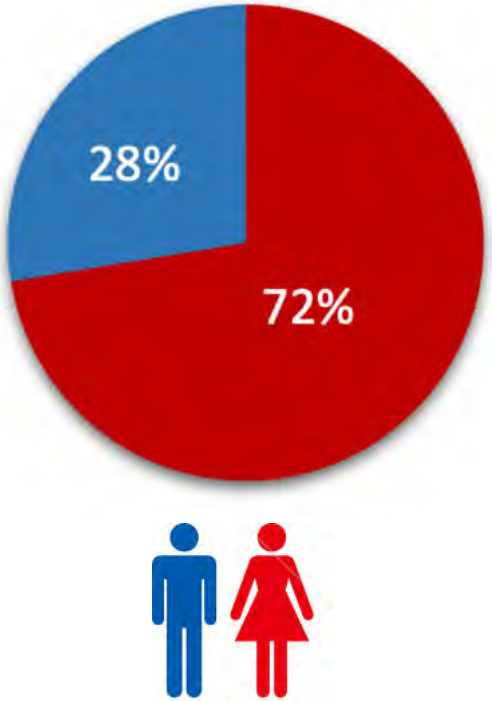


Age structure of the BMC SAS researchers involved in implementation of projects (HC). Dashed lines denote 2-period moving average.

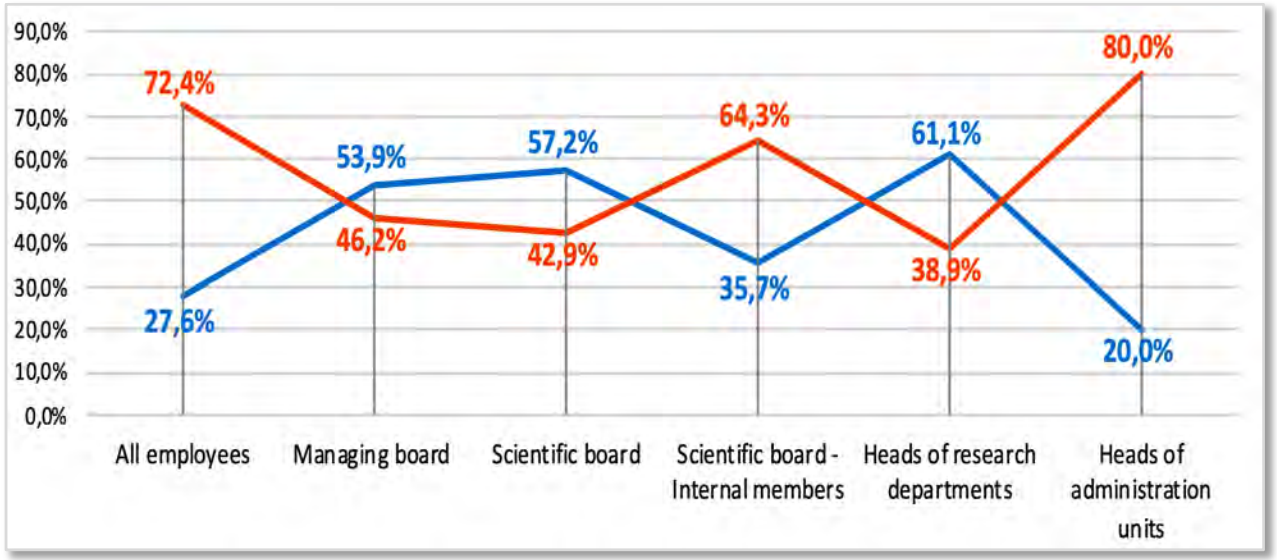
Exchange of generations is continuously ongoing with emphasis on young and middle-age PIs

GENDER STRUCTURE

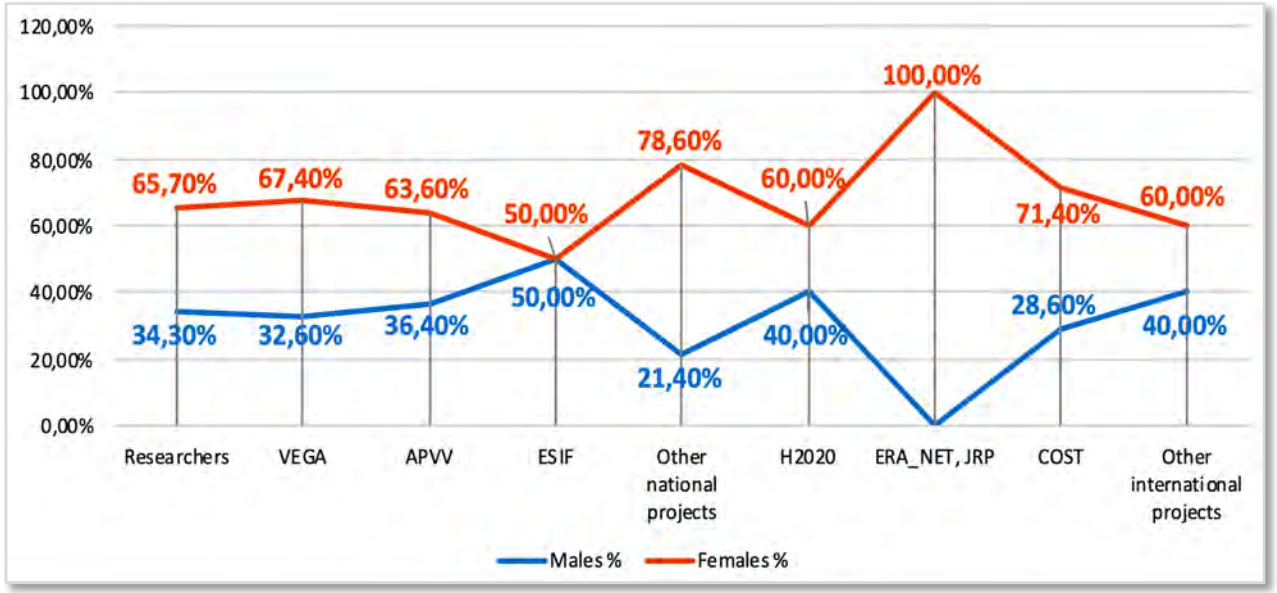
Aiming at creating equal opportunities while respecting individual preferences and ambitions



According to positions

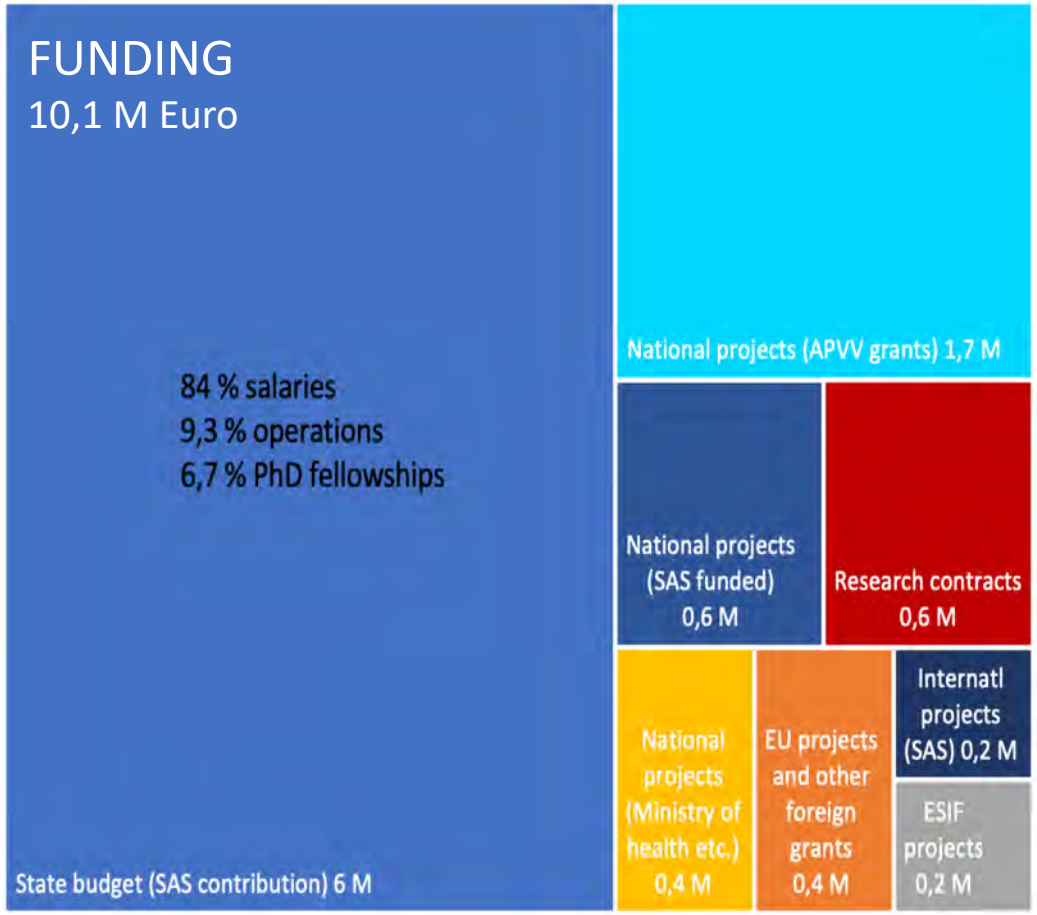


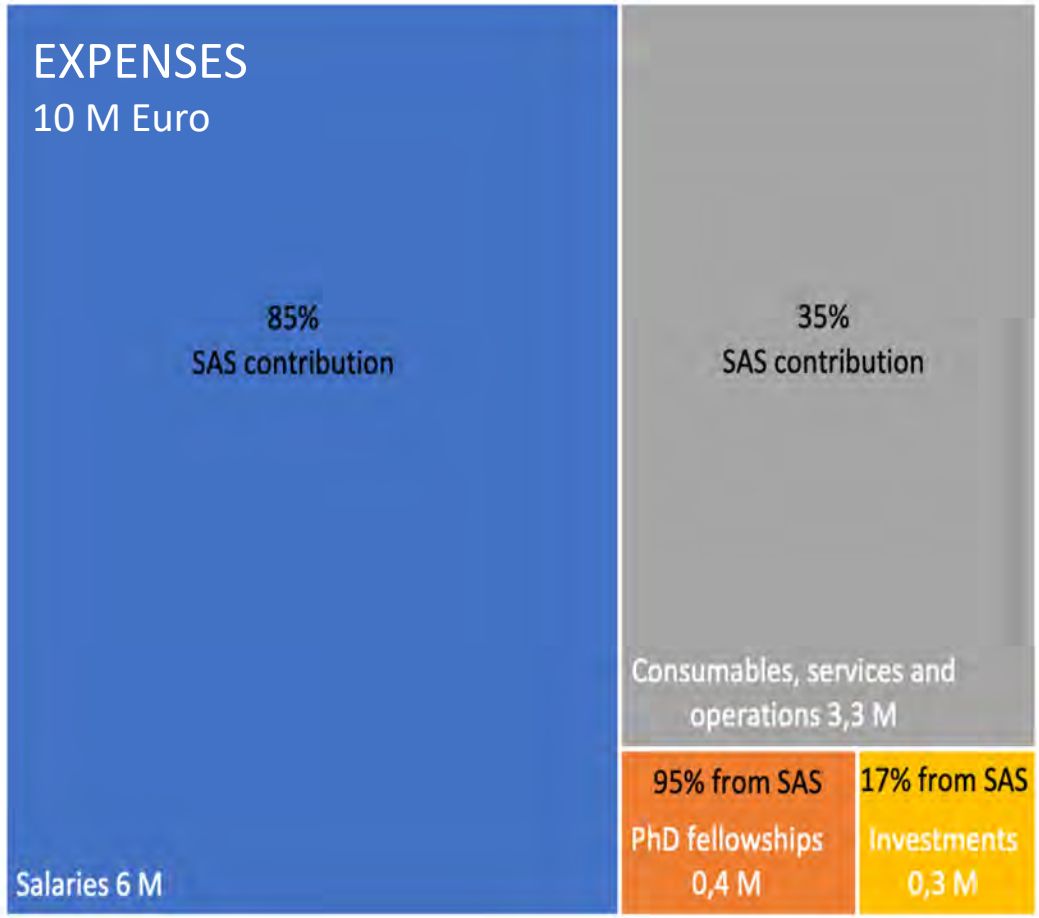
According to project PIs



AVERAGE BUDGET PER YEAR
IN THE PERIOD 2016 – 2021

40% of funding was secured by projects, research contracts and anti-pandemic activities





RESEARCH AND DEVELOPMENT ACTIVITIES

RESEARCH INSTITUTES AND DEPARTMENTS

OUR RESEARCH FOCUS is on understanding molecular and physiological mechanisms of human diseases and co-morbidities that cause socio-economic and healthcare burden in Slovakia and worldwide; including development of new diagnostic, stratification and/or therapeutic strategies.

INSTITUTE OF VIROLOGY

- Department of virus ecology
- Department of viral immunology
- Department of rickettsiology
- Department of tumor biology

INSTITUTE OF EXPERIMENTAL ENDOCRINOLOGY

- Department for research of metabolic disorders
- Department of endocrine regulations and psycho-pharmacology
- Department of neurosciences
- Department of cellular cardiology
- Laboratory of developmental genetics

CANCER RESEARCH INSTITUTE

- Department of molecular oncology
- Department of genetics
- Department of nanobiology
- Department of radiobiology
- Department of tumor immumology

INSTITUTE OF CLINICAL AND TRANSLATIONAL RESEARCH

- Department of clinical research
- Department of human genetics
- Department of molecular physiology

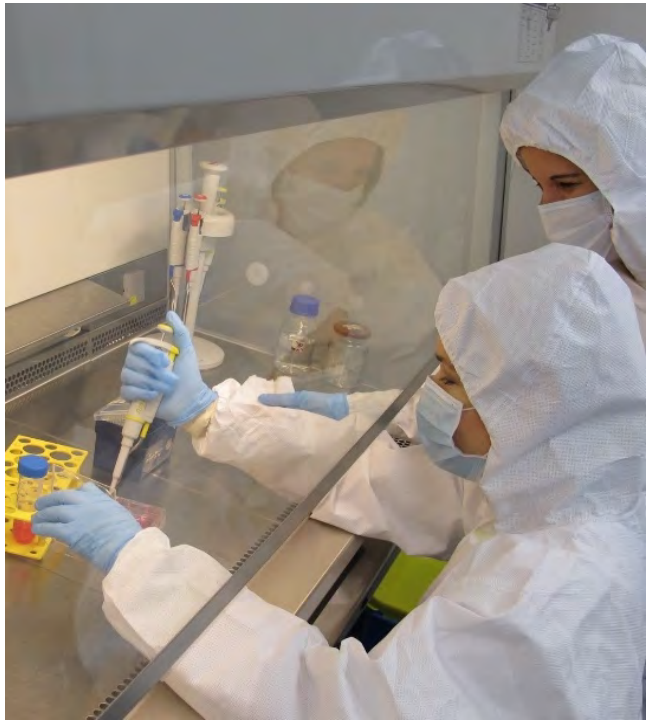
INSTITUTE OF NEUROBIOLOGY

- Department of regeneration medicine and cell therapy
- Department of neuro-degeneration, plasticity and repair

INSTITUTE OF VIROLOGY

RESEARCH TOPICS: molecular mechanisms of viral infections, ecology, and immunology, surveillance of *Rickettsiae* and *Coxiella burnetii*, new biomarkers of rickettsial infections and Q fever, mechanisms of cancer progression, new tumor biomarkers and therapeutic strategies

Director: Juraj KOPÁČEK, MVD., DSc.



DEPARTMENT OF VIRUS ECOLOGY

HEAD: **Boris KLEMPA, DSc.** (Chair of the BMC SAS Scientific board)

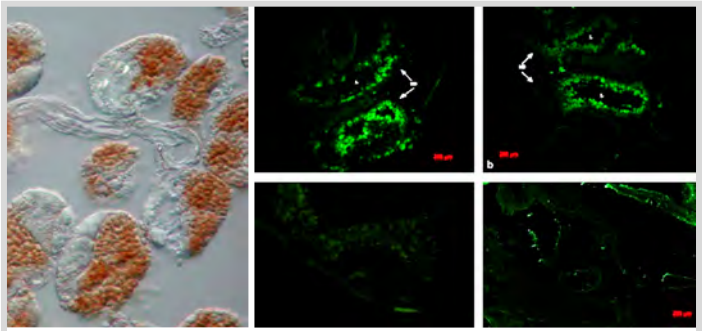
TOPICS: **ecology, epidemiology and evolution of zoonotic and plant viruses** (hantaviruses, tick-borne encephalitis virus, influenza, West Nile virus, SARS-CoV-2, plum pox, grapewine etc.)

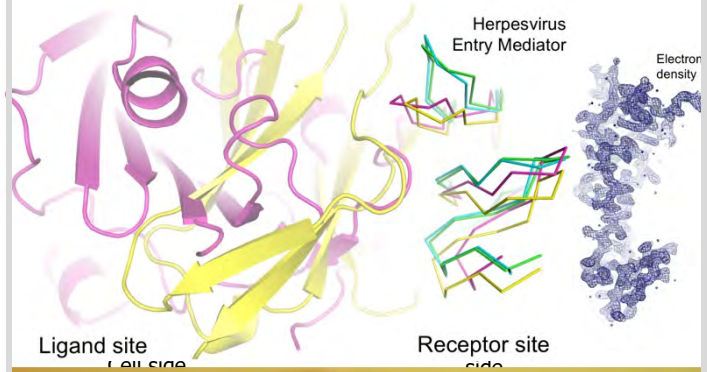
INFRASTRUCTURE: European virus archive GLOBAL, BSL3 lab

RESULTS:

- Mosquito surveillance of West Nile and Usutu viruses in Slovakia (*Eurosurveillance*)
- Surveillance of SARS-CoV-2 in Slovakia using newly developed RT-qPCR (*Sci Reports*)
- Identification of *Dermacentor reticulatus* as a vector for tick-borne encephalitis virus (*Ticks and Tick-borne diseases*)
- Discoveries of bat- and mole-borne hantaviruses (*Genome Biol Evol, Infect Genet Evol*)
- Stress response to Plum pox virus (*J Proteome Res*)
- Changed biological properties of influenza A genetically engineered HA2 mutants (*J Gen Virol*)
- Proteomic changes in response to persistent LCMV infection (*Front Microbiol*)

PROJECTS: 19 VEGA, 11 APVV, 4 EU, 1 ERA-NET, 3 COST, 1 Norway Grant





DEPARTMENT OF VIRAL IMMUNOLOGY

HEAD: **Ivana NEMČOVIČOVÁ, PhD**. (past SASPRO fellow)

TOPICS: **cross-talk between viruses and innate immunity** (herpes and influenza), **non-viraemic transmission of infectious agents via the tick saliva**, characterization and analysis of **viral immuno-modulatory proteins** for development of novel anti-inflammatory agonists, biological testing of **novel antiviral compounds** to coronaviruses

INFRASTRUCTURE: Crystallization lab, Breeding (domestic and subtropical) ticks

RESULTS:

- Solved crystal structure of viral HCMV UL144 used for design of 'prototype drug' with selectivity to BTLA - an checkpoint receptor *(2x J Biol Chem)*
- First experimental proof of Tick-Borne Transmission of MHV-68 *(J Fron Microbiol, Mol Eco)*
- Synergic and antagonistic role of small hairpin RNAs targeting InfA NS gene *(Intl J Mol Cell)*
- Suppression of TGFβ1 by Ixodid tick salivary gland extracts *(Biologia)*
- Protective efficacy of IFNs against influenza viruses *(Acta Virol)*

PROJECTS: 15 VEGA, 9 APVV, 1 INTERREG SK-AT, 2 SASPRO
3 OTHER (NSP, SK-AT Action)

SASPRO to Ivana Nemčovičová

SASPRO 2 to Katarína Lopušná

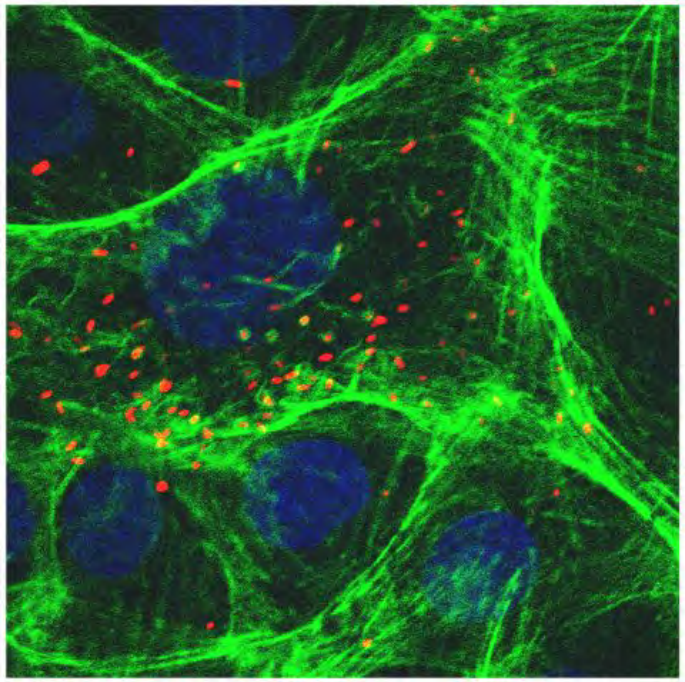
Slovak Academic and Scientific Programme

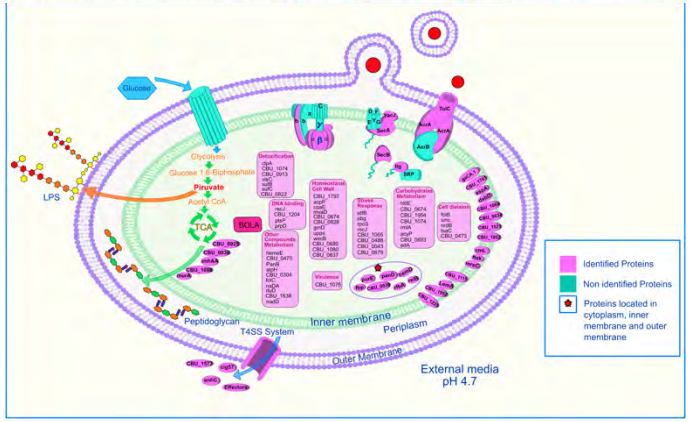
Interreg Slovakia-Austria European Regional Development Fund

Project CAPSID of the Slovakia-Austria Cooperation Programme

APVV

BIOMEDICAL RESEARCH CENTER SLOVAK ACADEMY OF SCIENCES





DEPARTMENT OF RICKETTSIOLOGY

HEAD: **Ľudovít ŠKULTÉTY, DSc.**
(SB member, National Reference Laboratory)

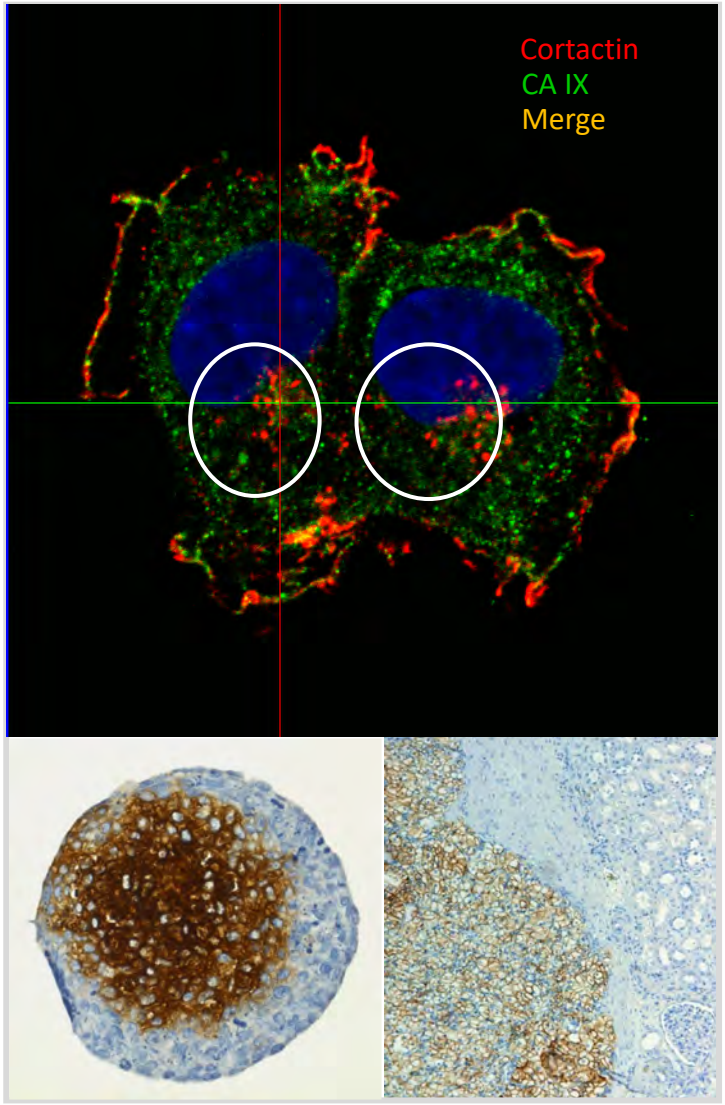
TOPICS: **Biomarker discovery**; elucidation of **the role of proteins in virulence, pathogenesis and immunity**; **monitoring** of *Rickettsiae*, *Chlamydiae*, and related bacteria in vectors and natural foci

INFRASTRUCTURE: GLP lab, proteomic lab, BSL3 lab

RESULTS:

- Survival strategy of *Coxiella burnetii* to doxycycline exposure (*J Proteomics*)
- Discovery of *Dermacentor reticulatus* proteins essential for tick attachment, host immune system evasion, and defensive response modulation (*Parasites & Vectors*)
- Biomarkers for rickettsial pox diagnostics (*BMC Microbiol*)
- Improved accuracy of diagnostics of rickettsial infections in the central nervous system (*PLoS Negl Trop Dis*)
- Surveillance of *Rickettsiae* and *Rickettsia*-like bacteria in Slovakia (*Ticks and Tick-Borne Diseases*)
- The role of carbonic anhydrase I in spontaneous tumor regression (*J Cell Mol Med*)

PROJECTS: 14 VEGA, 8 APVV, 1 DANUBE, 1 International Visegrad Fund



DEPARTMENT OF CANCER BIOLOGY

HEAD: **Eliška ŠVASTOVÁ, PhD**. (SB member)

TOPICS: **understanding the role of hypoxia and acidosis in cancer progression** with **focus on carbonic anhydrase IX** (CA IX), a clinical biomarker of hypoxia identified and characterized at the Institute of Virology

INFRASTRUCTURE: hypoxia workstation, IHC lab, IVIS imaging, confocal microscope

RESULTS:

- CA IX role in glycolytic metabolism, invadopodia and metastatic phenotype *(Front Oncol, BMC Cancer, Br J Cancer, IJMS, Cancer Metastasis Rev)*
- Role cAMP signalling in hypoxia and CA IX regulation *(Sci Rep)*
- Characterization of the humanised CA IX antibodies for cancer therapy *(Cancer Metab)*
- Identification of CA IX in pre-malignant lesions of pancreatic cancer, IPMN (intraductal papillary mucinous neoplasm) *(Cancers)*
- Cross-talk between pyruvate dehydrogenase kinase 1 and CA IX in cancer *(Int J Cancer)*
- Targeting CA IX by nanoparticles in collaboration with CEMEA *(Nanomedicine, Biomater Sci)*
- 4 sold licenses (monoclonal antibodies to CA IX and Endosialin)

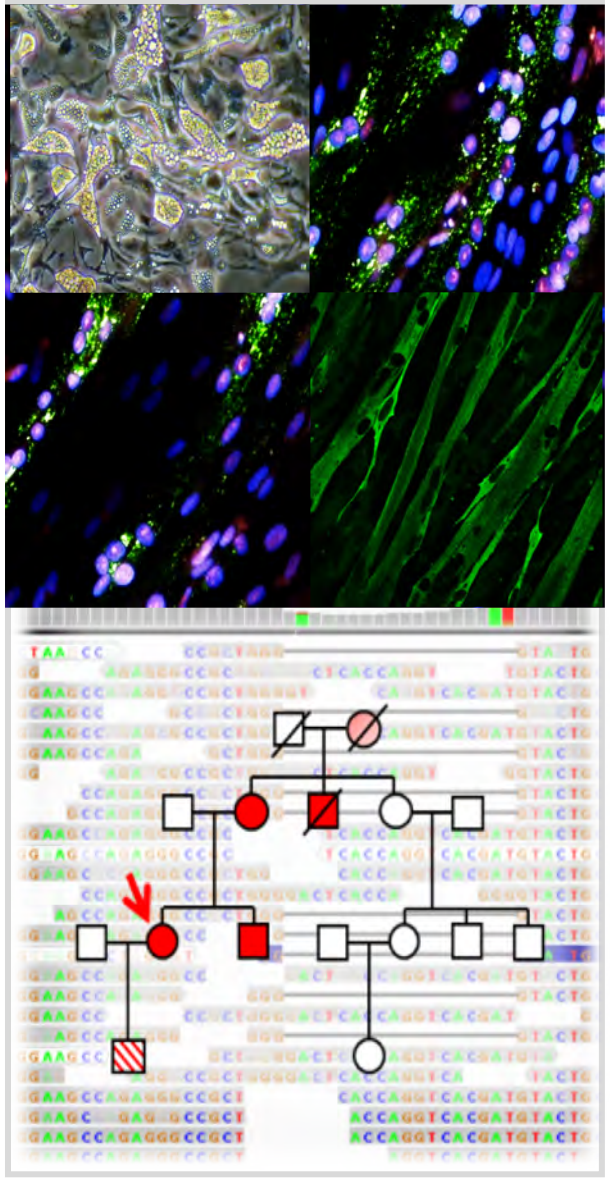
PROJECTS: 14 VEGA, 12 APVV, 1 SASPRO, 1 R&D Stimuli, 1 Min Health SR, SAS-MOST-JRP

to Tereza Goliaš

INSTITUTE OF EXPERIMENTAL ENDOCRINOLOGY

RESEARCH TOPICS: physiology of endocrine system; genetic, lifestyle, environmental and stress-related factors of human diseases; mechanisms of chronic diseases; animal, cellular and mathematical models of cardiac myocytes in health and disease; endocrine disruptors; genetics of diabetes and other metabolic and hormone-dependent diseases

Director: Daniela GAŠPERÍKOVÁ, DSc.



DEPARTMENT OF METABOLIC DISORDERS

HEAD: **Jozef UKROPEC, DSc**. (SB member)

TOPICS:

- o Integrative **physiology of exercise** in prevention & treatment of chronic diseases.
- ➢ **Genetics** of monogenic diabetes, obesity, hearing loss and extremely rare diseases.
- ❖ Molecular control of **energy metabolism** in adipose tissue and liver.

Translation to clinical decisions and search for the novel diagnostic and treatment strategies aimed to improve metabolic health in humans.

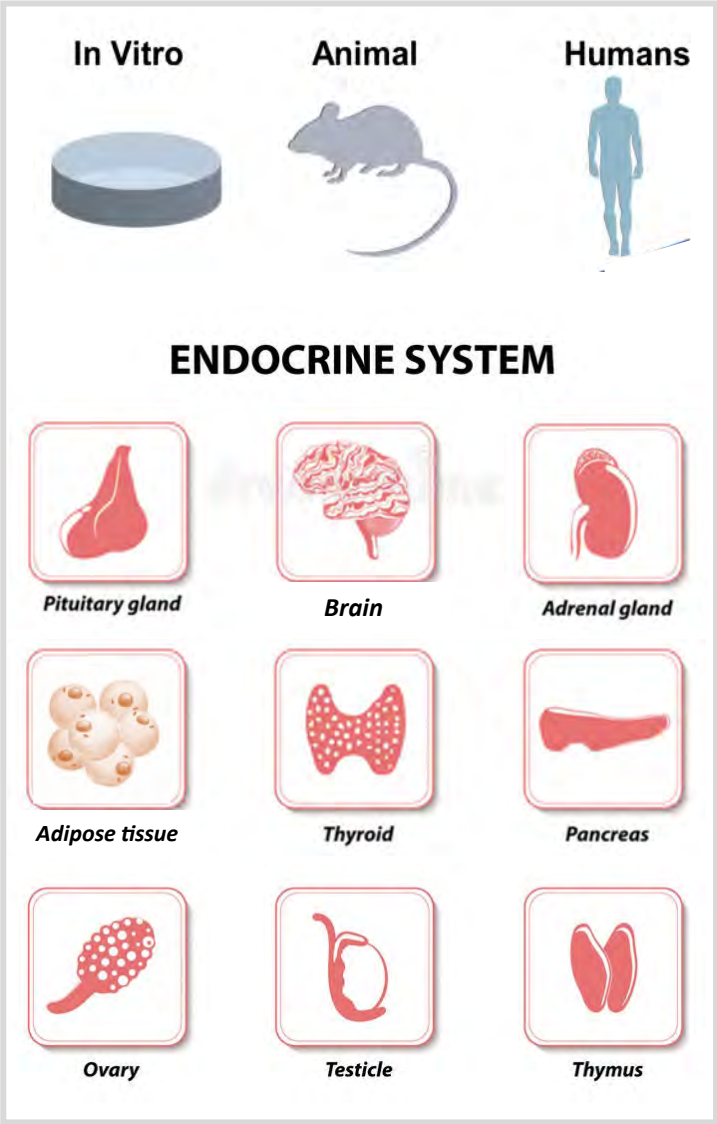
INFRASTRUCTURE: Research Clinic, Center for Physical Activity, DIABGENE lab

RESULTS:

- o Understanding specific metabolic and molecular aspects of the exercise-induced benefits in patients with metabolic, neurodegenerative diseases, myopathy and cancer *(J Physiol, Clin Exp Rheumatol, Front Neurol, J Alzh Dis, Front Aging Neurosci, Neuropeptides, Neuroimage Clin, Obesity Sci Rep, Front Physiol, Gerontology, Andrology)*
- o Metabolomic studies aimed at understanding the integrative component of the adaptive response to exercise or cold exposure *(Endocrinology, Metabolites, FASEB J).*
- ➢ Molecular-genetics research with pharmacogenetic consequences in patients with monogenic diabetes and monogenic *obesity (Diab Med, Lancet Diab Endo, Diab Care, Plos One)*
- ➢ Identification of new genetics aspects of rare diseases, e.g. MEHMO, Mitchel-Rilley, Waardenburg syndromes *(Human Mut, Eur J Med Genet, Int J Pediat Otorhinol)*
- ➢ Genetic etiology of sensorineural hearing loss *(Orphanet J Rare Dis, Sci Rep)*
- ❖ In depth characterization of human brown fat, uncovering its cellular heterogeneity and identification of several molecular mechanisms driving its thermogenic activity *(Nature, Cell Rep, Cell Metab, Nat Metab, Nat Commun, Adipocyte)*

PROJECTS: 13 VEGA, 9 APVV, 2 COST, 2 SAS-MOST-JRP, 2 SASPRO, 2 OTHER

to Miroslav Baláž & Lucia Balážová



DEPARTMENT OF ENDOCRINE REGULATIONS AND PSYCHOPHARMACOLOGY

HEAD: **Nataša HLAVÁČOVÁ, PhD.** (SB member)

TOPICS: Understanding **endocrine mechanisms** as well as searching for new pharmacological **treatment strategies related to chronic stress, psychiatric disorders, cardio-metabolic disease, cancer, and reproductive dysfunctions**.

RESULTS:

- Salivary aldosterone reflects the severity and duration of major depressive disorder *(J Psychiatric Res)*
- Aldosterone represents a state marker and cortisol is a trait marker of depression *(Neuroendocrinology)*
- Chronic social stress impacts the gut and blood-brain barrier proteins *(Neurogastroenterol Motil)*
- Key role of reactive oxygen species, insulin signalling and adipogenesis in adipose tissue *(Molecules)*
- Beneficial effect of prooxidant/antioxidant balance on adipose tissue metabolism *(Oxid Med Cell Longev)*
- Novel radioligand binding assay for precise quantitation of nuclear retinoid X receptors (*Toxicology Letters)*
- Autoimmune thyroiditis as a predisposing factor for papillary thyroid carcinoma development *(Oncol Lett)*
- Endocrine disruptors and polymeric nanoparticles contribute to the onset and development of female reproductive disorders and endocrine-related cancers *(Toxicol Appl Pharmacol, Oxid Med Cell Longev)*

PROJECTS: 18 APVV, 1 ERA-NET, 1 COST, 15 VEGA, 5 BILATERAL (Argentina, Hungary, Austria)

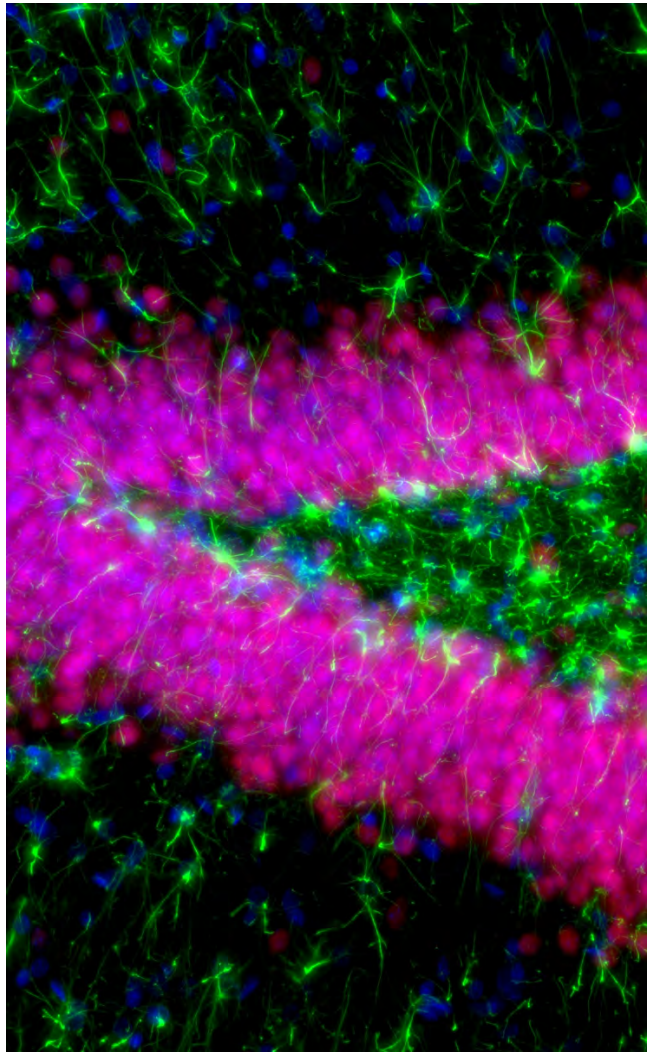
neuron ERA-NET NEURON Together for brain research

ADMIRE COST BM1301

SLOVAK RESEARCH AND DEVELOPMENT AGENCY

MINISTRY OF EDUCATION, SCIENCE, RESEARCH AND SPORT OF THE SLOVAK REPUBLIC

BIOMEDICAL RESEARCH CENTER SLOVAK ACADEMY OF SCIENCES



DEPARTMENT OF NEUROSCIENCES

HEAD: **Ján BAKOŠ, PhD.**

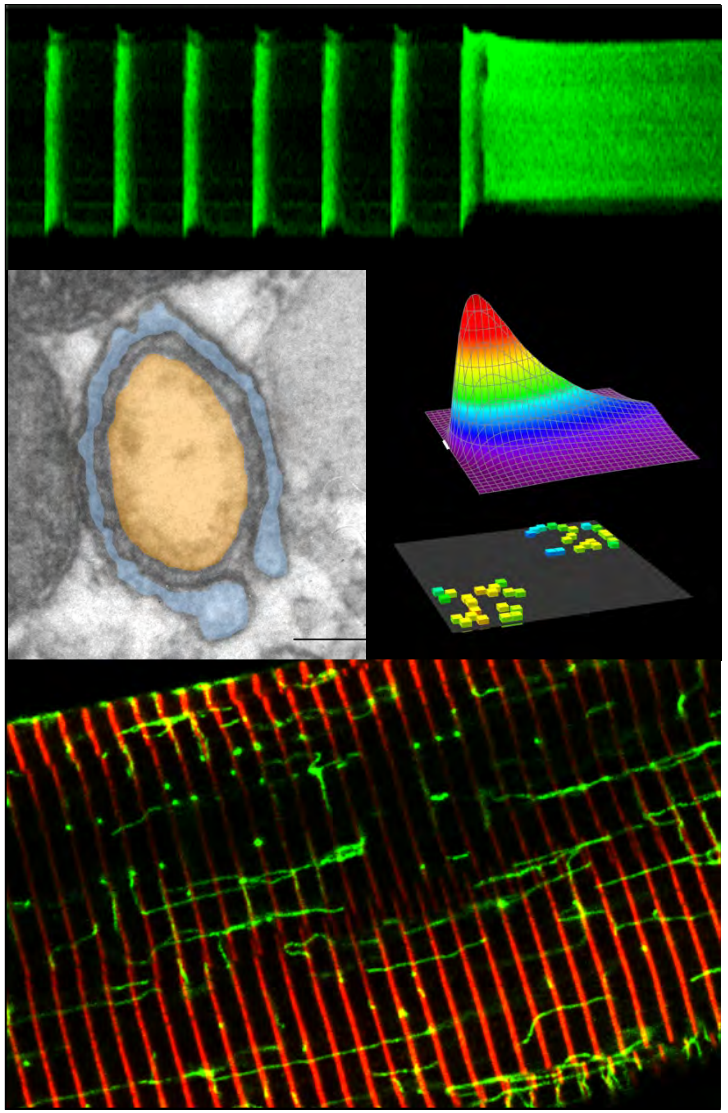
TOPICS: **Autism** and related neurodevelopmental conditions, **neurobiology of cancer**, mechanisms of **stress response and resilience**, neuropeptides and **neural cells communication**

INFRASTRUCTURE: IHC and ICC lab, Evos cell imaging system, fluorescence microscopy, behavioral analysis

RESULTS:

- Cancer-related signals are mediated by pro-inflammatory cytokines *(Eur J Neurosci)*
- Autism-like conditions are accompanied by neurite abnormalities and alterations in synaptic proteins, and those could be reversed by oxytocin treatment *(Mol Cell Endocrinol, Dev Neurobiol)*
- Mechanisms underlying stress-related modulation of immune function include urocortin 1 and urocortin 2 *(J Neuroendocrinol, J Neuroimmunol, Neurochem Res)*

PROJECTS: 12 VEGA, 3 APVV, 2 Other



DEPARTMENT OF CELLULAR CARDIOLOGY

HEAD: **Michal CAGALINEC, PhD.** (past SASPRO fellow)

TOPICS: **cellular, molecular and structural aspects of calcium signaling and energetics in cardiac myocytes**

INFRASTRUCTURE: confocal microscopy, electron microscopy, cellular electrophysiology, molecular biology, mathematical modelling workstation

RESULTS:

- Estimation of the effect of RyR distribution and regulation on cardiac calcium release dynamics (*J Gen Physiol; Front Physiol*)
- Elucidation of the role of mitochondria in progression of cardiac pathology (*Biol Sex Differ; Cells; Cardiovasc Res*)
- Pathological vs. physiological remodeling of myocardium and excitation-contraction coupling (*Sci Rep; PlosOne; Front Physiol*)
- The role of cyto-architecture in mitochondrial function (*Sci Signal; Front Cell Dev Biol*)

PROJECTS: 5 VEGA, 2 APVV, 1 ERA-NET, 1 SASPRO, 1 JRP Tübitak

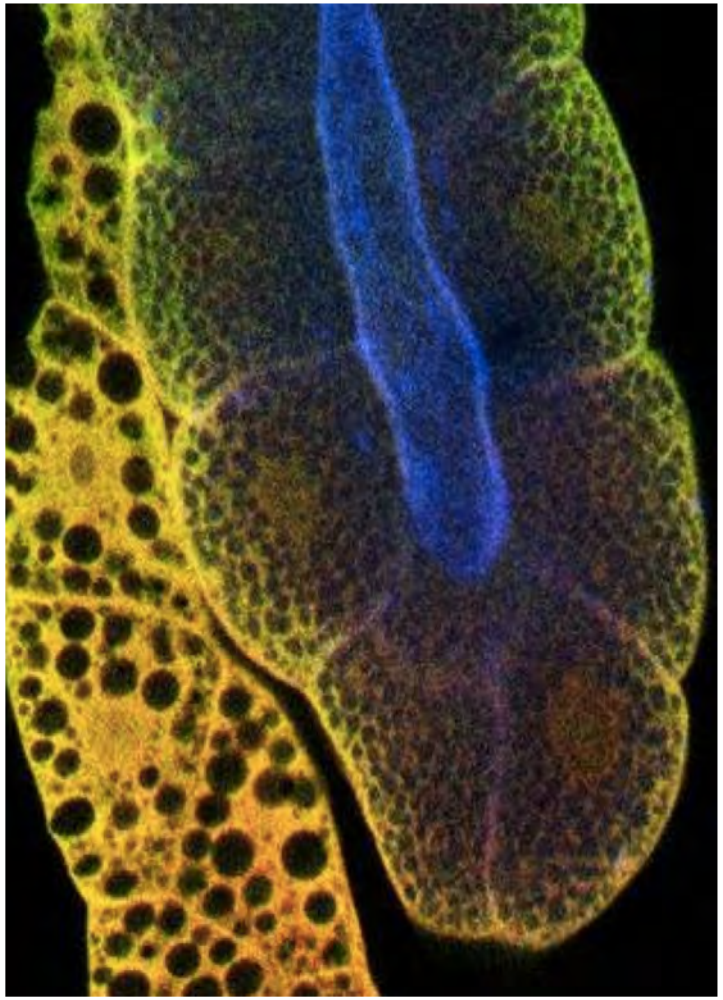
AGENTÚRA NA PODPORU VÝSKUMU A VÝVOJA

TÜBİTAK - SAS Bilateral Cooperation Project

TÜBİTAK

ERA CVD

SASPRO to Michal Cagalinec



LAB OF DEVELOPMENTAL GENETICS

HEAD: **Robert FARKAŠ, PhD.**

TOPICS: ***Drosophila* postembryonic development and hormonal control of metamorphosis** via nuclear receptors, **apocrine secretion** as novel non-canonical and non-vesicular transport and secretory mechanism.

INFRASTRUCTURE: Large *Drosophila* stock collection of genetic aberations (mutations, transgenic constructs and their numerous hybrids)

RESULTS:

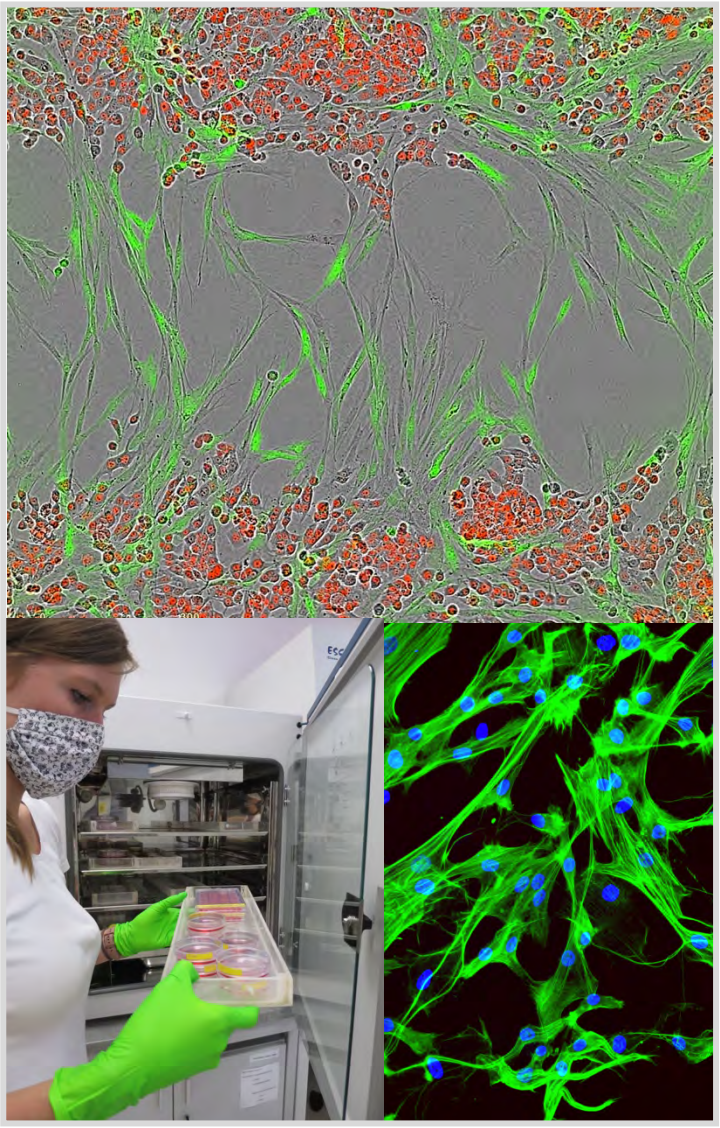
- Reappraisal and new definition of apocrine secretion, characteristic selectively for eukaryotic metazoans *(PLoS One; BBA)*
- Connecting extremely massive vacuolation to transsudation process as retransporting and resecreting mechanism preceding apocrine release *(Devel. Growth Differ; Phsyiol. Res)*
- Identification of apocrine secretion in production of exuvial fluid and immune defense against microbial infection at the interface with exterior (Sci. Rep.)
- Molecular mechanism of metamorphosis in *Drosophila*, detemination of larval instars, timing of metamorphosis initiation, and basal metabolism (malate-pyruvate shuttle).

PROJECTS: 2 VEGA, 1 APVV, 1 COST-ENBA, 1 GAČR

CANCER RESEARCH INSTITUTE

RESEARCH TOPICS: molecular mechanisms of cancer, cancer genetics and epigenetics, DNA repair, stem cells and therapy, tumor microenvironment, biomarkers for cancer diagnostics, prediction of therapy outcome and stratification of patients, bench-to-bedside translation

Director: Miroslav CHOVANEC, PhD.



DEPARTMENT OF MOLECULAR ONCOLOGY

HEAD: **Miroslava MATÚŠKOVÁ, PhD.** (SB member)

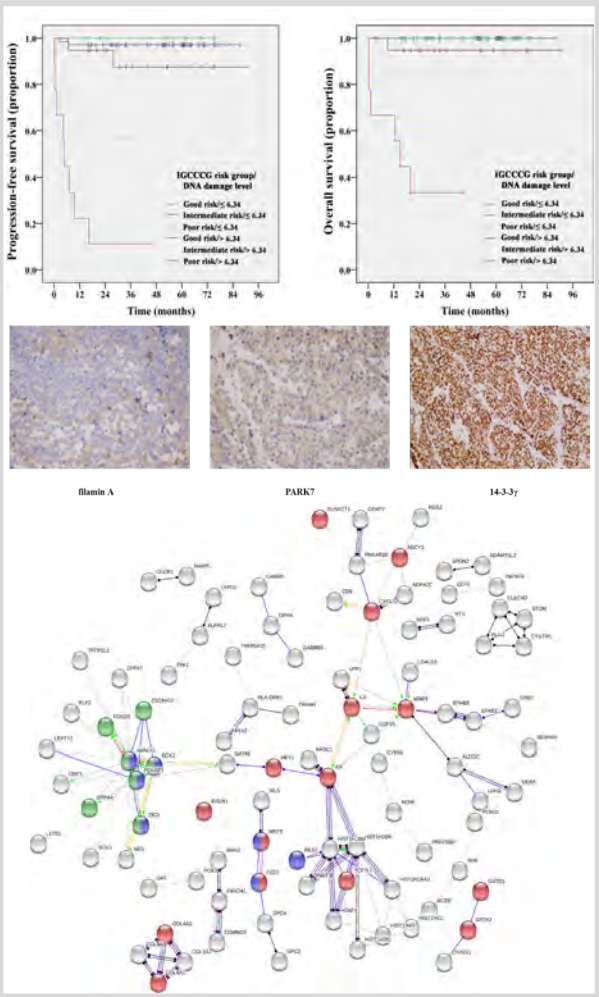
TOPICS: **tumor microenvironment**, cancer **gene therapy** mediated by nanocarriers or extracellular vesicles, **epigenetic changes** associated with metastasis, **refractory germ cell tumors**, role of **aldehyde dehydrogenase** in colorectal cancer

INFRASTRUCTURE: animal house for immunodeficient mice

RESULTS:

- Clinical study on chemoresistant germ cell tumors initiated by novel therapeutic approach *(Cancers, 2018/39-LFUK-13)*
- Evidence for exosome-mediated gene therapy efficacy *(Int J Cancer, Methods Mol Biol, Cancers)*
- Impact of chemotherapy on breast cancer tumor stroma *(J Exp Clin Cancer Res)*
- Identification of prognostic markers for metastatic uveal melanoma *(Int J Mol Sci)*
- Upregulation of aldehyde dehydrogenase 1A3 is associated with acquired chemoresistance and metastasis in colorectal cancer *(BMC Cancer, Cancer Gene Ther)*

PROJECTS: 8 APVV, 13 VEGA, 1 H2020, 3 ERA-NET, 1 SAS-TUBITAK-JRP, 2 others



DEPARTMENT OF GENETICS

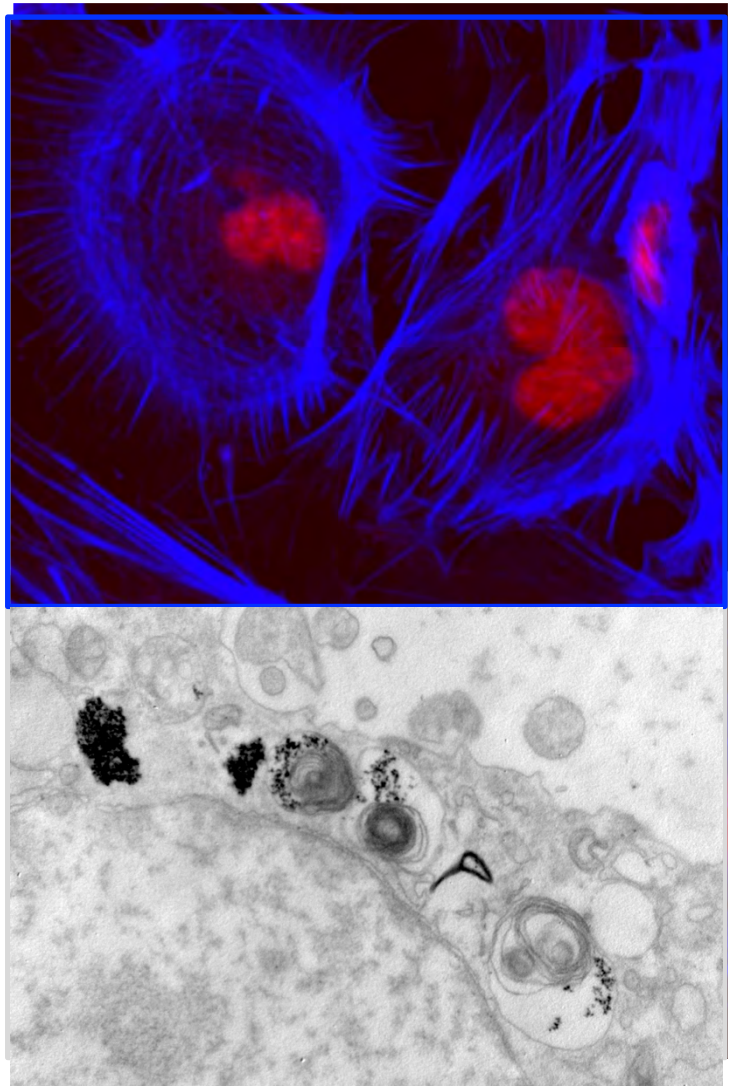
HEAD: **Miroslav CHOVANEC, PhD.** (CRI Director)

TOPICS: **drug resistance** in genitourinary cancers, **DNA damage response and repair, genetics/epigenetics, microRNA**, mitochondria in therapy response, **cancer biomarkers**, pre-mRNA splicing, meiosis, R-loops, spliceosome

RESULTS:

- Potential prognostic markers of cisplatin response in testicular germ cells tumors (TGCT) (*Oncotarget*)
- **XPA expression is an independent biomarker for stratifying poor prognosis TGCT patients (*BMC Cancer*)**
- Endogenous DNA damage is an independent prognosticator for survival in TGCT patients (*Mutat Res*)
- Identification of miRNAs with diagnostic and prognostic value in breast cancer (*Oncotarget*)
- **Expression of filamin A, PARK7 and 14-3-3γ associates with rete testis invasion in clinical stage I seminoma patients (*Cancers*)**
- **miRNAs targeting the genes involved in the PI3K-AKT and MAPK signalling pathways and their role in endometrial carcinoma (*Int J Mol Sci*)**
- Mechanisms regulating the *S. pombe* spliceosome-associated factor Nrl1 (*Int J Mol Sci*), which ensures genome stability (*Cell Cycle*)

PROJECTS: 15 VEGA, 8 APVV, 2 MZ SR, 1 COST, 1 EU



DEPARTMENT OF NANOBIOLOGY

HEAD: **Andrea BÁBELOVÁ, PhD**. (SB member, past SASPRO fellow)

TOPICS: **nano-bio interactions** of nanomaterials with cells, tissues and organs, **acute and long-term impact** of nanomaterials on living organism**, nanotoxicity, genotoxicity, theranostics**

INFRASTRUCTURE: Slide scanner microscope, RT-PCR systems, IHC lab

RESULTS:

- Characterization of inorganic nanoparticles *(Nanomedicine, Cell Biol Toxicol, RSC Advances)*
- Effective SARS-CoV-2 RNA reduction using a tailor-made RNA inhibitor (*Viruses*)
- Recommendations for describing comet assay protocol (*Nature Protocols)*
- Development of microfluidic platform for nanosafety screening (*Small)*
- Organizer of biennial conference *„Genetic toxicology and cancer prevention“*

PROJECTS: 8 VEGA, 7 APVV, 3 ERA-NET, 3 COST, 2 Horizon 2020, 1 SASPRO, 1 MHealth SR, 1 DAAD

SASPRO to Andrea Bábelová

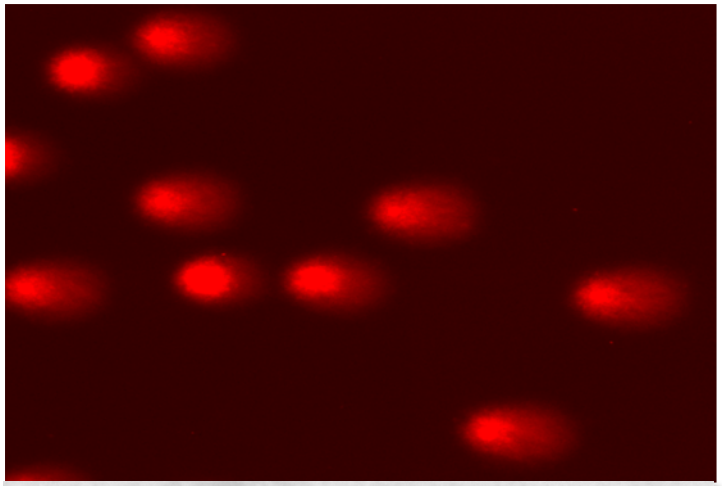
Tentacles EuroNanoMed3 TRANSCAN VISION

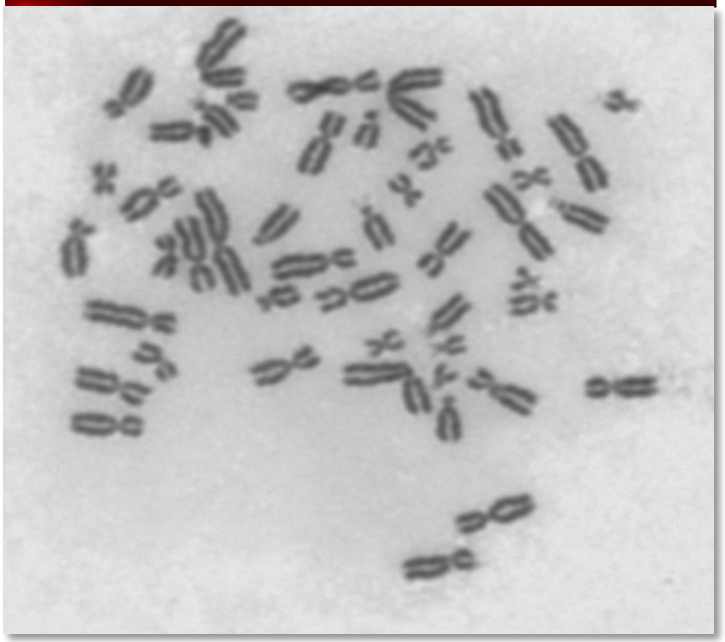
DAAD HISENTS CellFit

COST ACTION CA 17140 NANO2CLINIC CANCER NANOMEDICINE - FROM THE BENCH TO THE BEDSIDE

hCOMET CA15132

BIOMEDICAL RESEARCH CENTER SLOVAK ACADEMY OF SCIENCES





DEPARTMENT OF RADIOBIOLOGY

HEAD: **Associate Professor, Igor BELYAEV, DSc.**

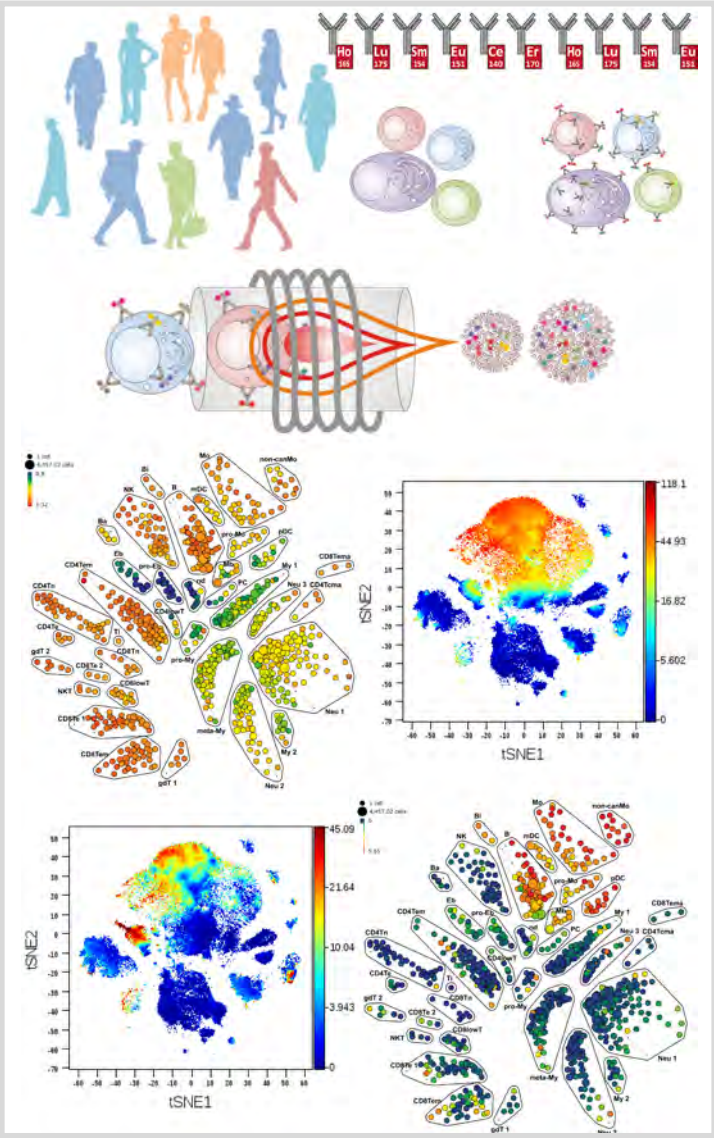
TOPICS: **radiation induced genomic instability**, biodosimetry, biomarkers of **individual radiosensitivity, magnetic fields** in cancer treatment

INFRASTRUCTURE: Radiobiology lab in the Proton Center (CVTI)

RESULTS:

- Assessment of radiation induced DNA damage, apoptosis and ROS *(Sci Rep, Environ Pollut, IJMS, Genes, Cytometry A)*
- Screening of umbilical cord blood cells (UCB) of Slovak newborns for preleukemic fusion genes *(Oncotarget, Antioxidants)*
- **Finding of genomic instability in UCB cells from childhood leukemic patients *(Oncotarget)***
- Characterization of radiosensitivity of human hematopoietic stem cells and their subpopulations *(Oncotarget, Neoplasma, Sci Rep)*
- Identification of exposure conditions for inhibition of cancer cell growth by alternating magnetic field *(BMC Cancer, Bioelectromagnetics)*

PROJECTS: 3 VEGA, APVV, IAEA, Kompetenzinitiative



DEPARTMENT OF TUMOR IMMUNOLOGY

HEAD: **Jana JAKUBÍKOVÁ, PhD.** (past SASPRO fellow)

TOPICS: translational research to study the **mechanisms of development and progression of hematological malignancies**, especially multiple myeloma and lymphoma

INFRASTRUCTURE: Specialized lab of flow cytometry including CyTOF, Hyperion, flow cytometry analyzer and sorter

RESULTS:

- sub-clonal heterogeneity of tumor cells by large-scale high-dimensional profiling
- clonal evolution during the development and progression of multiple myeloma
- clonal heterogeneity of Waldenström's macroglobulinemia and B cell non-Hodgkin's lymphoma
- mapping the tumor immune microenvironment in multiple myeloma and lymphoma
- evaluation of immune modulations, mechanisms and immune checkpoint molecules
- impact of chemo- and/or immuno-therapy on clonal selection and tumor-immune cell interactions
- development of novel diagnostic and predictive approach to diagnose, classify, stage and monitor the therapy response in patients with hematological malignancies
- preclinical studies of the mechanisms of action of the chemotherapeutic agents, antibodies and nanoparticles

PROJECTS: 7 VEGA, 6 APVV, 1 MHealth SR, 1 ERA-NET, SASPRO

SASPRO

AGENTÚRA NA PODPORU VÝSKUMU A VÝVOJA

MINISTERSTVO ZDRAVOTNÍCTVA SLOVENSKEJ REPUBLIKY

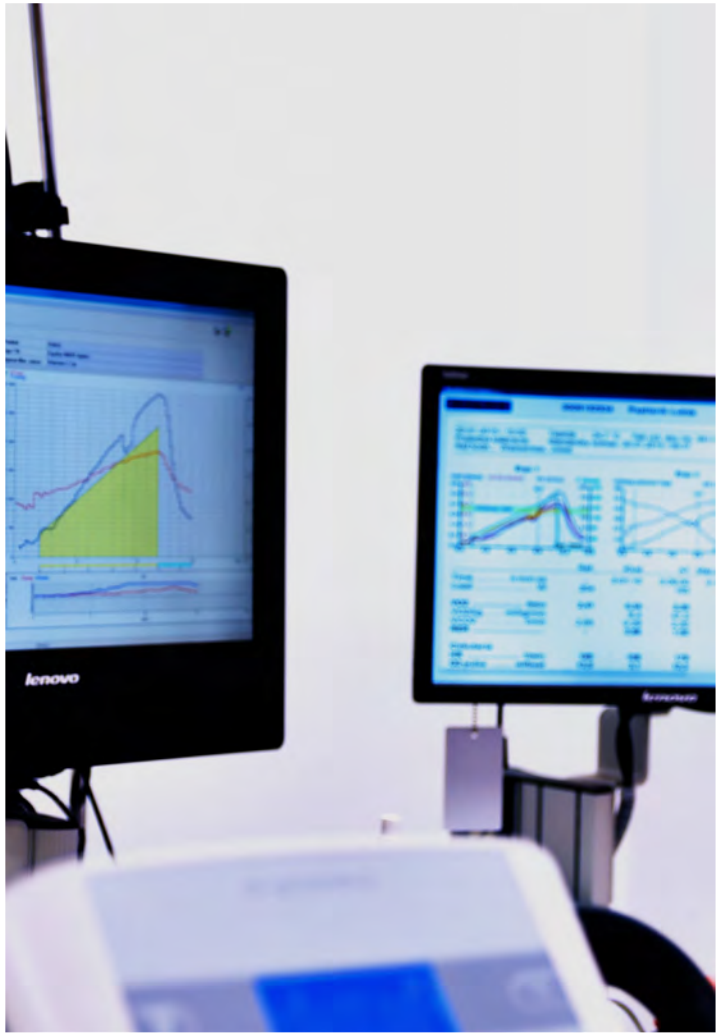
TRANSCAN-2

BIOMEDICAL RESEARCH CENTER SLOVAK ACADEMY OF SCIENCES

INSTITUTE OF CLINICAL AND TRANSLATIONAL RESEARCH

RESEARCH TOPICS: molecular mechanisms of human diseases, signaling pathways driven by ions and small molecules, translation of basic research to clinic, transfer of clinical needs to research (bedside-to-bench), R&D of novel diagnostic, prevention and intervention approaches

Director: Miroslav VLČEK, MD., PhD.



DEPARTMENT OF CLINICAL RESEARCH

HEAD: **Assoc. prof. Richard Imrich, MD, DSc**

TOPICS: Clinical research in autoimmunity, obesity and metabolic disorders

INFRASTRUCTURE: Clinical Research Unit including 2 inpatient intensive care beds and 5 outpatient rooms, Phase I/II certification by national authority for clinical trials on demand

RESULTS:

- Low adrenal androgens in rheumatoid arthritis and other chronic inflammation
- Impaired glucose metabolism in patients with multiple sclerosis
- Efficacy/safety of nitisinone in alkaptonuria (EMA marketing authorization 2020)
- Targeted nutritional interventions and gut microbiota in obesity and metabolic syndrome and multiple sclerosis patients

CLINICAL TRIALS:

- Multiple Sclerosis: The Role of Mitochondrial Dysfunction in IR Resistance (MS-MIDY) NCT03052595
- Effect of Specific Diet and Physical Activity on Weight and/or Fat Loss NCT02325804
- Alkaptonuria: Suitability Of Nitisinone In Alkaptonuria 2 (SONIA 2) NCT01916382

PROJECTS: 4 VEGA, 2 APVV, 1 7FP EU, 1 ERA-NET, 1 MIN HEALTH

DevelopAKUre

VÝSKUMNÁ AGENTÚRA

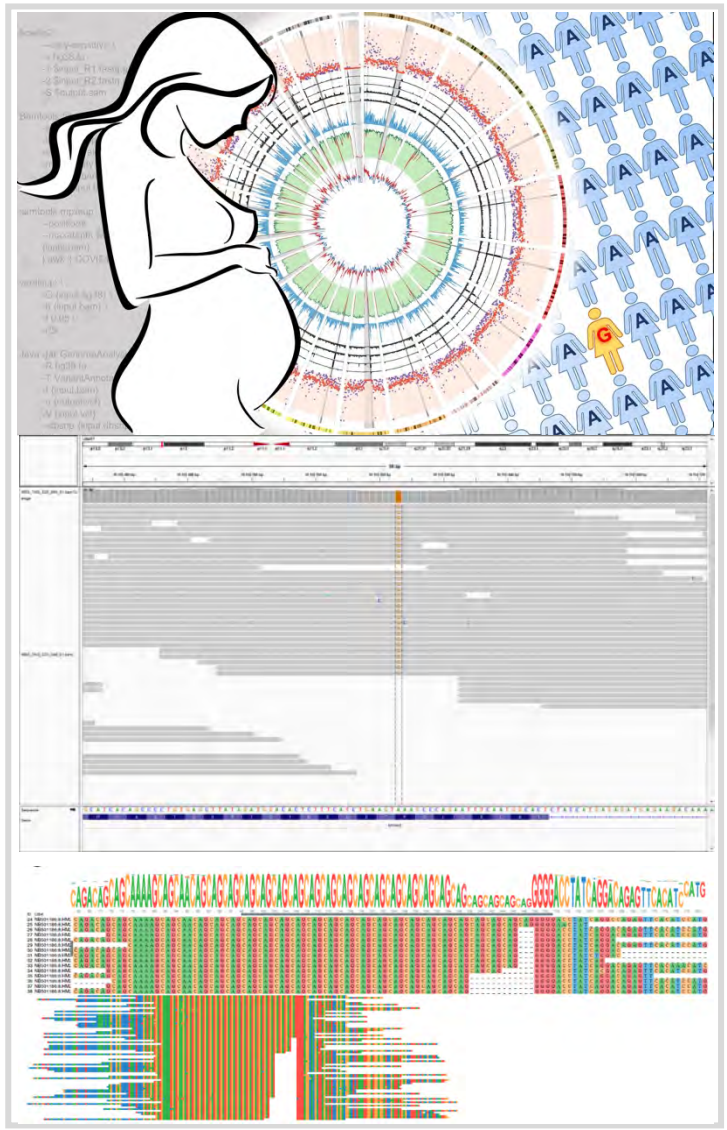
AGENTÚRA NA PODPORU VÝSKUMU A VÝVOJA

MINISTERSTVO ZDRAVOTNÍCTVA SLOVENSKEJ REPUBLIKY

neuron

SEVENTH FRAMEWORK PROGRAMME

BIOMEDICAL RESEARCH CENTER SLOVAK ACADEMY OF SCIENCES



DEPARTMENT OF HUMAN GENETICS

HEAD: **Prof. RNDr. Ľudevít KÁDAŠI, DSc.** (retired from 2022)
RNDr. Ján RADVÁNSZKY, PhD.

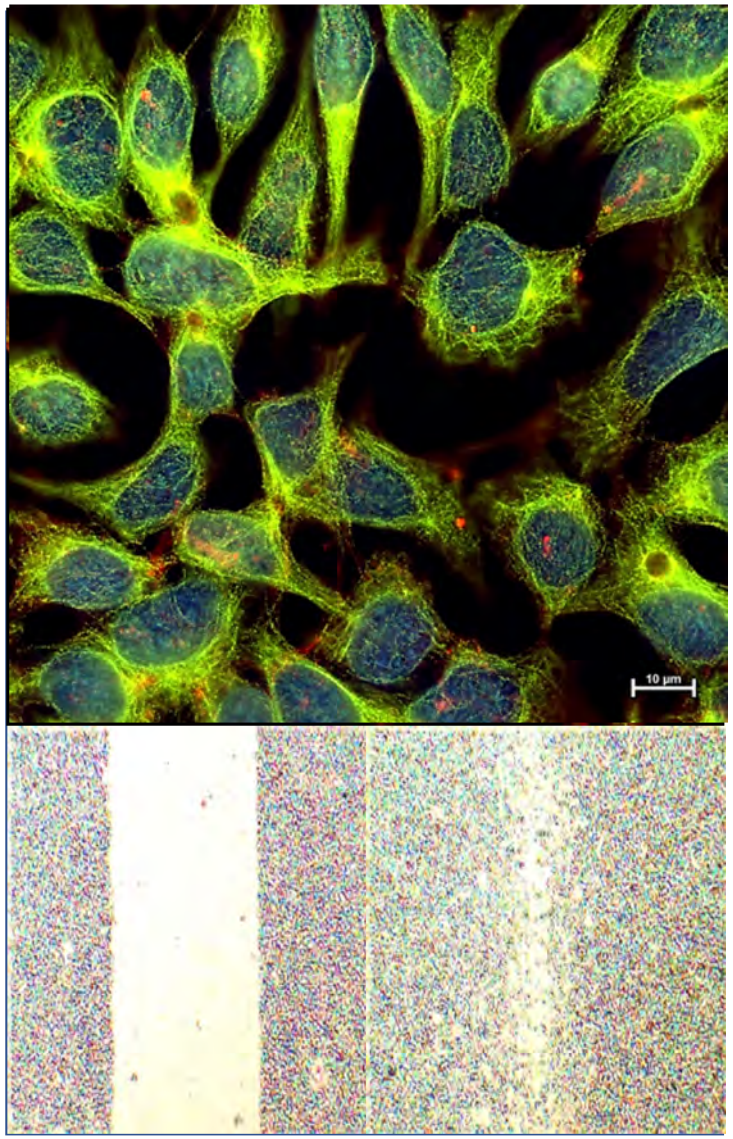
TOPICS: Human genome analyses and DNA diagnostics, and implementation of genetic and genomic technologies

INFRASTRUCTURE: molecular-genetic laboratory

RESULTS:

- DNA diagnostic tests developed and transferred to routine healthcare
- Bioinformatic tools processing and evaluating massively parallel sequencing data (e.g. **"Dante"** for STR Genotyping, **"PolyRisk"** for calculation of polygenic risk scores)
- Mutational profiling, genotype-phenotype correlations and identification of disease modifying genetic factors for several monogenic diseases in Slovakia
- Functional characterisation of DNA variants having yet uncertain or unknown clinical significance
- Development of nitisinone as a therapeutic drug for alkaptonuria (international cooperation - our department was responsible for DNA diagnostics and mutational profiling)

PROJECTS: 1 FP7-Health; 1 APVV; 1 MZ SR; 3 VEGA



DEPARTMENT OF MOLECULAR PHYSIOLOGY

HEAD: **prof. Oľga KRIŽANOVÁ, DSc.** (SB member)

TOPICS: modulation of the **calcium transport in tumors** and possible utilization of calcium transport blockers in their treatment, involvement of **hydrogen sulfide as a gasotransmitter in tumorigenesis** and/or treatment, **antioxidant properties of selenium compounds** due to interaction with hydrogen sulfide, nitric oxide, cysteine and glutathione

INFRASTRUCTURE: flow cytometer, fluorescent microscope, fluorescent reader

RESULTS:

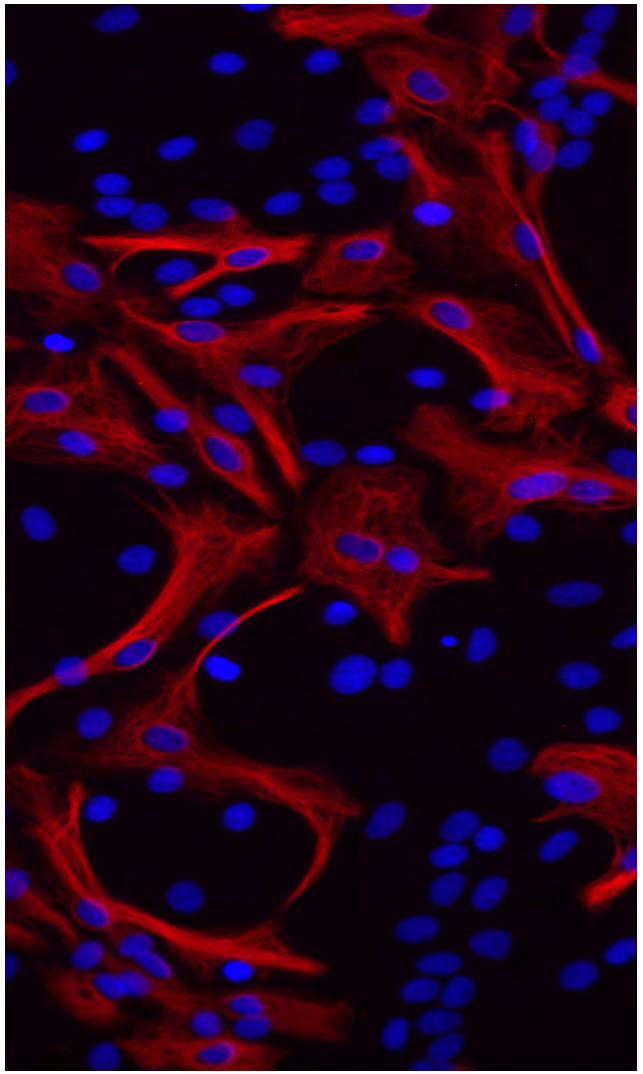
- Role of the sodium/calcium exchanger in tumor cells (*Nitric oxide, Cancers, Eur J Pharmacol*)
- Modulation of apoptosis by calcium transport and H2S producing enzymes in tumor cells (*Cell Death Dis, Oncotarget, Cell Physiol Biochem, BMC Cancer*)
- Antioxidant properties of sulfide/selenium derivatives (*Antioxidants, Oxidative medicine and cellular longevity, New Journal of Chemistry)*

PROJECTS: 5 VEGA, 5 APVV, 1 Min Health SR, 1 COST

INSTITUTE OF NEUROBIOLOGY

RESEARCH TOPICS: physiology of central nervous system with focus on cerebro-vascular disorders, mechanisms of ischemia or trauma-induced damage of nervous system, new approaches to neuroprotection and regeneration

Director: Ján GÁLIK, PhD.



DEPARTMENT OF REGENERATIVE MEDICINE AND CELL THERAPY

HEAD: **Ivo VANICKÝ, MVD., PhD.**

TOPICS: Regeneration of nervous system tissues, adult neurogenesis, regeneration of peripheral axons, cell therapies

INFRASTRUCTURE: Microsurgery and stereotaxic surgery, *In vivo* fluorescence imaging

RESULTS:

- Mapping of spatiotemporal molecular kinetics after spinal cord injury (*Mol Cell Proteomics*)
- Postnatally generated neurons of olfactory bulb are less sensitive to stress than pre-existing neurons (*Stress*)
- The significance of the rearrangement of blood vessels in neurogenic processes of the adult brain (*Brain Res, Int J Mol Sci*)
- Silencing of SOD1 gene prevents neurodegeneration in a model of ALS (*Nat Med*)

PROJECTS: 10 VEGA , 3 APVV, 1 APVV SK-FR , 3 ESIF

AGENTÚRA NA PODPORU VÝSKUMU A VÝVOJA

VÝSKUMNÁ AGENTÚRA

DEPARTMENT OF NEURODEGENERATION, PLASTICITY AND REPAIR

HEAD: **Jaroslav PAVEL, PhD.**

TOPICS: **acute injuries of the central nervous system** (CNS), primarily **traumatic spinal cord injury and cerebral ischemia** (stroke), endogenous **mechanisms of protection & regeneration**

INFRASTRUCTURE: surgery rooms equipped for stereotaxy and microsurgery, proteomics, functional electrophysiology, behavioural testing

RESULTS:

- enhanced regeneration and axonal growth by weak electric field (*J Neurosci Methods*)
- new histological optimally reproducible quantitative method (*J Neurotrauma*)
- remote ischemic conditioning improving neuronal survival after stroke (*Neurochem Int*)
- bioactive substance-mediated neuroprotection via blood cells (*Eur J Neurosci*)
- stimulated blood cells as a source for cell-free-based therapies (*J Neurochem*)
- necessity of microglial and astroglial polarization into neuroprotective phenotypes for neurological improvement (*Cells*)

PROJECTS: 9 VEGA, 3 APVV, 3 SF EU

AGENTÚRA NA PODPORU VÝSKUMU A VÝVOJA

VÝSKUMNÁ AGENTÚRA

BIOMEDICAL RESEARCH CENTER SLOVAK ACADEMY OF SCIENCES

CROSS-CUTTING RESEARCH ACTIVITIES OF BMC SAS

PROJECTS:

R&D CAPACITIES, OBESITY-SK, LISPER, BIOFORD, CEMEA

APVV COVID-20-0017, 18-0340, 15-0697, 14-0816, 19-0098, 15-0372, 19-0286, 15-0371, 19-0154 etc.

PUBLICATIONS: 13 IV+ICTR, 2 IV+IEE, 12 IC+CRI, 12 IEE+CRI, 8 IEE+ICTR, 16 CRI+ICTR
(registered in WOS & SCOPUS, abstracts excluded)

INFRASTRUCTURE: Research Clinic, Centre for Physical Activity, Laboratory of Bioinformatics, Animal facility for immunodeficient mice, etc.

KNOWLEDGE-SHARING: seminars, institutional conference, regular meetings of academic community to share plans and strategic decisions, trainings and skills development (projects VISION and CAPSID), teambuilding actions

OUTREACH: organization of scientific conferences, presentation of BMC SAS at science policy events and in media, web, facebook, participation in and organization of popularization activities etc.

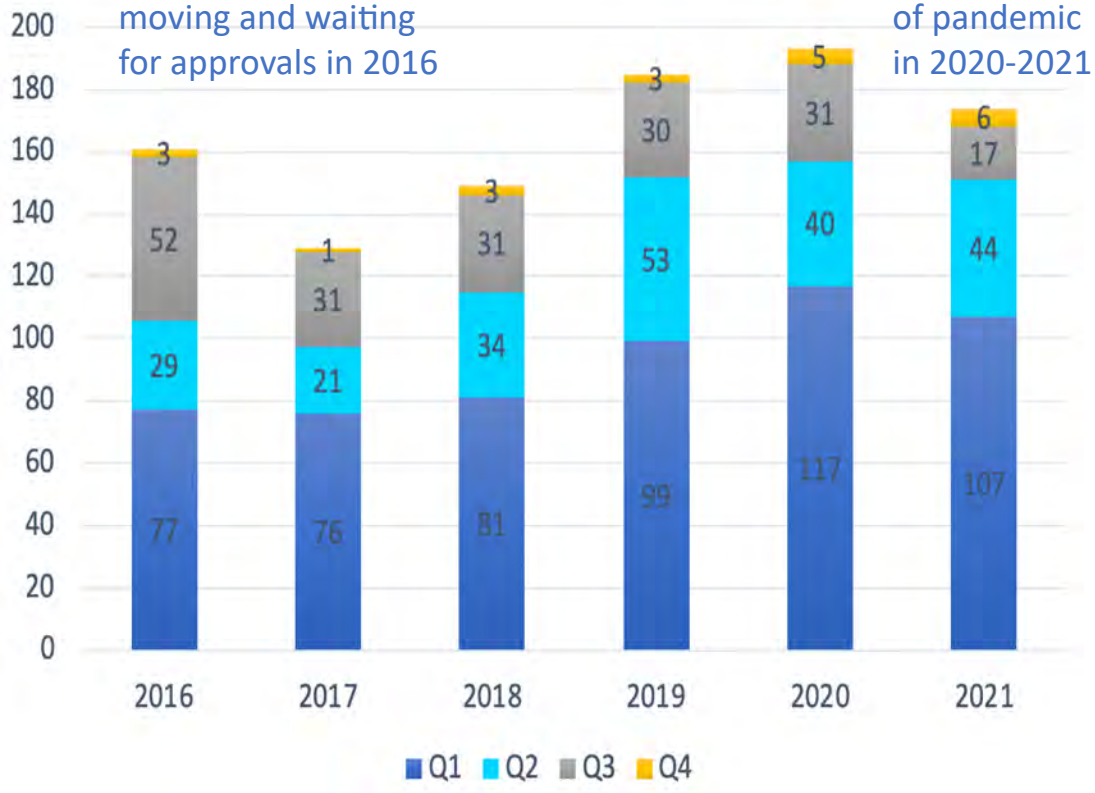
RESEARCH OUTPUTS

PUBLICATIONS

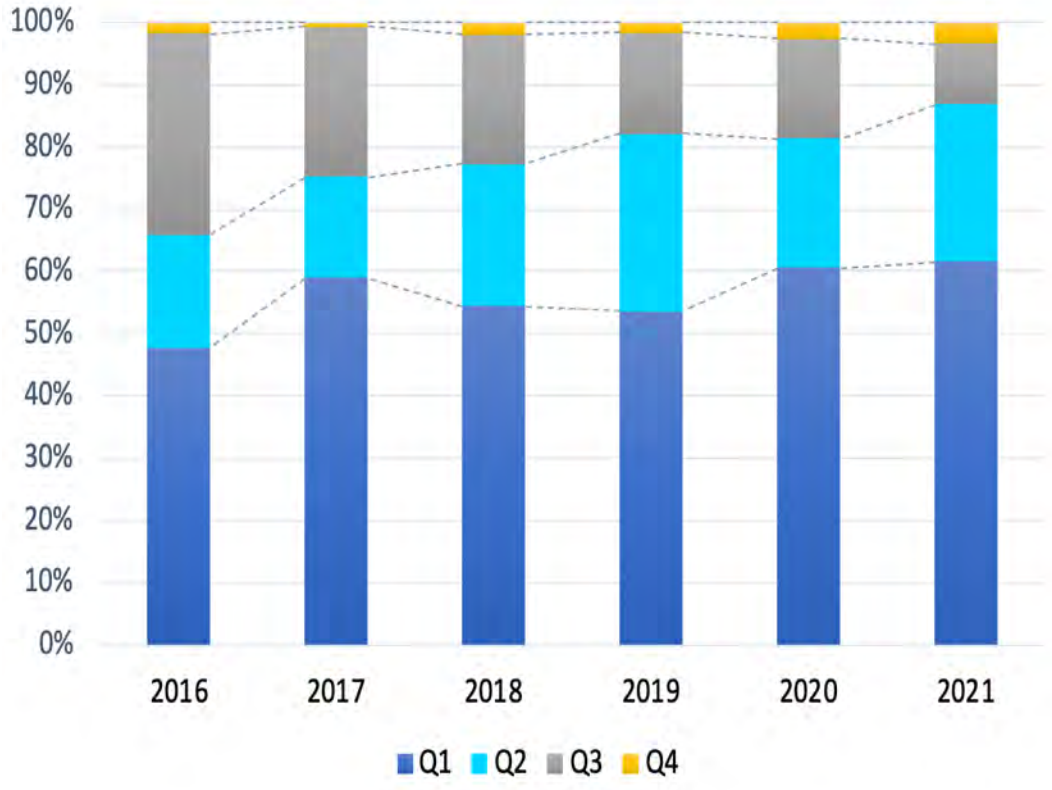
Saturation of quantity was reached, but space for improvement of quality remains.

Work disruption due to moving and waiting for approvals in 2016

Active mitigantion of pandemic in 2020-2021



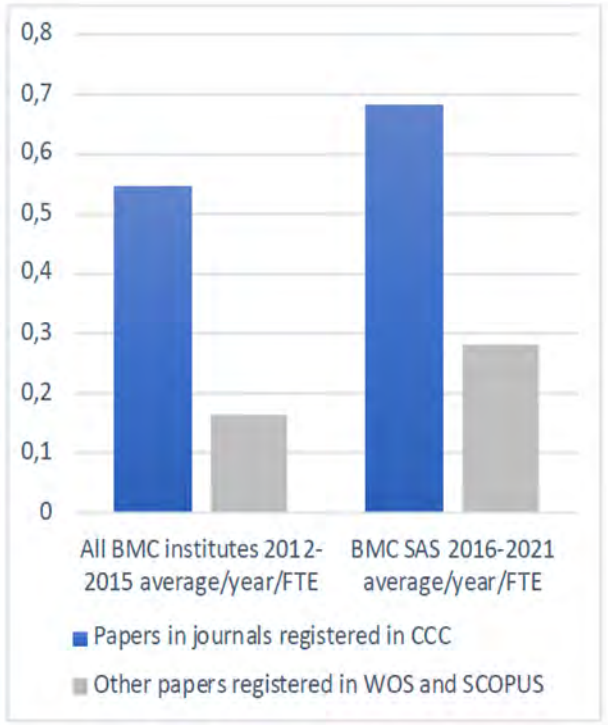
Number of papers according to Q (SJR)

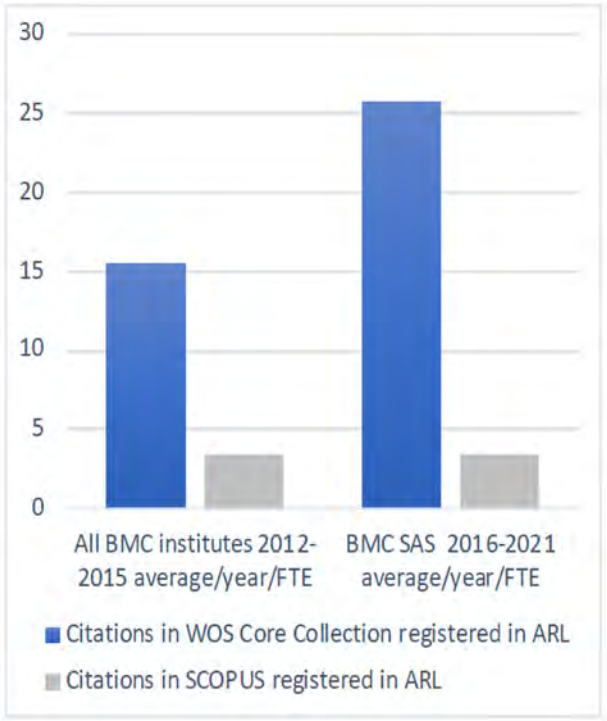


% of papers according to Q (SJR)

AVERAGE NUMBER OF PUBLICATIONS & CITATIONS PER FTE PER YEAR

2016-2021 VERSUS 2012-2025





Numbers have increased, but our key question persists:

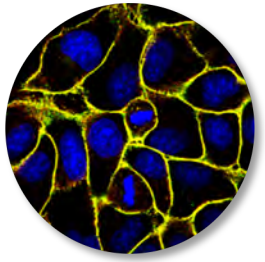
"What did this scientist do and why does it matter?"

https://www.nature.com/news/fewer-numbers-better-science-1.20858

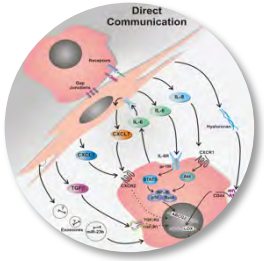
Merger of institutes resulted in reduced duplicity in registration of co-authored papers / citations

OUR MAIN CONTRIBUTIONS TO SCIENCE WITH IMPACT ON GLOBAL KNOWLEDGE

Based on most cited outputs with intellectual origin in BMC SAS institutes

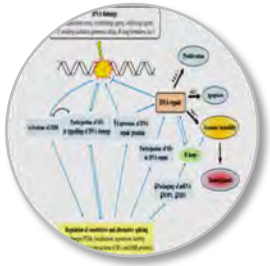


CA9
in cancer
biology

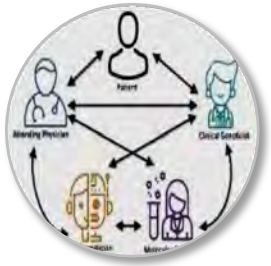


Tumor-
stroma
crosstalk

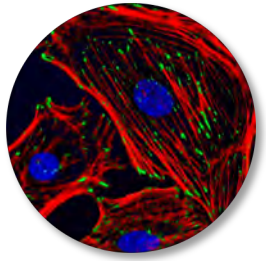
Integrative
physiology
of exercise



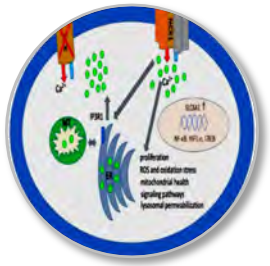
Genome
stability
maintenance



Functional
genomics of
monogenic
diabetes

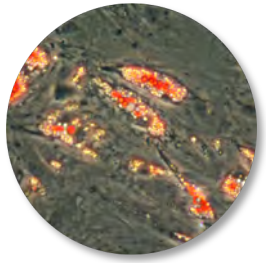


Nano-bio
Interactions
& approaches
to asses toxicity



Calcium
and H_2S
signaling

Tick-borne
and
zoonotic
diseases



Adipose
tissue
metabolism

Coxiella burnetii survival strategy

Etiology of autism

Aldosterone effects on mental functions

Novel treatments for alkaptonuria

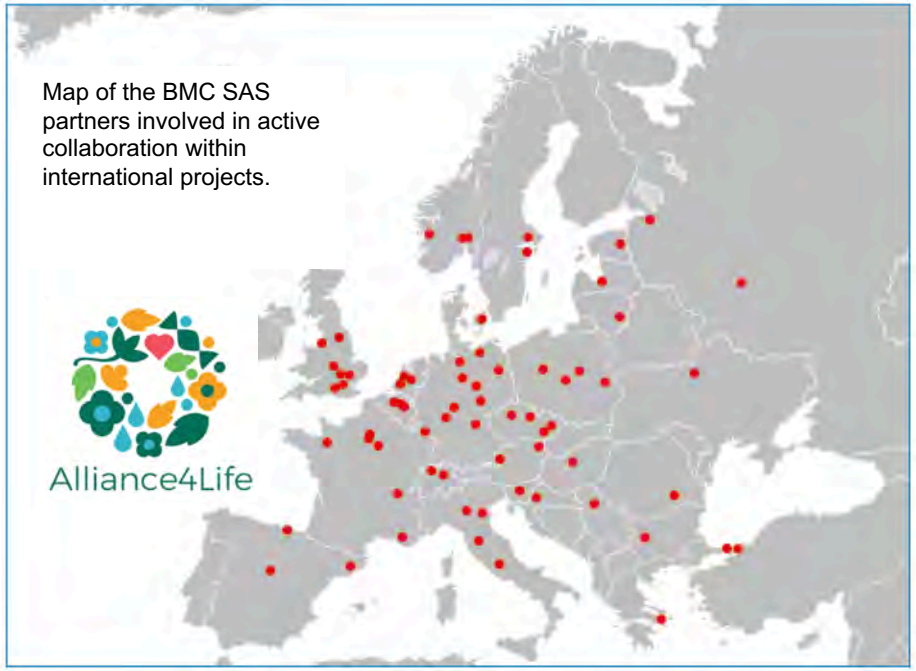
Neuroprotection in ischemia-reperfusion brain injury

Combination Treatment of acute CNS injuries

Postnatal neurogenesis in olfactory system

Plumpox virus evolution and ecology

POSITION IN ERA



Map of the BMC SAS partners involved in active collaboration within international projects.

INTERNATIONAL PROJECTS FP7, H2020, HEALTH, ERA-NET, COST, V4, DANUBE, NORDIC, INTERREG, CZ

INTERNATIONAL CONFERENCES 13 as main organizer (791 participants), 4 as co-organizer (415 participants)

INTERNATIONAL JOURNALS Neoplasma, Acta Virologica, Endocrine Regulations

MEMBERSHIPS IN INTERNATIONAL ORGANISATIONS EACR, ISCaM, FEBS, FEMS, FENS, EPS, ESN, MSAA, ADA, EASD, ESHG, IDH, EHA, EVD-LabNet, EFSA, IBRO, IUC, AAI, ESH, ESCMID, EASO, ISHR,

INTERNATIONAL AWARDS

Joel M. Dalrymple award of International Society of Hantaviruses to Boris Klempa

Janos Arany Award of the Hungarian Academy of Sciences to Ľudevít Kádaši

EVAg
European Virus Archive Global

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An international group of **46** laboratories

Including 27 EU and 19 non-EU research centers that represent an extensive range of virological disciplines.

Ref-SKU	Type	Product	Product Risk Group	Provider	Cost per Access (Academics)	Add to Cart
006N-03938	Nucleic Acid	SARS-CoV-2 strain Slovakia/SK-BMC5/2020, RNA	RG1	BMC-SAS	500€	Add to enquiry cart
006N-03939	Nucleic Acid	SARS-CoV-2 strain Slovakia/SK-BMC5/2020, cDNA	RG1	BMC-SAS	250€	Add to enquiry cart
006V-03933	Virus	SARS-CoV-2 strain Slovakia/SK-BMC5/2020	RG3	BMC-SAS	2,000€	Add to enquiry cart
006V-03937	Virus	SARS-CoV-2 strain Slovakia/SK-BMC5/2020 FD	RG3	BMC-SAS	2,000€	Add to enquiry cart
006V-03971	Virus	SARS-CoV-2 strain Slovakia/SK-BMC6/2020	RG3	BMC-SAS	2,000€	Add to enquiry cart

Boris KLEMPA, DSc.

Series of 3 EU projects, Institute of Virology
BMC SAS has been a founding member

The best way to get viral material within the *Scientific Community*.

Browse our viruses and derived products from the EVAg Portal.

Visit our Portal ! or learn more.

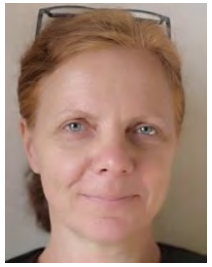
BIOMEDICAL RESEARCH CENTER SLOVAK ACADEMY OF SCIENCES

H2020 WIDESPREAD-TWINNING – Spreading Excellence and Widening Participation

VISION

STRATEGIES TO STRENGHTEN SCIENTIFIC EXCELLENCE AND INNOVATION CAPACITY FOR EARLY DIAGNOSIS OF GASTROINTESTINAL CANCERS

Alena GÁBELOVÁ, PhD.



Božena SMOLKOVÁ, PhD.

research **EXCELLENCE**

innovative capacity

COMPETITIVENESS

networking

creativity

new avenues of
CANCER RESEARCH

professional development
EDUCATION

knowledge society

PARTNERS

SLOVAKIA
BIOMEDICÍNSKE CENTRUM SLOVENSKEJ AKADÉMIE VIED

GERMANY
Fraunhofer
FRAUNHOFER INSTITUTE FOR BIOMEDICAL INGINEERING

SPAIN
SERVICIO MADRILEÑO DE SALUD

GREECE
HELLENIC REPUBLIC
National and Kapodistrian University of Athens
ΕΘΝΙΚΟ ΚΑΙ ΚΑΠΟΔΙΣΤΡΙΑΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ

NORWAY
NILU
NORSK INSTITUTT FOR LUFTFORSKNING STIFTELSE

STRATEGIES

Creation of strategic partnerships/ networking

Transfer of knowledge and research ideas

Sharing of know-how, expertise and best practices

Implementation of cutting-edge technologies

TOOLS

Trainings in advanced methods and technologies

Specialized courses, workshops, summer school,

Academic stays and secondments

Seminars, Invited talks, Conference

Co-supervision of PhD students

Outreach activities

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No. 857381

ALLIANCE FOR LIFE SCIENCES: FROM STRATEGIES TO ACTIONS IN CENTRAL AND EASTERN EUROPE (A4L_ACTIONS)

12 institutions from 11 countries of „EU-13“
Horizon 2020 / Health, demographic change and well-being
1.1.2018 – 31.12.2020 & 1.5.2021 – 30.4. 2024

With A4L_ACTIONS, we aim to use the established framework of Alliance4Life to **improve the cultures and networks** of health research performing institutions in a major part of the EU-13: the **Central and Eastern Europe**.

WP1 – Culture for Excellence
WP2 – Collaboration in Health R&I
WP3 – Careers in Science and Beyond
WP4 – Competences in Innovation for Human Health
WP5 – Closing the Gap
WP6 – Project Management
WP7 – Ethics Requirements

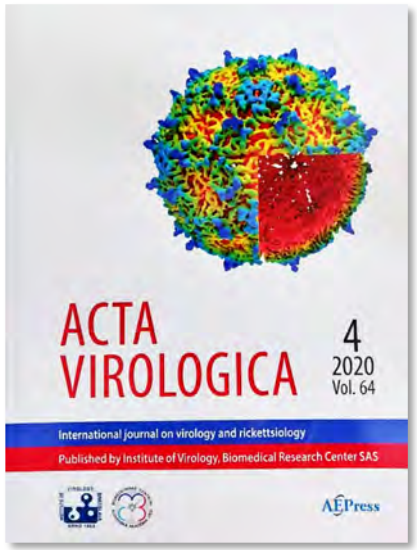
This project has received funding from the European Union‘s Horizon 2020 Research and Innovation programme under Grant Agreement No. 964997-

MASARYKOVA UNIVERZITA (CEITEC) – COORDINATOR
FAKULTNI NEMOCNICE U SV. ANNY V BRNE
BIOMEDICINSKE CENTRUM SLOVENSKEJ AKADEMIE VIED
UNIVERSYTET MEDYCZNY W LODZI
SVEUCILISTE U ZAGREBU MEDICINSKI FAKULTET
TARTU ULIKOOL
VILNIAUS UNIVERSITETAS
LATVIJAS ORGANISKAS SINTEZES INSTITUTS
UNIVERZA V LJUBLJANI
SEMMELWEIS EGYETEM
MEDICAL UNIVERSITY SOFIA
UNIVERSITATEA DE MEDICINA FARMACIE CAROL DAVILA DIN BUCURESTI

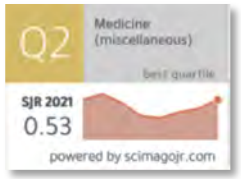
EDITORIAL ACTIVITIES – INTERNATIONAL JOURNALS

WoS Q3
IF 2016: 1,871
IF 2017: 1,696
IF 2018: 1,771
IF 2019: 1,721
IF 2020: 2,575
IF 2021: 3,409

Edited by the Cancer Research Institute BMC SAS
Established in 1954
Published 6-times a year
Chief Editor: Jela Brozmanová, DSc.
~ 160 documents per year



WoS Q4
IF 2016: 0,673
IF 2017: 0,696
IF 2018: 0,554
IF 2019: 0,793
IF 2020: 1,162
IF 2021: 1,827



Edited by the Institute of Virology BMC SAS
Established in 1957
Published 4-times a year
Chief Editor: Katarína Počicová, PhD.
~ 60 documents per year

FRONTIERS publishing partnership contract in process

Edited by the Institute of Experimental Endocrinology BMC SAS
Established in 1967
Published 4-times a year
Chief Editor: Alexander Kiss, DSc.
~ 30 documents per year

NATIONAL POSITION

NATIONAL COLLABORATIVE PROJECTS (50%)

7 out of 9 ESIF projects are collaborative (77%), 1 of these 7 is coordinated by BMC SAS
63 out of 116 APVV projects are coordinated by BMC SAS (44 of them collaborative),
in remaining 53 projects BMC SAS is a research partner (84% collaborative)
21 out of 203 VEGA projects are collaborative with SAS institutes and 39 with universities (29%)

MAIN NATIONAL COLLABORATORS

ACADEMIC

SAS: Institute of Zoology, Institute of Chemistry, Polymer Institute, Centre of Experimental Medicine, Centre of BioSciences, Institute of Molecular Biology, CEMEA

Comenius University in Bratislava: Faculty of Natural Sciences, Faculty of Medicine, Faculty of Physical Education and Sports, Jessenius Faculty of Medicine in Martin, Science Park of the Comenius University

Slovak University of Technology in Bratislava, Faculty of Chemical and Food Technology

Pavol Jozef Šafárik University in Košice

University of ss. Cyril and Methodius in Trnava: Faculty of Natural Sciences

National Agricultural and Food Centre in Nitra, Slovak University of Agronomy in Nitra

CLINICAL

University Hospital Bratislava, Department of Neurology, Department of Otorhinolaryngology

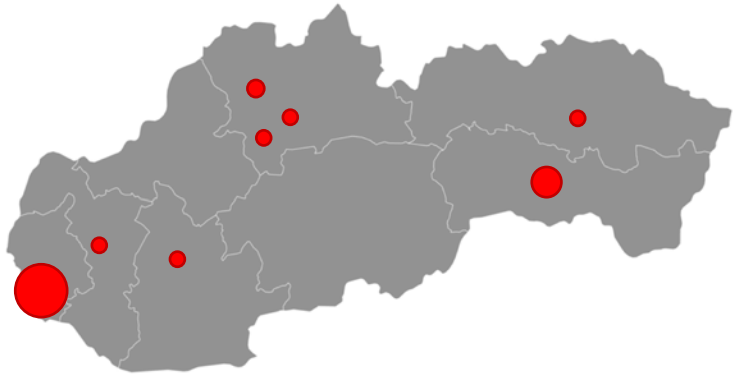
National Institute for Children's Diseases, Department of Pediatric Hematology and Oncology

National Cancer Institute, National Institute of Endocrinology and Diabetology

Public Health Office of the Slovak Republic

PRIVATE

MABPRO, GENETON, MuliplexDX, SELECTA Biotech, ImunaPharm



5 JOINT RESEARCH LABS SHARED WITH UNIVERSITIES

>40 INVITED/KEYNOTE LECTURES AT NATIONAL CONFERENCES

MEMBERSHIPS IN NATIONAL RESEARCH SOCIETIES and in their governing bodies

NATIONAL REFERENCE LAB FOR SURVEILLANCE OF RICKETTSIAE

SELECTED NATIONAL AWARDS

SAS AWARD for popularization of science and societal impact: Boris Klempa, Juraj Kopáček, Tatiana Betáková, Silvia Pastoreková
SAS AWARD for international collaboration: Alena Gábelová SAS AWARD for high citation impact: Oľga Križanová
SAS AWARD for excellent publications: Jozef Ukropec, Zuzana Kovaničová
SAS AWARD in competition of young researchers: Jana Plavá (1st place), Alexandra Reichová (2nd place)

MINISTRY OF EDUCATION, SCIENCES, RESEARCH and SPORTS awards "Personality of science and technology": Boris Klempa
"Young personality of science and technology": Viktória Čabanová "Best team in science and technology": Daniela Gašperíková et al.

SLOVAK LITERARY FUND premium award: Július Brtko, Daniela Ježová, Oľga Križanová, Jozef Ukropec, Timea Kurdiová

JUNIOR CHAMBER INTERNATIONAL Student's personality of Slovakia: Silvia Schmidtová (top personality), Radivojka Bánová, Zuzana Kubiritová-Pos, Jana Plavá
L'Oreal UNESCO for Women in Science Award: Lucia Kučerová, Svetlana Miklíková, Silvia Schmidtová

ESET SCIENCE AWARD finalists: Boris Klempa (finalits top research personality & award of public), Jozef Ukropec (top research personality), Svetlana Miklíková (finalist top young research personality)
CRYSTAL WING in Medicine and Science laureate: Boris Klempa
SLOVAK WOMAN OF THE YEAR: Barbora Ukropcová (absolute winner), Daniela Gašperíková (nomination), Adela Penesová (nomination)

STATE DECORATION BY PRESIDENT Zuzana Čaputová for outstanding contribution to development of science: Silvia Pastoreková

LEARNED SOCIETY OF SLOVAKIA

Daniela Ježová, Oľga Križanová, Alexandra Zahradníková, Silvia Pastoreková, Jaromír Pastorek, Ľudevít Kádaši, Karol Ondriaš, Boris Klempa

EDUCATION, TRAINING AND CAREER DEVELOPMENT

TEACHING AND SUPERVISING UNIVERSITY STUDENTS, ACTING IN COMMITTEES

TEACHING

Comenius University in Bratislava
Faculty of Natural Sciences, Faculty of Medicine, Faculty of Pharmacy, Faculty of Physical Education and Sports

Slovak University of Technology in Bratislava
Faculty of Chemical and Food Technology

Pavol Jozef Šafárik University in Košice Faculty of Science

University of ss. Cyril and Methodius in Trnava
Faculty of Natural Sciences

Slovak Medical University, Faculty of Medicine

TEACHING AND SUPERVISING	2016	2017	2018	2019	2020	2021
Lectures (hours per year)	603	403	434	408	380	470
Practicum courses (hours per year)	1906	1238	732	525	924	963
Supervised bachelor and diploma theses (in total)	88	67	86	93	83	75
Members in PhD committees (in total)	20	20	16	16	17	17
Members in DSc committees (in total)	6	5	6	5	7	7

JOINT FACILITIES

Laboratories of Virology, Institute of Virology BMC SAS shared with: Department of Microbiology and Virology, Faculty of Natural Sciences, Comenius University in Bratislava

Laboratory of Human Genetics, Department of Molecular Biology, Faculty of Natural Sciences, Comenius University in Bratislava shared with: Department of Human Genetics, Institute of clinical and Translational Research BMC SAS

MEDIPARK, University of Pavel Jozef Šafárik, Košice shared with: Institute of Neurobiology BMC SAS

University Science Park for Biomedicine in Bratislava shared with: Institute of Molecular Biomedicine, Faculty of Medicine, Comenius University in Bratislava

Department of Metabolic Disorders Research, Institute of Experimental Endocrinology BMC SAS shared with: 1st clinic of otorhinolaryngology, Faculty of Medicine, Comenius University in Bratislava

ACCREDITED PHD PROGRAMMES

Field of study: BIOLOGY
Guarantor at BMC SAS: Oľga Križanová, prof., DSc.
Programmes: Animal Physiology, Genetics, Molecular Biology, Microbiology, Virology (currently Microbiology& Virology)

Field of study: GENERAL MEDICINE
Guarantor at BMC SAS: Jozef Ukropec, DSc.
Programmes: Normal and Pathological Physiology, Oncology

Field of study: CHEMISTRY
Guarantor at BMC SAS: Ľudovít Škultéty, DSc.
Programme: Biochemistry

Field of study: PHYSICS
Guarantor at BMC SAS: Alexandra Zahradníková, DSc.
Programme: Biophysics

Field of study: SPORT SCIENCES
Guarantor at BMC SAS: Barbara Ukropcová, prof. , PhD.
Programme: Sport Sciences (from 2022)

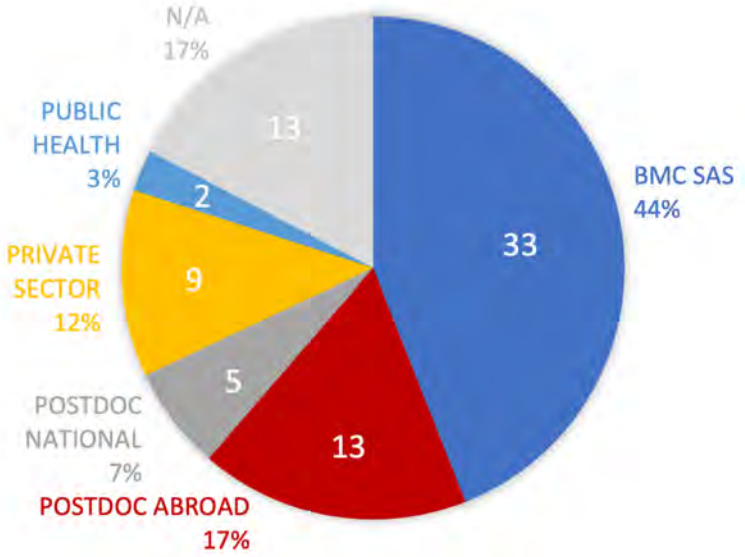
BMC SAS CAPACITIES

Pool of 141 POTENTIAL SUPERVISORS

92 PhD STUDENTS with SAS scholarship supervised during 2016-2021
(plus 15 PhD students funded by the universities)

74 PhD STUDENTS defended their thesis

POST-DOC CAREER PATHS



SASPRO FELLOWS (2015 – 2018)


Jana Jakubíková*


Andrea Bábelová*


Ivana Nemčovičová*


Michal Cagalinec*

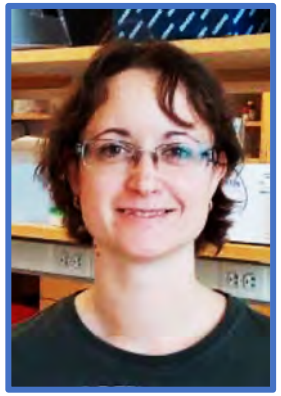

Tereza Goliaš


Ľuboš Čipák

SASPRO 2 FELLOWS (2022 – 2025)


Miroslav Baláž


Lucia Balážová


Katarína Lopušná

SASPRO

SASPRO 2

*Now heads of departments

TRAININGS, PRESENTATIONS AND SUPPORT

22 trainings in special skills and topics in oncology
14 courses in practical and soft skills
7 lectures by internationally renowned scientists
(> 1000 participants)

22 educational seminars for transfer of knowledge in state-of-the-art methods and research approaches in structural biology (>1800 participants)

Štefan Schwarz Support Fund, 12 postdocs

Compensatory allowance from SAS Fund
30 postdocs + 2 from internal BMC SAS resources

9 postdocs

Internal seminars for presentations of research by PhD students and postdocs
Workshop in bioinformatics for young BMC SAS researchers

CONTEST OF YOUNG ONCOLOGISTS

CONTEST OF YOUNG NEUROSCIENTISTS

BMC SAS TALENT
starting from 2022

SOCIETAL IMPACT

SOCIETAL IMPACT OF RESEARCH

"Not everything that can be counted counts, and not everything that counts can be counted."
Albert Einstein

https://www.docwirenews.com/docwire-pick/bench-to-bedside-translating-science-from-the-lab-to-the-clinic/

DNA DIAGNOSTICS

monogenic diabetes & spectrum of metabolic disorders, including identification of novel genotype-phenotype relationships
FOR PERSONALIZED THERAPY DECISIONS IN CLINICAL PRACTICE

CANCER DIAGNOSTICS

novel tumor biomarkers & therapy targets, multiparametric detection of clonal composition of tumors by mass cytometry
FOR PATIENTS' STRATIFICATION AND/OR THERAPY

DETECTION OF INFECTIONS

C. burnetii, Ch. pneumoniae, influenza, LCMV, herpes viruses, zoonotic agents, SARS-CoV-2
FOR EARLY DIAGNOSTICS & SURVEILLANCE
GLP certified production of
VACCINATION ANTIGEN AGAINST Q FEVER

OBESITY MANAGEMENT

personalized prevention and intervention programs of dietary and physical activities against obesity, type 2 diabetes, ageing and mental decline
FOR BETTER FITNESS AND QUALITY OF LIFE

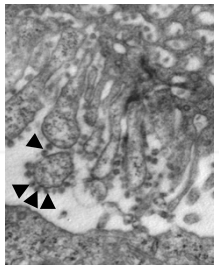
NEUROPROTECTION AND REPARATION

new means and procedures for protection, neurogenesis and reparation of trauma in CNS and spine
FOR BETTER QUALITY OF LIFE

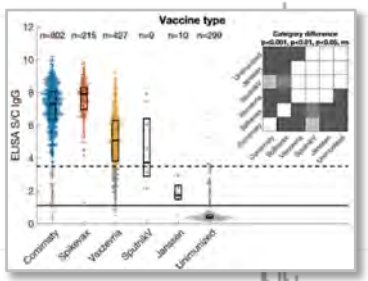
QUALITY CONTROL

development and practical use of methods for analysis and quality control of medical products - GMP certified
FOR SAFETY AND CARE OF PATIENTS

RESPONSE TO PANDEMIC



Serological testing (SAS, Slovak regions, Trencin city)



Testing virus Neutralization (patients, AXON MAbs)
Monitoring spaces
SOP contribution
Testing antiviral properties
Olfactory testing
Thermal inactivation for cleaner development
Etc.

RT-qPCR tests (MDX)
virus isolation, VNT
SARS-CoV-2 testing

SPUTNIK V evaluation*

Variants' sequencing

1 2 3 4 5 6 7 8 9 10

VEDA POMÁHA COVID19

building awareness and contributing to policy decisions, dissemination of knowledge, > 800 outreach activities

15000
10000
5000
0
Jul 2020
Jan 2021
Jul 2021
Jan 2022
Jul 2022

1 – testing initiation to support Public Health Authority, 2 – 1st isolate of SARS-CoV-2 from Slovak patient, 3 – development and validation of RT qPCR, the 1st of series
4 – donation of RNA isolation automat and intensification of testing, 5 – detection of B 1.1.7 variant onset, 6 – introduction of gargling test, 7 – detection of alpha variant onset, 8 – detection of delta variant onset, 9 – detection of Omicron onset, 10 – end of regular testing, *evaluation of pharmaceutical quality of vaccine

ACTIVITIES FOR DECISION-MAKING AUTHORITIES

SARS-CoV-2 **testing, sequencing and seroprevalence** studies for state and regional authorities

Validation of Sputnik V pharmaceutical quality for SUKL and Ministry of health (MH)

Surveillance of zoonoses, alimentary and water-borne infections in Slovakia for Ministry of agriculture (MA) and State Veterinary and Food Administration (SVFA)

Expert reports and opinions for different state authorities, incl. Slovak National Accreditation Service, SVFA, Criminal Office of Financial Administration, MA, Slovak Commission of Scientific Degrees etc.
Guidelines and SOP for Ministry of health SR

Reviewer activities for grant agencies
Memberships in commission for PhD and DSc defences

Hosting Innovation day of the Ministry of foreign affairs for foreign ambassadors accredited in Slovakia and then presenting BMC SAS at the meeting of Slovak ambassadors accredited abroad

Expert advises to the President of the Slovak Republic on the mitigation of pandemic threats

Expert advises to the Premier and Minister of health of the Slovak Republic on the mitigation of pandemic threats

Alliance4Life

National roundtable on science policy

VEDA POMÁHA COVID19

ÚVO ÚRAD PRE VEREJNÉ OBSTARÁVANIE

2020 Experiences from practice of biomedical research delivered to the **Office of Public Procurement** of the Slovak Republic and initial discussions with the representation of UVO on **specific aspects of procurement in R&D**
2021-2022 continuing discussions of possible changes in methodology, **collection of best practices from A4L partners** and other EU collaborators resulting in **approval of EC and new guidelines for R&D issued in August 2022**

CONTRACTS AND RESEARCH PROJECTS WITH INDUSTRY AND COMMERCIAL PARTNERS

Development and validation of analytical methods
Quality and sterility control of raw materials, semiproducts, final pharmaceuticals and medicinal products
Monitoring microbiological and virological safety of materials and spaces
Testing virocidal properties of materials

Regenmed

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NÁRODNÝ ÚSTAV DETSKÝCH CHORÔB

AG+ RUVIREX®

Calendula

PFSK PROGRESA FINAL SK

ŽELEZNIČNÁ SPOLOČNOSŤ SLOVENSKO NÁRODNÝ DOPRAVCA

Testing transport medium, antivirus spray, virus-neutralization activity, development and validation of tests for detection of SARS-CoV-2

Multiplex IDX

axon NEUROSCIENCE

gsk

Development of antibodies for cancer therapy

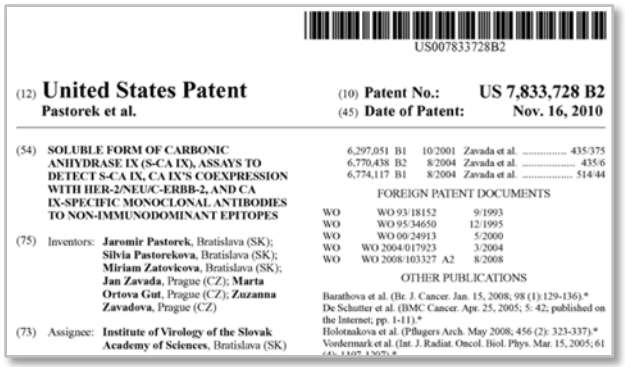
MABPRO

Testing blood samples for genomic instability

KI KOMPETENZINITIATIVE zum Schutz von Mensch, Umwelt und Demokratie e.V.

BIOMEDICAL RESEARCH CENTER SLOVAK ACADEMY OF SCIENCES

PATENTS AND LICENSES



US007833728B2

(12) **United States Patent**
Pastorek et al.

(10) **Patent No.: US 7,833,728 B2**
(45) **Date of Patent: Nov. 16, 2010**

(54) **SOLUBLE FORM OF CARBONIC ANHYDRASE IX (S-CA IX), ASSAYS TO DETECT S-CA IX, CA IX'S COEXPRESSION WITH HER-2/NEU/C-ERBB-2, AND CA IX-SPECIFIC MONOCLONAL ANTIBODIES TO NON-IMMUNODOMINANT EPITOPES**

(75) Inventors: **Jaromir Pastorek**, Bratislava (SK); **Silvia Pastorekova**, Bratislava (SK); **Miriam Zatovicova**, Bratislava (SK); **Jan Zavada**, Prague (CZ); **Marta Ortova Gut**, Prague (CZ); **Zuzanna Zavadova**, Prague (CZ)

(73) Assignee: **Institute of Virology of the Slovak Academy of Sciences**, Bratislava (SK)

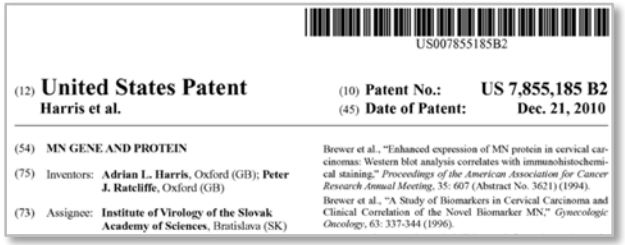
6,297,051 B1 10/2001 Zavada et al. 435/375
6,770,438 B2 8/2004 Zavada et al. 435/6
6,774,117 B1 8/2004 Zavada et al. 514/44

FOREIGN PATENT DOCUMENTS

WO WO 93/18152 9/1993
WO WO 95/34650 12/1995
WO WO 00/24913 5/2000
WO WO 2004/017923 3/2004
WO WO 2008/103327 A2 8/2008

OTHER PUBLICATIONS

Barathova et al. (Br. J. Cancer. Jan. 15, 2008; 98 (1):129-136).*
De Schutter et al. (BMC Cancer. Apr. 25, 2005; 5: 42; published on the Internet; pp. 1-11).*
Holotnakova et al. (Pflugers Arch. May 2008; 456 (2): 323-337).*
Vordermark et al. (Int. J. Radiat. Oncol. Biol. Phys. Mar. 15, 2005; 61



US007855185B2

(12) **United States Patent**
Harris et al.

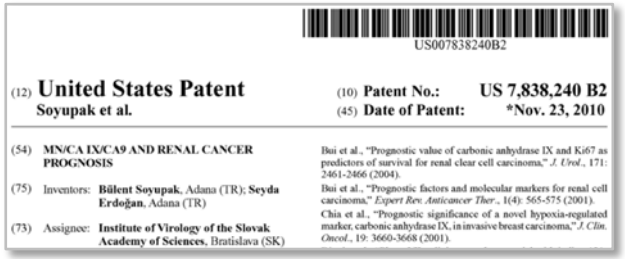
(10) **Patent No.: US 7,855,185 B2**
(45) **Date of Patent: Dec. 21, 2010**

(54) **MN GENE AND PROTEIN**

(75) Inventors: **Adrian L. Harris**, Oxford (GB); **Peter J. Ratcliffe**, Oxford (GB)

(73) Assignee: **Institute of Virology of the Slovak Academy of Sciences**, Bratislava (SK)

Brewer et al., "Enhanced expression of MN protein in cervical carcinomas: Western blot analysis correlates with immunohistochemical staining," *Proceedings of the American Association for Cancer Research Annual Meeting*, 35: 607 (Abstract No. 3621) (1994).
Brewer et al., "A Study of Biomarkers in Cervical Carcinoma and Clinical Correlation of the Novel Biomarker MN," *Gynecologic Oncology*, 63: 337-344 (1996).



US007838240B2

(12) **United States Patent**
Soyupak et al.

(10) **Patent No.: US 7,838,240 B2**
(45) **Date of Patent: *Nov. 23, 2010**

(54) **MN/CA IX/CA9 AND RENAL CANCER PROGNOSIS**

(75) Inventors: **Bülent Soyupak**, Adana (TR); **Seyda Erdoğan**, Adana (TR)

(73) Assignee: **Institute of Virology of the Slovak Academy of Sciences**, Bratislava (SK)

Boi et al., "Prognostic value of carbonic anhydrase IX and Ki67 as predictors of survival for renal clear cell carcinoma," *J. Urol.*, 171: 2461-2466 (2004).
Boi et al., "Prognostic factors and molecular markers for renal cell carcinoma," *Expert Rev. Anticancer Ther.*, 1(4): 565-575 (2001).
Chia et al., "Prognostic significance of a novel hypoxia-regulated marker, carbonic anhydrase IX, in invasive breast carcinoma," *J. Clin. Oncol.*, 19: 3660-3668 (2001).

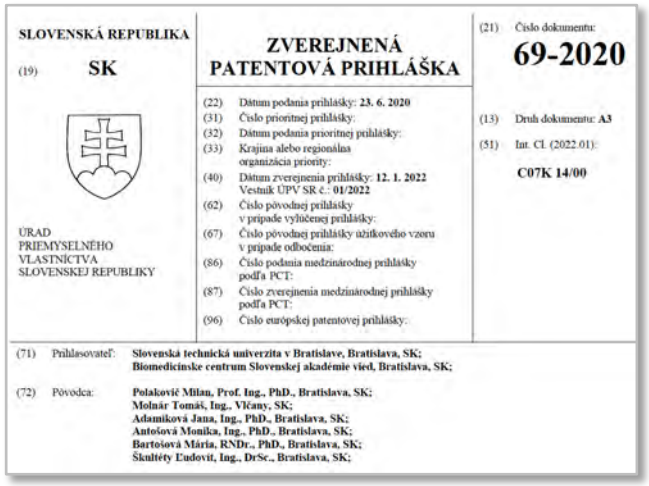
Non-exclusive License Agreements
Licensee: BioScience Slovakia, s.r.o.
Purpose: commercial use of CA IX-specific M75 monoclonal antibody for research and in vitro diagnostics

Licensee: WILEX a.g.
Country: Germany
Purpose: commercial use of CA IX-specific M75 monoclonal antibody for in vitro diagnostics and patient stratification to immunotherapy

Licensee: MABPRO, s.r.o.
Country: Slovakia
Purpose: commercial use of CA IX-specific monoclonal antibodies for cancer diagnostics and therapy

Licensee: BioLegend, Inc.
Country: California, USA
Purpose: commercialization of monoclonal antibodies specific for Endosialin, a marker of tumor angiogenesis, for research use

https://patents.google.com/patent/US7833728B2/en?oq=US7833728
https://patents.google.com/patent/US7816493B2/en?oq=US7816493
https://patents.google.com/patent/US7846673B2/en?oq=US7846673
https://patents.google.com/patent/US7855185B2/en?oq=US7855185+(B2)
https://patents.google.com/patent/US7851455B2/en?oq=7851455
https://patents.google.com/patent/US7838240B2/en?oq=US7838240
https://patents.google.com/patent/US7820159B2/en?oq=US7820159



SLOVENSKÁ REPUBLIKA
(19) **SK**

ÚRAD PRIEMYSELNÉHO VLASTNÍCTVA SLOVENSKEJ REPUBLIKY

ZVEREJNENÁ PATENTOVÁ PRIHLÁŠKA

(21) Číslo dokumentu: **69-2020**

(22) Dátum podania prihlášky: **23. 6. 2020**
(31) Číslo prioritnej prihlášky:
(32) Dátum podania prioritnej prihlášky:
(33) Krajina alebo regionálna organizácia priority:
(40) Dátum zverejnenia prihlášky: **12. 1. 2022**
Vestník ÚPV SR č.: **01/2022**
(62) Číslo pôvodnej prihlášky v prípade vyňatej prihlášky:
(67) Číslo pôvodnej prihlášky úžitkového vzoru v prípade odbočenia:
(86) Číslo podania medzinárodnej prihlášky podľa PCT:
(87) Číslo zverejnenia medzinárodnej prihlášky podľa PCT:
(96) Číslo európskej patentovej prihlášky:

(13) Druh dokumentu: **A3**
(51) Int. Cl. (2022.01):
C07K 14/00

(71) Prihlasovateľ: **Slovenská technická univerzita v Bratislave, Bratislava, SK; Biomedicínske centrum Slovenskej akadémie vied, Bratislava, SK;**

(72) Pôvodca: **Polaković Milan, Prof. Ing., PhD., Bratislava, SK; Molnár Tomáš, Ing., Vlčany, SK; Adamiková Jana, Ing., PhD., Bratislava, SK; Antošová Monika, Ing., PhD., Bratislava, SK; Bartošová Mária, RNDr., PhD., Bratislava, SK; Škultéty Ľudovít, Ing., DrSc., Bratislava, SK;**

Mode of chromatographic purification of recombinant human erythropoietin
Patent assignee: Slovak Technical University (70%), BMC SAS (30%)
https://wbr.indprop.gov.sk/WebRegistre/Patent/Detail/69-2020

Non-exclusive License Agreement
Licensee: Moredun Research Institute
Country: Scotland, UK
Purpose: development of Q fever vaccine using live culture of Coxiella burnetii strain RSA439 growing on axenic medium

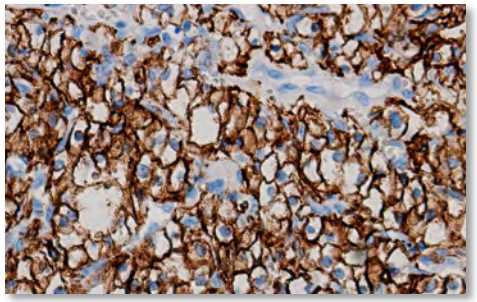
INTERNALLY REGISTERED IP

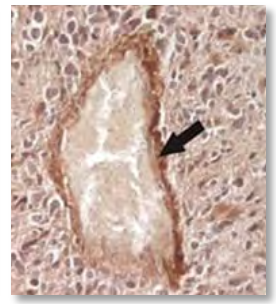
(CONFIDENTIAL KNOW-HOW)

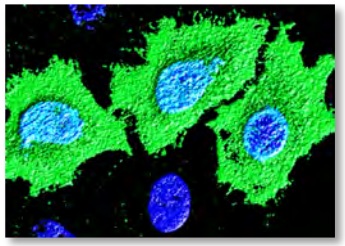
Examples of internally registered IP include:

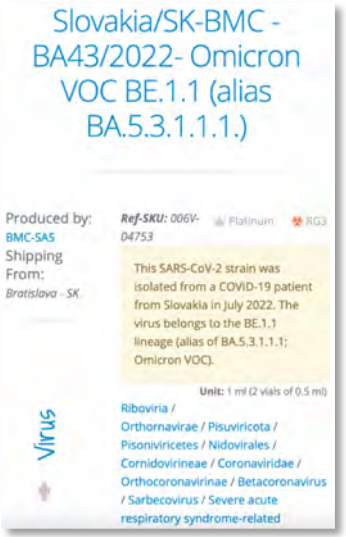
- HYBRIDOMAS AND MONOCLONAL ANTIBODIES specific for CA IX cancer biomarker, S100P cancer-associated calcium-binding protein, Endosialin - biomarker of tumor angiogensis, LCM virus, herpesvirus HSV1, influenza virus, HLA G antigen
- GENETICALLY MODIFIED CELLS LINES with overexpression or knock-out of selected regulatory molecules studied at BMC SAS
- VIRUSES AND VIRUS-DERIVED COMPONENTS (biobanked in the European Virus Archive)
- COLLECTION OF SAMPLES (blood and fibroblasts) of patients with monogenic disorders
- COLLECTION OF TUMOR TISSUE SPECIMENS
- SPECIALISED DIAGNOSTIC METHODS for genetic diagnostics (including special expertise in data interpretation and functional assays), immunodetection methods etc.
- CERTIFIED PRODUCTION of C. burnetii antigen for Q fever detection and/or vaccination
- CERTIFIED METHODS of analysis of medicinal products

Plan to elaborate a CATALOGUE OF ASSETS









DISSEMINATION, POPULARIZATION, BUILDING AWARENESS

ACTIVITIES ORGANISED/CO-ORGANISED BY BMC SAS

SCIENTIFIC WORKSHOPS IN ONCOLOGY

Spreading awareness of cancer among high school students throughout Slovakia. Annually includes more than 100 events in 30-40 high schools.

SCIENCE CAFÉ KOŠICE

Inform public on achievements of researchers in Slovakia via popularization lectures and discussions.

SLOVAK OBESITY DAY

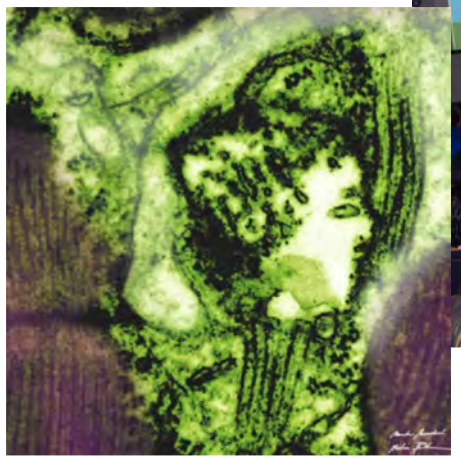
Raising public awareness of obesity as a major health risk issue preventable by changes in the lifestyle

GENERALI BALANS PROGRAM

Promote healthy lifestyle and provide expert advises on the subject

OUTREACH ACTIVITIES RELATED TO COVID-19 PANDEMIC

more than 400 appearances, articles and opinions in major media, more than 500 mentions, internet contributions



CREATIVE RESILIENCE – ART BY WOMEN IN SCIENCE (UNESCO, Paris, M.Novotová)

PARTICIPATION AT

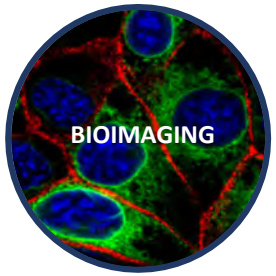
EUROPEAN RESEARCHERS' NIGHTS

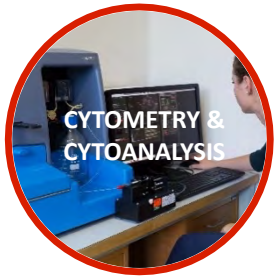
WEEK OF SCIENCE AND TECHNOLOGY (DAY OF OPEN DOORS)

EXPO DUBAI

INFRASTRUCTURE

SPECIALISED LABORATORIES AND FACILITIES





DIABGENE
DNA DIAGNOSTICS

PROTEOMICS 1

RADIOBIOLOGY

RADIOISOTOPES

GLP LAB FOR
PRODUCTION
C. BURNETTI Ag

ANIMAL HOUSE
INFECTIONS

IMPLEMENTATION OF RECOMMENDATIONS FROM EVALUATION 2012-2015

HORIZONTAL INTEGRATION

- Principles of integration defined in MEMORANDUM OF UNDERSTANDING
- Establishment of common administrative and technical support units = ECONOMIC, LEGAL, PROJECT AND TECHNICAL DEPARTMENTS, their consolidation and rules of operation based on EXTERNAL AUDIT
- Establishment of PUBLIC PROCUREMENT DEPARTMENT
- Submission and implementation of CROSS-CUTTING ESIF & EU PROJECTS
- Building, taking care and sharing INFRASTRUCTURE
- Developing COLLABORATIONS in research and management
- Using COMMON INSIGNIA, building corporate identity through knowledge sharing and developing professional relationships and mutual trust, while respecting history

SELECTION OF QUALITY, REDESIGN AND SELECTION OF RESEARCH AGENDA

- RESTRUCTURING of research departments (from 22 to 15)
- ACQUISITION of 3 new research departments (2 from the Institute of neurobiology, 1 from the Centre of Biosciences)
- SELECTION of department heads based on hearings (average age decreased by about 10 years)
- SYSTEMIZATION OF WORKING POSITIONS in line with needs and salary budget
- EVALUATION and reward of research performance, common rules adopted and updated
- REINTEGRATION of researchers and support of their career development
- CONSOLIDATION of agenda based on umbrella principle is ongoing

ESTABLISHMENT OF ISAB

- NOMINATIONS AND BYLAWS of ISAB (2019)
- No action so far due to pandemic
- Plan to call ISAB in 2023 for evaluation of research agenda and activities of research departments
- SELF-ASSESSMENT and benchmarking evaluations of 2015-2017 and 2018-2020 within Alliance4Life projects

IMPROVEMENT OF PUBLISHING STRATEGY

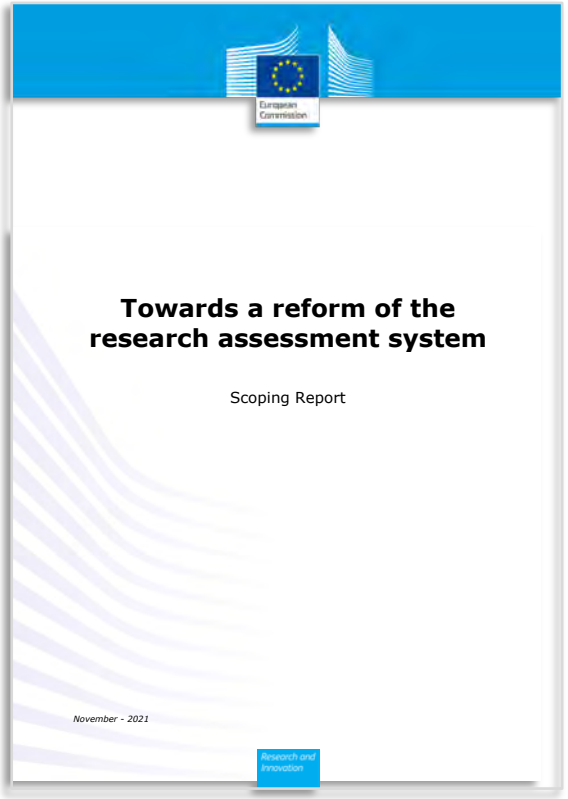
„LESS AND BETTER“ principle

Quality resulting from our genuine research
In-house research balanced with collaborations
≈ 50% papers in international collaboration + 30% national
≈ 50% papers with first or corresponding author from BMC SAS
≈ 20% of publications with single author from BMC SAS without key position

Regular analyses of trends, evaluation of individual researchers
Annual reward for publications and for other beneficial activities
in line with EC recommendations for responsible use of metrics

Specificities of biomedical research in the BMC SAS context:

- Elimination of duplicity in outputs registration (resulting from merge and internal rules)
- Complex character of investigations (from molecules through animal models to humans)
- Strict rules for approvals and difficult access to patients’ specimens
- Orientation towards societal impact, high engagement in projects
- Low resources for OA publishing and absence of national support for Open research
- Generation exchange potentially leading to temporary decline in metrics



SUPPORT TO YOUNG RESEARCHERS

by providing opportunities:

- for broad range of skills
- for submission of projects, career advance and founding new research groups
- for engagement in the Management board and Scientific board
- for nominations to awards
- for internal wage contributions
- for BMC SAS Talent award since in 2022

By continuing generation exchange and focus on stabilisation and reintegration


nature

Explore content ~ About the journal ~ Publish with us ~ Subscribe

nature › career news › article

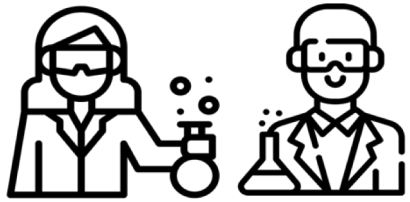
CAREER NEWS | 30 August 2022

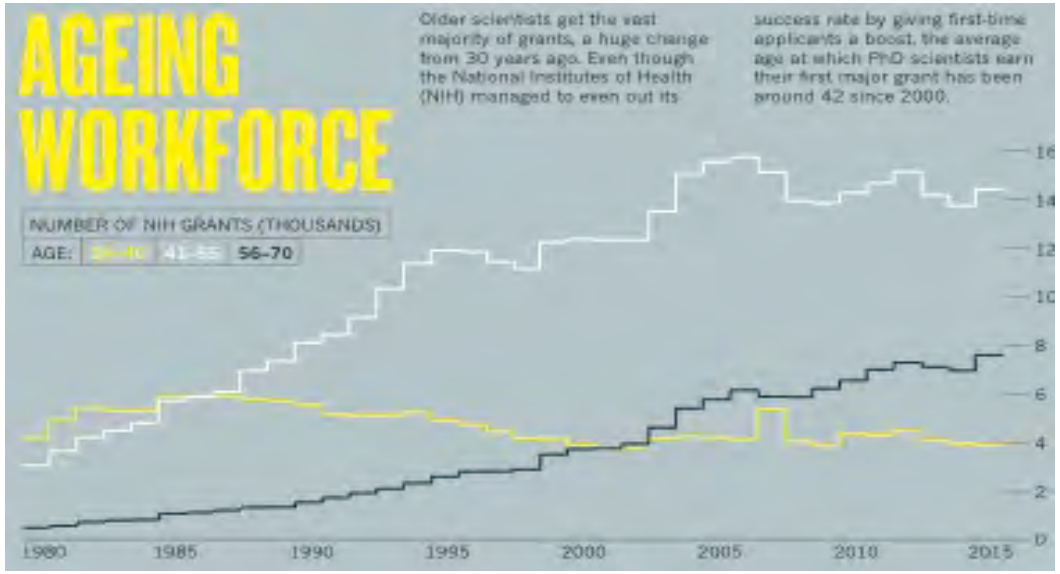
Lab leaders wrestle with paucity of postdocs

Even high-profile scientists are struggling to recruit qualified postdoctoral researchers.

https://www.nature.com/articles/d41586-022-02781-x?utm_source=Nature+Briefing&utm_campaign=abc632bc5c-briefing-dy-20220901&utm_medium=email&utm_term=0_c9dfd39373-abc632bc5c-44697661

YOUNG RESEARCHERS ARE HAVING TO FIGHT HARDER THAN PAST GENERATIONS FOR A SMALLER SHARE OF THE ACADEMIC PIE.





https://www.nature.com/news/polopoly_fs/1.20871!/menu/main/topColumns/topLeftColumn/pdf/538444a.pdf

IMPROVEMENT OF INTERNATIONAL MOBILITY AND COOPERATION

International projects (> 150 partners)
12 FP7, H2020 and HEALTH,
8 ERA-NET, 11 COST, 3 other
14 bilateral mobility projects
(9 SAS, 5 APVV)
72 submitted international projects

47 foreign researchers' visits to BMC
688 short term stays abroad
(visits + conferences)
19 long term stays abroad (> 6 months)
11 reintegrations

Mobility activities were hampered by the pandemic, but are on the rise again

SUPPORT FOR DEVELOPMENT OF THE BMC SAS RESEARCH CLINIC

Outpatient medical facility
With permit for healthcare in internal medicine

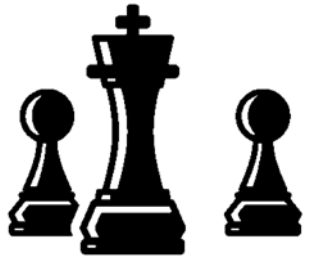
Acquisition of equipment, spaces and qualified staff:
part-time working nurses, diabetologist, cardiologist, gastroenterologist, psychologist, physiotherapists and currently orthopaedist

Establishment and equipment of the CENTER FOR PHYSICAL ACTIVITY and then adaptation of additional training spaces and sanitary facilities.

Formal and expert prerequisites for the establishment of the 1st in Slovakia CENTER FOR OBESITY MANAGEMENT

ELABORATION AND IMPLEMENTATION OF STRATEGIC / ACTION PLAN

PRIORITIES – STRATEGIC GOALS – ACTIONS
based on situation analysis and best practices



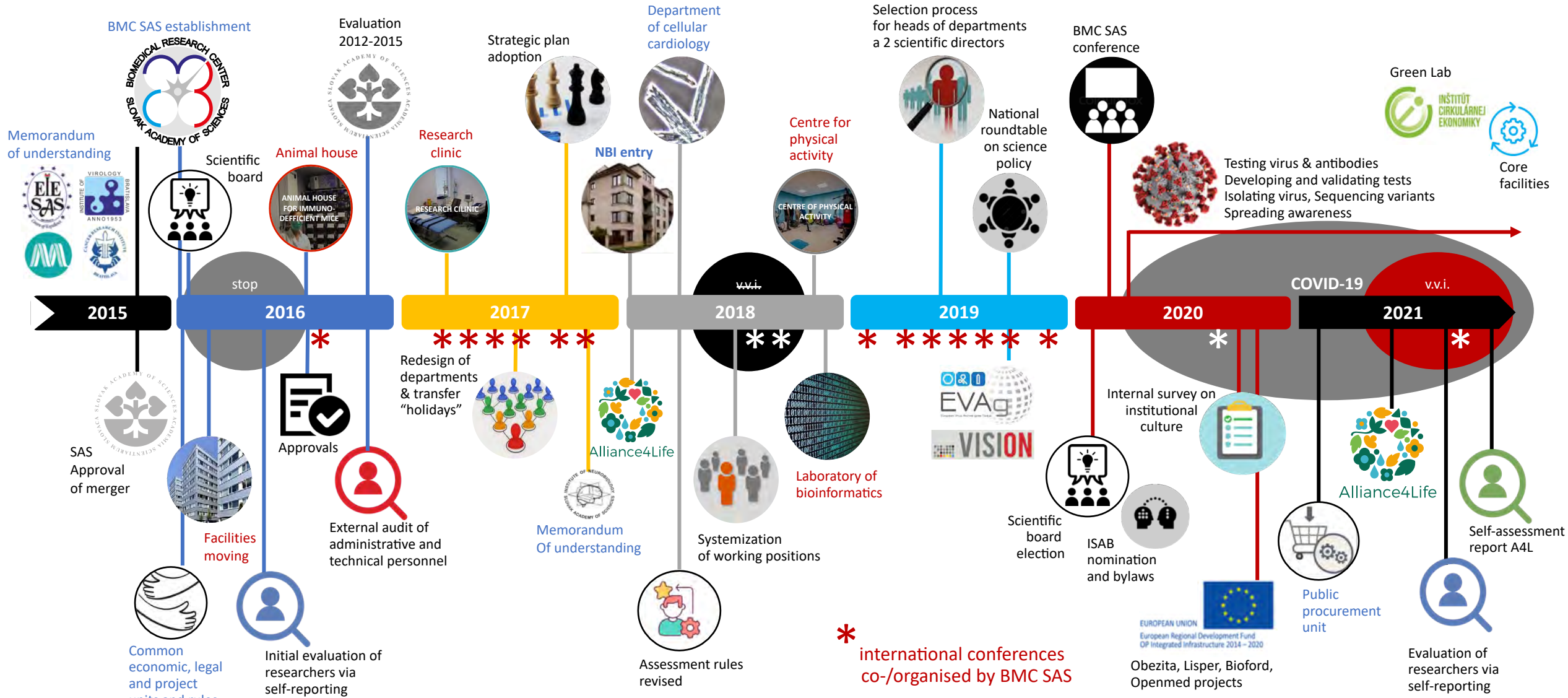
Actions to enhance research quality and reach leading position in biomedical research in Slovakia

Actions to improve national and international visibility and reputation

Actions to increase transfer of knowledge and serve society

Actions to secure sustainability and foster progressive development

MAIN STRATEGIC STEPS AND INSTITUTIONAL ACTIVITIES OF BMC SAS IN 2016-2021



RESEARCH STRATEGY AND FUTURE DEVELOPMENT

COMPETENT GOVERNANCE AND FAVOURABLE INSTITUTIONAL CULTURE ARE INEVITABLE PREREQUISITES FOR EXCELLENT RESEARCH

RESEARCH GOVERNANCE

Challenges

Low research funding
High bureaucracy
Complicated implementation of projects
(frequent and tedious controls and strict public procurement rules)

Strategy

Improve administrative and technical support to researchers
Facilitate career of young talents
Build service-oriented core facilities
List and offer unique assets for IP/TT
Make transparent, rational & fair decisions

RESEARCH AGENDA

Challenges

Traditional vs new topics
Projects vs curiosity
Basic vs applied research
Poor availability of high-tech infrastructure

Strategy

Support sustainable topics
Accept innovative research in line with BMC's mission
Propose new projects based on solid preliminary evidence
Submit high-level projects
Invite ISAB to evaluate research departments (2023)

RESEARCH CULTURE

Challenges

Interests of individual or group vs institution
Interpersonal relations
Leadership and seniority
Communication barriers

Strategy

Adhere to fairness and openness
Develop soft skills
Learn from anonymous surveys
Improve communication and collegiality at all levels
Support those who create lasting values

There is still space to improve and challenges to overcome
but we are determined to do our best to reach the goals.

On our way, we will adhere to principles of integration, ethics and cooperation.

THANK YOU FOR YOUR ATTENTION

MANY THANKS TO ALL COLLEAGUES FOR THEIR SUPPORT AND DEDICATION TO THEIR WORK

PANEL QUESTIONS

SCIENTIFIC QUALITY AND PRODUCTIVITY

- Describe how your main scientific achievements increase the understanding of the principal problems of your research fields specifically and what is the potential for interdisciplinarity
- The publication spectrum is very wide and would benefit from further increases in the international level and focus. Describe the Center‘s publication strategy

SOCIETAL, CULTURAL OR ECONOMIC IMPACT

- Describe the highlights of the Center’s societal, cultural and economic impact during the assessment period and overall its potential in future.
- Have policies and processes been formed for bridging the basic research to societal/economic impact?
- Are there new opportunities to further increase the Center’s cooperation with companies?

STRATEGY AND POTENTIAL FOR DEVELOPMENT

- Describe the synergy of the merged institutes in the Centre. Are there still structural barriers and overlaps in the large numbers of departments (several very small) stemming from pre-merger institutes.
- Specify how the research areas where you obtained your principal scientific achievements will be continued in your future endeavour, and in other hand, what new fields of research you want to address.
- What more could be done to increase the excellence of research?
- Are there policies for responsible and open research?
- Elaborate on career paths of early career researchers, brain drain and international recruitments.

OTHER QUESTIONS

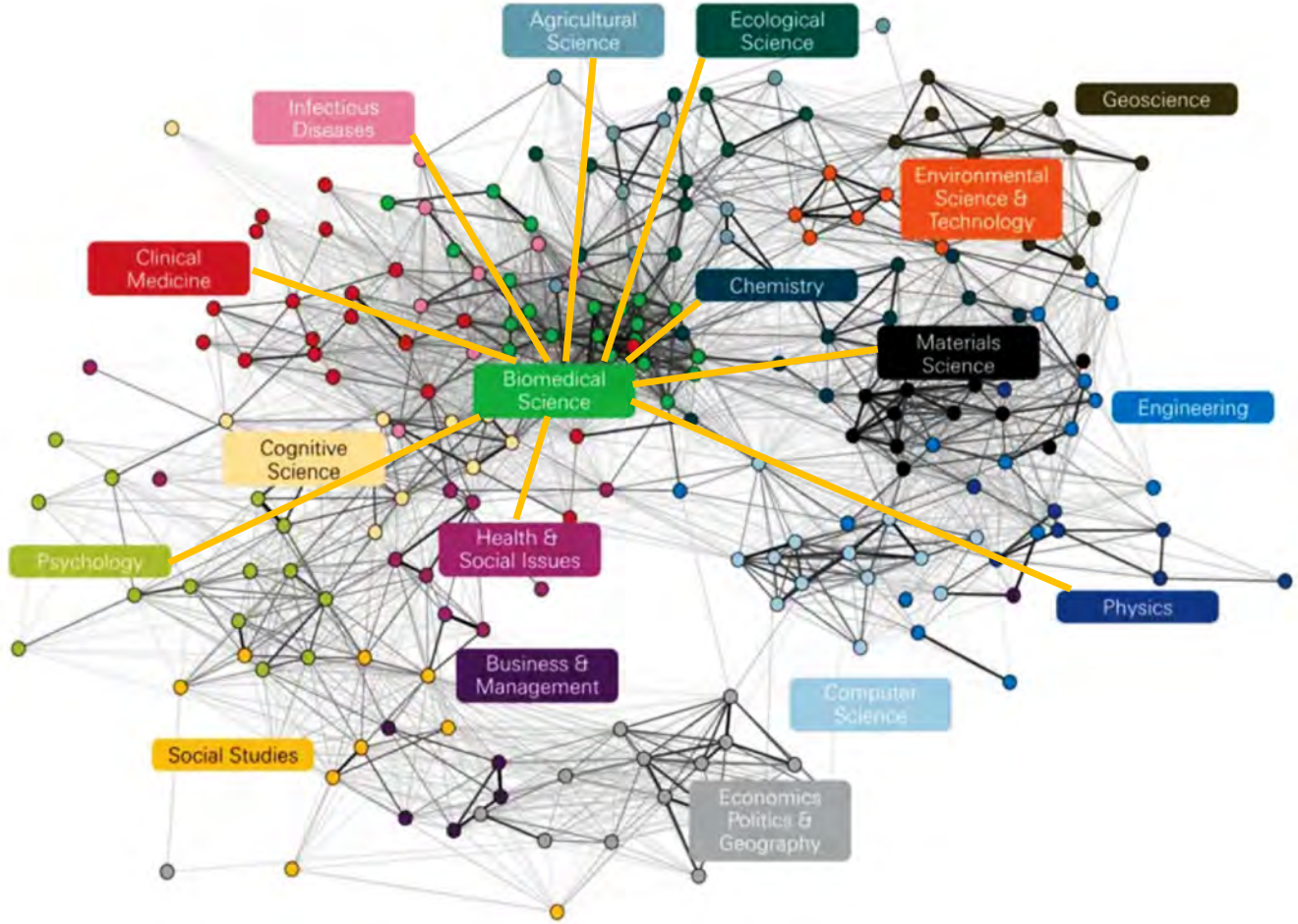
- Describe the process for preparing the questionnaire document. Who were asked to contribute to preparing the document, including strategy and potential for development?

SCIENTIFIC QUALITY AND PRODUCTIVITY

- Describe how your main scientific achievements increase the understanding of the principal problems of your research fields specifically **and what is the potential for interdisciplinarity**

Potential and/or existing interdisciplinarity (manifested in the collaboration of scientists with different educational background and professional experience)

Nanobiology / Polymer chemistry / Biophysics / Immunology (cancer detection and targeting)
Nanobiology / Chemistry / Toxicology (nanoparticles, nanochips, microfluidics)
Virology, Microbiology / Public health / Ecology (detection, surveillance, monitoring)
Virology / Clinical Medicine (infectology)
Virology / Material Science (antiviral devices and materials)
Microbiology / Medicine (neuroscience)
Neurobiology or Oncology / Medicine (obesity)
Virology / Oncology / Immunology / Chemistry (cancer targeting trough viral immunomodulators)
Integrative physiology / Public health (ageing, cognitive abilities, prevention/intervention of diseases)
Genetics / Bioinformatics / Clinical Medicine (personalized therapies)



Global science map based on citing similarities among ISI subject categories

https://www.nature.com/articles/s41599-019-0352-4, https://link.springer.com/content/pdf/10.1007/s11192-021-04133-4.pdf, https://onlinelibrary.wiley.com/doi/epdf/10.1002/asi.21368

SCIENTIFIC QUALITY AND PRODUCTIVITY

- **The publication spectrum is very wide and would benefit from further increases in the international level and focus. Describe the Center's publication strategy.**

We fully agree that **focus is very important for deeper insight into the topic**, for developing research excellence and recognition, but it is a process that cannot be forced just administratively and requires time and mindset.
We surely aim at reaching better focus, but on the other hand, **diversity of topics facilitates emergence of new ideas**, so we would like to preserve also this aspect to a reasonable extent.

Similarly, international collaborations has been shown to increase research performance and there, we would like to improve.
However, papers selected for the questionnaire do not provide full figure of our international collaborations:
In fact, during 2016-2021 we published altogether 991 papers registered in CCC, WoS and/or SCOPUS.
Around 50% of them were based on international collaboration (including papers of both international and national collaborations), and around 30% were based on national collaboration only.

Of these 991 papers, only 175 (corresponding to average number of FTE researchers) could be displayed in the questionnaire to represent R&D activities of the BMC SAS and for this purpose, we selected papers with key contributions of the authors from the BMC SAS, to present ourselves with outputs of our intellectual origin.
Only 40 papers could be selected to demonstrate our international collaborations.

SOCIETAL, CULTURAL OR ECONOMIC IMPACT

- Describe the highlights of the Center's **societal, cultural and economic impact** during the assessment period and overall its potential in future.

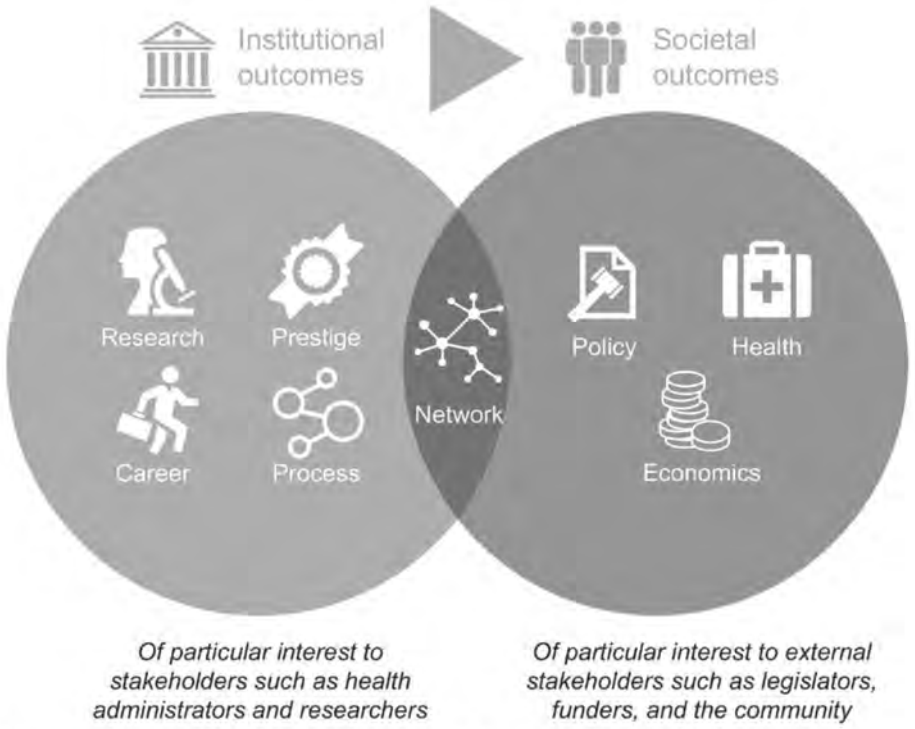


Figure 1 Illustration of the different outcomes that are of interest to different stakeholder groups. The figure, used through an agreement with RAND Europe, first appeared in Guthrie S, Krapels J, Lichten C, Wooding S. 100 Metrics to Assess and Communicate the Value of Biomedical Research: An Ideas Book. Santa Monica, CA: RAND Corporation; 2016. http://www.rand.org/pubs/research_reports/RR1606.html. Accessed January 31, 2017.

Infectious diseases as well as chronic non-communicable diseases will remain a significant threat for human population, thus the **potential impact of our research in future is high** and can be even increased by cultivating inherent interest of younger generation to perform impactful research.
In such effort, there is a **space for the role models**.

Research Outcomes of Particular Interest to External Stakeholders

Economic	Policy	Health	Network
• Level of local spending	• Number of citations in clinical guidelines	• Narrowing of health/ health care disparities	• Number of research projects engaging community partners
• Amount of direct employment	• Number of citations in policy documents	• Number of treatments developed in-house	• Number of articles coauthored with community partner(s)
• Number of patent applications and awards	• Number of invitations from policy makers	• Improved life expectancy of patients	• Number of collaborations on grant applications
• Number of patent citations	• Number of policy secondments	• Improved quality of care	• Number of staff members engaged in research
Number of educated individuals		• Improved awareness of preventive measures in community	

SOCIETAL, CULTURAL OR ECONOMIC IMPACT

- **Have policies and processes been formed for bridging the basic research to societal/economic impact?**

Throughout the history, the BMC SAS institutes have carried out research with societal/economic so this **mindset has been nurtured** among our researchers for generations.
Therefore, we consider societal/economic impact a **natural and important aspect** of our research activities. We keep tradition in organising events engaging community, collaborate with healthcare providers and are open to cooperation with companies. To **protect our IP, we adopted internal rules** (including MTAs and patenting procedures) in compliance with recommendations of the SAS Tech Transfer office.

- **Are there new opportunities to further increase the Center's cooperation with companies?**

Pharmaceutical industry in Slovakia is only marginally research-oriented, SME sector is in development, innovation hubs emerge, but their real support is weak. During the evaluation period, particularly during pandemic, **several collaborations with SME as well as large companies have been initiated and have potential to continue.**
Through **catalogue of unique assets** (reagents, methods) and their offer for licensing or collaboration, we aim at creating new opportunities for cooperation.

PHARMACEUTICAL INDUSTRY RESEARCH AND DEVELOPMENT IN EUROPE

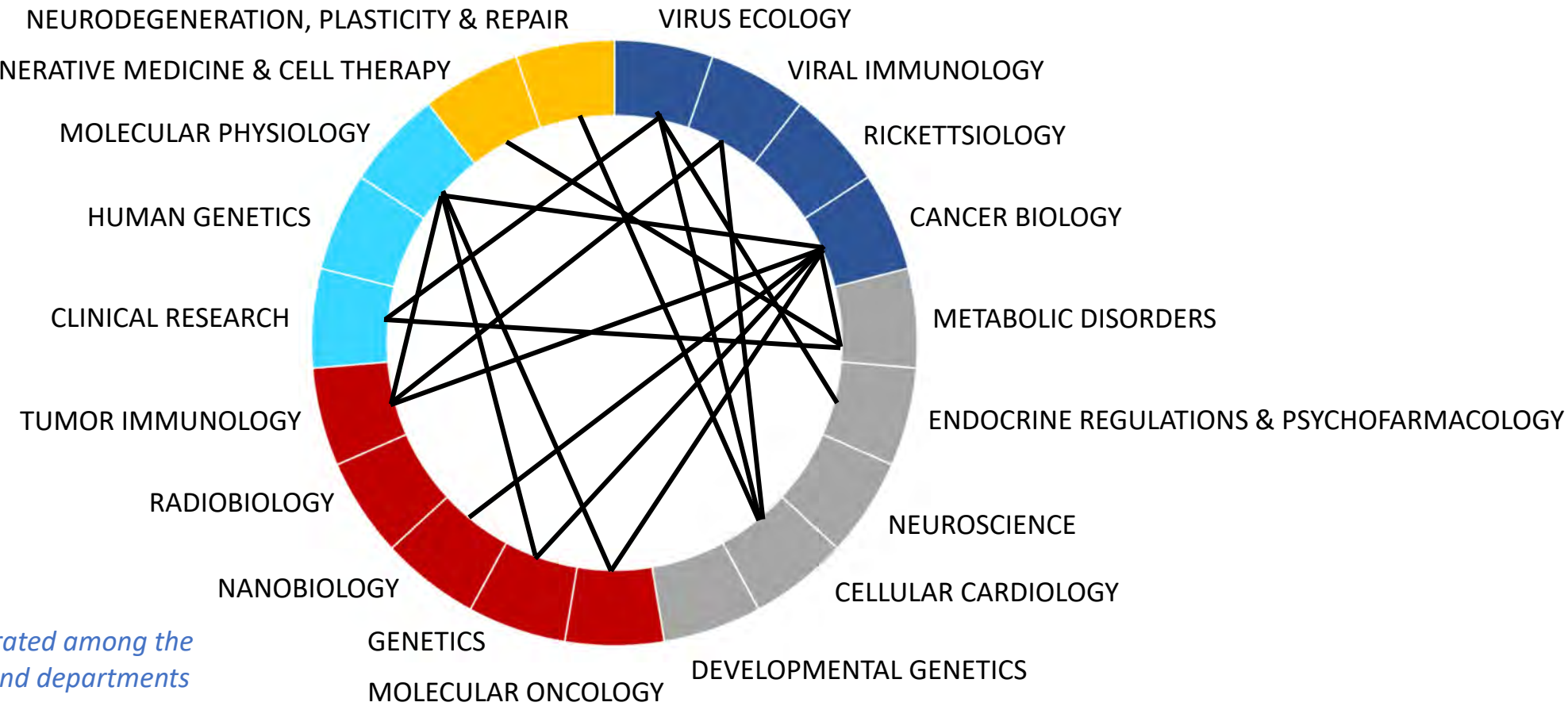
EFPIA 2019	€ million		€ million
Austria	311	Latvia	n.a
Belgium	3,846	Lithuania	n.a
Bulgaria	91	Malta	n.a
Croatia	40	Netherlands	642
Cyprus	85	Norway	126
Czech Rep.	62	Poland	339
Denmark	1,543	Portugal	117
Estonia	n.a	Romania	75
Finland	182	Russia	727
France	4,451	Slovakia	n.a
Germany	8,466	Slovenia	180
Greece	51	Spain	1,212
Hungary	242	Sweden	1,104
Iceland	n.a	Switzerland	6,383
Ireland	305	Turkey	137
Italy	1,600	U.K.	5,437
TOTAL			37,754

https://www.efpia.eu/media/602709/the-pharmaceutical-industry-in-figures-2021.pdf

STRATEGY AND POTENTIAL FOR DEVELOPMENT

- **Describe the synergy of the merged institutes in the Centre. Are there still structural barriers and overlaps in the large numbers of departments (several very small) stemming from pre-merger institutes.**

There are principally no structural barriers, convergence is ongoing but requires time and building interpersonal relationships. (synergy is not achievable merely by administrative means).



Collaborations generated among the BMC SAS institutes and departments

STRATEGY AND POTENTIAL FOR DEVELOPMENT

- **Specify how the research areas where you obtained your principal scientific achievements will be continued in your future endeavour, and in other hand, what new fields of research you want to address.**

The continuation will strongly depend not only on **our preferences**, but also on **opportunities** and **projects** supported by grants.
We are dedicated to keep academic freedom in project submissions that are in line with the mission and values of the BMC SAS.
We will continue in developing "umbrella" approach to build hierarchy of projects and will support both collaborative projects with our reasonable contribution, as well as highly ambitious projects of individual PIs (ERC, MSCA etc.).
As an institution, we aspirate to maintain continuity of large projects with societal impact (Obesity, EVA, A4L etc.....)
We also intend to invite ISAB to provide us external view on performance and future potential of our research teams and their topics.

We aim to support newly emerging ideas and their incorporation into our research portfolio:

REINTEGRATION OF RESEARCHERS (SASPRO....)

Mosquito-borne viruses
Viral immunomodulators
PDK1 in cancer metabolism
Clonal evolution in MM
Genomic stability
Metabolism of adipose tissue and liver
Etc.

INTERDICIPLINARY COLLABORATIONS

Nanoparticles in cancer targeting
Obesity comorbidities
Functional genetics of rare diseases
Clinical models and biomarkers for resistant TGCT
CNS infections by rickettsiae
Genomics of ricketsiae–infected macrophages
Etc.

EXTERNAL FACTORS (PANDEMIC, UNMET HEALTHCARE NEEDS)

SARS-CoV-2 surveillance
Genetics of extremely rare diseases
Center for physical activity
Center for management of obesity
Etc.

STRATEGY AND POTENTIAL FOR DEVELOPMENT

- **What more could be done to increase the excellence of research?**

Improve through experiences and evidences, learning from more advanced, seeking for ISAB advice (2023)

Alliance4Life

Drawing on a combination of the existing literature and interviews with 51 academics in 12 of the UK's leading institutions we find:

(i) the activities supporting the ***recruitment, development and motivation of researchers*** are critical drivers of research excellence;

(ii) the activities relating to ***collaborating with others, creating and implementing research strategies, securing a mix of funding and responding to competitive pressures*** are also seen as important by interviewees; and

(iii) in relation to many of these activities, our research emphasises that the "on-the-ground" or "day-to-day" initiatives by individual researchers can be at least as important as the "high-level strategic" initiatives instigated by institutions.

- Universal agreement that gathering "**a critical mass of researchers**" in one place contributes to research excellence
- informal and formal mentoring and appraisal arrangements – for example, striking the right **balance between offering guidance and preserving researcher autonomy**, knowing when to encourage a researcher to persevere or re-think
- **personal relationship** researchers forge in the early stages of their career can have a critical effect on their opportunities for collaboration later
- bring together different individuals to **share points of view and best practice**
- not just the level of funding, but **different sources of funding** have a bearing on research productivity
- being able to **attract the right people** is a significant driver of research excellence, but ability to **retain right individuals** is also very important
- **research environment and culture** can affect research performance
- Managing **middle-career researchers**
- Increasing internal recognition, creating opportunities for **personal development**
- Collaborating with others
- Having **identifiable strategy** can positively influence performance

BIOMEDICAL RESEARCH CENTER SLOVAK ACADEMY OF SCIENCES

STRATEGY AND POTENTIAL FOR DEVELOPMENT

- **Are there policies for responsible and open research?**

The following policies for RESPONSIBLE RESEARCH have been adopted (1) **SAS Rules:** Code of Ethics, Gender equality plan, HR strategy, (2) **BMC SAS internal rules:** Honest practice of publishing, Management of ethical issues, bylaws of ethics committees for research integrity, animal handling and biosafety

BMC SAS researchers adhere to principles of OPEN RESEARCH including collaborative working, sharing data, methodology, reagents and equipment.

- Our in-house edited journals have adopted OA policy: Neoplasma and Acta Virologica: Author-Paid Open Access Option, Endocrine Regulations: Open Access, no publication fees

- Where possible, we publish our findings in open access journals, although it is not always feasible especially for young researchers due to low accessibility of reasonable funding covering OA publishing costs. National support to open research has been declared (including a recently drafted National R&D strategy), but it has not been brought to practice so far.

One of potential institutional approaches is to use income from the publishing partnership with Frontiers to create funds for wages supporting publications of our researchers in the in-house edited journals. Another option is to secure eligible part of our resources from different activities to create funds supporting wages for selected excellent publications of young PIs. These approaches will need to be discussed within governing bodies and research community.

STRATEGY AND POTENTIAL FOR DEVELOPMENT

- **Elaborate on career paths of early career researchers, brain drain and international recruitments.**

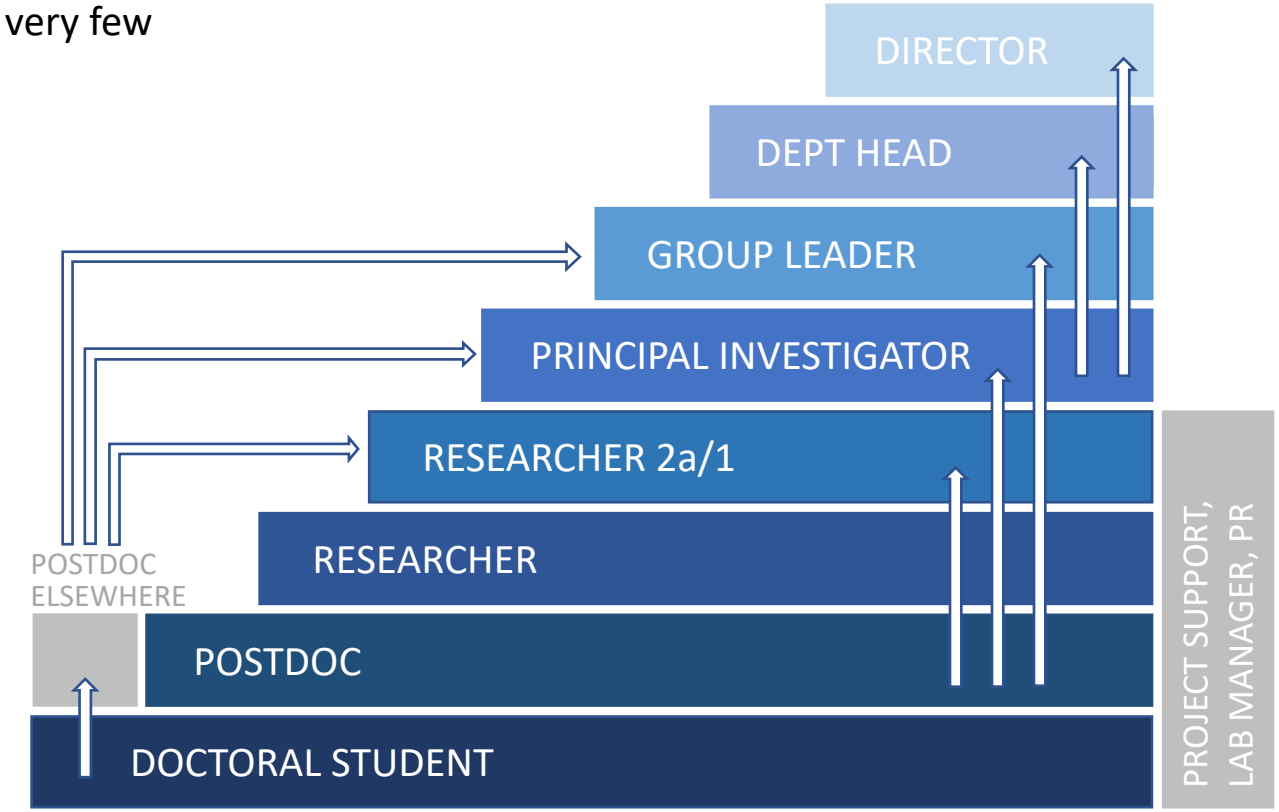
In line with reports of several national bodies and with the National R&D strategy elaborated recently by the Office of the Government of the SR we experience that **our national research environment is not attractive for talented young researchers (both domestic and international)** – non-competitive salaries resulting in lower life standard, difficult on-boarding, many bureaucratic barriers in research, very few opportunities to obtain funds for establishment of own research group ….

This leads to both brain-drain and inefficient international recruitment.

Thus, we believe that **stabilisation and/or reintegration of talented researchers is key to our success and competitiveness.**

The path that BMC SAS provides has not been officially formulated so far - this is one of our main tasks in the near future.

The practice is following:



OTHER QUESTIONS

- **Describe the process for preparing the questionnaire document. Who were asked to contribute to preparing the document, including strategy and potential for development?**

April 2022 – **concept** of the questionnaire elaboration discussed and adopted by the Managing board, with full agreement that the emphasis is given on presentation of outputs with intellectual origin in / organized by the BMC SAS

May 2022 – information about the evaluation and the questionnaire concept to the members of the Scientific board and heads of departments,

June 2022 – **contributions** of the directors of BMC institutes and heads of research departments to summary od R&D activities, narratives of the most important research outputs, activities with international relevance / national importance, list of invited presentations, societal impact, popularization, infrastructure etc. – all using common rules for text volume and structure

– contributions of the Project department to list of projects

– contributions of the Scientific secretary to information on PhD studies, educational activities and postdoctoral fellows

– contributions of the Legal department to information on human resources and processing of publication data

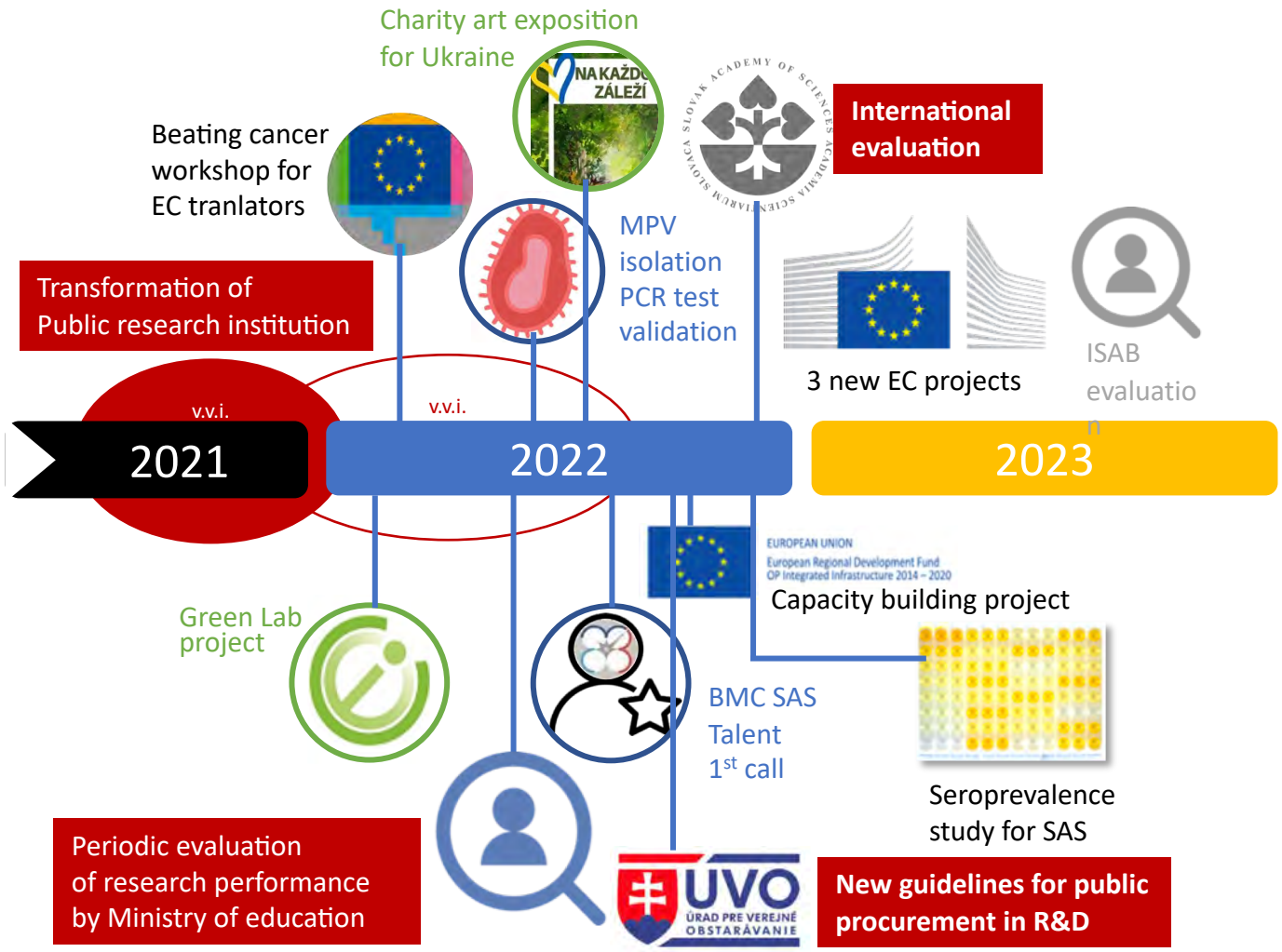
– contributions of the Economic department to all data related to budget

– **drafting chapters on implementation of recommendations and strategy** by the BMC SAS director (based on the BMC SAS Strategy 2017-2026 approved and updated by the Scientific board in 2017 and 2019) and text completion following discussions and comments from the members of governing bodies

– **assembly** of the questionnaire by the BMC SAS director in order to harmonize the form of the content

– **approval** of the final version by the boards

ACTIVITIES IN 2022 AND PLANS



ACTIVITIES

NEW PROJECTS

HORIZON-WIDERA-2022-ACCESS-04
ADDIT-CE (Alzheimer disease) MU+SAS
HORIZON-MISS-2021-UNCAN-01-01
4.UNCAN.EU
HORIZON-HLTH-2022-DISEASE-03-01
ERA4HEALTH
ESIF Capacity building project
VVK-TRANS-BIOMED

TALENT BMC SAS, 3 SASPRO reintegration projects

PLANS

Winter 2022
Establishment of the 1st in Slovakia
CENTRE FOR OBESITY MANAGEMENT
Publishing partnership with **FRONTIERS**
Spring 2023
ISAB evaluation of BMC SAS research groups and subsequent exclusion of underperforming **personnel** (in line with Coalition of Willing principles)
2 ERC projects submission
Catalogue of assets for licensing and collaboration