

COMENIUS UNIVERSITY BRATISLAVA
JESSENIUS FACULTY OF MEDICINE IN MARTIN



ABSTRACTS

from

47th Students' Scientific Conference

April 22, 2026
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ABSTRACTS

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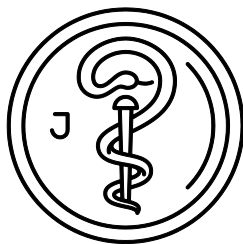


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Science is a way of thinking much more than it is a body of knowledge...

Carl Sagan

Dear fans of science, dear all.

The author of the quote above, the famous philosopher and astronomer (by the way, a fascinating combination of areas if you ask where we come from and where we are going) continues explaining that science is not just a way of thinking but also the way of skeptically interrogating the world with a fine understanding of human fallibility. He argued that the critical, questioning attitude of science is essential to protect democracy against ignorance and manipulation by charlatans. In addition to the emphasis on development of the scientific skills in young people this is another, no less important reason, why the Jessenius Faculty of Medicine CU seriously favors scientific activity in pre-graduate students, supports doctoral studies, and popularizes and promotes science externally.



Also this year, the conference is prepared with enthusiasm and love. Everyone does a bit – participants who can present their work, departments and clinics that can present research areas and their talented students, and, naturally, organizers. As expected, also this year of students' conference brings something new and allows us to expect the success.

I wish everyone a beautiful and intense day. On April 22, 2026 the faculty continues its tradition and the 47th student's scientific conference once again emphasizes the unity of students and tutors, our academic community, when it comes to the right cause.

Andrea Čalkovská
The Dean

PROGRAM AT GLANCE

Date: April 22, 2026

Place: Aula A – L. Novomeského 7, Martin
Aula B – L. Novomeského 7, Martin

Registration: April 22 from 07.30 or before the beginning of your section

Opening ceremony (Aula A) 08.00 – 08.10

Aula A

Section of Clinical Disciplines 1 08.15 – 10.15

– *coffee break*

Section of Clinical Disciplines 2 10.30 – 12.00

– *coffee break*

UpToDate Advanced AI Enhanced Search 12.15 – 12.45

Section of Pre-clinical Disciplines 12.45 – 14.15

The Future of Evidence Discovery with Artificial Intelligence 14.30 – 15.00

Aula B

Section of Public Health 08.15 – 10.15

– *coffee break*

Section of Theoretical Disciplines 10.30 – 12.00

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Section of Non-Medical Study Programmes 12.45 – 14.15

Awards ceremony (Aula A) 15.00

.....
Duration of lectures: 7 minutes, discussion – 3 minutes

Language: Slovak, Czech or English
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(Aula A, 12.15 – 12.45)

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²Biomedical Centre Martin, Jessenius Faculty of Medicine in Martin, Comenius University Bratislava

in collaboration with ³Psychiatric Clinic, University Hospital in Martin, Jessenius Faculty of Medicine in Martin, Comenius University Bratislava

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THE FUTURE OF EVIDENCE DISCOVERY WITH ARTIFICIAL INTELLIGENCE

Jose Bessa, Senior Consultant

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Awards ceremony (Aula A, 15.00)

ABSTRACTS



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UPTODATE ADVANCED AI ENHANCED SEARCH

**Mrs. Natasha Todoroska, Channel Partner Manager CPM Baltic,
Central East & Southern Europe**

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Abstract:

Advanced AI-enhanced search has rapidly evolved from keyword-based retrieval systems into intelligent, context-aware platforms capable of understanding user intent, generating insights, and delivering highly personalized results. Recent developments integrate large language models (LLMs), real-time data pipelines, and multimodal processing to significantly improve search relevance, speed, and adaptability.

Modern AI search systems leverage natural language understanding (NLU) to interpret complex, conversational queries rather than relying on exact keyword matches. This shift enables semantic search, where meaning and context drive retrieval. Retrieval-Augmented Generation (RAG) further enhances accuracy by combining generative AI with verified, up-to-date information sources, reducing hallucinations while maintaining fluency in responses.

A key advancement is real-time indexing and continuous learning. AI systems now incorporate live data streams, ensuring search results reflect the most current information across domains such as finance, healthcare, and news. Additionally, personalization algorithms utilize user behavior, preferences, and historical interactions to tailor results dynamically, balancing relevance with privacy considerations.

Multimodal search capabilities represent another frontier, allowing users to search using text, images, audio, and video simultaneously. AI models can interpret and cross-reference these inputs, enabling applications such as visual product search, medical imaging analysis, and voice-driven assistants.

Despite these advancements, challenges remain. Issues related to bias, misinformation, data privacy, and computational cost require ongoing attention. Transparent model design, responsible AI practices, and efficient infrastructure are critical for sustainable deployment.

In conclusion, up-to-date advanced AI-enhanced search systems are transforming information access by making it more intuitive, accurate, and responsive. As technologies continue to mature, they are expected to redefine how individuals and organizations interact with vast and complex data ecosystems, moving from simple retrieval toward intelligent knowledge discovery.

THE FUTURE OF EVIDENCE DISCOVERY WITH ARTIFICIAL INTELLIGENCE

Jose Bessa, Senior Consultant

Wolters Kluwer

E-mail: Jose.Bessa@wolterskluwer.com

Abstract:

Discover how AI is transforming evidence discovery by moving beyond traditional keyword search to deeper semantic understanding. This session will highlight what organisations should look for in trustworthy research AI – from source transparency and data quality to approaches that reduce bias – so attendees can confidently evaluate emerging tools. You'll also explore practical best practices for using AI safely and responsibly within research workflows, supported by real examples of accelerated literature review, summarisation, and comparison. Whether your institution is pushing the boundaries of innovation or prioritising reliability, this session will help you navigate how to adopt AI enhanced tools with both speed and confidence.

Agenda:

Introducing what's possible with Ovid Discovery AI

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DONOR-DERIVED CELL-FREE DNA IN ALLOGRAFT REJECTION DIAGNOSTICS

Martin Beňadik, Andrej Kollár, Andrej Čereš, Ivana Dedinská

Department of Internal Medicine I, Jessenius Faculty of Medicine in Martin,
Comenius University Bratislava and University Hospital in Martin
Transplant and Nephrology Department, University Hospital in Martin

Tutor: Professor Ivana Dedinská, MD, PhD., MHA, FERA

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Introduction: The diagnostics of allograft rejection currently rely on monitoring graft function via serum and urine markers, with biopsy and histopathological analysis as the definitive method of confirmation. Donor-derived cell-free DNA (dd-cf DNA) has been reported as one of the non-invasive markers with great clinical utility in the assessment of the graft condition and could be used in graft rejection diagnostics. Implementation of dd-cfDNA testing at our center represents one of the earliest experiences in Central Europe. The aim of this study was to evaluate the performance of monitoring dd-cf DNA in kidney transplant recipients and its correlation to biopsy-confirmed rejection.

Material and methods: This retrospective analysis included 11 kidney transplant recipients. Each with evaluable kidney biopsy and corresponding measurements of dd-cf DNA level. Other clinical data collected include levels of serum creatinine, estimated glomerular filtration rate (eGFR), albumin to creatinine ratio in urine (UACR), status of the donor-specific antibodies (DSA), and time from transplantation.

Results: Out of 11 transplant recipients, six recipients had biopsy-confirmed rejection, and five had no evidence of active rejection. Median dd-cfDNA levels were numerically higher in the rejection group (0.58% [IQR 0.30–1.50]), compared with the non-rejection group (0.22% [IQR 0.15–0.30]; $P = 0.082$).

ROC analysis demonstrated good diagnostic performance of dd-cfDNA for biopsy-confirmed rejection (AUC 0.83; $P = 0.018$). At an optimal cutoff value $>0.33\%$, dd-cfDNA achieved a sensitivity of 66.7% and a specificity of 100%. Serum creatinine and eGFR also showed trends toward worse graft function in the rejection group. No significant correlations were observed between dd-cfDNA levels and serum creatinine, eGFR, UACR, time from transplantation, or donor-specific antibody status.

Conclusion: In our sample group, the significance of measuring dd-cf DNA levels has been proven as clinically utilisable. Therefore, we intend to continue monitoring levels of dd-cf DNA in kidney transplant recipients, as one of the markers helping with surveillance of graft function, and decision-making regarding rejection diagnostics and treatment.

METABOLIC COMORBIDITIES ASSOCIATED WITH PSORIASIS

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Introduction: Psoriasis is a chronic systemic inflammatory disease significantly associated with various metabolic comorbidities, including non-alcoholic fatty liver disease (NAFLD) and metabolic syndrome. Long-term systemic therapy, particularly with hepatotoxic agents like methotrexate (MTX), further increases the risk of liver damage. The FIB-4 score is a validated non-invasive tool for assessing the risk of liver fibrosis based on age, platelet count, and liver enzymes. This study aimed to evaluate the liver fibrosis risk in psoriatic patients prior to biological therapy and its association with BMI, ultrasound findings, and previous treatment.

Material and methods: We conducted a retrospective analysis of 88 patients with psoriasis vulgaris indicated for biological therapy (guselkumab – Tremfya) at the Department of Dermatovenereology in Martin. The study cohort included 82 evaluable patients. FIB-4 scores were calculated and categorized into low, intermediate, and high risk of fibrosis. Data were compared with BMI values, hepatic USG findings- steatosis, and the history of previous therapy.

Results: The mean age of the cohort was 51 years, with a mean BMI of $28.16 \pm [SD]$ kg/m². According to the FIB-4 score, 59 patients (72%) were at low risk, 17 (21%) at intermediate risk, and 6 (7%) at high risk of liver fibrosis. Patients with a history of MTX treatment (n=25,30%) showed a higher mean FIB-4 score compared to those without MTX history. Hepatic steatosis was identified on USG in 23 patients (26%), with a mean FIB-4 score of 1.03 in this subgroup. No significant direct correlation was found between BMI and FIB-4 scores ($r=0.003$), suggesting that fibrosis risk may be influenced more by cumulative medication effects and disease duration than by weight alone.

Conclusion: Our findings confirm that a significant proportion of psoriatic patients (28%) exhibit an increased risk of liver fibrosis before starting biological therapy. The FIB-4 score represents an effective, cost-efficient screening method to identify patients requiring closer hepatological monitoring, especially those with a history of long-term methotrexate use.

T-CELL PHENOTYPING AS A MARKER OF IMMUNE RECONSTITUTION AFTER HEMATOPOIETIC STEM CELL TRANSPLANTATION

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Introduction: Immune reconstitution following hematopoietic stem cell transplantation (HSCT) is a key determinant of patient outcomes, including susceptibility to infections, relapse, and graft-versus-host disease (GvHD). T-cell recovery, particularly thymic output and immune regulation, can be assessed by specific subpopulations such as recent thymic emigrants (RTE) and regulatory T cells (Tregs). Accurate phenotyping of these subsets is essential for monitoring post-transplant immune dynamics; however, variability in identification strategies remains a limitation.

Material and methods: This retrospective study included patients (n=32) who underwent hematopoietic stem cell transplantation and had available immunophenotyping data obtained by flow cytometry during the post-transplant period (12-24 months). Peripheral blood samples from patients after HSCT were analyzed using multiparametric flow cytometry. T-cell subsets were evaluated, including CD4⁺ and CD8⁺ T lymphocytes, with calculation of the CD4/CD8 ratio. Thymic output was assessed by quantifying recent thymic emigrants (RTE; CD4⁺CD45RO⁺HLA-DR⁺CD31⁺CD62L⁺ T cells) and naïve T-cell subsets (CD4⁺ and CD8⁺) were analyzed to characterize immune reconstitution. Regulatory T cells (Tregs; CD4⁺CD25^{high} FoxP3⁺) were also evaluated as markers of immune regulation. Statistical analysis was performed using GraphPad Prism (GraphPad Software, San Diego, CA, USA). A p-value < 0.05 was considered statistically significant.

Results: Although complete patient data are still being analyzed, the flow cytometry panel was fully optimized to allow robust evaluation of key T-cell subsets. Optimization included titration of antibodies, refinement of gating strategies, and validation of marker combinations to ensure accurate identification of each subpopulation. This panel enables comparison between autologous and allogeneic transplant recipients, as well as between patients with severe versus mild post-transplant complications, and provides a strong foundation for subsequent analyses of immune reconstitution.

Conclusion: Monitoring immune reconstitution after HSCT is critical for assessing patient risk of infections, relapse, and graft-versus-host disease. Evaluation of key T-cell subsets offers insights into thymic recovery, T-cell maturation, and immune regulation, enabling early identification of patients with delayed or dysregulated immune reconstitution.

EPIDEMIOLOGICAL AND RISK FACTORS OF MALIGNANT MELANOMA

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Introduction: Malignant melanoma is a highly aggressive skin cancer whose incidence has been increasing in recent years. Its development results from a combination of genetic alterations in melanocytes and environmental influences. Despite significant advances in diagnosis and treatment, early detection remains the key factor affecting patient prognosis. The main aim of this study was to evaluate the epidemiological characteristics of patients with malignant melanoma and to analyse the correlation between selected risk factors and clinical parameters of the disease.

Material and methods: This study was conducted as a retrospective analysis at the Department of Dermatovenereology, in the skin cancer outpatient clinic of the University Hospital in Martin. Data were collected from newly diagnosed patients between 2024 and 2025. The analysis focused on key parameters including age, sex, tumour location, histological type of melanoma, and Breslow thickness, as well as analysis of sentinel lymph node biopsy as an important clinicopathological prognostic factor.

Results: In the monitored cohort from 2024 to 2025, a total of 227 newly diagnosed patients with malignant melanoma were identified, of whom 42,7% (n=97) were women and 57,3% (n=130) were men. The mean age at diagnosis was 66 years. The most common tumour location in women was the upper extremities (33%) whereas in men it was a dorsal region (44,4%). The most frequent histological type of melanoma in the both sexes was superficial spreading melanoma (SSM) accounting for 54,2% (123 of 227), followed by the more aggressive nodular malignant melanoma (NMM) in 26% (59 of 227). Sentinel lymph node biopsy was performed in 62,1% of patients (141 of 227) with a markedly higher positivity rate in men.

Conclusion: The analysis of epidemiological indicators and selected risk factors provides valuable insights into the distribution and clinical characteristics of malignant melanoma in the studied patient population. The results highlight sex-related differences in tumour localization and confirm the predominance of superficial spreading melanoma (SSM) in both men and women.

AN ASSOCIATION BETWEEN SELECTED BIOCHEMICAL PARAMETERS AND COMPENSATION OF TYPE 1 DIABETES IN CHILDHOOD

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Introduction: Type 1 diabetes is a chronic autoimmune disease affecting the metabolism of all nutrients. Among the newer parameters of glycemic control is time in range (TIR), reflecting the percentage of time spent within the optimal glycemic range of 3.9–10 mmol/l per day, using continuous glucose monitoring. The aim of this study was to evaluate the association between serum concentrations of selected micronutrients and glycemic control indicators.

Material and methods: A cross-sectional study included children aged 3–19 years with type 1 diabetes examined at the paediatric endocrinology outpatient clinic of the Department of Children and Adolescents in Martin between September 2025 and March 2026. A total of 112 children participated (66 boys, 46 girls; mean age 12.8 ± 4.5 years), all treated with insulin. Exclusion criteria were diabetic ketoacidosis within the past 3 months and acute infection within the past month. All patients used continuous glucose monitoring systems, from which TIR, mean glucose, and coefficient of variation were evaluated over the past 14 days. Anthropometric parameters and biochemical markers, including mineralogram, glycated haemoglobin (HbA1c), vitamin D, and vitamin B12, were assessed. Data were statistically analysed using MS Excel.

Results: Patients with excellent glycemic control ($\text{TIR} > 70\%$, $n=68$) had significantly higher serum magnesium levels (0.84 ± 0.07 vs. 0.78 ± 0.06 mmol/l, $p < 0.01$) and vitamin B12 levels (118.9 ± 61.1 vs. 76.7 ± 35.01 pmol/l, $p = 0.01$) compared to those with poor control ($\text{TIR} < 50\%$, $n=12$). Patients with inadequate long-term control ($\text{HbA1c} > 6.5\%$, $n=32$) had lower magnesium concentrations (0.79 ± 0.06 vs. 0.84 ± 0.07 mmol/L, $p = 0.003$) compared to those with satisfactory control ($\text{HbA1c} \leq 6.5\%$, $n=80$). A moderate positive correlation was found between TIR and magnesium ($r = 0.32$) and TIR and vitamin B12 ($r = 0.31$). A moderate negative correlation was observed between the coefficient of variation and vitamin B12 ($r = -0.37$), and between HbA1c and magnesium ($r = -0.31$).

Conclusion: Correlation between parameters of glycemic control and the levels of micronutrients and vitamins was found. Further studies are needed to confirm the potential benefit of magnesium and vitamin B12 supplementation in children with poorly controlled diabetes.

CLINICAL AND LABORATORY CHARACTERISTICS OF PEDIATRIC PATIENTS WITH PFAPA DURING COLCHICINE TREATMENT

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Introduction: Autoinflammatory diseases (AID) are conditions of innate immune dysregulation without participation of autoreactive T cells and autoantibodies. In pediatric patients, the onset is often early, but the diagnosis may be delayed due to heterogeneous clinical presentation. The most common AID in pediatric age is PFAPA syndrome (Periodic Fever, Adenitis, Pharyngitis, Aphthous stomatitis). The aim of this study was to describe the clinical course and laboratory profile of children with PFAPA syndrome and to assess changes observed after initiation of colchicine therapy.

Material and methods: A retrospective analysis of 13 pediatric patients was performed. We evaluated age at symptom onset, time to first specialist evaluation, flare frequency and duration, maximal body temperature, and accompanying clinical manifestations. Laboratory parameters including CRP, serum amyloid A (SAA), IL-6, procalcitonin, TNF- α , α 1-acid glycoprotein and serum calprotectin were analyzed at three time points: at initial evaluation, before colchicine treatment, and during colchicine therapy. Paired comparisons were carried out using the Wilcoxon signed-rank test.

Results: The median age at symptom onset was 18 months (IQR 12–36), while the first evaluation occurred later (median 41 months, IQR 31–67), suggesting a relevant diagnostic delay. Flares appeared regularly, every 4 weeks, and lasted on average 3.4 ± 1.3 days. The most frequent manifestations were lymphadenopathy, pharyngitis and aphthous stomatitis, often accompanied by gastrointestinal symptoms. During active disease, elevated acute-phase markers were observed, particularly CRP and SAA. After starting colchicine, CRP values decreased and SAA showed a marked decline towards normal levels. Procalcitonin remained consistently low throughout follow-up. Changes in other inflammatory markers were less consistent. Although paired analysis indicated a downward trend in several inflammatory markers, statistical power was limited by the small sample size.

Conclusion: Our findings confirm early disease onset, a regular flare pattern and a consistent reduction of inflammatory markers during colchicine therapy. SAA appears to reflect disease activity more sensitively than other evaluated parameters.

MANAGEMENT OF PERSISTENT PATENT DUCTUS ARTERIOSUS IN THE IMMATURE NEONATE

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Introduction: The ductus arteriosus Botalli (DAB) is a fetal structure that connects the pulmonary artery to the aorta, enabling the bypass of the non-functioning intrauterine pulmonary circulation. After birth and the first breath, the DAB typically closes within 72 hours. However, in some cases, it remains open, leading to a condition known as patent ductus arteriosus (PDA), which is quite common in preterm infants and may require medical intervention. The objective of this study was to compare different pharmacological treatment methods and their associated complications. PDA occurs in both preterm and term infants but is significantly more prevalent in preterm neonates. In recent years, several therapeutic options have been introduced, including intravenous and oral ibuprofen, as well as paracetamol. Our aim was to evaluate the effectiveness of these treatment alternatives in preterm neonates and to identify treatment-related complications in a cohort of children treated in Martin between 2019 and 2025.

Material and methods: In this retrospective observational study, we analyzed the effectiveness of pharmacological treatment for PDA in preterm neonates within a cohort of infants treated at the Neonatology Clinic in Martin between 2019 and 2025. We focused on evaluating treatment efficacy and complication rates, comparing different treatment groups as well as a no-treatment group.

Results: The study included 65 newborns with PDA, with a median gestational age of 28 weeks and a median birth weight of 990 g. Pharmacological treatment was administered to 34 infants (52%), with intravenous ibuprofen used in 12 (35%), oral ibuprofen in 7 (21%), and oral paracetamol in 15 (44%). Intravenous paracetamol was not used in our cohort. Spontaneous PDA closure occurred in 31 infants (48%). The median time to treatment initiation was 9 days. The efficacy rates for oral paracetamol, intravenous ibuprofen, and oral ibuprofen were 53%, 42%, and 29%, respectively. The incidence of treatment-related complications including intraventricular hemorrhage, necrotizing enterocolitis, bronchopulmonary dysplasia, and pulmonary hemorrhage was comparable across treatment groups. However, complications were significantly more frequent in the medically treated group compared to the untreated group (76% vs. 32%). Mortality occurred in 5 infants (8%) with PDA (4 treated, 1 untreated), all of whom were born between 23 and 25 weeks of gestation.

Conclusion: In our cohort, oral paracetamol demonstrated higher efficacy in the treatment of PDA compared to both intravenous and oral ibuprofen while maintaining a comparable complication rate.

EVALUATION OF FATIGUE IN PATIENTS WITH MULTIPLE SCLEROSIS

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Introduction: Multiple sclerosis (MS) is a chronic inflammatory, demyelinating, and neuro-degenerative disease of the central nervous system (CNS). One of its most common symptoms is fatigue, which significantly affects patients' daily lives. Fatigue is typically described as a loss of energy, muscle weakness, and can be associated with depression.

Materials and methods: The study included 17 patients diagnosed with early relapsing-remitting MS (mean disease duration 1.9years) and 10 age- and sex-matched healthy controls. Both groups were assessed using the Fatigue Severity Scale (FSS), Epworth Sleepiness Scale (ESS), Fatigue Impact Scale (FIS), Hospital Anxiety and Depression Scale (HADS), and the RAND 36-Item Health Survey (SF-36). Neurological disability in MS patients was evaluated using the Expanded Disability Status Scale (EDSS).

Results: There were no significant differences between the groups in age, sex distribution, employment status, education, marital status, number of children, or BMI. Fatigue assessed by FSS was slightly higher in MS patients. Daytime sleepiness (ESS) was similar in both groups and corresponded to normal levels.

The FIS results showed no statistically significant differences in total, cognitive, or physical scores. However, the psychosocial FIS score showed a trend toward higher values in the control group ($p = 0.054$). HADS results indicated low levels of anxiety and depression in both groups, without significant differences. Quality of life (RAND scale) was also comparable between groups (RAND I and RAND II; $p = 0.5$).

A significant correlation was found between EDSS and the FSS analogue scale ($r = -0.484$; $p = 0.049$), as well as between EDSS and the physical component of FIS ($r = 0.530$; $p = 0.029$).

Conclusion: No clinically significant differences were observed between MS patients and healthy controls in fatigue, daytime sleepiness, psychological status, or quality of life. Greater neurological disability was primarily associated with the physical impact of fatigue.

PROPORTION AND SPECTRUM OF GENETIC DIAGNOSES IN HOSPITALIZED PEDIATRIC PATIENTS: A RETROSPECTIVE EPIDEMIOLOGICAL ANALYSIS AT THE DEPARTMENT OF PAEDIATRICS AND ADOLESCENT MEDICINE JFMED CU AND UH MARTIN

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Introduction: Genetic disorders represent a significant proportion of diagnoses within the paediatric population, encompassing a highly heterogeneous spectrum ranging from monogenic disorders and chromosomal aberrations. Early and precise diagnosis is essential for establishing prognosis and guiding targeted management, all of which can improve the quality of patients' lives. Epidemiological evaluation of the hospitalised paediatric population can provide a more comprehensive understanding of the distribution and heterogeneity of genetic conditions.

Material and methods: A retrospective analysis was conducted using data collected from the hospital information system of the Department of Paediatrics and Adolescent Medicine at the University Hospital in Martin. The dataset comprised a total of 2850 hospitalizations recorded in 2025. The data were categorized into three groups: a confirmed genetic diagnosis, a negative case, and a phenotype consistent with suspected genetic etiology without confirmation.

Results: Of the 2850 cases analysed, a genetic diagnosis was confirmed in 297 cases (10.42%), 129 cases (4.53%) were classified as suspected or unconfirmed genetic diagnoses, and 2424 cases (85.05%) were negative. After excluding repeated hospitalizations, the total number of cases decreased to 2328, of which 187 cases (8.03%) represented confirmed genetic diagnoses and 2047 cases (87.93%) were negative. The mean number of hospitalizations per patient was 1.22; with a higher hospitalization frequency observed in patients with confirmed genetic diagnoses (1.59) compared to those with negative findings (1.18), corresponding to a 34.7% increase.

Conclusion: Genetic disorders are associated with higher hospitalization rates due to complications and prolonged diagnostic processes. Enhancing awareness of genetic disorders can reveal limitations in diagnostic approaches and improve the management of complications.

SLEEP DISORDERS CONTRIBUTING TO IMPAIRED EPILEPSY MANAGEMENT

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Introduction: Sleep and epilepsy are closely linked and can significantly influence each other. Sleep disorders may negatively affect seizure frequency and overall epilepsy control, while epilepsy itself can disrupt normal sleep architecture. The aim of this study is to analyze the prevalence of sleep disorders in patients with epilepsy and to evaluate their potential impact on disease management.

Material and methods: A total of 10 patients with epilepsy under therapeutic management at the Clinic of Neurology of the University Hospital Martin were included in the study. All patients underwent overnight video-polysomnography during the period from January 2025 to March 2026. The recorded parameters included multichannel electroencephalography (EEG), electrooculography (EOG), submental electromyography (EMG), nasal and oral airflow, electromyography of the muscoli tibiales anteriores, body position, electrocardiography (ECG), thoracic and respiratory movements, and blood oxygen saturation. The recordings were subsequently evaluated in 30-second epochs according to the American Academy of Sleep Medicine (AASM) criteria. The obtained data were then analyzed and interpreted in the context of relevant published studies.

Results: Sleep disorders were identified in 90% of patients in the studied sample, representing a broad spectrum of sleep-related abnormalities of varying severity and clinical significance. The most frequent findings included sleep-related breathing disorders, sleep-related movement disorders and circadian rhythm sleep-wake disorders, along with other disturbances requiring different levels of therapeutic intervention. Overall, the findings suggest a high prevalence of sleep pathology in patients with epilepsy within the studied cohort.

Conclusion: The high prevalence of sleep disorders observed in patients with epilepsy suggests that routine screening for sleep disturbances in this population may be clinically relevant. Early identification and management of these conditions could contribute to improved seizure control and overall disease management, and may potentially reduce seizure frequency. In addition, addressing sleep-related comorbidities may positively influence sleep quality as well as patients' overall quality of life.

PREVALENCE OF BURNOUT SYNDROME AMONG STUDENTS OF THE JESSENIUS FACULTY OF MEDICINE IN MARTIN, COMENIUS UNIVERSITY BRATISLAVA – BEFORE ENTERING EMPLOYMENT

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Introduction: Burnout syndrome is a condition resulting from prolonged exposure to chronic stress in academic or professional settings. It manifests through emotional and physical exhaustion, depersonalization, and reduced efficiency. Increasingly, it affects not only health-care professionals but also medical students, owing to demanding coursework, emotional strain from limited family contact, peer competition, and anxiety regarding future employment. The World Health Organization has included burnout syndrome in both the ICD-10 and ICD-11 classifications.

Material and methods: A total of 250 fifth- and sixth-year Slovak students at the Jessenius Faculty of Medicine were invited to participate, with 72 responding. The study targeted final-year students to identify those at increased risk of developing burnout syndrome prior to entering the workforce, with potential for long-term follow-up. Data were collected using a combined online questionnaire incorporating the Shirom-Melamed Burnout Measure and additional questions adapted for students.

Results: A low risk of burnout syndrome, defined as a Shirom–Melamed score below 55 points, was observed in 53% of respondents. Scores above 55 points, indicating a predisposition to burnout syndrome, were recorded in 46% of students. Fully developed burnout syndrome, defined by a score exceeding 84 points, was present in 1% of the sample.

Conclusion: The findings reveal a notable presence of burnout symptoms already among medical students. A particularly interesting result was the identification of a respondent with fully developed burnout syndrome who intends to work at the University Hospital in Martin, where parallel research on burnout syndrome among healthcare workers is ongoing. These outcomes underscore the importance of early detection of at-risk individuals and the implementation of preventive measures during undergraduate education.

ANTITHROMBIN DEFICIENCY REGISTRY IN SLOVAKIA

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Introduction: Antithrombin is the principal endogenous inhibitor of coagulation, playing a key role in the inhibition of coagulation factors II, IX, X and XI. Although primary antithrombin deficiency is classified as a rare disorder (prevalence 1:500-1:5000 individuals), it represents one of the most severe inherited thrombophilic conditions and is associated with a significantly increased risk of venous thromboembolism compared with the healthy population ($p < 0.00001$, likelihood ratio ~ 16). Due to the substantially elevated risk of life-threatening complications, this study aims to analyse data on patients with congenital antithrombin deficiency within the National Registry of Thrombophilic Conditions in the Slovak Republic.

Material and methods: Patients were identified from the database of the Outpatient Clinic of the National Centre of Haemostasis and Thrombosis, Department of Haematology and Transfusion Medicine, UNM and JLF UK. In addition, data from haematology outpatient clinics across Slovakia were statistically analysed. Inclusion in the registry required a functional antithrombin activity level below 60%, with acquired antithrombin deficiency excluded.

Results: A total of 78 patients met the inclusion criteria for the registry. Females predominated (65.39%) over males (34.61%). The mean age of patients at the time of registry inclusion was 50.06 years and the mean antithrombin activity at diagnosis was 45.22%. The most common clinical manifestation of antithrombin deficiency was deep vein thrombosis of the lower extremities (41.18%), followed by pulmonary embolism (25%), arterial thrombosis (5.88%) and other thrombotic complications (including cerebral venous thrombosis, renal vein thrombosis, recurrent miscarriage etc.).

Conclusion: Analysis of data on patients with congenital antithrombin deficiency enables a more comprehensive diagnostic approach utilising genetic testing and international collaboration, as well as systematic screening of family members. This may contribute to the early identification of at-risk individuals before the development of thromboembolic complications, improve the efficiency of antithrombin deficiency management, reduce the recurrence rate of venous thromboembolism, and support effective substitution therapy in specific patient groups.

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SURVIVAL OF PATIENTS WITH NON-MUSCLE INVASIVE BLADDER CANCER

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Introduction: Bladder cancer (BC) is the 10th most frequently diagnosed malignancy world-wide. The main risk factor is smoking. The primary treatment is transurethral resection of the bladder tumor (TURB), often supplemented with intravesical chemotherapy using Mitomycin/Epirubicin or BCG immunotherapy.

Material and methods: The study was conducted at the Department of Urology of the University Hospital in Martin. We analyzed a group of patients (n=99) who underwent TURB in 2024 with a positive histological finding. The patients were initially divided into two groups, with muscle-invasive (MIBC) and non-muscle-invasive bladder cancer (NMIBC). MIBC (n=18) is $\geq$ pT₂ according to the TNM classification. NMIBC (n=81) is pT_a / pT₁ according to the TNM classification and this group was the focus of our study.

Results: Of the 81 patients, 23 were female and 58 were male, with a mean age of 73 years. Histologically, pT_a LG was confirmed 19 times, 7 patients were diagnosed with a tumor with a pT_a HG result. Stage pT₁ LG was present in 11 patients, pT₁ HG was present in the most, with a total of 31. One patient was diagnosed with CIS, PUNLMP occurred only once and in two cases the sample with HG cells could not be evaluated. The most severe histological finding was pT₁ HG + CIS in 9 patients. The patients were subsequently stratified into risk groups – 64 patients were classified as high-risk group, 9 patients to the intermediate and 8 patients to the lowest risk group. All patients were treated with TURB, intravesical immunotherapy with BCG vaccine was applied 24 times, intravesical chemotherapy with Mitomycin was administered to 11 patients and intravesical chemotherapy with Epirubicin was used in one case. Recurrence was observed in 40 patients.

Conclusion: Our study confirmed a high risk of recurrence, which was observed in 40 patients (49.4%).

ANALYSIS OF PARAMETERS OF GASTROESOPHAGEAL REFLUX AFTER PERORAL ENDOSCOPIC MYOTOMY (SYSTEMATIC REVIEW AND META-ANALYSIS)

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Introduction: Peroral endoscopic myotomy (POEM) has become a primary therapeutic modality for esophageal achalasia. Usefulness of POEM in other – nonachalatic esophageal motility disorders (NMD), such as distal esophageal spasm or Jackhammer esophagus, is less explored, although available evidence is promising. During POEM, the lower esophageal sphincter is cut, disrupting the antireflux barrier and leading to post-procedural gastro-esophageal reflux (post-POEM reflux). While this is well described in achalasia, data on post-POEM reflux in NMD remain limited. Therefore, this study aimed to analyze the parameters of post-POEM reflux in adult patients, focusing on differences between achalasia and NMD.

Material and methods: A systematic search of the literature with a preregistered protocol (CRD42024533837) was performed on May 2, 2024, using Cochrane, Embase, and PubMed. Randomized controlled studies, prospective, and retrospective studies reporting reflux symptoms or objective evidence of post-POEM reflux were included, while case reports, case series, and pediatric studies were excluded. Subgroup analyses were conducted for patients with achalasia and those with NMD.

Results: A total of 2,259 records were identified, with 202 assessed in full text (Cohen's kappa = 0.82). Finally, 170 studies met the inclusion criteria (Cohen's kappa = 0.89). The pooled proportion of symptomatic reflux after POEM was 0.31 (95% CI, 0.26–0.38). In achalasia, it was 0.33 (95% CI, 0.27–0.39), and in patients with NMD 0.21 (95% CI, 0.05–0.55), without a significant difference between the subgroups ($p = 0.102$). Abnormal pH monitoring occurred in 0.44 overall, 0.44 in achalasia, and 0.46 in NMD ($p = 0.8842$). Esophagitis was present in 0.33 overall, 0.33 in achalasia, and 0.37 in NMD ($p = 0.6886$), again without a significant difference.

Conclusion: Significant post POEM reflux was found either in patients having undergone POEM for achalasia or NMD. No difference was found in the incidence post-POEM reflux either in terms of symptoms or esophagitis/positive pH metry between the patient groups.

MULTIFACTORIAL ANALYSIS OF SUDDEN AND UNEXPECTED DEATHS FROM CARDIOVASCULAR CAUSES IN THE CATCHMENT AREA OF ÚSLaME AND SLaPa IN MARTIN (2015-2025)

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Introduction: SCD (sudden cardiac death) is defined as an unexpected death from pathological cardiac causes that occurs in individuals who do not show any signs of cardiac disease or the disease is known, but in whose case a sudden death is not expected as a result of it. SADS (sudden arrhythmic death syndrome) includes cases where the cause of death cannot be determined by autopsy or toxicological examination, non-cardiac etiologies are excluded, and the heart is declared structurally normal after the autopsy and histological examination performed.

Material and methods: In this retrospective observational study, we obtained the required data by analyzing the autopsy records related to sudden cardiac death, archived by the Healthcare Surveillance Authority in Martin. We focused on individuals under 50 years of age. The data collected were organized and sorted into spreadsheets for analysis.

Results: A total of 266 death cases, which occurred between 2015 and 2025 in the catchment area of ÚSLaME and SLaPa in Martin, were suitable for this analysis. The majority of cases consist of men 218 (82%), whilst 48 (18%) were women. Average age of individuals was 42 years, of which 33 individuals were under the age of 35 and 233 above 35.

In our analysis, we collected information available from records such as weight and size of heart, cause of death, day, season, and place of death, toxicology, and available anamnesis. The most common cause of death appears to be acute myocardial infarction, followed by heart failure, mainly due to severe atherosclerosis and hypertension.

After a detailed analysis of all available health information, we grouped 35 cases in which individuals were found to have no known health complications, even after an autopsy. These 35 cases can be considered as SADS, and they would be suitable for genetic research.

Conclusion: The main purpose of this research was to find suitable cases for genetic research, because many SCD have a genetic background. Individual family members would be systematically approached in order to determine their willingness to participate in genetic research, with the collected data allowing us to identify whether it involved a genetic predisposition that could be passed on within the family.

ANATOMICAL VARIABILITY OF THE MIDDLE EAR: CADAVERIC AND CT CORRELATION

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Introduction: The temporal bone represents one of the most anatomically complex regions of the human skull. Middle ear surgery requires precise spatial orientation due to the proximity of critical structures such as the facial nerve (FN), bony labyrinth and sigmoid sinus (SS). Anatomical variability in these relationships may significantly influence surgical risk. Although high-resolution CT (HRCT) is routinely used in preoperative assessment, systematic correlation between CT-based measurements and anatomical findings remains limited. The aim of this project is to establish a standardized morphometric framework correlating cadaveric dissection with HRCT imaging in order to define reliable anatomical reference values for surgical training and planning.

Material and methods: Temporal bone specimens were obtained from routine forensic autopsies. Each specimen underwent submillimetric HRCT scanning (0.5–0.6 mm slice thickness, bone window) followed by multiplanar reconstruction.

Identical morphometric parameters were defined for both CT and cadaveric assessment. These included mastoid cortex (MC) thickness, posterior canal wall (PCW) thickness, and the following distances: MC-lateral semicircular canal, MC-SS, PCW-SS, PCW-FN (mastoid segment).

Following CT measurements, pilot cadaveric dissections were performed under an operating microscope to expose and identify the corresponding anatomical landmarks. Direct morphometric measurements were subsequently obtained using calibrated digital measuring instrument (accuracy ± 0.05 mm) and a Castroviejo caliper (resolution 0.5 mm).

All measurements were performed in triplicate to ensure reproducibility, and all procedures and findings were systematically recorded in a standardized protocol.

Results: During the pilot phase, a standardized dissection and measurement protocol was developed and optimized. The feasibility of CT–anatomical correlation and reliable identification of predefined landmarks were confirmed. The imaging process and data collection system were successfully implemented.

Conclusion: This ongoing project establishes the methodological foundation for systematic morphometric analysis of the temporal bone. The next phase includes expansion of the sample size, statistical evaluation of agreement between CT and cadaveric measurements, and development of 3D visualization models. The goal in future is to define anatomically based surgical safety parameters and support safer middle ear surgery.

UTILIZATION OF MULTIPARAMETRIC MRI IN THE DIAGNOSIS AND STAGING OF PROSTATE CANCER

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Introduction: Prostate cancer is one of the most common malignancies among men worldwide. Early and accurate diagnosis is crucial for proper risk stratification and the selection of optimal treatment. In recent years, multiparametric magnetic resonance imaging (mpMRI) has become established as an important non-invasive method for the detection and staging of prostate cancer. Nevertheless, prostate biopsy remains the reference standard for definitive diagnosis. The aim of this study is to evaluate the diagnostic accuracy of mpMRI in comparison with histopathological findings from prostate biopsy.

Materials and methods: The study included patients who underwent mpMRI examination followed by fusion prostate biopsy at the Department of Urology, Jessenius Faculty of Medicine in Martin, Comenius University and University Hospital in Martin in 2025. mpMRI findings were assessed using the PI-RADS scoring system. Histopathological examination of biopsy samples served as the reference standard. The analysis included comparison of mpMRI results with fusion biopsy, focusing on the detection of clinically significant prostate cancer and the localization of tumor lesions.

Results: The analysis demonstrates a significant correlation between multiparametric MRI findings and histopathological results of prostate biopsy. Higher PI-RADS scores were associated with a higher probability of clinically significant prostate cancer. mpMRI appears to be a valuable method for detecting and localizing tumor lesions, contributing to more accurate identification of clinically significant forms of the disease. The obtained data suggest its potential to improve the diagnostic process and optimize biopsy indications.

Conclusion: The results support the importance of multiparametric MRI as a key diagnostic tool in prostate cancer. Its use may lead to more accurate detection of clinically significant tumors and reduce the number of unnecessary biopsies. The integration of mpMRI into the diagnostic algorithm represents a promising approach to individualized patient management. Further studies on larger patient cohorts are needed to confirm these findings.

COMPLICATIONS ASSOCIATED WITH STRABISMUS SURGERY

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Introduction: Strabismus can be characterized as an ocular misalignment, where the visual axes of the eyes fail to align on a common fixation point, unlike in the healthy eye. The impairment of single binocular vision is frequently associated with this diagnosis. The constant suppression of transient diplopia, secondary to monocular strabismus, may lead to constant suppression of said eye, resulting in secondary strabismic amblyopia. Treatment aims to achieve orthophoria and to establish or restore single binocular vision. To achieve this, effective management requires timely intervention consisting of conservative therapy followed by surgical correction as potential subsequent step.

Material and methods: Data were collected through a retrospective analysis of patients who underwent surgery between 2017 and 2023. The study cohort comprised 404 patients (195 girls and 209 boys) with a median age of 7.41 years (range 1-18). Postoperative complications, their timing, the need of a reoperation with indication and lastly specific surgical procedures were recorded and analysed.

Results: The postoperative period was uneventful in 358 patients. Recorded complications included orbital cellulitis (2 cases), epithelial inclusion cysts (2 cases), eyelid edema (34 cases), conjunctivitis (4 cases) and dehiscence of conjunctiva (10 cases). Reoperation was required in 42 patients, whereas primary reasons included non-compliance in postoperative care and exercise (7), progression of strabismus despite the orthoptic-pleioptic exercises (29), conversion (1), other reasons (5).

Conclusion: The postoperative course was in majority of cases uneventful, and the recorded complications were mainly non-serious. Therefore, strabismus surgery can be considered a low-risk procedure. The primary reason for reoperation was the progression of strabismus despite therapy, highlighting the need for diligent monitoring and a personalized approach to each patient. The findings indicate that parental compliance and their active involvement in orthoptic exercises play a pivotal role in the overall success of the treatment.

OPTIMIZATION OF MOLECULAR BIOLOGY METHODS FOR DETERMINING THE POST-MORTEM INTERVAL IN FORENSIC MEDICINE

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Introduction: In forensic practice, accurately estimating the post-mortem interval (PMI) is a fundamental task. However, conventional methods do not always yield precise results, as their accuracy can be influenced by internal and external factors. Recent advances in molecular biology and genetics have opened new opportunities for improving PMI estimation. One promising approach focuses on RNA degradation, particularly the analysis of mRNA, which breaks down in a time-dependent manner after death due to ribonuclease activity.

Material and methods: To estimate RNA degradation as a PMI marker, we focused on two housekeeping genes, GAPDH and RPLPo. RNA quantification was performed using droplet digital PCR (ddPCR), an innovative and highly sensitive method for precise RNA measurement.

Results: The acquired data demonstrated the potential of this approach for accurate quantification of RNA degradation in forensic samples. However, analysis using the GAPDH probe showed inconsistencies, likely due to the hairpin structure formation and an insufficient fluorescence signal. In contrast, the RPLPo probe proved to be more suitable for this application.

Conclusion: The ddPCR enables direct and highly sensitive quantification of target RNA. A critical factor in applying ddPCR for PMI estimation is the careful selection of an appropriate target gene and the design of specific probes. Overall, our data highlight the strong potential of molecular biology approaches for improving PMI determination.

SENTINEL LYMPH NODE ASSESSMENT IN BREAST CANCER

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Introduction: Breast cancer ranks as the malignancy with the highest prevalence as well as incidence among women worldwide. Precise assessment of the lymph node is crucial for staging, risk stratification and postoperative clinical management. Sentinel lymph node (SLN) is the first node to which the tumor is most likely to spread. Our main goal was to evaluate the relationship between the timing of scintigraphy visualization of the SLN and the presence of metastatic involvement. We aimed to analyse the potential influence of patient age and histological tumor grade on the probability of SLN metastasis.

Material and methods: This retrospective study involved 216 patients with invasive breast cancer or ductal carcinoma in situ (DCIS) indicated for sentinel lymph node biopsy (SLNB) between January 2017 and January 2026. All included patients were administered with the radioactive tracer technetium-99m (99mTc) and underwent scintigraphy followed by surgery. Data about surgical procedure, preoperative neoadjuvant chemotherapy, molecular-biological characteristics, and definitive histology were collected. Patients were categorised into early (<60 min) and delayed (≥60 min) SLN visualisation groups, and the association with SLN metastasis was evaluated using the chi-square test. IBM SPSS software was used for statistical analysis.

Results: The analyzed cohort consisted of patients with the mean age of 61. Lympho-scintigraphy detection rate was 97%. Early visualisation was observed in 65% (140/216) and delayed visualization in 32% (70/216). No significant statistical dependence was confirmed between the timing of scintigraphy visualization and the presence of metastases ($p=0,055$). Using ROC curve optimal 14% Ki-67 cut-off associated with higher odds SLN metastasis was determined. Higher SLN involvement was observed in younger patients and tumors with higher grade.

Conclusion: Node visualization timing does not serve as a reliable predictive factor for metastasis involvement. Our study supports the importance of intraoperative SLN localization using a gammaprobe and definitive histology for subsequent management. Furthermore, our findings indicate that the Ki67 index and patient age facilitate preoperative risk stratification and the optimization of surgical strategies for axillary management.

PRESENCE OF TYPICAL SIGNS OF BURNING IN CASES EXAMINED BY THE DEPARTMENT OF FORENSIC MEDICINE IN MARTIN (2020-2024)

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Introduction: Notwithstanding 21st-century advancements in safety protocols, fire-related incidents persist as a prominent source of preventable mortality. This study investigates the etiology and circumstantial variables of these fatalities, specifically evaluating the prevalence of pathognomonic thermal indicators in cases documented between 2020 and 2024.

Materials and methods: A retrospective analysis was conducted utilizing records from the Department of Forensic Medicine and Pathological Anatomy at the Healthcare Surveillance Authority in Martin (Slovakia), in collaboration with the Department of Forensic Medicine and Medicolegal Expertise at the Jessenius Faculty of Medicine in Martin. The cohort (n=47) was systematically categorized to evaluate demographic, environmental, and physiological variables.

Results: The cohort exhibited a mean age of 55 years (range: 2–95), with a distinct male predominance (81%). Seasonal peaks were observed during winter (34%) and summer (30%), with 66% of incidents occurring nocturnally. Primary locations included residential houses (45%), apartments (13%), and cabins (11%).

The leading causes of death were carbon monoxide (CO) inhalation (68%), hypovolemic burn shock (34%), and acute ethanol intoxication (11%). Comorbidities or precipitating factors included electrocution-induced cerebral death, polytrauma, and natural pathology. Notably, 57% of victims were intoxicated (mean BAC: 2.3‰; max: 4.1‰), with one instance of methamphetamine detection.

Regarding forensic markers, pugilistic posturing was identified in 43% of cases, while vital periorbital "crow's feet" wrinkling appeared in 13%. Vital signs of smoke inhalation – specifically soot deposition in the respiratory and digestive tracts – were present in 85% and 53% of cases, respectively. The mean carboxyhemoglobin (COHb) saturation was 36%, peaking at 88.7%.

Conclusion: Due to the diagnostic intricacy of fire-related deaths, a universal manifestation of pathognomonic markers is rare. While thermal trauma is characteristic, vital reactions vary significantly; thus, the absence of classical signs does not preclude fire as the mechanism of death. Accurate forensic evaluation necessitates a synthesis of rigorous scene investigation, meticulous autopsy, and comprehensive toxicological screening.

A VACCINIUM CORYMBOSUM (CV. CHANDLER)-DERIVED COMPLEX ATTENUATES COUGH AND CHOLINERGIC BRONCHOCONSTRICTION IN OVALBUMIN-INDUCED AIRWAY INFLAMMATION

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Introduction: Natural polyphenol-rich complexes are increasingly explored for their therapeutic potential in respiratory diseases. We previously demonstrated dose-dependent bronchodilatory and antitussive effects of a cold-water extracted protein-polysaccharide-polyphenol (PPP) complex from *Vaccinium corymbosum* (cv. Chandler) in healthy animals. This study aimed to evaluate its efficacy under inflammatory conditions using an ovalbumin (OVA)-induced model of airway inflammation.

Material and methods: Airway inflammation was induced in guinea pigs by combined parenteral and inhalational sensitization with ovalbumin over 28 days. The test complex (50 mg/kg, p.o.) was administered from day 12 to the day 27. The cold-water extracted fraction consisted of anthocyanins (45%), flavonols (20%), and polysaccharides (35%). Cough reflex sensitivity was assessed using citric acid (300 mM), and specific airway resistance (sRaw) was measured following methacholine, histamine, and citric acid challenges. Tracheal smooth muscle reactivity was evaluated in vitro using cumulative concentrations of acetylcholine and histamine by organ-tissue bath method.

Results: OVA sensitization significantly increased cough frequency and airway reactivity. Treatment with the *Vaccinium corymbosum*-derived complex reduced the number of cough efforts by approximately 50% compared to baseline (from ~4 to ~2 coughs; $p < 0.001$). A marked reduction in airway resistance was observed in response to methacholine (approximately 40–50% vs. OVA group, $p < 0.001$), whereas histamine-induced bronchoconstriction remained unaffected. In vitro, tracheal smooth muscle exhibited decreased contractile responses to cumulative doses of acetylcholine, indicating reduced cholinergic reactivity. No consistent changes were observed in histamine-induced contractions.

Conclusion: The *Vaccinium corymbosum* (cv. Chandler)-derived PPP complex exerts significant antitussive and bronchodilatory effects in an inflammatory airway model, predominantly via modulation of cholinergic pathways rather than histaminergic mechanisms. These findings extend previous observations in healthy animals and support the therapeutic potential of this natural complex in inflammatory airway diseases such as asthma.

TUMOR-EDUCATED PLATELETS AS A POTENTIAL BIOMARKER FOR DETECTION OF PANCREATIC CANCER

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Introduction: Pancreatic ductal adenocarcinoma (PDAC) represents one of the most aggressive malignancies with a very poor prognosis. The high mortality rate is mainly associated with late diagnosis, rapid disease progression and limited treatment options. Therefore, there is an urgent need to identify reliable non-invasive biomarkers enabling earlier detection of pancreatic cancer. Recent research has highlighted the role of blood platelets in tumor biology. In response to tumor-derived signals, platelets undergo molecular and functional changes and become tumor-educated platelets (TEPs). These modified platelets exhibit specific alterations in their RNA profile reflecting the presence and biological characteristics of the tumor. Analysis of RNA signatures in TEPs represents a promising approach within the concept of liquid biopsy.

Material and methods: The aim of this study is to comprehensively evaluate the role of blood platelets in the pathogenesis of pancreatic ductal adenocarcinoma and to analyze the diagnostic potential of tumor-educated platelets as a non-invasive biomarker. The theoretical part focuses on molecular mechanisms of interaction between tumor cells and platelets and their involvement in metastasis and cancer-associated thrombosis. The practical part of the project is designed as a molecular analysis of selected microRNA (miRNA) and messenger RNA (mRNA) in tumor-educated platelets from patients with PDAC. After isolation of platelets from peripheral blood and RNA extraction, expression of target genes will be analyzed using reverse transcription and quantitative polymerase chain reaction (RT-qPCR). In future phases of the project, advanced methods such as digital PCR or RNA sequencing may be considered to enable deeper characterization of transcriptomic changes.

Results: At present, the study is in the preparatory phase focused on systematic biobanking of biological samples and optimization of laboratory procedures for platelet isolation and RNA analysis. Standardized protocols for sample collection, processing and storage are being established to ensure sample quality for subsequent molecular analyses.

Conclusion: Tumor-educated platelets represent a promising non-invasive source of molecular biomarkers for the detection of pancreatic cancer. Establishment of standardized biobanking procedures and laboratory methodologies provides a solid foundation for future research in this field, and further investigation of specific RNA and microRNA signatures may contribute to earlier detection of pancreatic ductal adenocarcinoma.

NEUTROPHIL TO LYMPHOCYTE RATIO – A PROMISING MARKER FOR MENTAL HEALTH ASSESSMENT?

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Introduction: Subclinical manifestations of depression and anxiety represent a significant yet often overlooked concern among medical students, a population exposed to sustained academic pressure. In recent years, there has been growing interest in identifying objective biomarkers that could facilitate early detection of psychological distress before the onset of clinically manifest mental disorders. One promising candidate is the neutrophil-to-lymphocyte ratio (NLR), a readily accessible marker of systemic inflammatory response. Although so far research indicates higher levels of NLR in major depressive disorder and anxiety-related disorders, the associations between the NLR and subclinical depression and anxiety remain undetected. Therefore, this study aimed to evaluate the association between the NLR and subclinical symptoms of depression and anxiety in medical students, as measured by standardized psychometric instruments.

Material and methods: A cross-sectional study was conducted in a cohort of 112 medical students (71 females; mean age 21.9 ± 1.9 years, BMI = 22.5 ± 4.9 kg/m²). Depressive symptomatology was assessed using the Beck Depression Inventory (BDI), while state and trait anxiety levels were measured with the State-Trait Anxiety Inventory (state=STAI-X₁, trait=STAI-X₂). Peripheral venous blood samples were collected, and NLR was calculated from complete blood count parameters obtained from automatic hematology analyser (Mindray BC-5500, China).

Results: Positive associations were found between NLR and BDI total score ($r=0.297$, $p<0.001$), NLR and cognitive-affective dimension of BDI ($r=0.351$, $p<0.001$), and NLR and somatic-vegetative dimension of BDI ($r=0.216$, $p=0.032$). Although no associations were found between NLR and STAI-X₁/STAI-X₂ total scores, positive associations were found between NLR and cognitive dimensions of STAI-X₁ and STAI-X₂ ($r=0.224$, $p=0.036$; $r=0.232$, $p=0.031$; respectively).

Conclusions: The study findings indicate that even at a subclinical level, depressive symptoms and cognitive aspects of state and trait anxiety are associated with systemic inflammatory activity indexed by NLR in medical students. NLR may thus represent a simple and cost-effective complementary biomarker for early identification of at-risk individuals. However, longitudinal studies are needed to clarify causality and clinical applicability.

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ROLE OF KIR6.2 IN CALCIUM HOMEOSTASIS AND MITOCHONDRIAL DYNAMICS IN A NEURONAL MODEL OF PARKINSON'S DISEASE

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Introduction: Parkinson's disease (PD) is a progressive neurodegenerative disorder characterized by the selective loss of dopaminergic neurons, closely associated with mitochondrial dysfunction and impaired intracellular calcium homeostasis. ATP-sensitive potassium (K_{ATP}) channels act as important metabolic sensors linking cellular energy status to neuronal excitability and have been extensively studied in the pathogenesis of PD. The aim of this study was to investigate the role of K_{ATP} channels, particularly the Kir6.2 subunit, in the regulation of intracellular physiology and functional properties of dopaminergic neuron-like cells.

Material and methods: This study compared wild-type and Kir6.2-deficient human neuroblastoma SH-SY5Y cells, which were exposed to K_{ATP} modulators, including glibenclamide, diazoxide, pinacidil, and 5-hydroxydecanoate. As indicators of intracellular physiology, intracellular calcium levels (basal and stimulation-induced) and mitochondrial network properties were evaluated using specific fluorescent staining and confocal microscopy. Functional properties were assessed by the expression of selected dopaminergic markers, including dopamine and β III-tubulin, using labeled antibodies.

Results: In wild-type cells, K_{ATP} modulation affected basal intracellular calcium levels, whereas these effects were markedly reduced or absent in putative Kir6.2-deficient cells. The Kir6.2-deficient cells exhibited a reduced calcium response to membrane depolarization compared to wild-type cells; however, the effect of glibenclamide was preserved in both conditions. Putative Kir6.2 deficiency was associated with decreased mitochondrial signal intensity and an overall attenuation of mitochondrial network responsiveness to K_{ATP} modulators. Notably, glibenclamide retained a measurable effect on mitochondrial morphology even in the depletion of Kir6.2. These findings are based on pilot measurements of a newly established SH-SY5Y-derived cell model.

Conclusion: Based on the presented results, Kir6.2 may play an important role in the regulation of basal calcium homeostasis and mitochondrial responses to K_{ATP} channel modulation in neuronal cells, which may be accompanied by changes in functional properties of dopaminergic neurons. Further characterization of the cell model is required to confirm these findings.

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ISOLATION OF INDUCED PLURIPOTENT STEM CELLS TO STUDY PATHOLOGY OF MALIGNANT MELANOMA

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Introduction: Melanoma is a malignant neoplasm, which arises from melanocytes. The incidence rises steadily in last decades and still remains at the top in lethality amongst cutaneous neoplasms. To study the pathology of malignant melanoma a unique animal model of Melanoma-bearing Liběchov Minipig (MeLiM) was developed in Czech Institute of Animal Physiology and Genetics, in Liběchov. This model has a hereditary form of malignant melanoma with high incidence of spontaneous regression, a phenomena not seen in human. Here, we present an isolation and characterization of MeLiM minipig skin fibroblasts, that are now subject to reprogramming into induced pluripotent stem cells (iPSc). Successfully reprogrammed cells will be characterized and tested and provided to other researchers via scientific collaboration.

Material and methods: After surgical biopsy, skin sample was transferred on ice in culture medium into our laboratory. Single cell suspension was prepared with two approaches – explant culture and with enzymatic treatment with collagenase. Cells were later analyzed by flow cytometry (with FACS ARIA II flow cytometer) and data processed with FACS DIVA software.

Results: We present here a successful isolation of cell line from MeLiM minipig skin fibroblasts. Cell line was derived from skin biopsy, surgically isolated previously at Institute of Animal Physiology and Genetics in Liběchov. Cells were partially characterized by immunocytochemistry and flow cytometry and after expansion, they are now subject to reprogramming procedure into induced pluripotent stem cells.

Conclusion: We provide here a partial characterization of a novel primary cell line, isolated from MeLiM melanoma pig skin sample. Currently, skin fibroblasts are being re-programmed with synthetic RNA vector encoding human Yamanaka factors. Further characterization of this cell line is currently in progress.

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PROGNOSTIC AND PREDICTIVE BIOMARKERS OF PANCREATIC CANCER

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Introduction: The most prevalent pancreatic malignancy is adenocarcinoma (PDAC), followed by less common neuroendocrine neoplasms (NEN) and mixed neuroendocrine-non neuroendocrine neoplasm (MiNEN). Systemic therapy for these malignancies is primarily based on nucleoside analogues (gemcitabine, 5-fluorouracil, capecitabine). ABC and SLC transporters are transmembrane proteins that mediate the transport of nucleoside analogues across the cell membrane. This mechanism is of particular significance in oncology due to its role in tumour chemoresistance, particularly acquired resistance.

Material and methods: Between 2018 and 2024, a total of 61 histologically verified paired samples of tumour and adjacent non-tumorous tissue were obtained from patients who underwent radical surgical resection for pancreatic tumours (41 PDAC and 20 NEN). The expression profiles of SLC and ABC transporters were determined using relative quantification of transcripts via real-time PCR.

Results: In PDAC tissues, we observed decreased expression of ABCB₄, ABCC₁₀, ABCC₆, and SLC29A₁ transporters. Conversely, NEN tissues exhibited decreased expression of ABCC₃, ABCC₆, and SLC28A₃, while expression of ABCB₁ and ABCC₅ was increased. In a direct comparison of tumour tissues (NEN vs. PDAC), NEN showed lower expression of ABCC₃ and SLC28A₃, whereas all other transporters were significantly upregulated. Decreased expression of ABCC₃ and ABCC₄, along with increased expression of ABCG₂ and SLC28A₃, was associated with longer overall survival (OS) in our cohort. Increased expression of ABCB₁, ABCB₄, and SLC29A₁ was also associated with longer OS; however, this association was driven by significantly higher expression within the NEN subgroup and did not reach significance in subgroup-specific analyses (PDAC vs. NEN).

Conclusion: This retrospective analysis identified potential genetic prognostic and predictive biomarkers for pancreatic tumours treated with nucleoside analogues. These findings warrant further verification in larger patient cohorts.

OPTIMIZATION OF A qPCR WORKFLOW AS A TOOL FOR INVESTIGATING THE MOLECULAR MECHANISMS OF STAPHYLOCOCCUS AUREUS-INDUCED ACTIVATION OF PRURICEPTORS

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Introduction: Itch and pain are distinct sensory modalities that greatly overlap at the molecular and cellular levels. Recent evidence, including findings from our laboratory, suggests that pruriceptors exhibit heightened sensitivity to various exogenous stimuli, such as the *Staphylococcus aureus* virulence factor α -hemolysin. Given the critical role of α -hemolysin in atopic dermatitis, this study sought to establish a reliable protocol to test the hypothesis that this heightened response in pruriceptors is driven by increased receptor expression.

Material and methods: Cutaneous neurons were labeled with the fluorescent tracer Dil applied to the dorsal skin of C57BL/6NCrl mice ($n=5$), followed by retrograde transport to dorsal root ganglia (DRG) over two weeks. DRGs were dissected and dissociated, and single neurons were collected for mRNA reverse transcription. Gene expression was assessed by quantitative PCR or qualitative PCR followed by gel electrophoresis. All experiments were in alignment with the approval of the Ethics Committee of JFMED CU and the State Veterinary Administration of the Slovak Republic.

Results: To characterize neuron populations, pruriceptors were defined as MrgprA3- or Histamine receptor 1 (HR1)-positive, and nociceptors as TRPV1-positive while negative for pruriceptive markers. Initially, we assessed the detection of these targets in pooled neurons (approximately 10 cells/sample). However, even pooled samples revealed substantial technical variance, with standard deviations ranging from 0.5 to 2.7 across different gene targets. Furthermore, when analyzing single cells, the qPCR data did not correlate with the qualitative PCR results visualized on agarose gels, highlighting the random variations inherent to single-cell analysis. Nevertheless, among the evaluated targets (β -actin, TRPV1, MrgprA3, Adam10), Adam10 demonstrated the highest stability. It yielded a mean Cq of 25.3 ± 0.8 in pooled samples versus 30.5 ± 0.76 in single neurons, accurately reflecting the expected reduction in transcript copy number.

Conclusion: While Adam10 expression results validate the experimental workflow, its high Cq (30.45) in single-cell samples limits quantitative reliability. Future optimization will incorporate global cDNA pre-amplification or concentration steps in the protocol.

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NEURO-IMMUNE PROFILE OF ADOLESCENTS WITH AUTISM SPECTRUM DISORDER AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER: A PERIPHERAL BIOMARKER PERSPECTIVE

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Introduction: Autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD) are prevalent neurodevelopmental disorders associated with immune dysregulation, yet data in adolescence are limited. Therefore, we aimed to evaluate multiple peripheral inflammatory markers, in addition with focus on assessing the balance of pro-inflammatory and anti-inflammatory activity, in adolescents with ASD and ADHD. Understanding peripheral inflammatory markers may provide insights into underlying immunopathology and potentially contribute to diagnostic approaches in adolescent psychiatry.

Material and methods: A total of 60 adolescents were included: 20 with ASD (5 females; mean age 12.4 ± 1.9 years), 20 with ADHD (5 females; mean age 13.4 ± 1.8 years), and 20 age- and sex-matched healthy controls (mean age 13.2 ± 1.9 years). Peripheral blood was analysed for complete blood count parameters (white blood cells, neutrophils, monocytes, lymphocytes, platelets, platelet distribution width) and cytokines (interferon (IFN)- γ , interleukin (IL)- 1α , IL- 1β , IL-2, IL-4, IL-6, IL-8, IL-10, TNF- α) using biochip array technology (Randox, UK). Consequently, selected pro-inflammatory and anti-inflammatory profiles, and ratios were calculated.

Results: Adolescents with ASD showed significantly higher levels of white blood cells, monocytes, IL- 1α , IL- 1β , IL-2, IL-4, IL-6, IL-8, IL-10, macrophage M1 profile, and anti-inflammatory profile compared to controls ($p < 0.05$ for all). Adolescents with ADHD exhibited significantly higher platelet distribution width and increased levels of IL- 1β , IL-6, TNF- α , M1 profile, pro-inflammatory profile, and pro-/anti-inflammatory ratio ($p < 0.05$ for all). ROC analyses demonstrated good predictive ability for several parameters, with enhanced accuracy when combining multiple markers (AUC up to 0.909 for ASD and 0.887 for ADHD).

Conclusions: ASD and ADHD in adolescents are associated with immune dysregulation, however, with different characteristics. While adolescents with ASD showed increased pro-inflammatory and anti-inflammatory cytokines reflecting a complex activation of the immune system, in adolescents with ADHD pro-inflammatory activity predominated. Interestingly, the combination of several cytokines was able to almost accurately distinguish patients from healthy individuals, suggesting their potential as candidate biomarkers of these disorders.

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INCIDENCE OF SELECTED INFECTIOUS DISEASES BEFORE, DURING AND AFTER THE COVID-19 PANDEMIC

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Introduction: The COVID-19 pandemic, along with associated non-pharmaceutical interventions (NPIs), disrupted established transmission patterns of numerous other pathogens on a global scale. This study aimed to evaluate changes in the reported incidence of selected infectious diseases in Slovakia during and after the COVID-19 pandemic compared to the pre-pandemic period, with a focus on varicella, scarlet fever, pertussis and to quantify the degree of immunity debt and its „repayment“, in the form of post-pandemic rise in reported cases, using epidemiological modelling.

Material and methods: Data on reported cases were obtained from the annual reports of the Public Health Authority of the Slovak Republic (ÚVZ SR) for the years 2013–2024. Temporal trends were assessed using descriptive epidemiological analysis, including age-specific incidence and seasonality patterns. To model the expected baseline incidence and quantify deviations from it, ARIMA and SARIMA time series models were applied to each disease using the pre-pandemic period as a reference.

Results: During the pandemic (2020–2022), a significant decline in reported cases was observed for all studied diseases, consistent with the impact of NPIs on transmission. In the post-pandemic period (2023–2024), pertussis and scarlet fever showed increases in incidence exceeding baseline levels (indexes 9,6 and 11,4, respectively), while varicella returned to values comparable to the pre-pandemic baseline. Shifts in seasonality and age-specific incidence were also identified, particularly for pertussis and scarlet fever.

Conclusion: These findings indicate that COVID-19 pandemic and related NPIs altered the epidemiological patterns of selected infectious diseases in Slovakia. The pronounced post-pandemic rebound, especially in pertussis and scarlet fever, supports the concept of immunity debt, with changes in age-specific incidence and seasonal patterns underscoring the importance of adaptive preventative measures following major disruptive events.

RISK ASSESSMENT OF LEAD EXPOSURE FROM HOMEMADE SPIRITS INTENDED FOR OWN CONSUMPTION

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Introduction: Homemade fruit spirits intended for own consumption produced in registered craft fruit distilleries are a traditional part of alcohol production and consumption in Slovakia. They differ in fruit variety and fermentation methods, which may affect contaminant levels. Traditional fruit spirits often contain 52–55 % alcohol by volume (ABV) and may include harmful substances such as heavy metals. This study aimed to analyse lead in homemade fruit spirits intended for own consumption and assess exposure risk to public health.

Material and methods: We analysed 30 samples (22 plum spirits, 8 apple spirits) from licensed craft distilleries across Slovakia. A questionnaire collected information on fruit origin, preparation, type, fermentation duration, year of distillation, and intended alcohol content. Sample preparation consisted of previous mineralization using microwave decomposition system MULTIWAVE 60 50 Hz. The samples were analyzed by atomic absorption spectrometry with graphite furnace (AAS GBC XPLOAA 5000 with GF 5000).

Results: Lead was detected in 25 samples. Most samples (N = 19) had levels lower than the limit of quantification (LOQ). The highest concentration was found in the sample from Banská Bystrica ($328.63 \pm 57.12 \mu\text{g/l}$), exceeding the Alcohol Measures for Public Health Research Alliance (AMPHORA) limits, which is set at $200 \mu\text{g/l}$. The average lead concentration was $42.73 \mu\text{g/l}$, and the average ethanol content was 51.32 %. Average MOE values for lead were 49.02 (1 drink) and 12.25 (4 drinks), while the minimum MOE values were 6.4 (1 drink) and 1.6 (4 drinks), indicating an increased risk for the most contaminated samples.

Conclusion: Lead is a frequent contaminant in homemade spirits intended for own consumption. Given the popularity of these alcoholic beverages and the lack of lead regulation, they represent a significant public health concern, highlighting the need for further research to identify contamination sources and reduce risk.

MICROBIOLOGICAL DIAGNOSTICS OF CONTAMINANTS IN THE ENVIRONMENT

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Introduction: Indoor air quality is a key factor influencing human health and comfort. Indoor microorganisms originate from various sources, and their concentration is largely affected by the presence and activity of occupants. This study aimed to analyze microbial load in a classroom at the Jessenius Faculty of Medicine in Martin, assess the impact of student presence on airborne microbial concentrations, and compare the efficiency of active and passive sampling methods.

Materials and methods: Monitoring was conducted in a classroom at the Department of Public Health, Jessenius Faculty of Medicine in Martin, Comenius University, during autumn 2025 (October and November), at both the beginning and the end of the week. Sampling was performed in an empty classroom and during teaching sessions. Air samples were collected at three locations at a height of approximately 1 m. Two methods were used: a passive sedimentation method (Petri dishes with tryptone soya agar and Sabouraud agar, exposed for 60 minutes) and an active method using a MicroBio MB1 air sampler with a sampled air volume of 1000 L. Statistical analysis was performed using the Mann–Whitney test.

Results: A statistically significant difference was found in bacterial counts between classrooms with and without students, with higher values observed in the presence of students using both passive and active methods ($p=0.003$ and $p=0.01$, respectively). A significant difference was also observed between sampling methods ($p=0.0002$), with the active method capturing a higher number of microorganisms than the passive method. Differences between the start and end of the week were not significant ($p>0.05$), and no significant differences were found between months for either method.

Conclusion: The presence of occupants significantly affects indoor air microbiological quality, with humans representing a primary source of contamination. The active sampling method proved to be more sensitive. These findings highlight the need to consider operational conditions and methodology when assessing indoor air quality. Systematic monitoring of indoor air, especially in spaces with higher occupancy, is essential for the protection of public health.

COMPLIANCE WITH THE FIVE MOMENTS FOR HAND HYGIENE PRIOR TO CLEAN ASEPTIC PROCEDURES – AN OBSERVATIONAL STUDY

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Introduction: Hand hygiene represents one of the most effective measures in the prevention of healthcare-associated infections. Adherence to the five moments of hand hygiene, according to the recommendations of the World Health Organization, allows for the evaluation of healthcare workers' behavior in clinical practice. The aim of this study was to assess the level of adherence to the five moments of hand hygiene among healthcare workers in a hospital setting, with a focus on the moment before aseptic procedures.

Materials and methods: Direct observation of hand hygiene was carried out from November 2023 to June 2025 across 15 departments of a university hospital during routine clinical practice. A total of 2,619 opportunities for hand hygiene among physicians and nurses were recorded. Data were analyzed using the chi-square test and Fisher's exact test at a significance level of $\alpha = 0.05$.

Results: Hand hygiene was performed in 1,001 out of 2,619 observed opportunities, corresponding to an adherence rate of 38.2%. Differences in adherence rates between individual hand hygiene moments were statistically significant ($\chi^2 = 61.34$; $p < 0.001$), with the highest adherence observed before aseptic procedures (55.04%) and the lowest after contact with patient surroundings (30.51%). No statistically significant difference was found between nurses (41.29%) and physicians (34.84%), nor for the moment before aseptic procedures. Adherence rates also differed significantly between departments, with the highest rate in the neurology department (50.93%) and the lowest in the internal medicine department (30.17%). Significant differences were also observed according to the type of aseptic procedure ($p = 0.0038$), with the highest adherence during puncture and insertion of intravenous lines (65.71%).

Conclusion: The results revealed insufficient adherence to hand hygiene in clinical practice. Despite higher adherence before aseptic procedures, the remaining moments are less consistently followed, highlighting the need for regular monitoring and the implementation of effective strategies to improve hand hygiene in order to increase patient safety.

DETERMINING THE PREVALENCE OF BURNOUT SYNDROME AMONG HEALTHCARE WORKERS

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Introduction: Burnout syndrome predominantly affects healthcare professionals and arises mainly as a result of prolonged occupational stress. The aim of this study was to determine the prevalence of burnout syndrome among public health professionals in Slovakia.

Material and methods: A cross-sectional study was conducted from October to November 2025. The study sample consisted of 783 public health professionals, of whom 704 were employed at Regional Public Health Authorities and 79 in occupational health services. Data were collected using the standardized online questionnaire Copenhagen Burnout Inventory, distributed via internal email addresses. The prevalence of burnout was assessed based on the second domain of the questionnaire – work-related burnout.

Results: Women accounted for nearly 90% of the sample ($N = 704$). The overall prevalence of burnout was 39,72%. The mean burnout score in the sample was 48.4 ± 18.98 . A moderate to high level of burnout was observed in 38.60% of men and 38.99% of women. The highest rate of burnout was found in the age group 41–50 years (46.02%).

Conclusion: The results indicate a high level of work-related burnout among public health professionals in Slovakia, with middle-aged workers representing the most at-risk group. These findings highlight the need for systematic measures aimed at burnout prevention and the promotion of mental health in this sector.

CONSUMPTION OF CAFFEINATED BEVERAGES AMONG ATHLETES

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Introduction: Caffeine is one of the most widely used ergogenic substances in sports, consumed to increase alertness, delay fatigue, and enhance athletic performance.

The aim of this study was to analyze the consumption of caffeinated beverages among athletes and to identify differences based on gender, age, and level of physical activity.

Materials and methods: The study was conducted using a self-designed questionnaire distributed through selected sports clubs. The analysis included 259 active athletes (123 men, 136 women), mostly aged 18–25 years. Based on their level of physical activity, respondents were divided into recreational ($n = 152$) and competitive athletes ($n = 107$). The study examined the frequency, quantity, and types of caffeinated beverages consumed, the reasons for their use, perceived subjective effects, and the level of knowledge regarding the recommended daily intake of caffeine.

Results: Coffee was the most commonly consumed beverage (86%), followed by energy drinks (46%), cola drinks (43%), and green tea (32%). Men consumed significantly higher amounts of caffeine ($p = 0.0092$), with the most common intake being 3–4 servings per day, while women consumed 1–2 servings per day. Men also consumed energy drinks more frequently, while women preferred coffee. In the subjective assessment of caffeine's effect on performance, men more often reported a positive effect (67%), while women more often reported no effect (59%) ($p = 0.001$). No significant differences were found between recreational and competitive athletes; however, competitive athletes more often reported a positive effect of caffeine on performance (58%) ($p = 0.0201$).

Conclusion: Caffeinated beverages are very common among athletes, especially coffee and energy drinks. Athletes may unknowingly exceed the recommended daily intake. The findings highlight the need to educate athletes about safe caffeine consumption.

ERGONOMICS IN THE DIGITAL ERA: RISK ANALYSIS OF WORKING WITH DISPLAY UNITS

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Introduction: Working with display units represents a significant part of the working life of administrative employees and increases the risk of musculoskeletal diseases. According to the most recent data, approximately 8.5 million people were employed as clerical occupations. The aim of this stud was to analyze the ergonomic risks associated with the use of display units in the occupational environment of administrative employees.

Material and methods: The study (November – December 2025) used two approaches: an objective method (structured ergonomic checklist, Rapid Upper Limb Assessment, Rapid Entire Body Assessment to evaluate working postures) and the subjective method (the standardized Boston Carpal Tunnel Syndrome Questionnaire). The sample consisted of 67 administrative employees working with display units from selected institutions (Municipal Office of Žarnovica, Office of Labor, Social Affairs and Family in Žarnovica, Social Insurance Agency in Žiar nad Hronom and the Tax Office in Žiar nad Hronom).

Results: The evaluation of working postures indicated a moderate level of ergonomic risk. Findings from Boston Carpal Tunnel Syndrome Questionnaire showed predominantly mild symptoms consistent with carpal tunnel syndrome. The mean symptom severity score was 1.7, with a prevalence ranging from 13.43% to 28.36%. Functional status ranged from minimal to mild impairment, with a mean score of 1.43 and a prevalence ranging from 4.48% to 19.4%.

Conclusion: The findings indicate the presence of ergonomic risks associated with working with display units, as well as the occurrence of mild musculoskeletal symptoms among employees. The results highlight the need to implement ergonomic interventions in order to prevent health problems.

PREVENTION OF MALARIA IN TRAVELLERS FROM SLOVAKIA

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Introduction: Travel agencies represent the first point of contact for travellers in providing information and education on risks, prevention, and protection against tropical diseases. This study is focused on the analysis of information service and educational content provided by travel agencies to individuals travelling to tropical destinations with a risk of malaria and other tropical diseases.

Material and methods: Between October 2025 and December 2025, we analysed the information service of 26 travel agencies (9 Slovak and 17 Czech), selected based on two criteria: Slovak or Czech origin and the offer of travel packages to tropical destinations with a risk of tropical diseases, particularly malaria. We assessed provisions of information on risks, prevention, and protection on their websites and further categorised the travel agencies according to six predefined criteria. Additional data regarding the specific information provided to clients was obtained via email communication; 16 agencies responded.

Results: Fourteen out of 26 travel agencies did not provide information on the risks and prevention of tropical diseases on their websites, while 12 offered at least basic information, 11 provided information on vaccination and 9 on risks and prevention. Only one agency provided information for specific groups, and two of them offered contacts to specialised healthcare facilities providing pre-travel advice. The most frequently provided information included travel medical kits and medications (9), vaccination (8), viral hepatitis A and B (8), yellow fever and malaria (8). Seven agencies did not consider standardised recommendations for informing clients necessary, while nine expressed interest in official informational materials.

Conclusion: The analysis of travel agencies revealed deficiencies in the provision of information on tropical diseases both on websites and in direct communication with clients. Considering significant risks for travellers, it is necessary to seek ways to improve the situation, particularly through legislatively supported standardised information service based on the recommendations of the World Health Organization.

UTILIZATION OF ATOMIC ABSORPTION SPECTROMETRY IN A GRAPHITE FURNACE FOR THE DETERMINATION OF ARSENIC IN WELL WATER

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Introduction: Drinking water quality is an important determinant of public health. Chemical contamination, particularly the presence of heavy metals, poses a significant risk due to their toxicity and ability to bioaccumulate. Among these substances is arsenic, which has a negative impact on human health, especially in the case of long-term exposure. Various analytical methods are used to determine these substances, including atomic absorption spectrometry with a graphite furnace (GF-AAS), which enables sensitive and reliable determination of elements in water. The aim of this study was to describe a methodology for arsenic determination using this method and to assess the quality of drinking water from selected individual sources.

Material and methods: Seven well water samples from individual sources in the villages of Belá and Dolná Tižina (Žilina district) were analyzed. Sampling was carried out in winter (January 2026). After collection, samples were filtered, acidified, and subsequently analyzed using GF-AAS. The study also included a questionnaire survey focused on the characteristics of wells, their usage, and the identification of potential sources of contamination.

Results: Arsenic was detected in 4 out of 7 samples. Measured concentrations ranged from below the detection limit ($< 3.44 \mu\text{g/L}$) to $10.98 \mu\text{g/L}$. Three samples showed elevated arsenic concentrations compared to the others, with one sample exceeding the legislative limit of $10 \mu\text{g/L}$. The results indicate variability in water quality in individual sources and suggest the influence of local geological and environmental conditions.

Conclusion: GF-AAS is a suitable and sensitive method for arsenic determination in drinking water. However, when concentrations are close to legislative limits, careful interpretation of results is required, particularly with regard to the limits of detection and quantification. When selecting an analytical method, it is therefore important to consider alternative techniques that may be more sensitive in this concentration range. The results also confirm the importance of routine monitoring of well water quality for public health protection.

EMPLOYMENT OF SPA TREATMENT IN A PREVENTION OF HEALTH-SOCIAL IMPACTS OF SELECTED DISEASES

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Introduction: The spa treatment plays a significant role in a prevention of health-social impacts of various diseases, and its employment can contribute to enhancing of population health. The aim of this study is to evaluate the importance and the employment of spa treatment in a prevention of health-social consequences of selected diseases.

Material and methods: The study retrospectively analyses the official data from the National Centre of Health Information and the Dôvera Health Insurance Company between 2015 and 2024 considering the extent of spa treatment employment, basic sociodemographic characteristics of patients, proportion of self-paying patients and treatment results.

Results: The spa treatment is the most frequently used for musculoskeletal, respiratory, cardiovascular and skin conditions. The spa attendance declined significantly between 2019 and 2022. Patients aged 60 – 69 years prevailed (more than 30% visitors), particularly retirees (almost 40%). Those being regularly employed accounted for 24%. People with low socio-economic status constituted the least frequent group. Women outnumbered men by 16%. The self-payers have accounted for most of the treatment stays since 2016. The proportion of short-term treatments lasting up to one week has gradually increased (reaching more than 40% in 2024). Most patients (91%) experienced an improvement in their health following treatment.

Conclusion: The spa treatment has significance in follow-up health care and prevention of diseases, too. The COVID-19 pandemic hampered its employment. There is a potential for better utilization of spa therapy, namely considering occupational diseases. Economic factors also play a significant role, as well.

OCCURRENCE OF TICK-BORNE ENCEPHALITIS AND LYME DISEASE IN SLOVAKIA

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Introduction: Vector borne diseases represent a significant public health issue with a global impact. Their occurrence is influenced primarily by climate change, land use changes, animal migration, and population mobility. The aim of this study was to analyze the occurrence of tick borne encephalitis and Lyme disease in Slovakia between 2007 and 2024 and to assess vaccination coverage against tick borne encephalitis.

Materials and methods: Data on disease occurrence were obtained from the Annual Reports of the Public Health Authority of the Slovak Republic for the years 2007–2024. Additional information on vaccination against tick borne encephalitis was sourced from analyses conducted by health insurance companies in Slovakia.

Results: The results show that the incidence of Lyme disease has long exceeded that of tick borne encephalitis, with both diseases demonstrating an increasing trend across all regions of Slovakia in recent years. The occurrence of tick borne encephalitis displayed a pronounced regional pattern, with the highest incidence in the northern and central parts of Slovakia, particularly in the Banská Bystrica (14.01/100,000), Trenčín (10.96/100,000), and Žilina regions (9.43/100,000). In contrast, Lyme disease has shown a recent increase even in southern regions, including the Bratislava and Trnava regions. The highest incidence of Lyme disease was recorded in the Trenčín region (89.6/100,000), with a growing trend observed in other regions as well. During the study period, year to year decreases in incidence were also noted, particularly in years characterized as exceptionally warm and dry. Seasonal occurrence of both diseases peaked in June and July, with a recent extension of the active season from April to October. Regarding sex distribution, a higher incidence of tick borne encephalitis was observed in men (54–71%), whereas women predominated among Lyme disease cases (53–58%). Data from health insurance companies indicate an increasing trend in vaccination coverage against tick borne encephalitis, particularly after 2020, across all age groups.

Conclusion: The findings suggest an expansion of endemic areas, especially in the northern regions of Slovakia, which may be associated with climate change. From a public health perspective, it is essential to strengthen population education on preventive measures and emphasize the importance of vaccination as an effective form of protection against tick borne encephalitis.

EVALUATION OF TEACHING METHODS IN MUSCULOSKELETAL ANATOMY: VIRTUAL DISSECTION TABLE VERSUS 3D MODELS

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Introduction: Traditional anatomical education is increasingly supplemented by modern technologies to enhance spatial orientation and knowledge retention. This study evaluated the effectiveness of the Anatomage table compared to physical 3D models during an anatomy practical lesson on the muscles of the head and neck, while assessing student interest in integrating modern technologies into the curriculum.

Material and methods: 89 first-year medical students were assigned to three groups using stratified randomization. Group 1 used the Anatomage table with self-study time; Group 2 used physical 3D muscle models with self-study time; Group 3 combined both methods. Knowledge acquisition was assessed by an immediate 35-point quiz comprising multiple-choice, open, and identification questions. A psychologist-validated survey evaluated student attitudes toward modern teaching methods. Long-term retention was measured by an unannounced follow-up test one week later. Group differences were analysed using the Kruskal-Wallis test and questionnaire reliability via Cronbach's alpha.

Results: Group 2 exhibited lower immediate test performance (mean $84.8\% \pm 8.6$) compared to Groups 1 and 3 ($88.0\% \pm 6.4$ and $88.2\% \pm 6.0$, respectively), though no statistically significant differences were observed ($p = 0.341$). The retention test showed a borderline result ($p = 0.053$), suggesting a trend favouring Group 3. All questionnaire scales – perceived learning effectiveness, cognitive load, motivation, and understanding – demonstrated satisfactory internal consistency ($\alpha = 0.707\text{--}0.800$). Statistically significant group differences emerged for cognitive load ($p = 0.044$) and motivation ($p = 0.045$). Descriptively, Group 2 showed the lowest mean scores and highest response variability across all scales, while Groups 1 and 3 were more similar, with Group 3 often achieving slightly higher values. Additionally, 81 students reported daily AI use and expressed strong interest in curricular integration, citing benefits for attention, motivation, and spatial visualisation.

Conclusion: Combining the Anatomage table with physical 3D models appears to offer synergistic benefits for both immediate learning and long-term retention. Given strong student demand and promising pedagogical advantages, this hybrid approach warrants consideration in future curricula.

CARDIOVASCULAR AND RESPIRATORY SYSTEM RESPONSE TO ASMR VIDEOS

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Introduction: ASMR (Autonomous Sensory Meridian Response) is a sensory phenomenon typically evoked by audiovisual triggers such as whispering or object manipulation, often accompanied by tingles (specific sensations typically occurring in the scalp, neck, and spreading down the back). Although ASMR is frequently used in social media, its physiological responses remain still unclear. Aim of this study is to explore physiological and subjective responses to ASMR stimuli and their relation.

Material and methods: Forty participants (21 women, 19 men; mean age $19,4 \pm 1,8$ years) watched a video containing two audiovisual ASMR stimuli (whispering and manipulation with polystyrene) and one neutral non ASMR stimulus (relaxation video with flying lights) in a randomized order. While watching video, cardiovascular and respiratory parameters were continuously and non invasively recorded focusing on basic characteristics of cardiovascular control and respiratory pattern. Then, participants completed a questionnaire evaluating relaxation, irritation, pleasure and tingling sensations during video watching.

Results: Cardiovascular regulation assessment indicate a relatively complex response pattern mediated by the autonomic nervous system. Several parameters suggest an increase in sympathetic activity, however, this is accompanied by a concurrent reduction in sympathetic influence on certain variables and/or an increased parasympathetic modulation of the cardiovascular system. This pattern of autonomic nervous system response is further accompanied by changes in the breathing pattern, which rather reflect mild arousal associated with watching ASMR videos. The cardiorespiratory response was not related to tingles perceiving and to sex. No significant correlations were found between subjective perception of different stimulus types (whispering vs. polystyrene), suggesting that responses to individual ASMR triggers are largely independent.

Conclusion: The findings show that different audiovisual stimuli in ASMR videos can influence autonomic regulation in distinct ways, producing specific patterns across cardiac, vascular and respiratory changes. Complexity of response is underlined by a non-reciprocal responses in two principal components of autonomic nervous system.

FIRST EVALUATION OF ANTITUSSIVE EFFECTS OF A NEW BUTAMIRATE ANALOGUE – ELECTROPHYSIOLOGICAL STUDY

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Introduction: Butamirate is an antitussive commonly used in syrup form to suppress cough in adults, and it is also suitable for children. Its mechanism of action is not fully understood, however, it is chemically and pharmacologically unrelated to opioid alkaloids. Butamirate analogues are being developed in an effort to enhance stability, which may also alter pharmacokinetics and pharmacodynamics compared to butamirate.

Material and methods: Seven male rabbits (average weight: 2.63 ± 0.18 kg) were anesthetized using sodium pentobarbital prior to administration of the butamirate analogue into the fourth ventricle. The animals subsequently received intravenous injections. The cough reflex was mechanically induced by introducing a soft polyethylene fiber into the trachea (tracheobronchial cough). Electromyograms (EMG) of the diaphragm (DIA) and the abdominal muscles (ABD), esophageal pressures (EP), and blood pressure were recorded and analyzed.

Results: Intracerebroventricular administration of the butamirate analogue significantly reduced cough frequency. A significant reduction in the amplitudes of ABD EMG was observed, accompanied by a significant decrease in the amplitudes of expiratory EP during the cough reflex. There was also a significant reduction in DIA EMG amplitudes, which was accompanied by a reduction in inspiratory EP amplitudes. In contrast, subsequent intravenous administration did not produce any major changes in cough parameters. Temporal analysis did not reveal any significance.

Conclusion: Our findings indicate that administration of the butamirate analogue intracerebroventricularly resulted in significant inhibition of the cough reflex, suggesting a predominantly central mechanism of action. These findings therefore support further studies of this compound as a potential antitussive agent.

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DESIGN AND DEVELOPMENT OF A MOBILE APP FOR PLURILINGUAL FOREIGN LANGUAGE AND MEDICAL TERMINOLOGY LEARNING USING AI

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Introduction: Access to structured and multilingual medical terminology represents a significant challenge for medical students, particularly in international and plurilingual educational environments. Traditional learning resources are often fragmented and lack interactive components necessary for effective knowledge acquisition and retention. The aim of this project was to design and develop an application that facilitates learning of medical terminology across multiple languages, including English, Latin, German, and Slovak, while integrating modern digital and AI-based approaches to enhance user experience and learning efficiency.

Material and methods: The application was developed as a web-based and mobile-compatible platform using HTML, CSS, and JavaScript to enable dynamic interaction and responsiveness. Medical terminology data were structured in CSV-based databases containing translations, definitions, and grammatical attributes. Cloud-based synchronization was implemented to ensure centralized data access and user-specific data management. Advanced logical components were introduced to support adaptive learning, including quiz generation, personalized review of incorrect answers, and intelligent structuring of learning content. The system architecture follows a modular design, allowing integration of additional educational features such as muscle terminology training and guided anamnesis taking.

Results: A functional prototype of the application was successfully implemented, providing an intuitive user interface with multilingual support and modular navigation. The system enables efficient search, retrieval, and expansion of medical vocabulary across multiple languages. Interactive learning modules, including quizzes and structured clinical training scenarios, contribute to active recall and deeper understanding. Advanced elements also enhance personalization of the learning process by adapting content based on user performance. Cloud synchronization ensures consistent access to data and supports scalable deployment across different devices.

Conclusion: The developed application represents an innovative tool for plurilingual medical terminology learning, combining structured data management, interactive educational methods, and AI-driven personalization. This approach has the potential to significantly improve both theoretical knowledge acquisition and practical clinical readiness. Future development will focus on expanding the database, scaling up AI functionalities, and optimizing user experience to further increase educational effectiveness based on user input.

CEREBRAL ISCHEMIA AND REPERFUSION INJURY OF EXPERIMENTAL ANIMALS OF BOTH SEXES IN ACUTE, SUBACUTE, AND CHRONIC STAGES

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Cerebral tissue exhibits a high metabolic demand and strict dependence on continuous oxygen and nutrient delivery, rendering it exceptionally susceptible to ischemic insult following cardiac arrest (CA), where even brief interruptions precipitate irreversible neuronal injury that is further exacerbated by subsequent reperfusion-induced pathophysiological cascades.

Despite extensive investigation, insufficient attention has been directed toward the long-term histopathological consequences of ischemia–reperfusion injury, particularly with respect to sex-dependent differences in neurodegenerative processes. In this study, we systematically evaluated sex-specific alterations in neuronal and astrocytic morphology and density across selectively vulnerable brain regions, including the motor cortex, hippocampus, and entorhinal cortex.

Using a well-established four-vessel occlusion model of global cerebral ischemia in 9 male and 9 female Wistar rats, followed by defined reperfusion intervals (1, 7, and 28 days), we performed comprehensive histomorphological and immunohistochemical analyses on frozen sections with specific markers to detect astrocytes and amyloid precursor protein/ β -amyloid.

Our findings demonstrate a pronounced sex-dependent divergence in neurodegenerative progression, with males exhibiting greater neuronal loss, astroglial alterations, and increased β -amyloid accumulation. These results highlight that sex is a critical biological variable influencing the trajectory and severity of ischemia-induced neurodegeneration, underscoring the necessity to elucidate underlying sex-specific hormonal and molecular mechanisms to advance precision-targeted therapeutic strategies.

EXPERIMENTALLY INDUCED HISTOLOGICAL AND COGNITIVE CHANGES IN THE BRAIN AFTER EXPOSURE TO IONIZING RADIATION

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Introduction: Ionizing radiation, widely used in cancer radiotherapy, induces structural and functional changes in brain tissue. Late effects, including cognitive impairment and neurodegeneration, significantly affect patients' quality of life. Animal studies focus on neurogenic brain regions, such as the dentate gyrus (DG) of the hippocampus, which are highly sensitive to radiation.

Materials and methods: We used 20 adult male Wistar rats (4 months old), dividing them into a control group (n=10) and an irradiated group (n=10). The latter received a total brain irradiation dose of 32 Gy (4 × 8 Gy per week) using a Clinac iX linear accelerator. Four months post-irradiation, we conducted a novel object recognition test (NOR) and Morris water maze (MWM) to assess recognition, spatial memory and learning. At 9–10 months of age, we performed transcatheter perfusion, followed by immunofluorescence staining and confocal microscopy to evaluate histological changes in neurogenic areas.

Results: Irradiated rats did not exhibit memory changes during NOR and MWM. Quantitative image analysis of the DG molecular layer revealed highly selective radiation-induced synaptic alterations. The excitatory network remained morphologically radioresistant, with presynaptic (VGLUT) and postsynaptic (NMDAR1) markers showing no significant changes in puncta density, size, or area fraction. Conversely, the inhibitory GABAergic network underwent profound structural remodeling. GAD1 analysis demonstrated a significant decrease in the physical density of discrete presynaptic puncta, accompanied by a significant increase in both their average size and overall area fraction.

Conclusions: The preservation of the glutamatergic axis alongside the pathological hypertrophy and potential clustering of GABAergic terminals indicates a radiation-induced excitation/inhibition (E/I) imbalance. This selective vulnerability of local inhibitory interneurons may drive network hyperexcitability, providing a key structural mechanism underlying delayed radiation-induced cognitive and neurobehavioral deficits. Understanding these effects is crucial for mitigating the long-term consequences of radiotherapy on brain health.

EXPERIMENTAL MODEL OF NEONATAL RESPIRATORY DISTRESS SYNDROME: PROTOCOL STANDARDIZATION

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Introduction: Neonatal respiratory distress syndrome (RDS) is a condition found in preterm newborns as a consequence of the surfactant deficiency caused by anatomical and functional underdevelopment of lungs. Clinically, this condition manifests immediately after birth as a rapidly progressing respiratory insufficiency due to reduced lung compliance, alveolar collapse, and hypoxemia. The most used therapy of RDS today is intratracheal administration of animal-derived surfactant. Although this therapy has proven to be very effective, individual response to exogenous surfactant administration remains variable. Prematurely born rabbit kits represent a robust model for evaluating the effect of the exogenous surfactant therapy. This study, therefore, aims to standardise an animal experimental protocol of RDS, that will allow reproducible functional and histological evaluation of exogenous surfactant effects.

Material and methods: Preterm New Zealand white rabbits at a gestational age of 27 days (term 31 days) were used to establish the experimental model of RDS. After tracheotomy animals were ventilated at different PIPs for 30 minutes. The RDS model included an untreated group and a group with an intratracheal bolus of exogenous surfactant poractant alfa. Tidal volume was measured every 5 minutes and lung compliance was calculated. Lastly, histological scores and gas volume were evaluated in lung tissue.

Results: The standardized protocol allowed stable ventilation, reproducible measurements of respiratory parameters, and consistent tissue collection. Surfactant therapy clearly distinguished immature, untreated lungs from the treated ones, improved lung mechanical properties and reduced histological damage.

Conclusion: The rabbit model of RDS provides a reliable and reproducible platform for evaluating effects of surfactant therapy.

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MODULATION OF HEART RATE VARIABILITY BY A 50 HZ MAGNETIC FIELD IN HEALTHY ADOLESCENTS

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Introduction: The aim of this study was to study heart rate variability (HRV) modulations during exposure to an extremely low frequency magnetic field in adolescent students. Assessing autonomic nervous system (ANS) reactivity is essential, as HRV may serve as an early indicator of subtle biological effects.

Material and methods: Nineteen healthy students (age 20.1 ± 1.5 years; BMI: 22.0 ± 2.8 kg/m²; mean $\pm$ SD) were randomized into 3 different groups (head-chest, chest-head exposures, and placebo). A 100 μ T, 50 Hz magnetic field was applied in 5 min. intervals using a custom exposure setup. Exposure parameters were verified using magnetic field meters (Narda NBM-550 and EHP-50D). Short-term HRV was recorded by ECG (EDAN SE1515), while core and peripheral temperatures (Optocon Fotemp OEM-Plus) and electrodermal activity (EDA) were recorded in parallel. Results were analyzed in time and frequency domains, focusing on rMSSD (Root Mean Square of Successive Differences) and high-frequency (HF-HRV) spectral power as indexes of parasympathetic activity, low-frequency (LF-HRV) and EDA for sympathetic activity, and SDNN (Standard Deviation of Normal-to-normal intervals) as a global indicator of the ANS balance.

Results: Preliminary analysis revealed that rMSSD increased ($p < 0.05$) after head exposure compared to sham exposure, but only in the absence of prior chest exposure. During chest exposure, both rMSSD and SDNN increased ($p < 0.05$) only if head exposure occurred first, indicating an order-dependent modulation of autonomic regulation.

Conclusion: Short-term exposure (intermittent 20 min.) to 50 Hz magnetic field induced measurable variations in HRV, characterized by a complex ANS response with a predominance of parasympathetic activation. These findings suggest that the low-frequency magnetic field may modulate cardiac autonomic regulation in healthy young students.

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NURSES' EXPERIENCES WITH THEIR PROFESSIONAL DIGNITY: A QUALITATIVE STUDY

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Introduction: Professional dignity reflects an individual's sense of dignity within their occupational role, shaped by education, skills, and ethical values. Although essential, the professional dignity of nurses is still underexplored in society and academia. Understanding nurses' experiences helps identify factors that support, undermine, or preserve their professional dignity.

Aim and methods: The purpose of this study was to explore nurses' experiences of professional dignity in internal medicine settings. A qualitative exploratory research design was used. Data were collected through semi-structured interviews conducted with six nurses and subsequently analysed using reflective thematic analysis according to Braun and Clarke. The sample size was determined on the basis of the principle of data saturation. Before data collection, informed consent was obtained from all participants, along with institutional approval from the respective health facilities.

Results: The participants highlighted the importance of recognition within interpersonal relationships and the influence of social status on the experience of professional dignity. Recognition from doctors, colleagues, management, and patients was identified as a key factor in strengthening professional dignity. On the other hand, a lack of recognition, particularly from patients' relatives, was perceived as undermining it. Professional dignity was further strengthened through opportunities for professional development, including continuing education and experience. The participants also emphasized the importance of perceived meaningfulness of their work in sustaining their sense of dignity. In response to experiences perceived as undignified, participants reported adopting coping strategies such as emotional distancing and the deliberate disregard of negative interactions in order to preserve their professional dignity.

Conclusion: The findings indicate that the professional dignity of nurses is a dynamic and relational construct, shaped primarily by the quality of interpersonal relationships, perceived social status, opportunities for professional development, and a sense of meaning in work. These results highlight the importance of fostering respect, recognition, and a supportive workplace culture, which are essential for the preservation and enhancement of professional dignity among nurses.

PARENTAL BURNOUT AS A RISK FACTOR OF PLANNED PARENTHOOD

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Introduction: Parental burnout (PB) is a specific syndrome caused by long-term stress associated with parenthood. Planned parenthood is a conscious process that involves individuals deciding whether they want to have children, when they want to have them, and under what conditions. Our goal was to determine whether PB influences plans for future parenthood.

Materials and methods: A cross-sectional quantitative study design was chosen. The study sample consisted of 105 parents, including 83 women and 22 men, with an average age of 33 years ($SD=4.15$). As a measurement tool, we used a self-constructed questionnaire consisting of 20 questions, complemented by a standardized PBA questionnaire. In the questionnaire, we assessed selected sociodemographic and family factors, the level of social support, circumstances influencing plans for further parenthood, and the degree of PB.

Results: Using the Parental Burnout Assessment questionnaire, we found a high probability of PB in only one respondent (0.9%) in our study sample. A higher risk of PB was observed in 3 respondents (2.9%). The largest group consisted of respondents without a risk of PB ($n=101$; 96.2%). Emotional exhaustion, as a dimension of PB, was the highest-scoring subscale with an average of 11.6 points. Participants felt they received sufficient support from their partner (82.8%) and from their family (85.6%) but would welcome more support from the government. Statistical comparisons did not confirm any difference in PB levels between groups of parents according to their family planning ($H=2.10$; $p=0.718$). We also found no statistically significant correlation between selected characteristics of the children and the level of PB.

Conclusion: Based on the research results, it can be concluded that PB occurred only to a low degree in the sample of participants. Furthermore, no correlation was found between the level of PB and plans for further childbearing. However, the findings highlight the importance of early detection of risk factors for PB and the need to support parents in their parenting role, which is important for practice in the field of midwifery.

PERIOPERATIVE PRESSURE ULCER PREVENTION IN ORTHOPEDIC AND TRAUMATOLOGIC PATIENTS

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Introduction: The perioperative period represents a risk for the development of pressure injuries, particularly during surgeries lasting >2 hours, with an incidence of 1 in 10 patients. The highest risk occurs in cardiologic and orthopedic surgery (36–38%). These injuries are preventable through targeted interventions and interdisciplinary collaboration. Nurses must know the risk factors and apply evidence based preventive measures. The aim of this study was to analyze nursing interventions used in perioperative pressure injury prevention at a traumatology and orthopedic department.

Material and methods: Data were obtained through qualitative retrospective research based on a self developed protocol derived from the Ministry of Health SR standard „Comprehensive Nursing Management for the Prevention of Pressure Injuries – 1st Revision“ by Grešš Halász et al. (2023). The research was conducted at the Orthopaedic Clinic of the University Hospital Martin from January to December 2025. The sample included 50 patients undergoing planned THA or acutely admitted with fractura perthrochanterica femoris indicated for THA. Interventions were analyzed according to risk level across perioperative phases, 72 hours after surgery, and 24 hours before patient discharge.

Results: Some interventions were not implemented in any perioperative phase (nutritional support) or were minimally applied (protective dressings on pressure prone areas, 13 times). The most frequently implemented interventions were mobilization/rehabilitation (141 times), use of anti pressure injury devices (137 times), positioning (72 times), nutritional screening (BMI) monitoring (98 times), and establishing nursing diagnosis D 104 (91 times).

Conclusion: The results confirm the importance of risk based preventive interventions and individualized selection of preventive measures. Among 50 patients, 3 cases of pressure injuries were recorded, indicating overall intervention effectiveness and emphasizing the importance of early mobilization and RHB after THA.

THE PRESENCE OF A DOULA DURING CHILDBIRTH FROM THE PERSPECTIVE OF MIDWIVES AND MOTHERS

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Introduction: Doulas, as support people, play an increasingly important role in obstetrics in supporting mothers. Our goal was to determine whether there are differences in the perception of doulas between mothers and midwives.

Material and methods: As part of a quantitative cross-sectional study, a self-designed questionnaire was used as data collection tool. The study sample consisted of 61 midwives who had come into contact with a doula during childbirth and 60 mothers who gave birth with a doula. Each of the study groups had its own questionnaire. The average age of the midwives was $31,74 \pm 11,16$, and that of the mothers was $31,81 \pm 5,07$. Data collection took place from June 2025 to December 2025 in hospitals in Stará Ľubovňa and Krompachy, as well as via a Facebook page. Descriptive statistical methods were used to analyze the data.

Results: As many as 83% of mothers reported being very satisfied with their childbirth experience, and 15% rated it as satisfactory. All mothers stated that they would recommend doula's services to other women and would choose her again for their next birth. Mothers rated the doula's presence clearly positively, while midwives expressed more neutral attitudes. While they confirmed the importance of emotional support from the doula, they pointed out several issues in collaboration, such as interference with competence (50%), conflict situations and questioning the work of healthcare staff (23%), and communication misunderstandings (19,6%). Mothers and midwives also had different perceptions of the doulas' preparedness for their work. 96,67% of mothers assessed that doulas are trained and prepared for the role of a doula, in contrast to midwives, who do not rate their preparedness as sufficient ($M=2,92$ on a 1–5 agreement scale).

Conclusion: The presence of a doula during childbirth is perceived by mothers as a significant source of support and also highlights opportunities for improving collaboration between doulas and midwives.

ATTITUDES OF PREGNANT WOMEN TOWARDS PERFORMING A CAESAREAN SECTION AT THE PATIENT'S REQUEST

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Introduction: Cesarean section is a frequently discussed topic in obstetrics, and its global rate is increasing. The phenomenon of cesarean section on maternal request is increasingly coming to the forefront. The aim was to examine pregnant women's attitudes toward cesarean section on patient's request, their awareness of the issue, and the factors influencing these attitudes.

Material and methods: Data collection was conducted using a quantitative research method via a self-designed questionnaire administered to a sample of 117 pregnant women with an average age of 29.3 ± 4.51 years. The collected data were analyzed using descriptive statistics and subsequently evaluated using contingency tables and the chi-square test.

Results: Nearly one-third of respondents (29.06%) would prefer a cesarean section as their method of delivery, indicating its growing acceptance among the population. Cesarean sections are preferred more often by multiparous women (67.6%) than by primiparous women (32.4%). More than half of the respondents (52.99%) mistakenly believe that a cesarean section at the patient's request is possible in Slovakia, which points to a lack of information. The main motivations for requesting a cesarean section are concern for the child's health (36.04%), one's own health (25.80%), and a negative previous childbirth and pregnancy experience (15.19%). The question of whether they would request a cesarean section without medical indication revealed a neutral to slightly positive attitude (2.58 ± 1.53), with interest being higher among multiparous women (64.9%) than among primiparous women (35.1%). The expert's opinion significantly influences the decision regarding the method of delivery – nearly half of the respondents (47.86%) would reconsider their decision following the expert's recommendation, and 5.13% would change it immediately. At the same time, the majority of women (76.92%) prefer that the method of delivery be decided in consultation with a doctor.

Conclusion: Pregnant women's attitudes toward a cesarean section at the patient's request are neutral to cautious, showing respect for professional opinion and supporting decision-making about the mode of delivery in collaboration with the physician.

STRATEGIES FOR OVERCOMING COMMUNICATION CHALLENGES IN A MULTILINGUAL HEALTHCARE ENVIRONMENT

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Introduction: Effective communication is an essential component of healthcare, alongside the implementation of clinical procedures, manual work activities, treatment, and diagnostics. Nurses, as the largest group of healthcare workers, rely on communication as a fundamental tool to ensure high-quality and safe patient care. This study aimed to determine the strategies nurses use to overcome communication challenges with patients who face a language barrier.

Material and methods: Empirical data were collected at the University Hospital in Martin (UNM) and the J. A. Reiman University Hospital with Polyclinic in Prešov (FNsP) using a self-constructed questionnaire titled "Effective Communication." Inclusion criteria required respondents to be professionally qualified nurses, employed at UNM and/or FNsP, native Slovak speakers, with at least one year of nursing experience, and to provide informed consent. Data were processed using Microsoft Excel and analyzed through univariate descriptive statistics. Prior to data collection, approvals were obtained from the relevant healthcare institutions, the ethics committee at FNsP, and all respondents.

Results: The research sample consisted of 140 respondents, of whom 95% (N = 133) were women and 5% (N = 7) were men. The results showed that 37.86% (N = 53) of nurses in Slovakia did not speak any foreign language, while only 4.62% (N = 12) had never provided care to a patient with a language barrier. Our findings further demonstrated that communication with patients can be difficult or disrupted due to individual, social, or situational factors. Language barriers can lead to incomplete information from the patient, errors in nursing care, negatively impact the quality of nursing care, and compromise patient safety and satisfaction. Nurses identified several strategies to overcome these challenges, including the presence of interpreters, language courses and training, brochures with key phrases and professional medical terminology, translation technologies, and involving patients' relatives in communication.

Conclusion: The obtained data provide a basis for initial recommendations to address language barriers in healthcare. The study serves as a useful resource for nursing students and practicing nurses by clarifying communication challenges and offering strategies to reduce their impact. The findings highlight the importance of integrating foreign language education and multicultural nursing into both undergraduate and continuing professional development.

For nursing practice, systematic measures such as access to interpreters, use of translation technologies, and development of multilingual communication tools should be strengthened to improve patient safety and quality of care.

Regarding further research, there is a clear need for studies evaluating the effectiveness of communication strategies, exploring patient perspectives, and assessing educational interventions. As this issue remains underexplored in Slovakia, future research should focus on multilingual healthcare environments to support evidence-based improvements in communication.

WOMEN'S SEXUAL HEALTH IN THE CONTEXT OF MIDWIVES' WORK

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Introduction: Midwives play a key role in providing comprehensive care for women's sexual health. The aim of this study was to analyze midwives' care in sexual health and identify the most common barriers preventing them from fully performing this role.

Methodology: This cross-sectional study was conducted among midwives from June to November 2025. A self-designed questionnaire, based on the study by Azar et al. (2022) on midwives' and nurses' experiences in sexual health care, was used. Questionnaires were distributed in paper form in hospitals in Vranov nad Topľou, Michalovce, Humenné, Trebišov, Kráľovský Chlmec, and online through the Slovak Chamber of Nurses and Midwives. The study sample consisted of 137 midwives (mean age 37.9 ± 11.8). Collected data were statistically processed using descriptive and inferential statistics.

Results: Approximately half of the respondents (51.1%) do not actively assess sexual health history, yet many encounter patients requiring care (67.2%), and about half (51.1%) reported that patients themselves requested assistance. A high proportion (89.1%) agreed that sexual health questions should be part of healthcare, while 57.7% considered its integration insufficient. Despite being open to addressing sexual health issues, 86.1% of respondents considered it appropriate for the patient to initiate the discussion. The most frequently identified barriers were lack of privacy in healthcare settings and insufficient educational resources on the topic. Suggested strategies included professional training during studies and raising awareness among women and their partners about sexuality. No statistically significant differences were found regarding education, years of practice, or workplace. Younger midwives were more likely to highlight insufficient integration of sexual health in healthcare.

Conclusion: The study shows that midwives are open to addressing sexual health issues, but most do not assess sexual history and expect the patient to initiate the discussion. The main barriers were lack of privacy and educational resources. The results emphasize the need for systematic support for midwives, removal of barriers, and implementation of proposed strategies in care. Keywords: women's sexual health, midwives, barriers, strategies

PATIENT SATISFACTION IN LONG-TERM CARE FACILITIES

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Introduction: Patient satisfaction is an important subjective indicator in the evaluation of the quality of care provided. In long-term care facilities, it is of particular importance, as patients remain in continuous contact with healthcare personnel and their care experience is influenced not only by the professional delivery of nursing interventions, but also by communication, respect, support, and the organization of daily care.

Material and methods: The research sample consisted of 75 patients aged over 65 years living in long-term care facilities. The study was approved by the Ethics Committee of JLF UK, protocol no. 113/2024. Data collection was conducted from January 2025 to November 2025. Patient satisfaction with the quality of nursing care was assessed using the Patient Satisfaction with Nursing Care Quality Questionnaire (PSNCQQ), which consists of 22 items. Quality of life was assessed using the Quality of Life Index – Nursing Home Version III. The obtained data were analyzed using descriptive statistics and correlation analysis in IBM SPSS Statistics 27.0.

Results: The mean score for patient satisfaction with nursing care was 4.10 ± 0.61 . The lowest-rated areas were care coordination (3.72 ± 1.09) and nurses' daily routine (3.72 ± 0.95). In contrast, privacy protection was rated highest (4.49 ± 0.90). The study confirmed a statistically significant relationship between satisfaction with the care provided and the patient's overall quality of life ($r(S) = 0.323$; $p = 0.005$). Statistically significant relationships were identified between patient satisfaction and the Socio-economic subscale ($r(S) = 0.412$; $p < 0.001$) and the Health and Functioning subscale ($r(S) = 0.274$; $p = 0.017$).

Conclusion: The results indicate an overall high level of patient satisfaction with nursing care in long-term care facilities. Privacy protection was evaluated most positively, whereas care coordination and nurses' daily routine were identified as areas requiring greater attention. The relationship identified between satisfaction with nursing care and quality of life highlights the importance of this domain in the comprehensive evaluation of patient care in long-term care settings.

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