

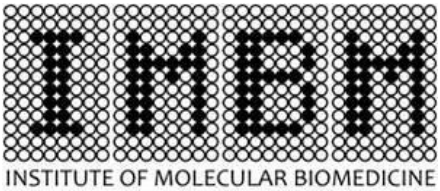
INSTITUTE OF MOLECULAR BIOMEDICINE

Annual Report 2025

INSTITUTE OF MOLECULAR BIOMEDICINE

IMBM 2025

1 research institute
16 years
2 professors
6 associate professors
9 postdocs
15 PhD students
18 diploma thesis students
15 bachelor students
1 HORIZON EUROPE grant
1 PROGRAM SLOVENSKO grant
2 VAIA grants
5 APVV grants
4 VEGA grants
1 KEGA grant
2 GUKPOST grants
11 UK grants
23 CC/IF publications



SCIENTOMETRIC DATA IN 2025



NUMBER OF CC/IF PUBLICATIONS: **23**

OF THESE WITH FIRST/LAST AUTHORS FROM IMBM: **12**

CUMULATIVE IF: **155.5**

INSTITUTE OF MOLECULAR BIOMEDICINE

THE YEAR 2025 AT IMBM

THE VIEW OF THE HEAD OF THE INSTITUTE

In 2025, we continued to develop as a stable and internationally engaged research and educational unit. Sixteen years after its establishment, the institute demonstrates that sustained growth can be achieved through focused research, strong mentoring, and long-term collaboration rather than size alone.

Our scientific activities were supported by a wide range of competitive national and European grants, including Horizon Europe, European Union funds, APVV, VEGA, VAIA, and university funding schemes. This funding enabled research addressing clinically relevant questions in areas such as sepsis, autoimmunity, metabolic disorders, and neurodevelopment. The resulting scientific output included 23 CC/IF publications with a cumulative impact factor exceeding 155, with a substantial proportion led by our researchers.

International visibility remained strong throughout the year. We actively participated in numerous international scientific meetings across Europe, North America, and Asia, where we presented our work and engaged in discussions with leading experts in their fields. The institute also hosted and contributed to specialized meetings and symposia, creating valuable opportunities for direct exchange with world-class scientists and for initiating new collaborative projects.

We remain deeply committed to education at all academic levels. In 2025, students successfully completed doctoral, master's, and bachelor's theses under close supervision, while the 5th IMBM Summer School of Biomedicine provided motivated students with early exposure to experimental research and critical scientific thinking. The institute also continued to encourage international experience through research stays at leading foreign institutions.

I would like to acknowledge the dedication of our researchers, students, and technical staff, whose daily work forms the foundation of the institute's achievements. With their continued engagement and the support of our partners, IMBM is well positioned to further strengthen its scientific impact and educational role in the years ahead.

Roman Gardlík

RESEARCHERS AT IMBM

PROFESSORS:



PETER BOOR, prof., MD, PhD
CC/IF publications - 478, SCI citations - 15954, h-index - 70
renal fibrosis, nephropathology, immunopathomechanisms, models of renal diseases, imaging
boor.peter@gmail.com
pboor@ukaachen.de



PETER CELEC, prof., MD, MSc, Ing, DrSc, MPH
CC/IF publications - 361, SCI citations - 5920, h-index - 40
extracellular DNA, testosterone, salivary biomarkers, sepsis
peter.celec@imbm.sk



ROMAN GARDLÍK, assoc.prof., MD, MSc, PhD
CC/IF publications - 94, SCI citations - 1476, h-index - 23
inflammatory bowel disease, acute and chronic liver disease, animal models, extracellular DNA, microbiome
roman.gardlik@imbm.sk



JÚLIUS HODOSY, assoc. prof., MD, MSc, PhD, MPH
CC/IF publications - 110, SCI citations - 2011, h-index - 25
sex steroids, oxidative stress, sepsis, sleep apnea syndrome, traumatic brain injury
julius.hodosy@imbm.sk



KATARÍNA ŠEBEKOVÁ, assoc. prof., MD, DrSc
CC/IF publications - 198, SCI citations - 4033, h-index - 35
metabolic syndrome, diabetes mellitus,
advanced glycation end products, clinical biochemistry, pathogenesis of renal diseases
katarina.sebekova@imbm.sk



ĽUBOMÍRA TÓTHOVÁ, assoc.prof., PhD
CC/IF publications - 111, SCI citations - 2164, h-index - 26
salivary markers, oxidative stress, urinary tract infections, experimental nephrology, bacteriophages
lubomira.tothova@imbm.sk

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BARBORA VLKOVÁ, assoc. prof., MSc, PhD
CC/IF publications - 87, SCI citations - 1485, h-index - 17
extracellular DNA, non-invasive prenatal diagnostics, neutrophils, pneumonia, sepsis, molecular pathology
barbora.vlkova@imbm.sk



MICHAL PASTOREK, assoc. prof., MSc, PhD
CC/IF publications - 47, SCI citations - 568, h-index - 14
Sepsis, neutrophil biology, sterile inflammation, autoimmune diseases
michal.pastorek@imbm.sk

POSTDOCS:



JANKA BÁBÍČKOVÁ, MSc, PhD
CC/IF publications - 55, SCI citations - 1439, h-index - 19
phage display, sex steroids, inflammatory bowel disease, extracellular DNA, experimental nephrology
jana.babickova@gmail.com



VERONIKA BORBÉLYOVÁ, MSc, PhD
CC/IF publications - 50, SCI citations - 462, h-index - 12
animal models, autism spectrum disorder, obesity, metabolic syndrome, sex hormones
veronika.borbelyova@imbm.sk



BARBORA TAMÁŠOVÁ, MSc, PhD
CC/IF publications - 43, SCI citations - 713, h-index - 14
extracellular DNA, extracellular vesicles,
pregnancy complications, quantitative real-time PCR
barbora.konecna@imbm.sk



EMESE RENCZÉS, MSc, PhD
CC/IF publications - 30, SCI citations - 421, h-index - 12
sex hormones, behavioral phenotyping in rats and mice, mental disorders, autism
emese.domonkos@imbm.sk

ĽUBICA JANOVIČOVÁ, MSc, PhD
CC/IF publications - 19, SCI citations - 222, h-index - 8
extracellular DNA, DNase activity, sepsis, anemia, animal models
lubica.janovicova@imbm.sk



BARBORA GROMOVÁ, MSc, PhD
CC/IF publications - 26, SCI citations - 186, h-index - 8
DNase activity, extracellular DNA, purinergic signalling pathway, inflammatory bowel disease and liver disease
barbora.gromova@imbm.sk



KRISTÍNA MACÁKOVÁ, MSc, PhD
CC/IF publications - 11, SCI citations - 34, h-index - 4
rheumatoid arthritis, extracellular DNA, neutrophils
kristina.macakova@imbm.sk



LUCIA KRAJČÍK LAUKOVÁ, MSc, PhD
CC/IF publications - 20, SCI citations - 499, h-index - 12
extracellular nucleic acids, sepsis, NETosis, extracellular vesicles, deoxyribonucleases
lucia.laukova@imbm.sk



SILVIA BENDÍKOVÁ, MSc, PhD
CC/IF publications - 9, SCI citations - 30, h-index - 3
next generation sequencing, data analysis, cancer biology, pathophysiology of autoimmune disorders
silvia.bendikova@imbm.sk



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Students at IMBM

PHD STUDENTS AT IMBM IN 2025:

Alena Potočárová, DVM
Kristína Lichá, MSc.
Paulína Belvončíková, MSc.
Emil Bečka, MSc.
Petronela Sušienková, M.A.
Andrej Feješ, MSc.
Tomáš Strečanský MSc.
Nikola Tóthová MSc.
Letícia Hudecová MSc.
Emma Skybová, M.A.
Karolína Bíla, Ing.
Patrik Bertovič, MSc.
Filip Baran, MSc.
Peter Bielik, MSc.
Erik Vitáliš, MSc.

MASTER STUDENTS AT IMBM IN 2025:

Petra Papšová, BSc.
Tereza Mrázová, BSc.
Dominika Stoláriková
Filip Karkošiak, BSc.
Evangelos Zempas
Alexander Florian Faber
Tetiana Pydlipska, BSc.
Jázmin Orsolya Takácsová BSc.
Daniel Králik, BSc.
Alexandra Chudá, BSc.
Regina Varga, BSc.
Janka Emília Klimová, BSc.
Miriam Antlová BSc.
Natália Krajčovičová BSc.
Jakub Urban, BSc.
Monika Veisová, BSc.
Laura Litváková, BSc.
Adela Blahútová, BA.
Lea Farkašová, BSc.
Joseph Harrant

BACHELOR STUDENTS AT IMBM IN 2025:

Adela Miklovičová
Lenka Chudadová
Rebeka Roninová
Janka Emília Klimová
Flóra Takács
Laura Litváková
Paulína Mondelová
Annamária Sekeráková
Danylo Dolzhenko
Dominika Fedorová
Monika Gáborová
Kateryna Ovcharenko
Stanislav Lukáč
Emma Zemanová

PhD STUDENTS WHO SUCCESSFULLY DEFENDED THEIR THESIS IN 2025:

Kristína Lichá, MSc.
Paulína Belvončíková, MSc.



MASTER STUDENTS WHO SUCCESSFULLY DEFENDED THEIR THESES IN 2025:

Evangelos Zgempas
Alexander Florian Faber
Tetiana Pydlipska, BSc.
Jázmin Orsolya Takácsová BSc.
Daniel Králik, BSc.
Samuel Vakrčka, BSc.
Matúš Šadibol





BACHELOR STUDENTS WHO SUCCESSFULLY DEFENDED THEIR THESES IN 2025:
Rebeka Roninová
Adela Miklovičová
Janka Emília Klimová
Emma Zemanová



OTHER COLLEAGUES:
Secretary: Henrieta Vontorčíková
Lab Manager: Jakub Janko, MSc., PhD
Laboratory Technicians: Ingrid Simonová, Stanislava Sochová, MSc., Bibiana Bujačková, MSc., Regina Varga, BSc., Jakub Urban BSc., Emma Zahradníková, Rebeka Bartalová, MSc., Tomáš Gubáň BSc.
Animal Technicians: Mária Turoňová, Barnabáš Borbély
Cleaner: Kristína Michalovičová

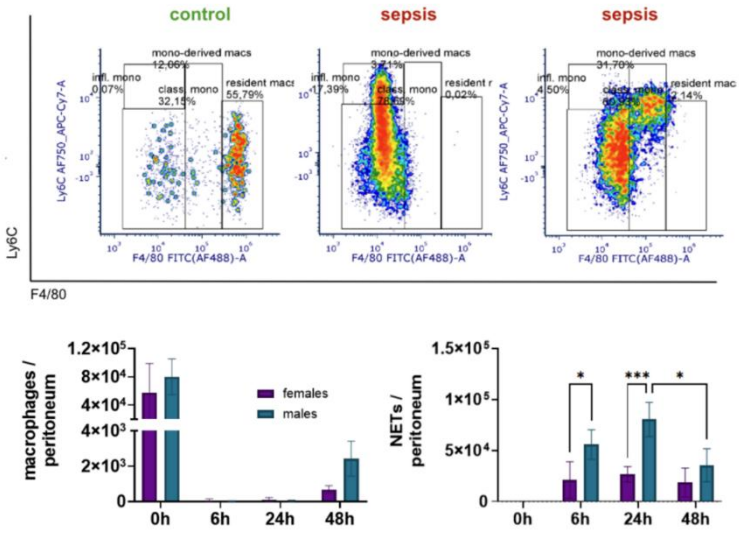
ACUTE AND LONG-TERM PATHOLOGICAL CONSEQUENCES OF THE FORMATION OF NEUTROPHIL EXTRACELLULAR TRAPS

What is known?

- Changes in macrophage phenotype post-sepsis are highly heterogeneous, driving inflammation or immune paralysis, as well as the inability to differentiate into dendritic cells. However, their viability, persistence and ability to clear debris at the primary site of infection post-sepsis are still not completely understood.

What is new?

- Last year, we extended our work from *in vitro* macrophage–NET co-cultures to *in vivo* mouse models. Using the Fecal Slurry Injection (FSI) model, we analyzed myeloid dynamics via flow cytometry. Sepsis induced a profound remodeling of the peritoneal compartment.
- Original resident macrophages were depleted and replaced by a persistent population of monocyte-derived macrophages surviving for at least one month.
- Furthermore, long-term macrophage cultures derived from the bone marrow of septic and control mice using M-CSF revealed fewer adherent, differentiated macrophages that were not able to persist in the culture for more than 5 days. This suggests persistent impairment of the myeloid compartment after sepsis.



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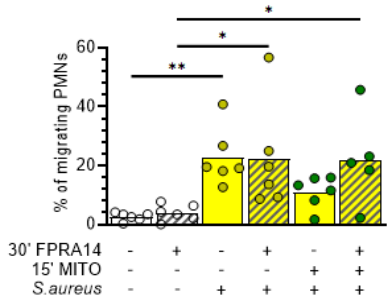
FORMYL PEPTIDE RECEPTOR 1 AGONIST AS PROPHYLAXIS FOR NOSOCOMIAL INFECTION PREVENTION AFTER MITOCHONDRIA-INDUCED TRAUMATIC INJURY

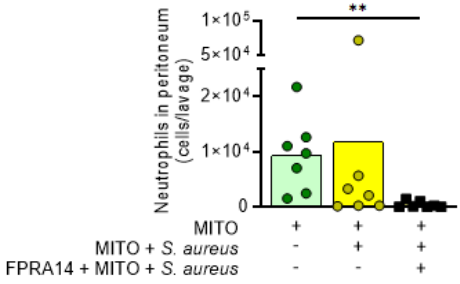
What is known?

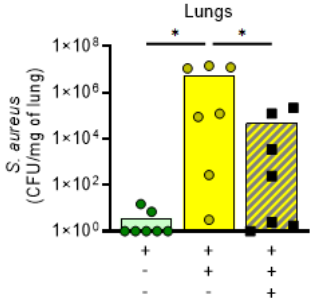
- During traumatic injury, tissues are damaged, releasing damage-associated molecular patterns, including mitochondria (MITO) through receptors, including formyl peptide receptor 1 (FPR1).
- Innate immune cells, including neutrophils, respond to MITO accumulating at the site of injury, followed by activation of defense mechanisms, which are, in the context of sterile inflammation, more or less relevant.
- Furthermore, persistent inflammation predisposes patients to nosocomial infections, thereby complicating clinical management and outcomes.

What is new?

- Pretreatment of neutrophils with FPR1 agonist prevents the migration of neutrophils towards bacteria even after pre-stimulation with mitochondria *in vitro*.
- FPR1 treatment ameliorates the neutrophil response toward mitochondria, enhancing antimicrobial activity against bacteria in the lungs.







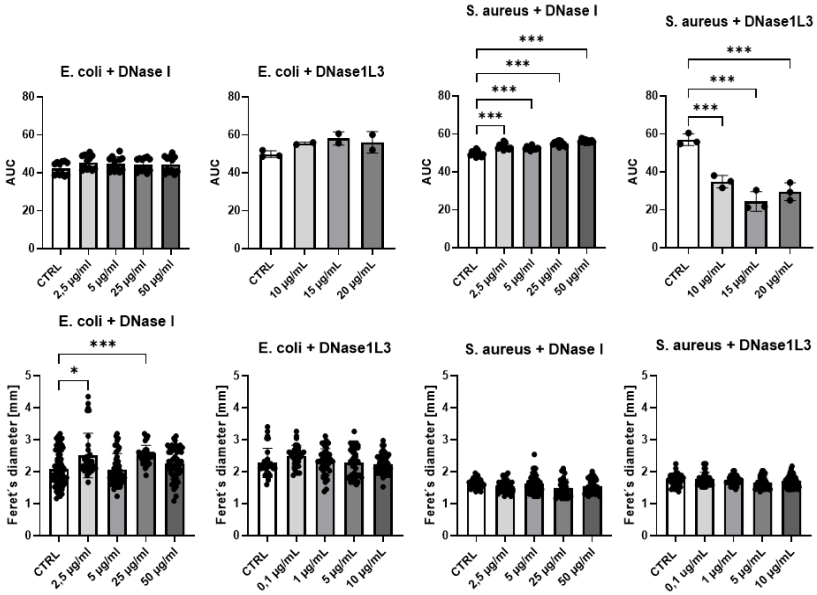
ANALYSIS OF POTENTIAL ANTIBACTERIAL PROPERTIES OF DNASE I AND DNASE 1L3

What is known?

- DNase I is being tested as a complementary treatment in case of systemic bacterial infections. Its protective effects are ascribed to its ability to cleave excessive extracellular DNA from dying cells, neutrophil extracellular traps or in bacterial biofilms. However, whether DNase I or DNase 1L3 enzymes exhibit direct antibacterial properties is currently understudied.

What is new?

- DNase I had no negative effect on the growth of *E. coli* or *S. aureus* in liquid media over the course of 48 hours. However, DNase 1L3 caused a significant decrease of the overall bacterial growth through this time period.
- DNase I nor DNase 1L3 did not exhibit any negative effects on the growth of bacteria on solid agar plates. The diameter of *E. coli* colonies was larger in some of the groups treated with DNase I. This effect can be explained by the fact that colonies in the control group showed a negative correlation between their size and number.



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PARADIX - AN ULTRA-RAPID IDENTIFICATION OF INFECTION-CAUSING PATHOGENS AND THEIR ANTIMICROBIAL RESISTANCE BY NANOPORE SEQUENCING

What is known?

- Infections are cured primarily by antibiotics (ATBs). To target effective ATB treatment, biological samples (blood, swabs, sputum, urine, cerebrospinal fluid etc.) are taken for microbiological culture.
- This process, despite being sensitive and providing data about the etiological agent, takes 48-96 hours.
- Due to the lengthy process, clinicians are forced to administer empiric broad-spectrum ATBs. However, these are contributing to the more and more severe spread of antimicrobial resistance (AMR).

What is new?

- Together with MediPark s.r.o. we have developed and verified a proof-of-concept method PARADIX on 30 patients for diagnostic identification of any types of DNA pathogens (bacteria, DNA viruses, yeasts) and their AMRs from urine and sputum samples, using real-time nanopore sequencing in cca 3-6 hours.

Pathogen Identification		
Match (Total)	13	43.3%
• Precise Match	5	16.7%
• Match + Additional Pathogens	8	26.7%
Partial Match	4	13.3%
Sequencing Positive, Culture Negative	4	13.3%
False Negative (Sequencing Negative)	1	3.3%
True Negative	8	26.7%
AMR Analysis		
Insufficient Data for Analysis	15	50.0%
AMR Profile Compared (Total)	9	30.0%
• Perfect Match	3	10.0%
• Partial Match	3	10.0%
• False Negative	3	10.0%

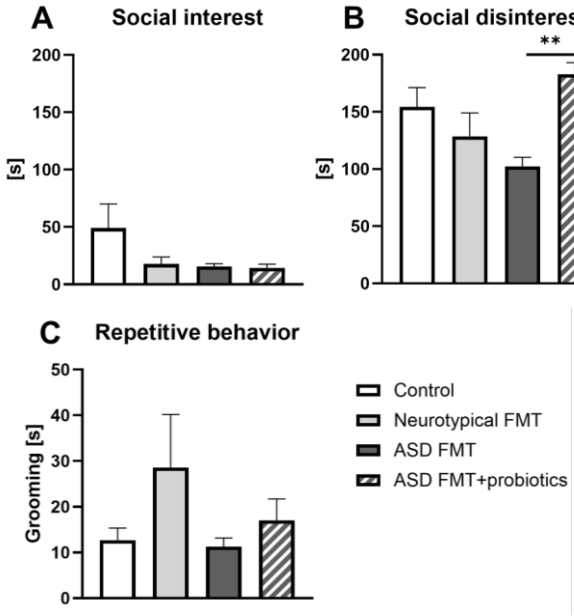
THE ROLE OF FECAL MICROBIOTA TRANSPLANTATION AND PROBIOTIC TREATMENT IN AUTISM SPECTRUM DISORDERS-LIKE BEHAVIOR

What is known?

- Autism spectrum disorders (ASD) are characterized by social interaction difficulties and the presence of repetitive behaviors.
- ASD are frequently accompanied by gastrointestinal problems and alterations in the gut microbiota that may affect brain function via the gut–brain axis.
- Modulation of the gut microbiota using probiotics, prebiotics, or fecal microbiota transplantation (FMT) has therefore been suggested as a potential approach to reduce gastrointestinal disturbances and possibly reduce symptoms of ASD.

What is new?

- FMT from donors with ASD did not contribute to the regulation of the severity of ASD-like behavior in female BALB/c pseudo–germ-free mice.
- Administration of probiotics after application of FMT did not reduce ASD-like behavior in this animal model and, on the contrary, it elevated the time of social disinterest in the BALB/c pseudo–germ-free females.



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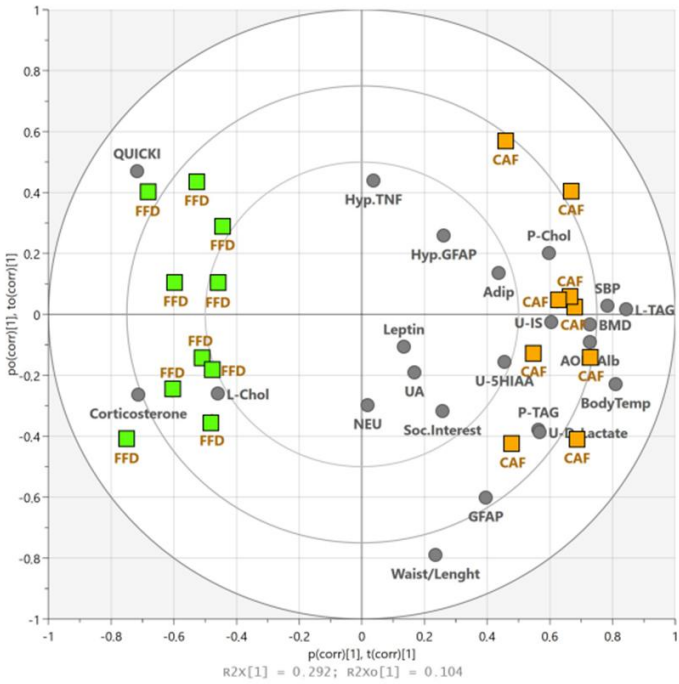
CAFETERIA AND FAST-FOOD DIETS INDUCE A DISTINCT CARDIOMETABOLIC PHENOTYPE IN RATS

What is known?

- Obesity is a major risk factor for the development of non-communicable diseases.
- A high-fat diet usually models obesity-associated metabolic syndrome in rodents, yet it does not stimulate sensory, texture, and taste proportions of an unhealthy diet.
- Both fast-food diets (fixed diet composition) and the cafeteria diet (voluntary choice of highly palatable foods) mimic unhealthy human diets.

What is new?

- In rats, feeding a cafeteria diet induced a classical metabolic syndrome–like profile characterized by severe obesity, insulin resistance, dyslipidemia, and liver steatosis.
- In contrast, the fast-food diet model resulted in moderate obesity with preserved insulin sensitivity, but was associated with elevated blood pressure and hepatic cholesterol accumulation.



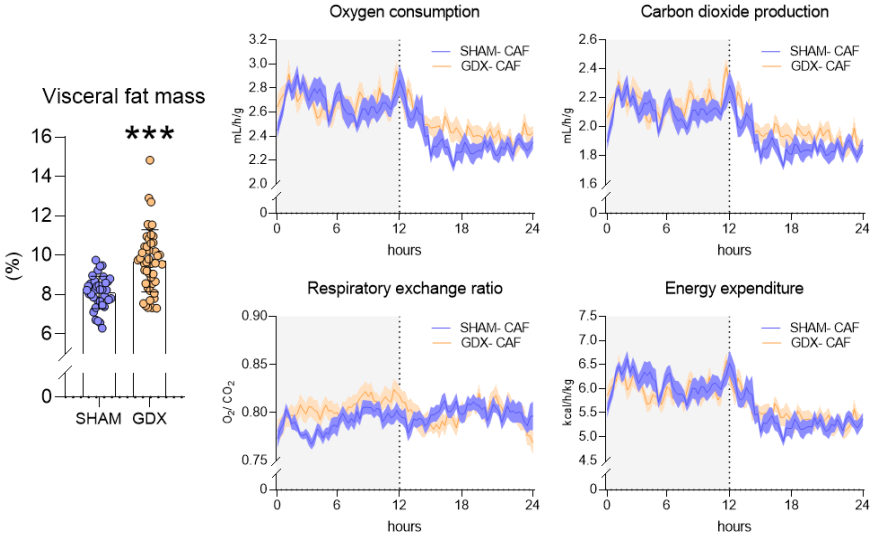
DOES GONADECTOMY LEAD TO IMPAIRMENT IN ENERGY METABOLISM?

What is known?

- Gonadectomy (GDX) in males triggers a shift toward visceral fat storage, leading to a rapid increase in abdominal adiposity.
- One of the hypotheses explaining how low testosterone leads to obesity is that it impairs the body's ability to oxidize fat, thereby promoting the storage of excess energy as adipose tissue.

What is new?

- With the cafeteria diet model, we successfully induced visceral obesity in both SHAM (control) and GDX mice, while more severe visceral obesity was present in the GDX group.
- However, using indirect calorimetry, we did not observe significant differences between SHAM and GDX mice in oxygen consumption, carbon dioxide production, respiratory exchange ratio, and energy expenditure.



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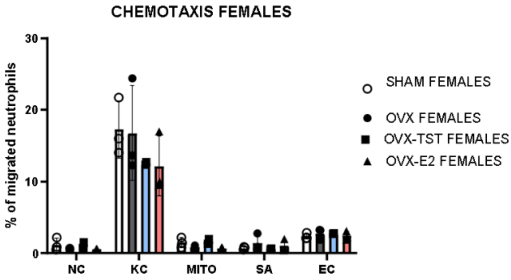
THE EFFECT OF SEX HORMONES ON CHEMOTAXIS OF MURINE NEUTROPHILS

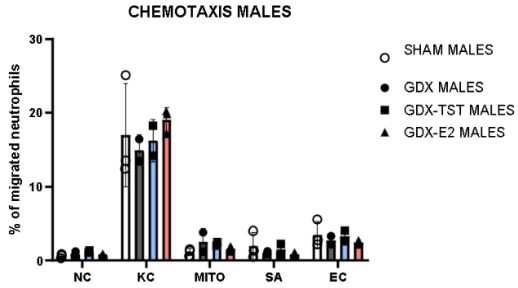
What is known?

- Autoimmune diseases occur more frequently in women than in men, suggesting a strong influence of biological sex on immune regulation.
- Neutrophil chemotaxis is a fundamental component of innate immunity.
- Sex hormones such as estrogen and testosterone have been reported to affect neutrophil function, including migration, activation, and survival.

What is new?

- Neutrophil chemotactic responses are not significantly altered by sex hormone status in mice.
- Gonadectomy and subsequent hormone supplementation do not significantly affect neutrophil migration toward multiple chemoattractants.
- Both female and male murine neutrophils exhibit comparable chemotactic ability across bacterial and mitochondrial stimuli, regardless of hormonal supplementation.





OVX - ovariectomy,
TST - testosterone,
E2 - estradiol,
NC - negative CTRL,
KC - keratinocyte-derived chemokine,
MITO - mitochondria,
SA - *S. aureus*, *EC* - *E.coli*

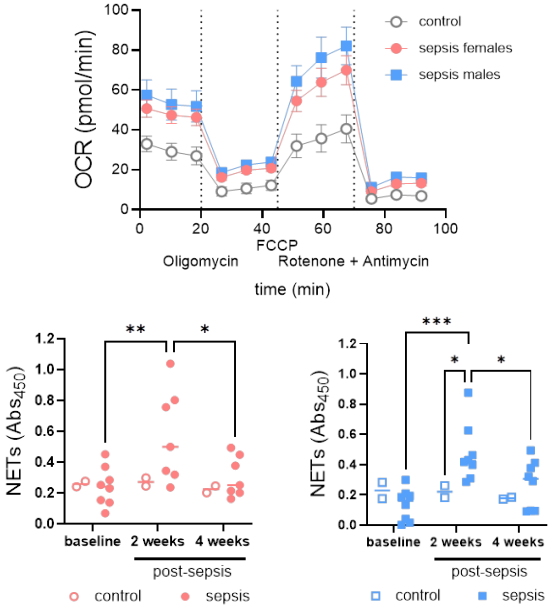
ALTERATIONS IN IMMUNE CELLS AND BONE MARROW FUNCTION IN POST-SEPSIS SYNDROME

What is known?

- Sepsis survivors exhibit immune dysregulation and impaired metabolism of polymorphonuclear cells, characterized by altered glycolytic activity (ECAR) and mitochondrial respiration (OCR).
- While neutrophil extracellular traps (NETs) are essential for acute infection control, their persistence or excessive production drives endothelial injury, microvascular activation, and survival.

What is new?

- Increased OCR in bone marrow neutrophils after sepsis indicates a shift toward higher mitochondrial respiration and neutrophil activation and pro-inflammatory state. Males have a higher metabolic response compared to females, suggesting sex-specific differences in metabolic reprogramming in sepsis survivors.
- NETs remained elevated in plasma in sepsis survivors 2 weeks after sepsis with a later decrease after 4 weeks post-sepsis. While males show a more pronounced peak at two weeks compared to females, both sexes reach comparable levels by week four. Persistent NETs serve as a biomarker for ongoing inflammation and late-stage complications.



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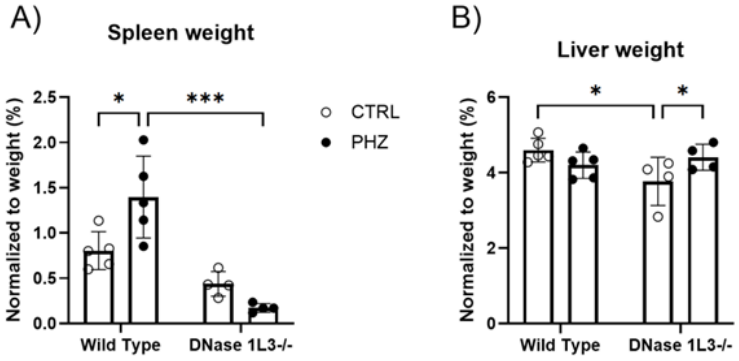
THE IMPACT OF DNASE 1L3 DEFICIENCY ON EXTRACELLULAR DNA AND ORGAN PATHOLOGY IN HEMOLYTIC ANEMIA

What is known?

- Extracellular DNA (ecDNA) is released into the circulation during cell death, including hemolysis and tissue injury.
- DNase 1L3 is a key enzyme responsible for the degradation of ecDNA, and its deficiency is linked to the accumulation of DNA and potential autoimmune complications.

What is new?

- In a 24-hour model of PHZ-induced acute hemolytic anemia, DNase 1L3 deficiency significantly alters the distribution of ecDNA fragment length, shifting it from free short circulating fragments to long multinucleosomal DNA fragments of necrotic origin.
- Deficient mice showed a significantly lower relative spleen weight, accompanied by a significant increase in liver weight, suggesting a redistribution of the metabolic and clearance load.



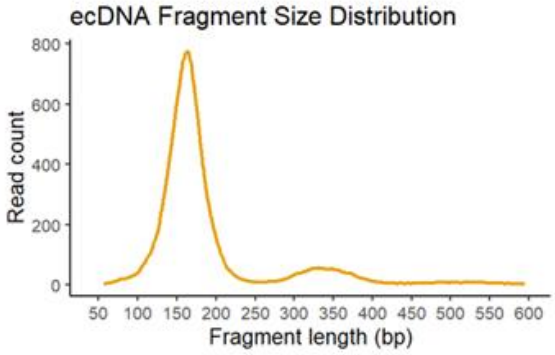
OPTIMIZATION OF METHODS FOR EXTRACELLULAR DNA FRAGMENTATION ANALYSIS: FROM QUANTITATIVE PCR TO NANOPORE SEQUENCING

What is known?

- The fragmentation profile of extracellular DNA (ecDNA) serves as a promising biomarker for monitoring autoimmune diseases, cancer, sepsis, and other pathological conditions.
- Assessment of ecDNA integrity is performed using quantitative PCR (qPCR) targeting specific fragment lengths of ALU repetitive elements.
- Third-generation sequencing (Oxford Nanopore Technologies) provides an alternative approach that can deliver a more detailed view of the fragmentation profile.

What is new?

- We performed qPCR optimization of conditions and primer pairs to distinguish between short apoptotic and long necrotic ecDNA fragments. The specificity was verified via melting curve analysis and agarose gel electrophoresis.
- Pilot testing of ecDNA sequencing on the MinION platform using Flongle flow cell was conducted. Bioinformatic analysis on preliminary data showed sequence-specific fragmentation patterns, end motif distribution and length-dependent motif enrichment.



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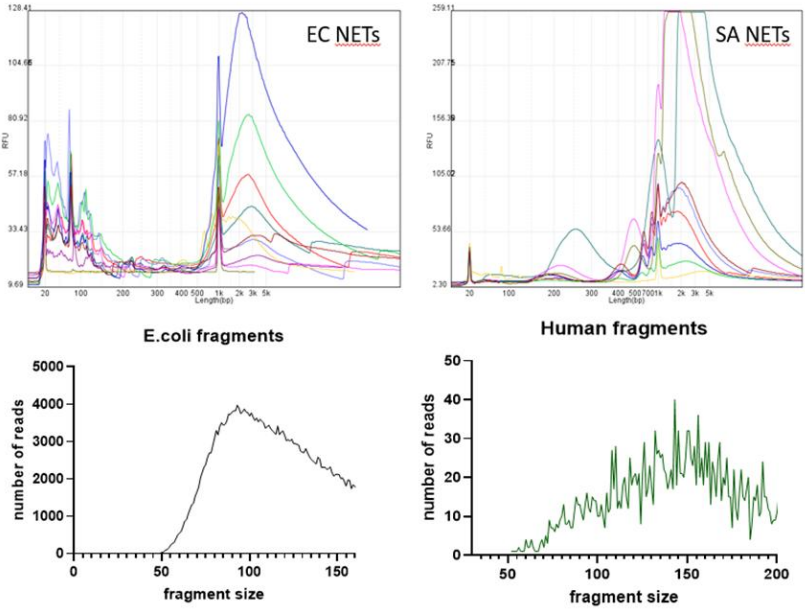
STIMULI-DEPENDENT HETEROGENITY OF NEUTROPHIL EXTRACELLULAR TRAPS

What is known?

- Neutrophil extracellular traps (NETs) help to destroy bacteria, but if produced in excess, they have a cytotoxic effect.
- The type of stimulus directly affects the protein content of NETs.
- The protein content of NETs, specifically LL37, an antimicrobial peptide cathelicidin, increases their antimicrobial properties and protects them from bacterial nucleases.

What is new?

- *S. aureus* – NETs enriched in LL37 exhibit increased resistance to plasma nuclease–mediated degradation, persist in the circulation, and exert tissue-damaging effects.
- *E. coli* – NETs contain short bacterial-derived DNA fragments that are efficiently recognized by the toll-like receptor 9, leading to activation of inflammatory signaling.



5th IMBM Summer School of Biomedicine

In July 2025, the 5th IMBM Summer School of Biomedicine offered nine students a unique opportunity to become part of an active research team and gain first-hand insight into the world of modern biomedical science. The summer school took place in the laboratories of the IMBM at the Faculty of Medicine, Comenius University, and the Slovak Academy of Sciences in Bratislava.

Students were introduced to essential laboratory techniques and experimental approaches fundamental for future scientific careers. As hands-on training in biomedical research is often limited during high school and university studies, our summer schools play an increasingly important role in bridging this gap.

Through active participation in ongoing research projects, students developed both theoretical knowledge and practical skills. They learned how to search and critically read scientific literature, work with citation managers, design and perform experiments, conduct basic statistical analyses, and interpret experimental data. On the final day of the summer school, students presented their results at an internal IMBM meeting, followed by scientific discussion, further strengthening their presentation and communication skills.

We believe that participation in the IMBM Summer School of Biomedicine significantly enhanced students' preparedness for their academic studies and future careers in biomedical research. In addition, one participant was subsequently accepted as a bachelor and one as a diploma thesis student at our institute.

The summer school also attracted Slovak students studying both in Slovakia and abroad across various natural science and medical disciplines. In this way, the program contributes to the reintegration of Slovak students studying abroad into Slovak biomedical research and supports the broader popularization of science and research in Slovakia.

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Students of IMBM
Summer School of Biomedicine 2025



We are happy about the student's interest in spending part of the summer with scientific research at IMBM!
Thank you and we look forward to next year!

Second TEATIME Beginners Training School on the Use of Home-Cage Technologies to Monitor Rodents

From 2021 to 2025, we were active members of the COST action CA20135: *Improving biomedical research by automated behaviour monitoring in the animal home-cage (TEATIME)*. This international initiative focused on enhancing the reproducibility and translational value of biomedical research through the use of advanced technologies for automated, continuous monitoring of laboratory animal behavior.

These home-cage technologies offer a powerful alternative to conventional behavioral testing by reducing key stressors, such as frequent human handling or exposure to unfamiliar testing apparatuses, both of which can substantially alter natural animal behavior and compromise experimental outcomes. While individual systems differ in their technical approaches and limitations, their shared goal is to capture more naturalistic, reliable, and unbiased behavioral data. In 2025, our involvement in the TEATIME network culminated in the organization of the final COST TEATIME Training School, held on 17–20 June at the Science Park in Bratislava under the auspices of the Faculty of Medicine, Comenius University. The event brought together master's, PhD, and postdoctoral researchers for an intensive hands-on experience with home-cage monitoring technologies. Beyond technical training, the school fostered scientific exchange, collaboration, and new perspectives on behavioral research, making it a truly inspiring conclusion to this successful COST Action.



Conferences 2025

100th PHYSIOLOGICAL DAYS
04-05/02/2025, Prague, Czech Republic
(Filip Baran, Emil Bečka, Karolína Bíla, Patrik Bertovič, Letícia Hudecová, Kristína Macáková, Alena Potočárová, Emma Skybová, Tomáš Strečanský, Petronela Sušienková, Nikola Tóthová)



VIII. NEWS IN HEMATOLOGY AND TRANSFUSION
07-08/02/2025, Bratislava, Slovak Republic
(Michal Pastorek)

CENTRAL EUROPE NANOPORE DAYS 2025
17-19/02/2025, Telč, Czech Republic
(Tomáš Strečanský)

IX. SLOVAK NEUROPSYCHIATRIC CONGRESS 2025
13-14/03/2025, Bojnice, Slovak Republic
(Petronela Sušienková)

XIX. SPRING RHEUMATOLOGY SEMINAR
14/03/2025, Piešťany, Slovak Republic
(Kristína Macáková)

19th RANK CONFERENCE (ROUTINE ANALYSIS OF NUCLEIC ACIDS)
19-20/03/2025, Pardubice, Czech Republic
(Tomáš Strečanský)

EUROPEAN PHAGOCYTE MEETING 2025
26-28/03/2025, Madrid, Spain
(Emil Bečka, Patrik Bertovič, Karolína Bíla, Letícia Hudecová, Michal Pastorek)

26th CONFERENCE OF THE SOCIETY FOR LABORATORY ANIMAL SCIENCE
23-25/04/2025, Tábor, Czech Republic
(Veronika Borbélyová)

ISEV2025 Annual Meeting
24-27/03/2025, Vienna, Austria
(Kristína Lichá, Barbora Tamášová)

63rd FACULTY CONFERENCE OF STUDENT SCIENTIFIC PROFESSIONAL ACTIVITIES
30/04/2025, Bratislava, Slovakia
(Dominika Stoláriková)

20th SCIENTIFIC CONFERENCE OF PHD STUDENTS
30/04/2025, Bratislava, Slovakia
(Emil Bečka, Filip Baran, Paulína Belvončíková, Emma Skybová, Petronela Sušienková, Nikola Tóthová)





6th INTERNATIONAL MEETING ON CELL-FREE DNA
08-09/05/2025, Copenhagen, Denmark
(Peter Celec)

44th EUROPEAN WORKSHOP FOR RHEUMATOLOGY RESEARCH 2025
08-10/05/2025, Budapest, Hungary
(Kristína Macáková)

32nd EUROPEAN CONGRESS ON OBESITY
11-14/05/2025, Malaga, Spain
(Andrej Feješ, Katarína Šebeková)

52nd MAY HEPATOLOGICAL DAYS
21-23/05/2025, Tatranská Lomnice, Slovak Republic
(Barbora Gromová, Ľubica Janovičová)

16th FELASA Congress 2025
02-05/06/2025, Athens, Greece
(Veronika Borbélyová)



XXIII. BIOCHEMISTRY CONGRESS OF CZECH AND SLOVAK SOCIETIES FOR BIOCHEMISTRY & MOLECULAR BIOLOGY ON THE OCCASION OF THE 70TH ANNIVERSARY OF THEIR ESTABLISHMENT AND IN PARTICIPATION OF POLISH AND GERMAN BIOCHEMICAL SOCIETIES
07-10/09/2025, Praha, Česká republika
(Peter Celec)

CZECH NEUROSCIENCE 2025
15-18/09/2025, Plzeň, Czech republic
(Petronela Sušienková)

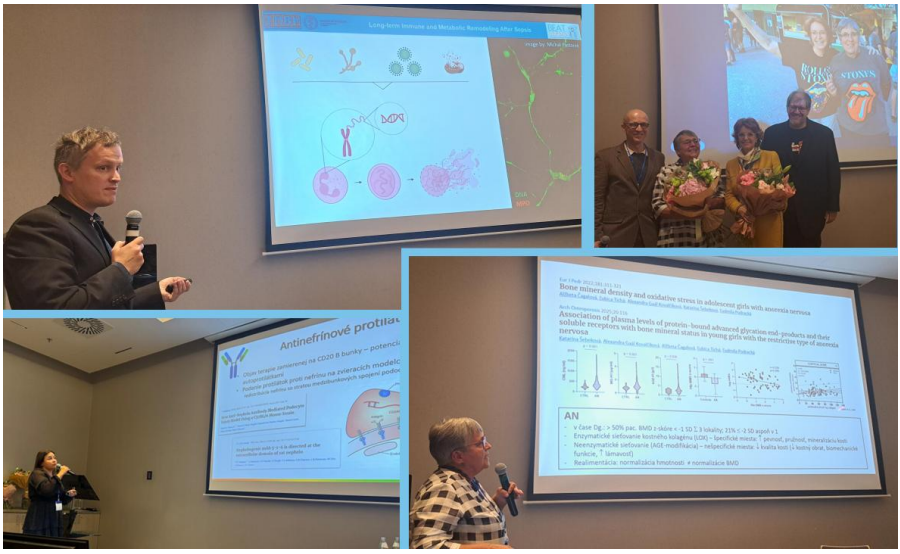
INTERNATIONAL MINI-SYMPOSIUM – ADVANCED EDUCATION ON NEURODEVELOPMENTAL DISORDERS: COMPARISON OF ANIMAL MODELS
06/10/2025, Bratislava, Slovak Republic
(Petronela Sušienková)

XXXV. IZAKOVIC MEMORIAL 2025
08-10/10/2025, Tatranská Lomnica, Slovak Republic
(Peter Celec, Barbora Vlková)

WORKING CONFERENCE OF THE CHILDREN'S CLINIC OF THE FACULTY OF MEDICINE, COMENIUS UNIVERSITY AND NATIONAL INSTITUTE OF CHILDREN'S DISEASES
09-10/10/2025, Bratislava, Slovak Republic
(Peter Celec, Katarína Šebeková)

XLII. CONGRESS OF SLOVAK AND CZECH ALLERGISTS AND CLINICAL IMMUNOLOGISTS
22-25/10/2025, Vysoké Tatry, Slovak Republic
(Peter Celec)

XV. CONFERENCE OF PEDIATRIC NEPHROLOGY WITH INTERNATIONAL PARTICIPATION
24-25/10/2025, Bratislava, Slovak Republic
(Peter Celec, Michal Pastorek, Katarína Šebeková)



AUTUMN SCHOOL: SOCIAL PROCESSES IN AUTISM AND SCHIZOPHRENIA IN MULTIDISCIPLINARY CONTEXTS
06-07/11/2025, Bratislava, Slovak Republic
(Petronela Sušienková)





AMP 2025 ANNUAL MEETING & EXPO
11-15/11/2025, Boston, United States
(Tomáš Strečanský)

14th CNAPS INTERNATIONAL SYMPOSIUM ON CIRCULATING NUCLEIC ACIDS IN PLASMA & SERUM
03-05/12/2025, Hong Kong, China
(Barbora Vlková, Peter Celec)

Research Stays Abroad:

LETÍCIA HUDECOVÁ – University Hospital Bonn, Institute of Innate Immunity, Bonn, Germany, March 2025 - August 2025

VERONIKA BORBÉLYOVÁ – Institute of Physiology of the 1st Faculty of Medicine of Charles University in Prague, Prague, April 2025, training on analyzing the spontaneous behavior of mice using Laboratory Animal Behaviour Observation, Registration, and Analysis System (LABORAS)

VERONIKA BORBÉLYOVÁ – Institute of Physiology of the 1st Faculty of Medicine of Charles University in Prague, Prague, November-December 2025, investigating the spontaneous behavior of male and female mice, focusing on cage-lid climbing activity with respect to the presence or absence of a social partner using home-cage monitoring system LABORAS

EMMA SKYBOVÁ – Beth Israel Deaconess Medical Center/Harvard Medical School Boston, MA, USA, Department of Surgery, October 2025 - August 2026



INSTITUTE OF MOLECULAR BIOMEDICINE

Teaching at IMBM

IMBM is a research institute, but it is also important to participate in the educational process. Beyond institutional meetings, seminars and courses we prepared the lectures, seminars and practical courses at the Faculty of Medicine, Faculty of Natural Sciences, Faculty of Mathematics and Physics Comenius University in Bratislava:

FACULTY OF MEDICINE:

Physiology

Pathophysiology

Introduction to Science

FACULTY OF NATURAL SCIENCES:

Molecular Endocrinology

Basics of Theoretical and Experimental Medicine

Behavioral Genetics

Special Genetics

FACULTY OF MATHEMATICS AND PHYSICS

Laboratory Methods in Biomedicine





Congratulations to assoc. prof. Katarína Šebeková!

Associate professor Katarína Šebeková received the highest award of the Slovak Medical Society (SLS), namely the T.R. Niederland honorary plaque for her contributions to the development of the SLS, which was awarded to her by the Slovak Society of Clinical Biochemistry. She also received the Medal of Foundation of the Společnost lékařsko-slowanská in Pest from the Slovak Nephrological Society of the SLS. Big congratulations!



Awards and Prizes

TOMÁŠ STREČANSKÝ – Best oral presentation by young authors under 35, as well as the Dalibor Novotný Award for the best work by young authors under 35 at 19th Annual RANK conference (Routine Analysis of Nucleic Acids), Pardubice, Czech Republic (19-20/03/2025)





TOMÁŠ STREČANSKÝ – Abstract evaluation – Abstract selected for Oral Presentation at AMP 2025 Annual Meeting & Expo in Boston (Association for Molecular Pathology), Boston, MA, USA (11-15/11/2025)

NIKOLA TÓTHOVÁ – 1st place in the Molecular and Experimental Medicine section 20th Scientific Conference of PhD Students, Bratislava, Slovak Republic, April 30, 2025

EMMA SKYBOVÁ – 2nd place in the Molecular and Experimental Medicine section 20th Scientific Conference of PhD Students, Bratislava, Slovak Republic, April 30, 2025

TETIANA PIDLYPSKA – Rector's Award of Comenius University in Bratislava for her excellent diploma thesis (under supervision Associate Professor Michal Pastorek) in the academic year 2024/2025 at Faculty of Science, Comenius University in Bratislava, Slovak Republic, July, 2025

PAULÍNA BELVONČÍKOVÁ – Extraordinary Prize of the Dean of the Faculty of Medicine of the Comenius University for her exceptional scientific contribution during her doctoral studies (under supervision Associate Professor Roman Gardlík in the academic year 2024/2025, Bratislava, Slovak Republic, September, 2025



PAULÍNA BELVONČÍKOVÁ, ANDREJ FEJEŠ and colleagues – Best Publication of the Slovak Physiological Society in 2024 for publication The Effect of Cross-Sex Fecal Microbiota Transplantation on Metabolism and Hormonal Status in Adult Rats

PETRONELA SUŠIENKOVÁ – Professor Ziermans Prize (University of Amsterdam) for the best presentation, Social Processes in Autism and Schizophrenia in Multidisciplinary Contexts (Autumn School), Bratislava, Slovak Republic, November, 2025

Science Popularization and Invited Lectures

TOMÁŠ STREČANSKÝ – invited lecture titled: *How to Detect AMR (antimicrobial resistance) from Low Bacterial Load Samples Using Advanced Molecular Techniques*, from Micronbrane Medical Company (06/02/2025)

TOMÁŠ STREČANSKÝ – invited lecture titled: *Making the Most of MinION Point-of-Care Test: Development of Rapid Identification of Pathogens and AMR based on Nanopore Sequencing – Analysis for the Future of Clinical Genomics*, at Central European Nanopore Days (CENDa) in Telč, Czech Republic (18/02/2025)

PETER CELEC – guest in a discussion about health entitled: *Healthcare – how not to get lost in a sea of information*, organised by Citizens' initiative Krupina (13/02/2025)

PETER CELEC – short interview for .týždeň about: *I am a scientist, but I stop understanding some things* (25/02/2025)

PETER CELEC – short review titled: *Obesity Treatment: Yesterday, Today, and Tomorrow* in Monitor of Medicine as a journal of the Slovak Medical Society (1-2/2025, volume 15)

NEXTSTEP SCIENCE CONFERENCE 2025 – career and networking event focussed on meeting potential employers or organization representatives from the field of natural sciences (03/03/2025)



STAND UP FOR SCIENCE – global campaign supporting science, fighting against misinformation and political pressures, with the aim of emphasizing the importance of scientific research for society (07/03/2025)

PETER CELEC – guest on Aktuality's podcast – Ráno Nahlas where they discussed how to combat the world of myths and their spreaders, whether modern medicine and evidence-based science are coming to an end, the current state of American science after changes in funding, whether this presents an opportunity for Europe and Slovakia, and what Slovak science is doing to retain young researchers (20/03/2025)

GALILEO SCHOOL – four students visited IMBM for practical training about how science is done (24-28/03/2025)

DNA DAY – 5th Annual DNA Day celebration in Slovakia in honor of the 72nd anniversary of the discovery of the DNA structure, it was co-organized with the Department of Genetics from the Faculty of Science of Comenius University in Bratislava (25/04/2025)



JÚLIUS HODOSY – interview for Denník N on topic the government's actions on the international pandemic treaty – the World Health Organization (19/05/2025)

ELEMENTARY SCHOOL LIBELLUS – seventh and eighth grade students visited IMBM for an interactive workshop: *On how science is done*, about the basic principles of science, cells in the blood, neutrophils and how they create traps for bacteria, what it means to publish in a good journal and how to formulate and test hypotheses was not left out (26/05/2025)



MICHAL PASTOREK – invited lecture at 14th Annual Miniconference of PhD Students Centre of Experimental Medicine Slovak Academy of Sciences (16/06/2025)

SECOND TEATIME BEGINNERS TRAINING SCHOOL ON THE USE OF HOME-CAGE TECHNOLOGIES TO MONITOR RODENTS – organized in collaboration with the COST organization under the auspices of the Faculty of Medicine, Comenius University in Bratislava (17-20/06/2025)

PETER CELEC – short review for Radio Slovakia on his current scientific research on autism spectrum disorders

PETER CELEC – guest in a discussion titled: *Health under attack: The dangers of misinformation in healthcare*, in Lučenec (26/06/2025)

PETER CELEC – guest in West Slovak Television, where he discusses what our DNA says about us and why we should be careful how research into free DNA, epigenetics and molecular biomedicine affects the future of medicine and all of us

JÚLIUS HODOSY – interview for Denník N about how the human body reacts to extremes, whether it is possible to train for a heart attack, and why action films and series often distort the reality of the medical environment (23/07/2026)

PETER CELEC – guest in the scientific debate for 360tka about cloning, longevity, "superhumans," and mRNA vaccine (23/08/2025)

PETER CELEC – interview for Denník N about why scientific thinking is crucial for quality medicine, how medical education is changing in the age of artificial intelligence, and why it is important for doctors to understand scientific studies, how the Faculty of Medicine at Comenius University shapes future doctors through the course Introduction to Science, so that they do not get lost in the flood of information, how we should approach health information in an age of spreading disinformation, and how to build trust in science and healthcare (23/08/2025)

PAULÍNA BELVONČÍKOVÁ – guest in the discussion at Inaugural Meeting of the Doctoral School Comenius University Science Park to share her experiences during PhD study (24/09/2025)

KRISTÍNA MACÁKOVÁ – guest in the discussion at MediFutura event about benefits of science and medicine in Slovakia, international internships, returning to Slovakia, and compared the advantages and disadvantages (25/09/2025)

PETER CELEC – invited lecture at MediFutura event titled: *High-quality biomedical research can be conducted in Slovakia* (25/09/2025)

EUROPEAN SCIENCE NIGHT – interactive science stand titled: *How is science done?* (26/09/2025)







EMMA SKYBOVÁ – lecture *Sex Differences In Autism Heritability* as part of the Women's Health Club series at Beth Israel Deaconess Medical Center, Boston (04/11/2025)

OPEN DAY AT THE FACULTY OF MEDICINE – interactive science stand about what are the possibilities to get involved in research during medical studies (21/11/2025)



Meetings with Nobel Laureates

Professor Peter Celec met **Sir Paul Nurse**, the former director of the Francis Crick Institute, President of the Royal Society and winner of the Nobel Prize in Physiology or Medicine in 2021 – at the 23rd Biochemistry Congress in Prague.

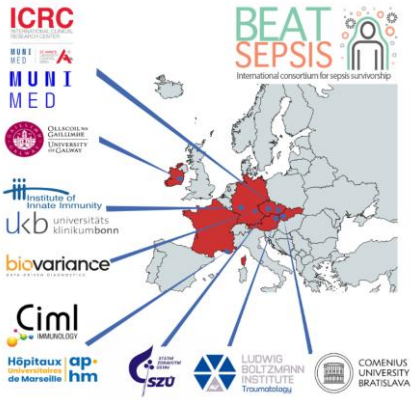


Several of our colleagues attended a public lecture at the Medical University of Vienna by **Nobel Laureate Katalin Karikó**, who has received the Nobel Prize in Physiology or Medicine in 2023 together with Drew Weissman 19. May 2025.



Grants

HORIZON EUROPE GRANT



HORIZON EUROPE FOR BEATSEP CONSORTIUM TO RESEARCH THE LONG-TERM CONSEQUENCES OF SEPSIS
Michal Pastorek
2023-2028
www.beatsepsis.eu

PROGRAM SLOVENSKO GRANT

NFP401101C202
ENDOGENOUS DEOXYRIBONUCLEASE ACTIVITY AND THE BIOLOGY OF EXTRACELLULAR DNA
Peter Celec
2025-2029

VAIA GRANTS

VAIA – 09I01-03-V04-00079:
IMPACT OF SEPSIS RISK FACTORS ON POSTSEPTIC SYNDROME MEDIATED BY NEUTROPHIL EXTRACELLULAR TRAPS
Michal Pastorek
2025-2026

VAIA – 09I01-03-V05-00013:
STERILE INFLAMMATION AT BIRTH AND RISK OF POSTPARTUM INFECTION
Barbora Vlková
2025-2026

APVV GRANTS

APVV-21-0378
THE ROLE OF INFECTIOUS AND STERILE INDUCERS OF NEUTROPHIL EXTRACELLULAR TRAP FORMATION IN SEPSIS
Michal Pastorek
2022-2025

APVV-21-0370
THE ROLE OF EXTRACELLULAR DNA AND NEUTROPHIL EXTRACELLULAR TRAPS IN THE PATHOGENESIS OF CHRONIC LIVER DISEASES
Roman Gardlík
2022-2025

APVV-21-0355
CAFETERIA DIET-INDUCED OBESITY IN WILD-TYPE AND RECEPTOR FOR ADVANCED GLYCATION END PRODUCTS (RAGE-/-) KNOCKOUT MICE AND THE EFFECTS OF PERIPHERALLY ADMINISTERED OXYTOCIN
Katarína Šebeková
2022-2025

APVV-22-0554 DEOXYRIBONUCLEASE 1L3 IN THE BIOLOGY OF EXTRACELLULAR DNA
Peter Celec
2023-2027

APVV-24-0274 THE HOME-CAGE SOCIAL INTERACTION TEST: AN INNOVATIVE ETHOLOGICAL APPROACH FOR MEASURING SOCIAL BEHAVIOR IN LABORATORY RATS AND THE ROLE OF SEX STEROID HORMONES
Veronika Borbélyová
2025-2029

VEGA GRANTS

VEGA 1/0341/23:
THE ROLE OF NEUTROPHIL EXTRACELLULAR TRAPS IN THE PATHOGENESIS OF METABOLIC SYNDROME
Veronika Borbélyová
2023-2025

VEGA 1/0496/24:
IMPACT OF ANTIBIOTICS ON MITOCHONDRIAL HEALTH AND NEUTROPHIL FUNCTION
Michal Pastorek
2024-2027

VEGA 1/0727/24:
STERILE INFLAMMATION AT BIRTH, EXTRACELLULAR MITOCHONDRIA AND THE RISK OF POSTPARTUM INFECTION
Barbora Vlková
2024-2026

VEGA 1/0706/25:
STUDYING THE PATHOGENESIS AND THERAPY OF AUTOIMMUNE DISEASES USING FECAL MICROBIAL TRANSPLANTATION
Roman Gardlík
2025-2027

KEGA GRANTS

KEGA 082UK-4/2025:
INNOVATION OF THE MOLECULAR ENDOCRINOLOGY COURSE FOR SECOND-CYCLE UNIVERSITY STUDENTS AT THE FACULTY OF SCIENCE, COMENIUS UNIVERSITY IN BRATISLAVA
Veronika Borbélyová
2025-2027

GUKPOST GRANTS

GUK/41/2025:
THE ROLE OF INTESTINAL AND ORAL MICROBIOTA IN THE PATHOGENESIS OF AUTOIMMUNE DISEASES: USE OF FECAL MICROBIAL TRANSPLANTATION AND ANIMAL MODELS
Kristína Macáková
2025-2026

GUK/42/2025:
EFFECT OF DIET AND HORMONAL THERAPY ON DNASE ACTIVITY IN THE GASTROINTESTINAL TRACT OF MICE
Barbora Gromová
2025-2026

COMENIUS UNIVERSITY GRANTS

UK/1201/2025:
THE EFFECT OF THE SYNERGY OF NEUTROPHIL EXTRACELLULAR TRAPS AND ASC COMPLEXES ON THE COURSE OF SEPSIS
Letícia Hudecová
2025

UK/1157/2025:
IMMUNOMODULATORY EFFECT OF INTENSE PHYSICAL ACTIVITY IN OVERCOMING SECONDARY PNEUMONIA IN A MOUSE MODEL
Nikola Tóthová
2025

UK/1131/2025:
THE INFLUENCE OF SEX HORMONE MODULATION ON THE SOCIAL BEHAVIOR OF MICE
Petronela Sušienková
2025

UK/1289/2025:
THE ROLE OF EXTRACELLULAR DNA AND DNASE ACTIVITY IN ANIMAL MODELS OF HEMOLYTIC AND HEMORRHAGIC ANEMIA
Emma Skybová
2025

UK/1354/2025:
PHYSIOLOGICAL CONCENTRATIONS OF EXTRACELLULAR DNA IN THE URINE OF HEALTHY INDIVIDUALS AND THE INFLUENCE OF GENDER
Alena Potočárová
2025

UK/1179/2025:
THE INFLUENCE OF ANTIBIOTICS ON THE REGULATION OF THE INNATE IMMUNE RESPONSE IN THE PATHOLOGY OF SYSTEMIC INFLAMMATION
Karolína Bíla
2025

INSTITUTE OF MOLECULAR BIOMEDICINE

UK/1178/2025:
ACUTE AND LONG-TERM PATHOLOGICAL CONSEQUENCES OF THE FORMATION OF NEUTROPHIL EXTRACELLULAR TRAPS
Patrik Bertovič
2025

UK/1296/2025:
STUDY OF THE PATHOGENESIS OF RHEUMATOID ARTHRITIS USING FECAL MICROBIAL TRANSPLANTATION
Paulína Belvončíková
2025

UK/1222/2025:
THE ROLE OF NEUTROPHIL RECEPTORS FOR FORMYLATED PEPTIDES IN STERILE INJURY
Emil Bečka
2025

UK/1301/2025:
THE ROLE OF NEUTROPHILS AND NEUTROPHIL EXTRACELLULAR TRAPS IN A GENETIC MODEL OF COLITIS
Filip Baran
2025

WHERE TO FIND US?

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http://www.imbm.sk/

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