INSTITUTE OF MOLECULAR BIOMEDICINE

Annual report 2022



IMBM 2022

1 research institute
13 years
1 professor
6 associate professors
6 postdocs
17 PhD students
28 diploma thesis students
12 bachelor students
7 APVV grants
1 KEGA grant
7 VEGA grants
7 UK grants
38 CC/IF publications

IMBM
INSTITUTE OF MOLECULAR BIOMEDICINE

SCIENTOMETRIC DATA, YEAR 2022

38 NUMBER OF CC/IF PUBLICATIONS

19 OF THESE WITH FIRST/LAST AUTHORS FROM IMBM

174 CUMULATIVE IMPACT FACTOR



IMBM
INSTITUTE OF MOLECULAR BIOMEDICINE

RESEARCHERS AT IMBM

PROFESSORS:



PETER BOOR, prof., MD, PhD
CC/IF publications - 303, SCI citations - 8051, h-index - 56
renal fibrosis, nephropathology, immunopathomechanisms, models of renal diseases, imaging
boor.peter@gmail.com
pboor@ukaachen.de



PETER CELEC, assoc. prof., MD, MSc, Ing, DrSc, MPH
CC/IF publications - 284, SCI citations - 4005, h-index - 37
extracellular DNA, testosterone, salivary biomarkers, sepsis
peter.celec@imbm.sk



JÚLIUS HODOSY, assoc. prof., MD, MSc, PhD, MPH
CC/IF publications - 100, SCI citations - 1596, 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 - 187, SCI citations - 3496, h-index - 33
metabolic syndrome, diabetes mellitus,
advanced glycation end products, clinical biochemistry, pathogenesis of renal diseases
katarina.sebekova@imbm.sk

IMBM TEAM

ROMAN GARDLÍK, assoc.prof., MD, MSc, PhD
CC/IF publications - 82, SCI citations - 987, h-index - 17
inflammatory bowel disease, animal models,
extracellular DNA, microbiome
roman.gardlik@imbm.sk



ĽUBOMÍRA TÓTHOVÁ, assoc.prof., PhD
CC/IF publications - 98, SCI citations - 1460, h-index - 20
salivary markers, oxidative stress, urinary tract infections,
experimental nephrology , bacteriophages
lubomira.tothova@imbm.sk



BARBORA VLKOVÁ, assoc. prof., MSc, PhD
CC/IF publications - 55, SCI citations - 1039, h-index - 15
extracellular DNA, non-invasive prenatal diagnostics,
neutrophils, pneumonia, sepsis, molecular pathology
barbora.vlkova@imbm.sk



POSTDOCS:

JANKA BÁBÍČKOVÁ, MSc, PhD
CC/IF publications - 42, SCI citations - 782, h-index - 16
phage display, sex steroids, inflammatory bowel disease,
extracellular DNA, experimental nephrology
jana.babickova@gmail.com



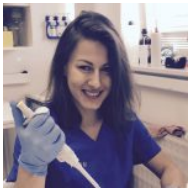
MICHAL PASTOREK, MSc, PhD
CC/IF publications - 34, SCI citations - 356, h-index - 12
Neutrophil biology, sterile inflammation, autoimmune diseases
michal.pastorek@imbm.sk



IMBM TEAM



VERONIKA BORBÉLYOVÁ, MSc, PhD
CC/IF publications - 30, SCI citations - 224, h-index - 10
animal models, autism spectrum disorder, metabolic syndrome, rheumatoid arthritis, sex hormones
veronika.borbelyova@imbm.sk



BARBORA KONEČNÁ, MSc, PhD
CC/IF publications - 40, SCI citations - 376, h-index - 11
extracellular DNA, extracellular vesicles,
pregnancy complications, quantitative real-time PCR
barbora.konecna@imbm.sk



EMESE RENCZÉS, MSc, PhD
CC/IF publications - 24, SCI citations - 187, h-index - 8
sex hormones, behavioral phenotyping in rats and mice,
mental disorders, autism
emese.domonkos@imbm.sk



ĽUBICA JANOVIČOVÁ, MSc, PhD
CC/IF publications - 15 , SCI citations - 76, h-index - 4
extracellular DNA, DNase activity, sepsis, anemia, animal models
lubica.janovicova@imbm.sk

Students at IMBM

PHD STUDENTS AT IMBM IN 2022:
Katarína Kmeťová, MSc
Lucia Mihalovičová, MSc
Miriam Pillerová, MSc
Veronika Šarayová, MSc
Alena Potočárová, DVM
Jakub Janko, MSc
Kristína Macáková, MSc
Nadja Ivašková, MSc
Jakub Szabó, MA.
Monika Janíková, MSc
Barbora Gromová, MSc
Kristína Lichá, MSc
Paulína Belvončíková, MSc
Emil Bečka, MSc
Petronela Sušienková, MA.
Andrej Feješ, MSc.
Nikola Kováčová MSc.

MASTER STUDENTS AT IMBM IN 2022:
Gergő Borka, B.S.
Michaela Budovcová, B.S.
Michaela Kardohelyová, B.S.
Viktória Godová, B.S.
Dominika Monika Koritková, B.S.
Bernhard Schuh
Daniel Králik, B.S.
Tim Gross
Šimon Pethö
Tomáš Strečanský, B.S.
Emma Skybová, B.A.
Karin Gabľasová, B.S.
Marwin Shir
Alžbeta Jančovičová, B.S.

Letícia Hudecová, B.S.
Lucia Mosná, B.S.
Alexandra Hladíková
Ema Cibulová B.S.
Paulína Makovická B.S.
Anna Purgatová B.S.
Ivana Slivková B.S.
Zabáková Dominika B.S.
Karolina Gubišová B.S.
Karolína Kováčová B.S.
Gabriela Forraiová B.S.
Zuzana Matulová
Nikola Dudová
Alexander Jančuška

BACHELOR STUDENTS AT IMBM IN 2022:
Rebecca Horváthová
Tetiana Pidlypska
Marek Lúčan
Barbora Benčičová
Patrik Hains
Dominika Kytková
Jázmin Orsolya Takácsová
Katarína Purdjaková
Tomáš Niedl
Monika Jankechová
Nelia Korotushak
Daniela Ščepková



POSTDOCS WHO SUCCESSFULLY DEFENDED THEIR HABILITATION THESIS IN 2022:
Miriam Pillerová, MSc
Veronika Šarayová, MSc

MASTER STUDENTS WHO SUCCESSFULLY DEFENDED THEIR THESES IN 2022:
Gergő Borka, B.S.
Michaela Budovcová, B.S.
Emil Bečka, B.S.
Alexander Jančuška
Andrej Feješ, B.S.

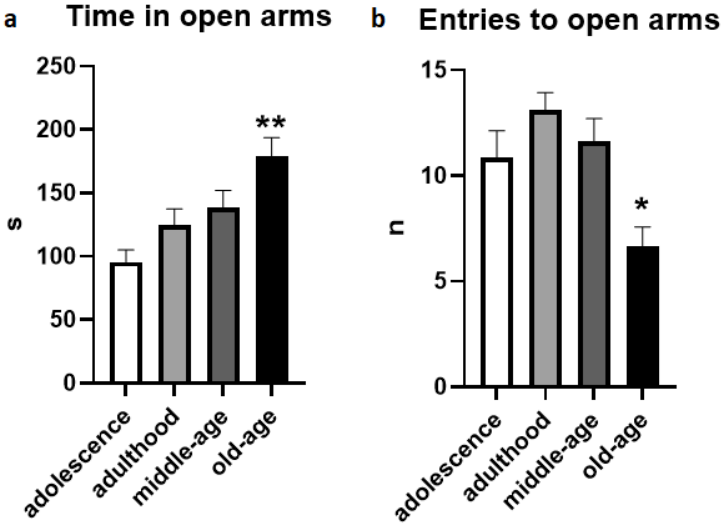
BACHELOR STUDENTS WHO SUCCESSFULLY DEFENDED THEIR THESES IN 2022:
Daniel Králik
Paulína Makovická
Ivana Slivková
Marek Lúčan

OTHER COLLEAGUES:
Henrieta Vontorčíková, Eva Cibáková, Ingrid Simonová, Mária Turoňová, Barnabáš Borbély, Mária Moyzesová, Stanislava Sochová, Hanna Fedorets, Bibiana Bujačková, Darina Skuráková

Age-related behavioral characteristics of Wistar rats

What is new?

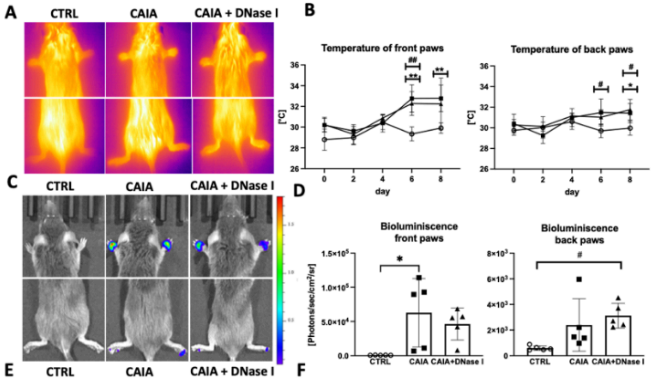
- Lower anxiety-like behavior combined with a lack of exploration might indicate less motivation to movement in aged rats.
- There are no age-dependent differences in spatial learning and memory.
- Body weight has no effect on locomotor activity, anxiety-like behavior, exploration, or memory in any age stage.



Effects of exogenous deoxyribonuclease I in collagen antibody-induced arthritis

What is new?

- The CAIA (collagen antibody induced arthritis) model was successfully induced as proved by a higher volume, temperature and the overall arthritis score in comparison to controls.
- This is the first study describing the effect of intraperitoneal DNase administration in the CAIA model.
- The administration of DNase I resulted in a nearly two-fold increase in serum DNase activity. Still, it did affect neither plasma ecDNA, nor the arthritis score or other measures of joint inflammation.
- EcDNA does not seem to be involved in the pathogenesis of CAIA. This could be influenced by the selected animal model, which represents only, very acute, and local inflammation.
- Our results suggest that exogenous DNase I does not prevent the development of CAIA in mice. Whether this is true for other animal models of arthritis or clinical RA requires further research.

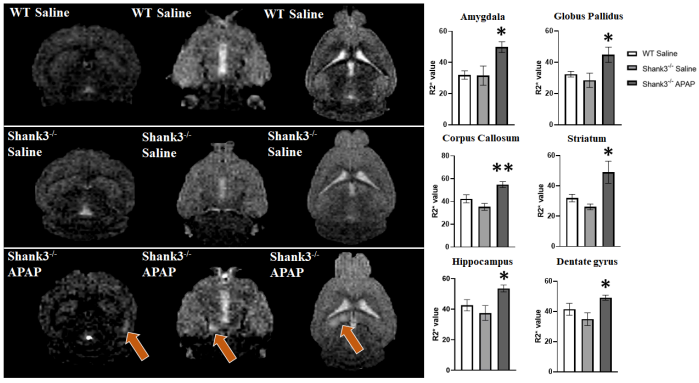


INSTITUTE OF MOLECULAR BIOMEDICINE

Behavioral and neuromorphological consequences of paracetamol-induced liver damage in a genetic mouse model of autism

What is new?

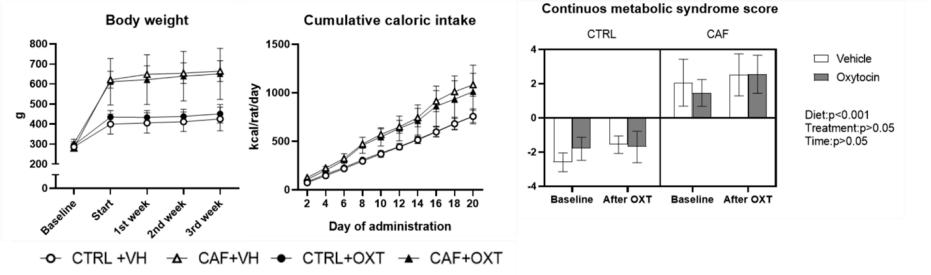
- High doses of paracetamol (APAP) cause liver damage, which is associated with neuroinflammation.
- Neuroinflammation could exacerbate the autism-like phenotype.
- Single high dose of APAP induces structural abnormalities associated with neuroinflammation in the brain. No functional effects were observed.
- Whether the lack of behavioral effects, despite clear neuromorphological abnormalities, is due to insufficient time following APAP administration will be analyzed shortly.
- Chronic APAP administration during early postnatal development could prove more insightful in future research.



Short-term intranasal oxytocin treatment did not improve obesity-associated metabolic syndrome in aged female rats

What is new?

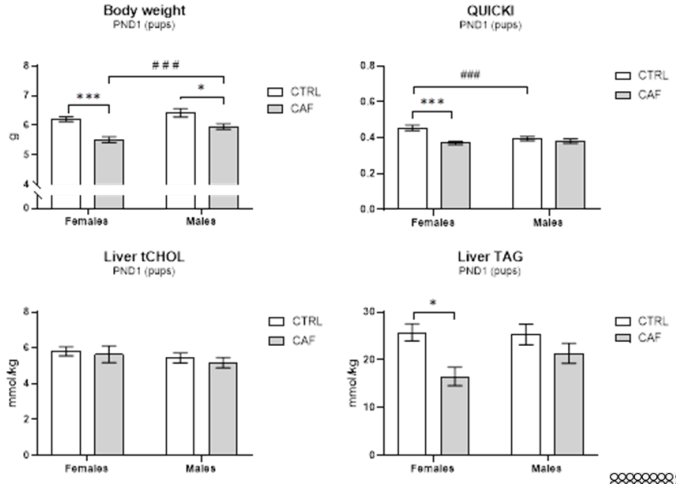
- Obesity-associated metabolic syndrome represents a risk for cardiovascular disease.
- Oxytocin decreases food intake, increases energy expenditure and improves components of metabolic syndrome.
- Oxytocin (OXT) or vehicle (VH, NaCl) has been administered intranasally for 3 weeks to old female rats fed either standard (CTRL) or cafeteria diet (CAF).
- Administration of OXT did not impact body weight, caloric intake, and metabolic parameters assessed as continuous metabolic syndrome score.
- Further studies need to focus on interaction of sex, age, obesogenic diet type, oxytocin dosage, and duration of administration as a treatment of obesity-associated metabolic syndrome.



Sex-dependent metabolic effects of prenatal cafeteria diet in rat neonates

What is new?

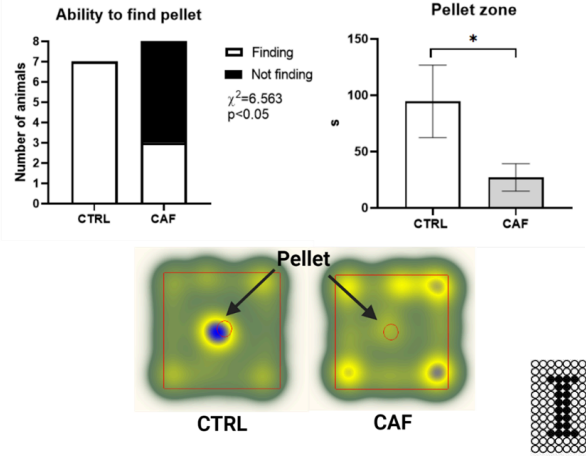
- During intrauterine development, maternal diet affects offspring metabolic status *via* epigenetic alterations.
- To mimic unhealthy diet, rat dams were preconceptionally and during pregnancy fed with an obesogenic cafeteria diet (CAF).
- Preconceptionally CAF exposed offspring (postnatal day 1, PND1) of both sexes exhibited lower birth weight.
- Female CAF neonates showed impairment in insulin sensitivity and lower triacylglycerol storage in the liver compared to CTRL counterparts.
- Maternal cafeteria diet sex-dependently impairs metabolism of rat neonates.



Effect of obesogenic cafeteria diet on female mice olfaction behavior

What is new?

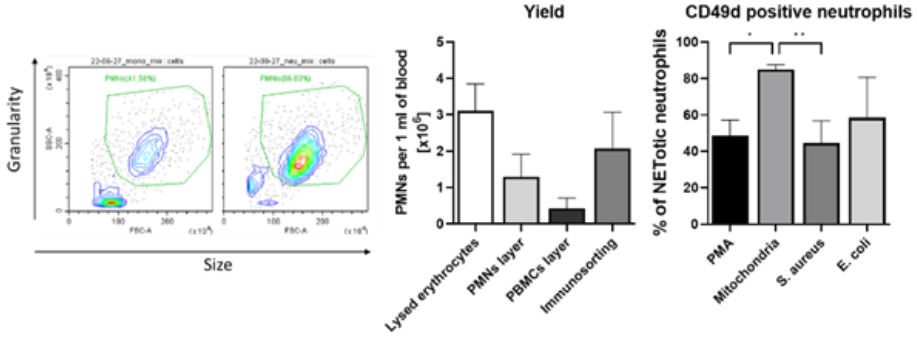
- Food intake and food preference is affected by different odorant stimuli from the diet.
- Cafeteria diet (CAF) contained different food components such as sweet, salted, crunchy, processed food, and standard pellet chow (CTRL).
- Buried food test was used to assess the olfactory behavior of mice through the ability of mice to find hidden pellets in sawdust.
- CAF females showed impaired ability of finding the pellet, reflected by less time spent with pellet sniffing or consumption compared to CTRL females.
- Animals consuming flavor-rich CAF diet showed impaired interest in standard chow, which might indicate alteration in olfaction.



Neutrophil phenotype and behavior vary based on the isolation method

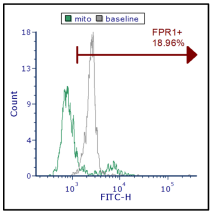
What is new?

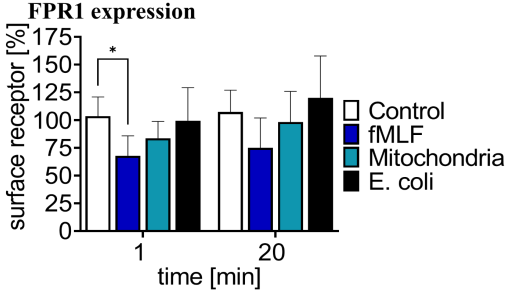
- Neutrophils change their phenotype during inflammation, based on the tissue they are localized in or as they age in circulation.
- We have found that the method of neutrophil isolation also affects their phenotype as standard gradient isolation can reduce the subset of CD49d+ neutrophils that are most potent at forming neutrophil extracellular traps.
- All isolation methods, however, pre-activate neutrophils so we have optimized a new ex vivo method of neutrophil stimulation in whole blood that better represents an in vivo situation.

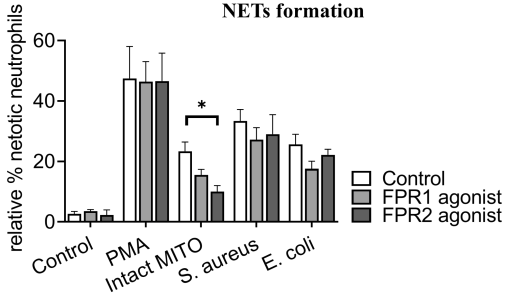


FPR agonism ameliorates NETosis and partially decreases neutrophil phagocytosis of mitochondria but not bacteria

- Bacterial infection is often accompanied by tissue damage that results in the release of mitochondria from dead cells.
- In contrast to bacteria, mitochondria are not infectious but still induce an immune response such as phagocytosis or the formation of neutrophil extracellular traps (NETs).
- Both bacteria and mitochondria produce N-formylated proteins that are recognized by neutrophils via formyl peptide receptors (FPRs).
- We have found that, interestingly, agonism of the FPR1 receptor results in decreased mitochondria-induced phagocytosis and NETs formation while preserving the response to bacteria.



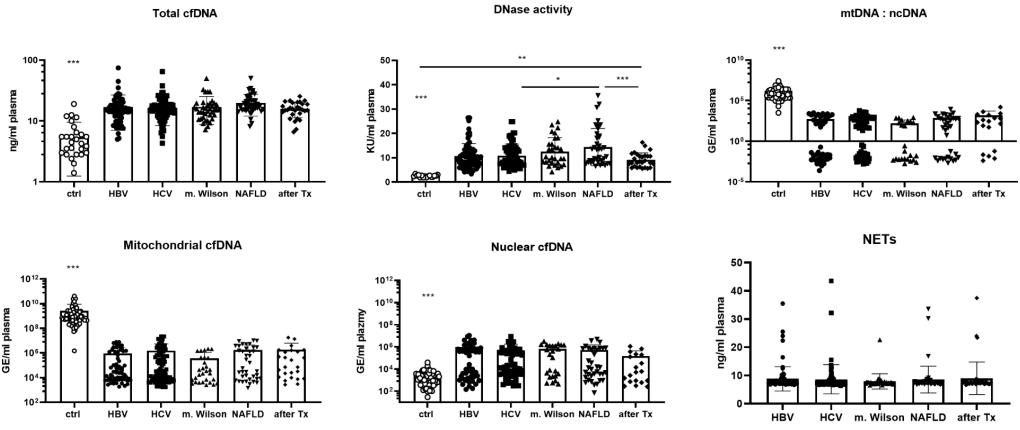




The role of cell-free DNA in the pathogenesis of liver disease

What is new?

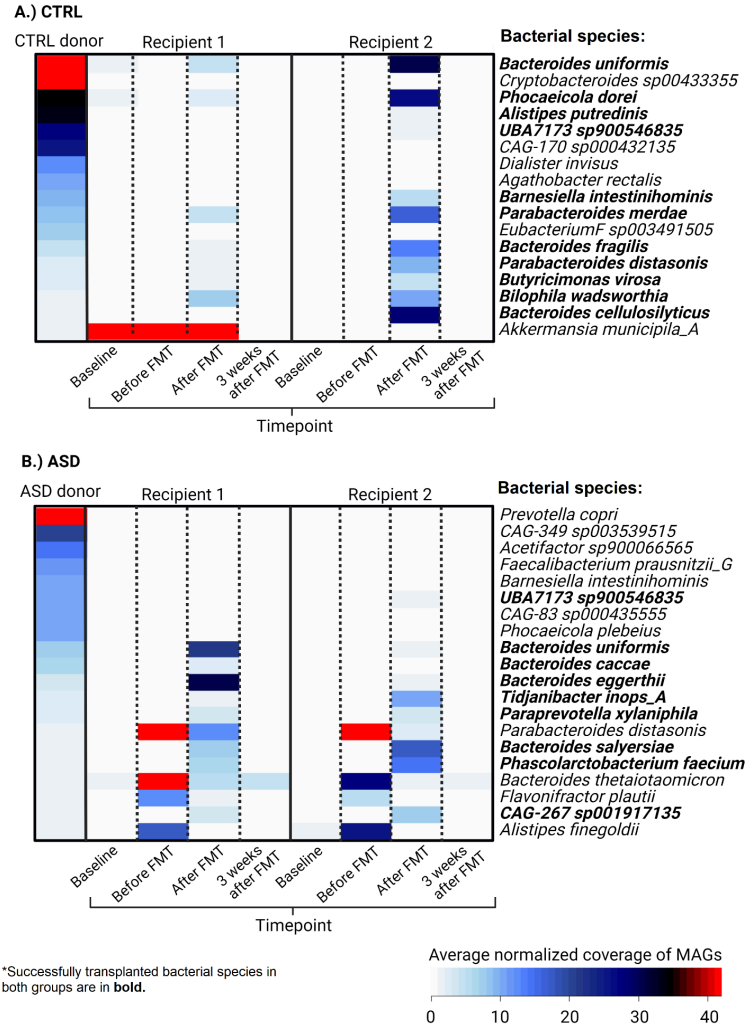
- Total cell-free DNA was significantly higher in all liver diseases compared to healthy subjects and may result from higher fragmentation caused by increased endogenous DNase activity.
- Mitochondrial cell-free DNA concentrations were lower in all liver groups compared with healthy individuals.
- In each patient group, two populations are distinguishable based on mitochondrial and nuclear cell-free DNA levels and their ratio.
- Number of circulating NETs was not higher and did not differ between patient groups.



The engraftment and persistence of fecal microbiota transplantation from a human donor to a genetic mouse model of autism

What is new?

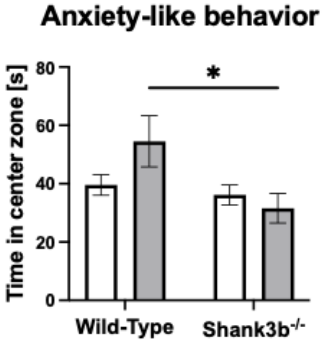
- In the CTRL group, 65% of bacterial species were successfully transplanted into at least one mouse recipient. Typical representatives of healthy human gut microbiota were transplanted and detected 24 hours post-FMT.
- In the ASD group, 45% of bacterial species were successfully transplanted into at least one mouse recipient. Bacteria, which may be potentially associated with the pathogenesis of ASD, were not transplanted.
- A low percentage of viruses was successfully transplanted and detected in the recipient's gut 24 hours post-FMT, also.
- Three weeks after FMT, no successfully transplanted bacteria or viruses were detected implying that donor microbiota is not able to establish itself in the mouse recipient for a long time.
- Knowledge of bacterial and viral transport through the FMT could serve as a potentially interesting therapeutic tool for ASD in the future. However, the protocol optimization of the FMT procedure is necessary.


A.) CTRL
CTRL donor
Recipient 1
Recipient 2
Bacterial species:
Bacteroides uniformis
Cryptobacteroides sp00433355
Phocaeicola dorei
Alistipes putredinis
UBA7173 sp900546835
CAG-170 sp000432135
Dialister invisus
Agathobacter rectalis
Barnesiella intestinihominis
Parabacteroides merdae
EubacteriumF sp003491505
Bacteroides fragilis
Parabacteroides distasonis
Butyricimonas virosa
Bilophila wadsworthia
Bacteroides cellulosilyticus
Akkermansia municipila_A
Baseline
Before FMT
After FMT
3 weeks after FMT
Baseline
Before FMT
After FMT
3 weeks after FMT
Timepoint
B.) ASD
ASD donor
Recipient 1
Recipient 2
Bacterial species:
Prevotella copri
CAG-349 sp003539515
Acetifactor sp900066565
Faecalibacterium prausnitzii_G
Barnesiella intestinihominis
UBA7173 sp900546835
CAG-83 sp000435555
Phocaeicola plebeius
Bacteroides uniformis
Bacteroides caccae
Bacteroides eggerthii
Tidjanibacter inops_A
Paraprevotella xylaniphila
Parabacteroides distasonis
Bacteroides salyersiae
Phascolarctobacterium faecium
Bacteroides thetaiotaomicron
Flavonifractor plautii
CAG-267 sp001917135
Alistipes finegoldii
Baseline
Before FMT
After FMT
3 weeks after FMT
Baseline
Before FMT
After FMT
3 weeks after FMT
Timepoint
*Successfully transplanted bacterial species in both groups are in bold.
Average normalized coverage of MAGs
0
10
20
30
40

The effect of human fecal microbiota transplantation on autistic-like behavior in a genetic mouse model of autism

What is new?

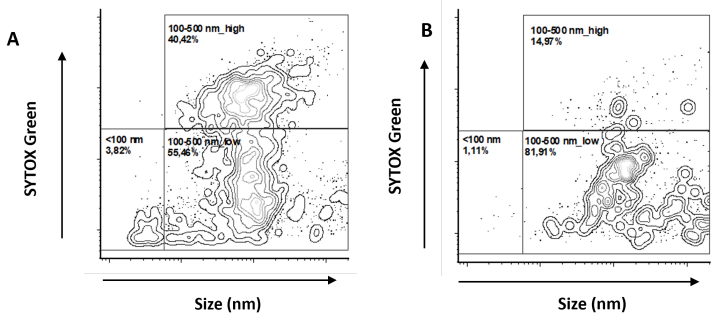
- Adult Shank3b$^{-/-}$ mice prenatally exposed to fecal microbiota transplantation (FMT) from donors with ASD showed higher anxiety-like behavior in comparison to mice prenatally exposed to FMT from intact controls (CTRL).
- The higher anxiety-like behavior of adult Shank3b$^{-/-}$ mice prenatally exposed to ASD FMT suggests that maternal gut dysbiosis can affect the behavior of the offspring.



Extracellular DNA in plasma-derived small extracellular vesicles

What is new?

- Plasma-derived small extracellular vesicles (sEVs) contain extracellular DNA (ecDNA).
- sEVs were (un)treated with DNase I and stained with SytoxGreen to observe the association of ecDNA with sEVs.
- The fluorescence signal of particles after DNase treatment decreases, as well as the number of particles in the sample, in comparison to untreated samples.
- It appears that the DNA is also protected from DNase I degradation on the outside of the membrane. It is possible that DNase could get inside through the non-intact membrane of particles which was created during UC.
- Alternatively, maybe the DNase did not cleave all the ecDNA, and the shortest fragments were detectable with Sytox.

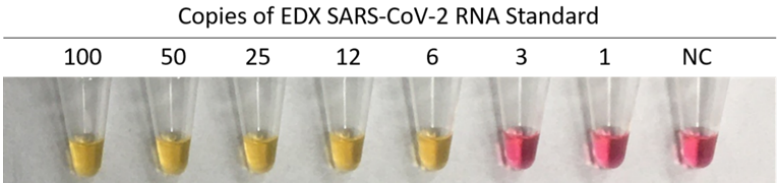


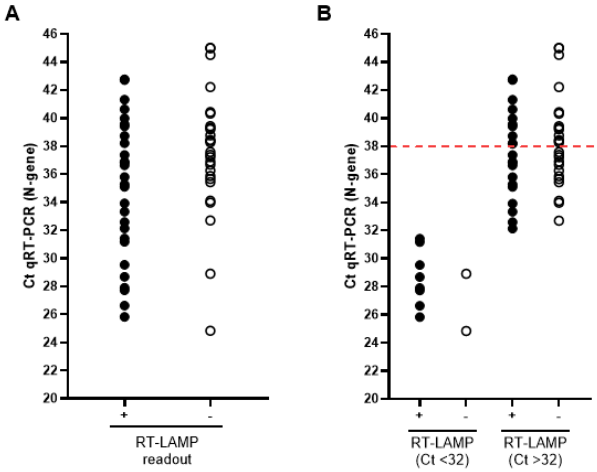
Saliva and diagnostics SARS-COV-2

What is new?

- Testing and rapid identification of infectious pathogens play a key role in limiting the spread of the virus in the population during virus outbreaks such as Covid-19 pandemics.
- Saliva as a diagnostic fluid offers non-invasive sampling suitable for the diagnosis of viral infection.
- Direct use of saliva in reverse transcriptase loop-mediated isothermal amplification (RT-LAMP) represents rapid testing compared to conventional RT-qPCR with no previous nucleic acid isolation and minimum laboratory equipment.
- The sensitivity of the RT-LAMP reaction was assessed using 2-fold dilution of EDX SARS-CoV-2 RNA Standard from 100 copies to 1 copy per reaction. We evaluated results based on color change: yellow – positive; pink – negative; and NC – negative control. The primer mix (S-123 by Yan et al. 2020) has shown the lowest limit of detection (LOD) at 6 copies of the EDX SARS-CoV-2 RNA Standard per reaction.
- In the RT-LAMP we have directly tested saliva samples (n=58) previously tested positive on COVID-19 antigen test. We compared RT-LAMP results to the Ct values obtained from one-step qRT-PCR.

- The sensitivity of the RT-LAMP reaction was 58% and the specificity 50% based on our results.
- The real sensitivity of RT-LAMP is lower compared to testing conditions with EDX SARS-CoV-2 RNA standard and further optimization to increase the sensitivity of the diagnostic test is necessary.

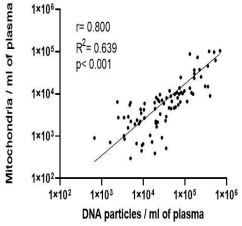


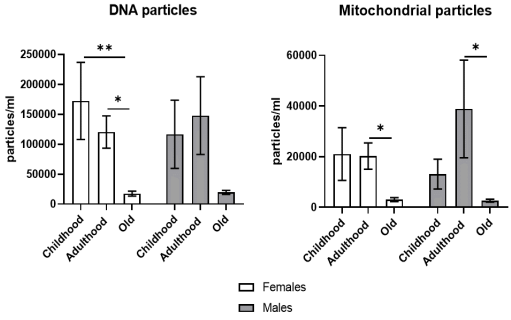


Amount of circulating microparticles in healthy individuals depends on age and sex

What is new?

- Strong correlation between DNA associated microparticles and mitochondria. DNA was stained with SytoxGreen to observe the association of DNA and mitochondria were stained with mitotracker.
- Children have significantly more DNA containing microparticles than adults, adult women have significantly more DNA particles than older women.
- Male adults had significantly more mitochondria than older males. Adult females had significantly more mitochondria than older females.
- DNase I activity is significantly higher in pregnant women.
- Pregnant women have significantly less mitochondria and DNA particles in plasma compared to non-pregnant women.





Summer School of Biomedicine for High School Students and University Students

The summer of 2022 was the last year of the IMBM Summer School of Biomedicine for High School Students and University Students organized thanks to the grant support of The Ministry of Education, Science, Research and Sport of the Slovak Republic (KEGA/ 045UK-4/2020). In 2022, together 34 high school and university students obtained the opportunity to learn basic laboratory methods necessary for their future scientific career in laboratories of IMBM at the Medical Faculty and Slovak Academy of Sciences in Bratislava.

We felt the importance of IMBM Summer School of Biomedicine during the entire 3-year-long period (2020-2022), as due to the pandemic situation students had mainly online teaching, and thus, minimal opportunity to learn basic methods of biomedical research throughout practical courses at university or high school. IMBM Summer School of Biomedicine allowed students to learn or master the basic methods of biomedical research and also obtain experience in research work in the laboratories of the IMBM by participating in our ongoing projects. Results obtained during the IMBM Summer School of Biomedicine were presented at scientific conferences in 2022, e.g. The Biology of Neuropsychiatric Disorders in Spain, 97th Physiological Days in Prague, Europhysiology in Denmark.

We assume that participation in the IMBM Summer School of Biomedicine increased the overall readiness of students to successfully complete their university studies which will subsequently enable them to be better employed in biomedical

research. The main output of the project is a textbook (http://www.imbm.sk/wp-content/uploads/2023/01/final-kega-kniha.pdf), which represents a summary of theoretical knowledge and protocols for individual projects that we worked on during the IMBM Summer School of Biomedicine.

We gained the interest of Slovak students studying not only in Slovakia, but also abroad from various natural and medical fields of study, thus, we have worked on the reintegration of Slovak students studying abroad into biomedical research at Slovak scientific institutions, and therefore, on the popularization of science and research at Slovakia as well.



Conferences attended in 2022

Participating actively in scientific conferences is a crucial aspect of our work. These conferences provide us with valuable opportunities to present our experimental findings, engage in discussions with experts, and foster new collaborations. In 2022, we enthusiastically participated in the following scientific conferences:

FALLING WALLS SCIENCE SUMMIT 2022, November 5-9, 2022, Berlin, Germany (Monika Janíková)

XVI. SCIENTIFIC CONFERENCE OF DOCTORAL STUDENTS, Comenius University, Medical Faculty, April 30, 2022, Bratislava, Slovakia (Veronika Šarayová, Lucia Mihalovičová, Kristína Lichá, Paulína Belvončíková, Barbora Gromová, Zuzana Matulová)

97. PHYSIOLOGICAL DAYS, Institute of Physiology, 1st Faculty of Medicine, Charles University, Prague, February 8-9, 2022 (Kristína Macáková, Barbora Gromová, Jakub Szabó, Nadja Ivašková, Kristína Lichá, Paulína Belvončíková, Veronika Borbélyová)

EUROPHYSIOLOGY 2022, September 16-18, 2022, Copenhagen, Denmark (Veronika Borbélyová, Bernhard Schuh)

THE BIOLOGY OF NEUROPSYCHIATRIC DISORDERS 2022, May 15-17, 2022, Sitges, Spain (Veronika Borbélyová)

SLOVAK GASTROENTEROLOGY CONGRESS 2022, November 25-26, 2022, Hotel Carlton, Bratislava, Slovakia (Barbora Konečná, Barbora Gromová)

9TH CENTRAL EASTERN EUROPEAN SYMPOSIUM ON PLASMA CHEMISTRY, September 4-9, 2022, Vysoké Tatry, Slovakia (Barbora Konečná, Kristína Lichá)

11TH INTERNATIONAL MEETING - STEROIDS AND NERVOUS SYSTEM, February 19-22, 2022, Torino, Italy (Veronika Borbélyová)

13TH CONFERENCE OF PEDIATRIC NEPHROLOGY, 43RD WORKING DAYS OF PEDIATRIC NEPHROLOGY, May 27-28, 2022**,** Starý Smokovec, Slovakia (Katarína Šebeková)

1ST TRAINING SCHOOL 2022, FUNDAMENTAL ASPECTS OF PLASMA MEDICINE, February 14-16, 2022, NOVA School of Science and Technology Caparica, Lisabon, Portugal (Nadja Ivašková, Barbora Gromová)

49TH MAY HEPATOLOGY DAYS, May 18-20, 2022, Hotel Residence Donovaly, Slovakia (Roman Gardlík, Barbora Konečná, Barbora Gromová)

EUROPEAN SOCIETY FOR GENE & CELL THERAPY 29TH CONGRESS IN COLLABORATION WITH BSGCT, October 11-14, 2022, International Conference Centrum, Edinburg, Great Britain (Kristína Lichá, Paulína Belvončíková, Barbora Gromová)

EUROPEAN SOCIETY FOR GENE & CELL THERAPY SPRING SCHOOL, April 27 – 29, 2022, Athens, Greece (Kristína Lichá, Barbora Gromová)

COMBIVET & BALTIC SOCIETY OF EXTRACELLULAR VESICLES JOINT CONFERENCE, October 1 - 2, 2022, Tartu, Estonia **(**Kristína Lichá, Ivana Slivková)

X BIOINFORMATICS AND GENOMICS SYMPOSIUM (BGS-X), December 15-16, 2022, Valencia (Paulína Belvončíková)

AMERICAN COLLEGE OF RHEUMATOLOGY CONVERGENCE 2022, November 10-14, 2022, San Diego, California (Katarína Kmeťová)

NEUTROPHILS 2022, December 3-6, 2022, Mexico city, Mexico (Michal Pastorek)

15TH INTERNATIONAL SCIENTIFIC CONFERENCE ON PROBIOTICA, GUT MICROBIOTA AND HEALTH - IPC2022, June 27-29, 2022, Bratislava, Slovakia (Peter Celec, Roman Gardlík)

GENETIC CONFERENCE IN MARTIN 2022, March 17-19, 2022, Martin, Slovakia (Peter Celec, Barbora Vlková)

65TH CONGRESS OF SLOVAK AND CZECH RHEUMATOLOGISTS November 30-December 1, 2022, Bratislava, Slovakia (Peter Celec)

WORKING CONFERENCE OF THE CHILDREN'S CLINIC OF LF UK and NÚDCH with international participation, October 6-7, 2022, Bratislava**,** Slovakia (Peter Celec, Katarína Šebeková)

VIII. joint congress of the Slovak Gynecological and Obstetrical Society SLS and the Czech Gynecological and Obstetrical Society ČLS JEP, May 27-29, 2022, Bratislava, Slovakia (Barbora Vlkova)

CONFERENCES



INSTITUTE OF MOLECULAR BIOMEDICINE

Research stays abroad in 2022

JAKUB SZABÓ, NYU & NYU Langone Health, New York, NY, USA, Department of Neurology, March 2022 – October 2022, focusing on neurobehavioral specifics of physiological aging, immunomodulatory properties of TLR9 agonist, CpG ODN, in treatment of Alzheimer's disease (AD) pathology in a non-human primate model of AD and early biofluid markers of AD.

MONIKA JANÍKOVÁ, Beth Israel Deaconess Medical Center/Harvard Medical School Boston, MA, USA, Department of Surgery, November 2020 - August 2022, working on origin of extracellular DNA in plasma and its structure.

KRISTÍNA MACÁKOVÁ, Beth Israel Deaconess Medical Center/Harvard Medical School Boston, MA, USA, Department of Surgery, March 2022 - November 2022, working on cytomegalovirus and neutrophils applications.

BARBORA GROMOVÁ, Institute of Physiology of the Faculty of Medicine in Hradec Králové, Charles University, Czech Republic, October 2022 - December 2022, working on immunogenicity of endogenous molecules in liver failure.

PAULÍNA BELVONČÍKOVÁ, Institute for Integrative Systems Biology (I2SysBio), University of Valencia, Valencia, Spain, September 2022 - June 2023, working on bioinformatic shotgun data analysis of fecal microbiota transplantation samples.

NADJA ŠUPČÍKOVÁ, Christian Doppler Laboratory for Molecular Stress Research in Peritoneal Dialysis, Medical University of Vienna, Austria, October 2022 - August 2023, working on role of ecDNA and EVs in peritoneal dialysis.





Invited lectures in 2022

Michal Pastorek - Neutrophil extracellular traps: a double-edged sword of innate immunity, NextStep Science Conference 2022, 16.3.2022, Bratislava, Slovakia

Katarína Šebeková - Differences in the classification of hypofiltration and hyperfiltration using creatinine-derived patterns in children and adolescents. XIII. Conference of pediatric nephrology with international participation, 27-28 May 2022, Starý Smokovec



Education

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 and Faculty of Natural Sciences, 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

Prizes won by IMBM team members in 2022

Monika Janíková, MSc. - winner at Falling Walls Lab Slovakia 2022 - Breaking the Wall of Red Blood Cell Traps

Kristína Macáková, MSc. - grant from TATRA BANKA for the scholarship for 10 months at Harvard Medical School in Boston, United States (funded by National Scholarship Programme of Slovak Republic)

Jakub Szabó, MA. – scholarship for research stay for 7 months at New York University, New York, NY, USA (funded by Vilcek Foundation)

Nadja Ivašková MSc. - scholarship for research stay for 10 months at Medical University in Vienna, Austria (funded by the National Scholarship Programme of Slovak Republic)

Paulína Belvončíková MSc. - scholarship for research stay for 10 months at Institute for Integrative Systems Biology in Valencia, Spain (funded by the National Scholarship Programme of Slovak Republic)

Barbora Gromová MSc. - scholarship for research stay for 10 months at Harvard Medical School in Boston, United States (funded by the National Scholarship Programme of Slovak Republic)

Kristína Lichá MSc. - scholarship for research stay for 10 months at Universitätsklinikum in Essen, Germany (funded by the National Scholarship Programme of Slovak Republic

Talks focussed on science popularization

Michal Pastorek - NextStep Science Conference 2022

Roman Gardlík - a regular panel discussion called Visionaries

Barbora Konečná – a lecture at popularization-scientific cycle Vedatour

Peter Celec – article for Dennik N about current events in Slovak healthcare system

Peter Celec - Podcast talk Rozhovory MD focused on medicine and studying

Peter Celec - Harvard stay and Ig Nobel prize on SME ZOOM podcast

DNA day 2022 - competition for highschool students and discussion with cooperation with Department of Genetics, Natural sciences faculty, Comenius university



Grants at IMBM

APVV GRANTS

APVV-18-0287
NON-INVASIVE YET UNUSED MARKERS OF RENAL FUNCTION: PROBLEMS, CAUSES AND OPPORTUNITIES
Ľubomíra Tóthová
2019-2022

APVV-18-0366
THE ROLE OF NETOSIS IN THE ETIOPATHOGENESIS OF RHEUMATOID ARTHRITIS
Barbora Vlková
2019-2023

APVV-20-0185 - cooperation
SOCIAL PROCESSES IN AUTISM AND SCHIZOPHRENIA
Michal Hajdúk
2020-2023

APVV-20-0114 - cooperation
SEX-SPECIFIC MICROBIOME AND GENE INTERACTIONS IN THE PATHOGENESIS OF BEHAVIORAL AND GASTROINTESTINAL SYMPTOMS IN THE ANIMAL MODEL OF AUTISM SPECTRUM DISORDER - cooperation
Aleksandra Tomová
2020-2023

APVV-21-0378
THE ROLE OF INFECTIOUS AND STERILE INDUCERS OF NEUTROPHIL EXTRACELLULAR TRAP FORMATION IN SEPSIS
Michal Patorek
2021-2025

APVV-21-0370
THE ROLE OF EXTRACELLULAR DNA AND NEUTROPHIL EXTRACELLULAR TRAPS IN THE PATHOGENESIS OF CHRONIC LIVER DISEASES
Roman Gardlík
2021-2024

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
2021-2024

KEGA GRANT

KEGA 045UK-4/2020
SUMMER SCHOOL OF BIOMEDICINE FOR HIGH SCHOOL STUDENTS AND UNIVERSITY STUDENTS
Veronika Borbélyová
2020-2022

VEGA GRANTS

VEGA 1/0635/20
SENSITIVE PERIOD OF BRAIN DEVELOPMENT AND THE ROLE OF TESTOSTERONE IN AUTISM
Emese Renczés
2020-2022

VEGA 1/0716/20
CAUSES AND EFFECTS OF NETOSIS IN STERILE INFLAMMATION - FLOW CYTOMETRY ANALYSIS
Michal Pastorek
2020-2023

VEGA 1/0649/21
ELUCIDATION OF THE PATHOGENESIS OF CHRONIC LIVER DISEASES USING THE STUDY OF NEUTROPHIL EXTRACELLULAR TRAPS AND CIRCULATING DNA
Roman Gardlík
2021-2023

VEGA 1/0674/21
A MODEL OF COLITIS FROM THE POINT OF VIEW OF BIOPHYSICS AS A CONTRIBUTION TO THE UNDERSTANDING OF INFLAMMATORY BOWEL DISEASE
Barbora Konečná
2021-2023

VEGA 1/0212/22
THE ROLE OF EXTRACELLULAR DNA AND NEUTROPHIL TRACTS IN URINARY TRACT INFECTIONS
Ľubomíra Tóthová
2022-2024

VEGA 1/0742/21
DEOXYRIBONUCLEASE - ROLE IN THE PHYSIOLOGY AND PATHOPHYSIOLOGY OF PREGNANCY
Barbora Vlková
2021-2023

VEGA 1/0657/21
SALIVARY NUCLEIC ACIDS AND THEIR CLINICAL USE
Peter Celec
2021-2023

COMENIUS UNIVERSITY GRANTS

UK/372/2022
Saliva and diagnostics of SARS-CoV-2
Monika Janíková

UK/14/2022
Neuromotor development in genetic mouse model of autism
Miriam Pillerová

UK/239/2022
Deficits in Social Processes and their relation to Autistic and Psychotic phenotype
Jakub Szabó

UK/323/2022
Role of ecDNA in acute pyelonephritis in pediatric patients
Nadja Ivašková

UK/329/2022
Extracellular DNA in exosomes
Kristína Lichá

UK/331/2022
How does caffeine affect activity of neutrophils?
Katarína Kmeťová

UK/370/2022
Neutrophil Extracellular Traps in Fever
Jakub Janko

WHERE TO FIND US?

FACULTY OF MEDICINE
COMENIUS UNIVERSITY
5TH FLOOR
SASINKOVA 4
BRATISLAVA
811 08
SLOVAK REPUBLIC

PHONE: +421 2 9011 9371



WHERE TO FIND US?

PAVILION OF MEDICAL SCIENCES
SLOVAK ACADEMY OF SCIENCES, BLOCK B
6TH FLOOR
DÚBRAVSKÁ CESTA 9
BRATISLAVA
845 05
SLOVAK REPUBLIC



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http://www.imbm.sk/

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