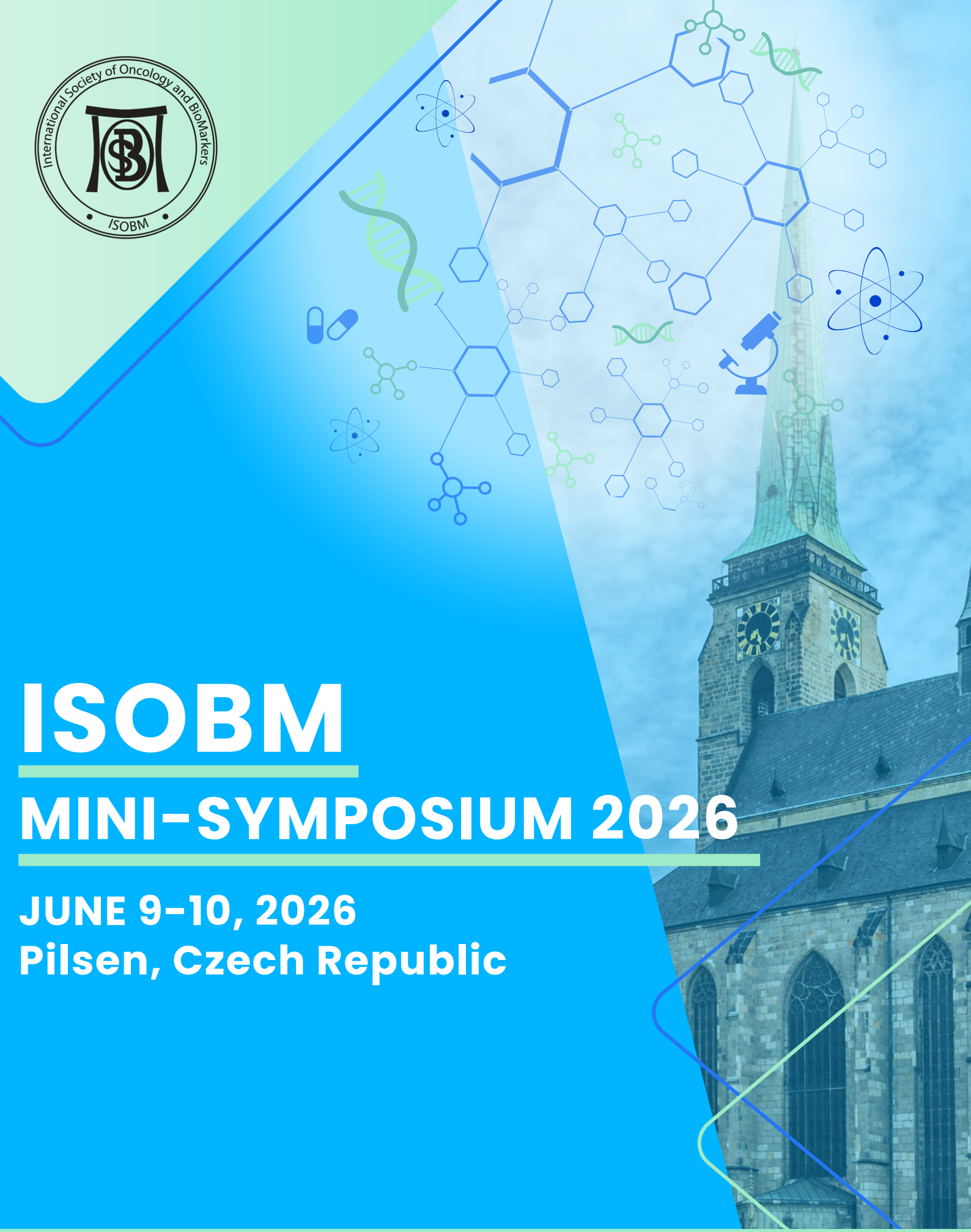

ISOBM

MINI-SYMPOSIUM 2026

JUNE 9–10, 2026
Pilsen, Czech Republic

ABSTRACT BOOK

Tuesday June 9

8:00 **REGISTRATION**

8:30 **OPENING CEREMONY**

9:00 – 9:30 **Stefan Holdenrieder (GER, Munich)**
President of ISOBM
Keynote Lecture: Better biomarkers mean better patient care - vision and mission of the ISOBM

SESSION 1: BIOMARKERS IN CANCER
Chairs: **Radek Kučera, Václav Šimánek**

9:30 – 10:00 **Drahomíra Springer (CZ, Prague)**
President of the Czech Society of Clinical Biochemistry (CSKB)
Keynote Lecture: Cancer screening programmes

10:00 – 10:30 **Radek Kučera (CZ, Pilsen)**
Department of Immunochemistry Diagnostics, University Hospital, Pilsen
Prostate cancer diagnostics, balance between screening
and overdiagnosis

10:30 – 11:00 *COFFEE BREAK*

11:00 – 11:30
ROUND TABLE 1: CANCER SCREENING VERSUS OVERDIAGNOSIS
Participants: **Drahomíra Springer, Stefan Holdenrieder, Huub van Rossum**
Moderator: Natalie Krouza Bergman

SESSION 2: CANCER DIAGNOSIS IN A MULTIDISCIPLINARY COOPERATION

Chairs: **Richard Pikner, Michal Jirásko**

11:30 – 12:00 **Jiří Ferda (CZ, Pilsen)**
Department of Imaging methods, University Hospital, Pilsen
Advanced imaging methods in cancer diagnostics

12:00 – 12:15 **Richard Pikner (CZ, Klatovy)**
Department of Clinical Biochemistry and Bone Metabolism, Klatovska Hospital, Klatovy
Calcium-phosphate Disorders in Oncological Patients

12:15 – 12:30 **Tomáš Kostlivý (CZ, Pilsen)**
Department of Otorhinolaryngology, University Hospital, Pilsen
Biomarkers in Head and Neck Oncology

12:30 – 12:45 **Michal Emingr (CZ, Prague)**
Department of Gynecology, Obstetrics and Neonatology, General University Hospital and First Faculty of Medicine, Charles University in Prague
Biomarkers in gynecologic oncology: from static testing to dynamic treatment guidance

12:45 – 13:00 **Company Talk: Matilda Tuglu (Beckman Coulter)**
Beyond the bench: A Focus on Novel Neurodegenerative Disease RUO Assays

13:00 – 14:00 *LUNCH*

SESSION 3: BIOMARKERS AND CLINICAL PRACTICE

Chairs: **Martin Pešta, Jindra Windrichová**

14:00 – 14:15 **Ondřej Topolčan (CZ, Pilsen)**
Department of Immunochemistry Diagnostics, University Hospital, Pilsen
From Measurement to Meaning: The Role of Immunoassays in Assessing Tumor Biological Activity in Surgical Patients

14:15 – 14:30 **Miklós Damásdi (HU, Pécs)**
Department of Urology, Clinical Center, University of Pécs, Hungary
Initial Clinical Experience with pro2PSA/PHI Index Application in Prostate Cancer Screening in Hungary

14:30 – 14:45 **Michal Jirásko (CZ, Pilsen)**
Department of Immunochemistry Diagnostics, University Hospital, Pilsen
Effect of chronic pharmacotherapy on serum levels of prostate biomarkers, derived indexes and glycosylation patterns of fPSA

14:45 – 15:00 **Ákos Szegedi (HU, Budapest)**
Department of Urology, Jahn Ferenc South Pest Hospital and Outpatient Clinic, Budapest, Hungary
From PSA Subforms to Validated Indices: What Makes a Biomarker Clinically Useful?

15:00 – 15:15 **Radek Kučera (CZ, Pilsen)**
Department of Immunochemistry Diagnostics, University Hospital, Pilsen
Prostate cancer, diagnostic algorithm of University Hospital in Pilsen and case report

15:15 – 15:30 **Jindra Windrichová (CZ, Pilsen)**
Department of Immunochemistry Diagnostics, University Hospital, Pilsen
LncRNA SH3GL3-5:3 level in serum is associated with prognosis in metastatic prostate cancer treated by ARTA agents

15:30 – 16:00 *COFFEE BREAK*

SESSION 4: LIQUID BIOPSY
Chairs: **Shashank Pandey, Jiří Polívka**

16:00 – 16:20 **Martin Pešta (CZ, Pilsen)**
Department of Biology, Faculty of Medicine in Pilsen, Charles University
Predictive Significance of Combined Plasmatic Detection of BRAF Mutations and S100B Tumor Marker in Early - Stage Malignant Melanoma

16:20 – 16:40 **Jiří Polívka (CZ, Prague)**
Department of Histology, Second Faculty of Medicine, Prague, Charles University
Diagnosis and Risk Stratification of Prostate Cancer Based on Liquid Biopsy

16:40 – 17:00 **Veronika Boušková (CZ, Pilsen)**
Laboratory of Pharmacogenomics, Faculty of Medicine in Pilsen, Charles University
ctDNA as a tool of colorectal and ovarian tumor dynamics monitoring: clinical applications, limits and methodological approaches

17:00 – 17:15 **Esther Mettler (GER, Mainz)**
Department of Endocrinology and Metabolism, University Medical Center of the Johannes Gutenberg University Mainz
Mapping Molecular Escape in NEN G3: Insights from Multiparametric Liquid Biopsy

17:15 – 17:45
ROUND TABLE 2: CURRENT CHALLENGES IN LIQUID BIOPSY
Participants: **Jiří Polívka, Monika Holubová, Veronika Boušková**
Moderator: Martin Pešta

17:45 – 18:00 **CLOSING OF DAY 1**
RADEK KUČERA

19:30 **DINNER IN PILSEN BREWERY**

Wednesday June 10

SESSION 5: ANALYTICAL CHALLENGES
Chairs: **Huub van Rossum, Monika Holubová**

8:30 – 9:00 **Huub van Rossum (NL, Amsterdam)**
Netherlands Cancer Institute, Amsterdam
Keynote Lecture: Tumor markers; identifying pre-analytical, analytical and post-analytical challenges and opportunities to improve the clinical cancer care

9:00 – 9:20 **Monika Holubová (CZ, Pilsen)**
Biomedical center, Faculty of Medicine in Pilsen, Charles University
Invariant NKT Cells in Cancer: Monitoring and Therapeutic Potential

9:20 – 9:40 **Robin Klieber (CZ, Pilsen)**
Biomedical center, Faculty of Medicine in Pilsen, Charles University
In-house method for evaluating nucleic acids in the plasma of lymphoma patients

9:40 – 10:00 **Bhavana Hemantha Rao (CZ, Pilsen)**
Biomedical center, Faculty of Medicine in Pilsen, Charles University
Circulating miR-200 family as a potential biomarker for metastatic colorectal cancer

10:00 – 10:30 *COFFEE BREAK*

SESSION 6: PALIATIVE CARE
Chairs: **Stefan Holdenrieder, Samuel Vokurka**

10:30 – 10:45 **Samuel Vokurka (CZ, Pilsen)**
Department of Oncology and Radiotherapeutics, University Hospital, Pilsen, Charles University
Keynote Lecture: Insights into Oncological and Palliative Treatment and Care

10:45 – 11:15 **Vojtěch Linka (CZ, Pilsen)**
Center for Palliative and Supportive Medicine, University Hospital, Pilsen
Bioethical Dilemmas in End-of-Life Care

11:15 – 11:45 **Klára Suchomelová (CZ, Pilsen)**
University Hospital, Pilsen
The role of the hospital chaplain in the palliative care process

SESSION 7: VARIA
Chairs: **Martin Doležal, Roman Viták**

11:45 – 12:15 **Roman Viták (CZ, Pilsen), Adam Needle (CZ, Hradec Králové)**
Department of Pharmacology and Toxicology, Faculty of Medicine in Pilsen;
Department of Pharmaceutical Chemistry and Pharmaceutical Analysis, Faculty of Pharmacy in Hradec Králové
Development and testing boron derivatives of anti-androgenic drugs on prostate cancer cell lines

12:15 – 12:30 **Francesco Biddoccu (CZ, Hradec Králové)**
Department of Pharmaceutical Chemistry and Pharmaceutical Analysis, Faculty of Pharmacy in Hradec Králové
Rational design and in-silico studies of novel potential feline McDonough sarcoma-like tyrosinase kinase 3 inhibitors

12:30 – 12:45 **Eliška Jandová (CZ, Pilsen)**
Biomedical center, Faculty of Medicine in Pilsen, Charles University
Surface markers as targets for immunotherapy

12:45 – 13:00 **Natálie Hříbková (CZ, Pilsen)**
Biomedical center, Faculty of Medicine in Pilsen, Charles University
Optimization and validation of digital PCR for detection of KRAS mutations in plasma of patients with metastatic colorectal carcinoma

13:00 – 13:15 **CLOSING CEREMONY AND AWARDS**

13:15 *LUNCH*

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PLZEŇSKÝ KRAJ

TABLE OF CONTENTS

RATIONAL DESIGN AND IN-SILICO STUDIES OF NOVEL POTENTIAL FELINE MCDONOUGH SARCOMA-LIKE TYROSINE KINASE 3 INHIBITORS— STRUCTURE-BASED DRUG DESIGN AND ISOSTERIC OPTIMIZATION IN TARGET CANCER DRUG DISCOVERY 3

ctDNA as a tool for monitoring of colorectal and ovarian carcinoma dynamics: clinical applications, limits and methodological approaches 5

Initial Clinical Experience with pro2PSA/PHI Index Application in Prostate cancer Screening in Hungary 7

Biomarkers in gynecologic oncology: from static testing to dynamic treatment guidance 9

Advanced imaging methods in cancer diagnostics 11

Better biomarkers mean better patient care - vision and mission of the ISOBM 13

Invariant NKT Cells in Cancer: Monitoring and Therapeutic Potential 16

Optimization and validation of digital PCR for detection of KRAS mutations in plasma of patients with metastatic colorectal carcinoma 19

Surface markers as targets for immunotherapy 21

Effect of chronic pharmacotherapy on serum levels of prostate biomarkers, derived indexes and glycosylation patterns of free form of prostate specific antigen 23

In-house method for evaluating nucleic acids in the plasma of lymphoma patients 24

Biomarkers in Head and Neck Oncology: Are We Really Using Them? 25

Prostate cancer diagnostics, balance between screening and overdiagnosis 27

Prostate cancer, diagnostic algorithm of University Hospital in Pilsen 28

Bioethical Dilemmas in End-of-life Care 30

Mapping Molecular Escape in NEN G3: Insights from Multiparametric Liquid Biopsy 32

Predictive Significance of Combined Plasmatic Detection of BRAF Mutations and S100B Tumor Marker in Early-Stage Malignant Melanoma 35

Calcium-phosphate Disorders in Oncological Patients 38

Diagnosis and Risk Stratification of Prostate Cancer Based on Liquid Biopsy 41

Circulating miR-200 family as a potential biomarker for metastatic colorectal cancer..... 43

Cancer screening programme..... 45

The Role of the Hospital Chaplain in the Palliative Care Process 48

From PSA to Glycobiomarkers: The Evolution of Prostate Cancer Biomarker Diagnostics .. 50

From Measurement to Meaning: The Role of Immunoassays in Assessing Tumor Biological Activity in Surgical Patients..... 52

Beyond the bench: A Focus on Novel Neurodegenerative Disease RUO Assays 55

Development and testing boron derivatives of anti-androgenic drugs on prostate cancer cell lines. 57

Insights into Oncological and Palliative Treatment and Care..... 60

LncRNA SH3GL3-5:3 level in serum is associated with prognosis in metastatic prostate cancer treated by ARTA agents..... 62

RATIONAL DESIGN AND IN-SILICO STUDIES OF NOVEL POTENTIAL FELINE MCDONOUGH SARCOMA-LIKE TYROSINE KINASE 3 INHIBITORS— STRUCTURE-BASED DRUG DESIGN AND ISOSTERIC OPTIMIZATION IN TARGET CANCER DRUG DISCOVERY

Francesco Biddoccu[1], Martin Doležal[1], Martin Juhás[1,2]
[1] Faculty of Pharmacy in Hradec Králové, Charles University, Czech Republic
[2] Department of Chemistry, University of Hradec Králové, Czech Republic

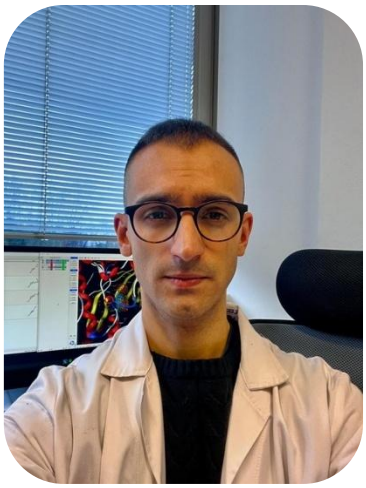
Keywords: AML, FLT3, TARGETED THERAPY, COVALENT DRUGS, MOLECULAR DOCKING

Objective:
In this studies, we developed two novels series of compound likely to escape mutation that current FLT3 kinase inhibitors are facing. Stronger interaction in the hinge and covalent bond in the region of the pocket where the F691L mutation occurs where explored in order to overcome resistance.

Methods:
Structure-based drug design and isosteric modifications were carried on Quizartinib backbone to model the new series onto the binding pocket features and counter mutations. Both covalent and non covalent molecular docking were used to harvest data.

Results:
In-silico studies conducted on the FLT3 crystal structure showed encouraging and consistent results. Comparable scores and sought interactions are achieved in both the wild-type and F691L
mutated target along with unreported poses likely to counter the F691L mutation.

Conclusion:
In-vitro MTT assay (48h) on MV4-11, MOLM-13 (FLT3-Internal Tandem Duplication) and THP-11 (FLT3 wild-type) leukemia cells are currently planned, with Quizartinib as main reference. At the same time, additional molecular dynamics simulations will follow to test the steadiness of the ligand-protein complexes and analyse the binding-unbinding processes.



Francesco Biddoccu

Faculty of Pharmacy in Hradec Králové, Charles University, Czech Republic

Graduated in Pharmaceutical Chemistry and Technology at the University of Sassari in 2024 with a thesis focused on novel VEGFR inhibitors related to Axitinib structure. At present pursuing PhD in Pharmaceutical Chemistry at the Faculty of Pharmacy in Hradec Králové, Charles University, Czech Republic. Currently committed in heterogeneous project targeting FLT3 inhibitors, PXR ligands and antimycobacterial compounds.

ctDNA as a tool for monitoring of colorectal and ovarian carcinoma dynamics: clinical applications, limits and methodological approaches

Veronika Boušková[1,2], Lucie Heczko[1], Mohammad Moufaq Khatar Al Obeed Allah[1], Natálie Hříbková[1,2], Martin Hruda[3], Lukáš Rob[3], Alena Bartáková[4], Jiří Bouda[4], Václav Liška[1,5], Ondřej Vyčítal[1,5], Ondřej Fiala[1,6], Ondřej Šorejs[1,6], Pavel Souček[1,2], Radka Václavíková[1,2]

[1] Biomedical Center, Faculty of Medicine in Pilsen, Charles University, Pilsen, Czech Republic
[2] Toxicogenomics Unit, National Institute of Public Health, Prague, Czech Republic
[3] Third Faculty of Medicine and Kralovske Vinohrady University Hospital, Prague, Czech Republic
[4] Department of Gynaecology and Obstetrics, Faculty of Medicine in Pilsen and University Hospital Pilsen, Charles University, Pilsen, Czech Republic
[5] Department of Surgery, Faculty of Medicine and University Hospital in Pilsen, Charles University, Pilsen, Czech Republic
[6] Department of Oncology and Radiotherapeutics, Faculty of Medicine and University Hospital in Pilsen, Charles University, Pilsen, Czech Republic

Objective:

The aim of this study was to optimize a workflow for sensitive detection of low-frequency variants in circulating tumor DNA (ctDNA) and to assess its potential clinical applicability in ovarian and metastatic colorectal cancer (OvC, mCRC).

Methods:

Optimization focused on digital PCR assay sensitivity, specificity, and multiplexing, including key pre-analytical steps in cell-free DNA processing. Clinical applicability was evaluated using plasma and tumor samples from patients with OvC and mCRC.

Results:

TThe optimized digital PCR assays targeting TP53 and KRAS mutations demonstrated high sensitivity for the detection of low-abundance variants. In both OvC and mCRC, plasma mutation profiles were consistent with those detected in the corresponding tumor tissue. In addition, the feasibility of longitudinal KRAS mutation monitoring during systemic treatment was evaluated in patients with mCRC.

Conclusion:

In summary, optimized digital PCR-based ctDNA analysis represents a sensitive and reliable tool with potential for use in personalized oncology.

This study was supported by the Czech Health Research Council grant no. NW25J-08-00050.

MSc. Veronika Boušková, Ph.D.

MSc. Veronika Boušková, Ph.D., is a junior researcher at the Biomedical Center of the Faculty of Medicine in Pilsen and the National Institute of Public Health in Prague, specializing in molecular and cellular biology, genetics, and pharmacogenomics. Her research focuses on gene expression, microRNA regulation, and genetic variability in breast, pancreatic, and colorectal carcinoma.

Initial Clinical Experience with pro2PSA/PHI Index Application in Prostate cancer Screening in Hungary

Miklós Damásdi[1]

[1] Department of Urology, University of Pécs, Pécs, Hungary

Keywords: Prostate cancer, Pro2PSA/PHI, mp/biMRI Objective:
Among patients identified through risk-adapted screening and subsequently undergoing prostate biopsy, 30–40% have negative histopathological findings, while a substantial proportion of detected cancers are clinically insignificant

Methods:

Similarly to many other European countries, access to MRI in Hungary is limited, highlighting the need for additional biomarkers that can further support personalized diagnostic strategies and treatment decisions.

Results:

Based on our experience so far, the use of pro2PSA/PHI is particularly advantageous in patients with PSA levels in the gray zone, in those showing progression while receiving 5-alpha-reductase inhibitors (5-ARIs), and/or in patients who have previously undergone prostate biopsy, however, the precise definition of optimal cutoff values is still pending.

Conclusion:

The Pro2PSA/PHI index reduces the number of unnecessary biopsy procedures and increases the detection rate of clinically significant prostate cancers when applied in the appropriate clinical setting

Miklós Damásdi

Department of Urology, University of Pécs,
Pécs, Hungary

Dr. Miklós Damásdi, MD, PhD was born on 18 December 1976 in Kaposvár, Hungary. In 2008, he successfully passed the board examination in Urology, on 18 June 2018, he was awarded his PhD degree at the Clinical Medical Sciences Doctoral School of the Faculty of Medicine, University of Pécs, for his doctoral dissertation entitled “The Etiological Role of Human Papillomavirus in Penile Cancer." In April 2022, he obtained board certification in Clinical Oncology. He is currently the chair of the institutional uro-oncology multidisciplinary tumor board. He is actively involved in academic education and supervision within the Doctoral School of the Faculty of Medicine, University of Pécs, serving as PhD supervisor and mentor. Dr. Damásdi is a member of several professional societies, including the Hungarian Urological Association, the European Association of Urology (EAU), the International Society for Sexually Transmitted Diseases (STI Society), and the Hungarian Society of Clinical Oncology. Since 2025, he has served as the Hungarian delegate and committee member of the European Board of Urology (EBU) educational and training committee under the auspices of the EAU.

Biomarkers in gynecologic oncology: from static testing to dynamic treatment guidance

Michal Emingr[1]

[1] Department of Gynecology, Obstetrics and Neonatology, General University Hospital and First Faculty of Medicine, Charles University in Prague

Keywords: gynecologic oncology, biomarkers, HRD, MMR, immunotherapy, PARP inhibitors, folate receptor alpha, antibody-drug conjugates, re-biopsy, precision medicine

Objective:

To provide a clinically oriented overview of key predictive biomarkers in gynecologic oncology and demonstrate how dynamic biomarker assessment, including re-biopsy at recurrence, guides personalized treatment decisions.

Methods:

Narrative clinical overview integrating data from pivotal trials (PARPi, immunotherapy, ADCs) with real-world practice. Includes our experience with re-biopsy from prospective TRUTH study using tru-cut biopsy with IHC and NGS

.

Results:

HRD predicts benefit from PARP inhibitors, MMRd identifies patients for immunotherapy, and FR enables ADC therapy in platinum-resistant disease. Re-biopsy reveals temporal tumor heterogeneity. TRUTH confirms that tru-cut biopsy provides adequate tissue for comprehensive molecular profiling.

Conclusion:

Biomarkers are central to treatment selection in gynecologic oncology, but their dynamic nature requires repeated assessment. Tumor biology evolves during treatment, and re-biopsy at recurrence enables identification of new targets and resistance mechanisms. Tru-cut biopsy is a safe and feasible method for obtaining tissue for advanced molecular testing. Integrating biomarker-driven strategies with

dynamic reassessment is essential for delivering true precision oncology and improving patient outcomes.

Michal Emingr

Department of Gynecology, Obstetrics and Neonatology,
General University Hospital and First Faculty of Medicine,
Charles University in Prague

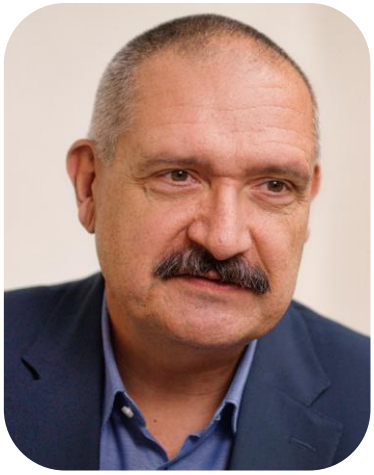
Michal Emingr, MD, is a physician at the Department of Gynecology, Obstetrics and Neonatology, General University Hospital and First Faculty of Medicine, Charles University in Prague, Czech Republic. His clinical and research focus is gynecologic oncology, with particular interest in precision oncology, hereditary cancer syndromes, and minimally invasive diagnostic approaches.

Advanced imaging methods in cancer diagnostics

Jiří Ferda[1]

[1] Department of the Imaging Methods, University Hospital Pilsen, Faculty of Medicine in Pilsen, Charles University

Advanced imaging methods in the diagnosis of malignant tumors aim to detect cancer as early and accurately as possible through morphological imaging, as well as to assess the biological behavior of tumor processes and evaluate response to treatment. The most significant advance in improving the accuracy of morphological imaging is photon-counting CT. The extraordinary increase in spatial resolution, along with the potential to reduce radiation dose and perform functional imaging via spectral analysis, has a significant impact on the implementation of more precise detection methods in the early diagnosis of lung cancer and multiple myeloma; on the other hand, very high-resolution imaging of vascular structures also allows for more precise planning of certain highly advanced surgical procedures, such as pancreatic tumor surgery. A second key aspect is the imaging of tumor tissue behavior before the start of treatment, during treatment, and upon its completion. Molecular methods of positron emission tomography can currently, in addition to the already widely used and well-known diagnostics using fluorodeoxyglucose, also utilize specific molecules for the diagnosis of protein synthesis in brain tumors, the hormonal status of breast cancer using fluoroestradiol, and also specific molecules for prostate cancer or neuroendocrine tumors. The combination of advanced CT and magnetic resonance imaging systems in hybrid methods represents a significant trend toward maximizing the benefits of both molecular and advanced morphological imaging.



prof. MUDr. Jiří Ferda, Ph.D.

Prof. MUDr. Jiří Ferda, Ph.D. (born 1970, Pilsen) is a full professor Radiology and Nuclear Medicine. He graduated from the Faculty of Medicine in Pilsen at Charles University. He has been fully boarded in specializations Radiology, Neuroradiology, Vascular Intervention Radiology na Nuclear Medicine He earned his Ph.D. degree and later completed his habilitation at the Faculty of Medicine in Pilsen, Charles University, where he was appointed full professor in 2015.

He began his professional career in 1994 at the Department of Radiologiy at University Hospital Pilsen. Since 2010 he had been deputy nead of The department of the Imaging , and since 2020 is being the head of this department.

His research focuses mainly on the advanced methods in cardiovascular and cancer imaging using computed tomography, he has been one of the most involved people in the Clinical introduction of the photon.-counting CT, he has made the first world-wide human scal of the ill subject with photon-counting. Molecular imaging using PET/MRI is the second direction of the Clinical work and the research work. He has been one of the first users of the advanced radiopahramceuticals in Clinical practice like PSMA-ligands of fluoroestradiol . His work has received more than 1,700 citations, and his H-index is 21 according to the Web of Science.

Better biomarkers mean better patient care - vision and mission of the ISOBM

Stefan Holdenrieder

Munich Biomarker Research Center, Institute of Laboratory Medicine, TUM University Hospital German Heart Center, Munich, Germany.

The International Society of Oncology and Biomarkers (ISOBM) is an interdisciplinary network of experts – spanning basic research, technology development, data science, laboratory medicine, pathology, and clinical oncology – united by a shared commitment to advancing diagnostics and therapies for cancer patients. Its members are convinced that the coordinated discovery, development, standardization, and clinical validation of high-quality biomarkers form the essential foundation for better cancer care.

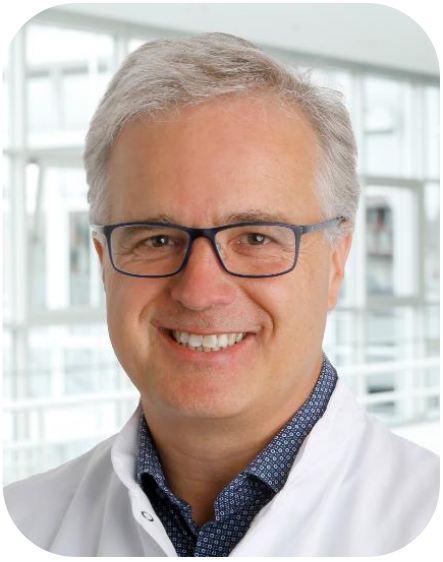
Founded in 1973 by pioneers of protein tumor marker research, ISOBM has continuously broadened its scope to encompass molecular, (sub)cellular, imaging, and other biomarker classes, as well as marker patterns assessed by established and cutting-edge omics technologies across all biological levels. Bioinformatics and biostatistics – including machine learning and artificial intelligence – have become increasingly central to the field, alongside pre- and postanalytical considerations, regulatory frameworks, quality control, assay harmonization, biobanking, evidence-based medicine, and prospective clinical biomarker trials.

ISOBM pursues its mission through a range of activities: annual scientific meetings, regular online webinars, focused working groups, programs supporting young investigators, the peer-reviewed journal *Tumor Biology*, and active collaboration with partner organizations including BBMRI-ERIC, IFCC, GSEV, and WHO-IARC.

Biomarkers hold transformative potential across the full spectrum of oncology — from early detection and therapy selection to treatment monitoring, minimal residual disease assessment, clonal evolution tracking, and toxicity evaluation. Together, these applications form the basis of truly personalized guidance for cancer patients throughout their disease journey. Yet realizing this potential requires confronting persistent challenges: patient and tumor heterogeneity, biological variability in biomarker release, metabolism and clearance, preanalytical and analytical variability, insufficient assay standardization, and the inherent complexity of interpreting single or longitudinally evolving marker profiles.

Successful clinical translation therefore demands: (i) rigorous, prospective biomarker validation; (ii) robust method standardization and harmonization; (iii) stringent quality control standards; (iv) well-defined decision criteria for specific clinical applications; (v) algorithms capable of integrating multiple or dynamically changing markers; (vi) embedding biomarkers as genuine companion diagnostics within prospective trials; (vii) comparative effectiveness studies demonstrating added clinical value; and (viii) multimodal, AI-driven integrative approaches that exploit the full depth of available data.

On the threshold of a new era in oncology biomarker research, translating scientific promise into patient benefit demands sustained interdisciplinary collaboration, rigorous clinical validation, and thoughtful integration into existing clinical workflows. These are precisely the objectives that define the mission of ISOBM.



Prof. Stefan Holdenrieder

Prof. Stefan Holdenrieder is Director of the Institute of Laboratory Medicine at the TUM University Hospital German Heart Center Munich and Head of the Munich Biomarker Research Center (MBRC).

He is President of the International Society of Oncology and BioMarkers (ISOBM), Member of WHO-IARC IC3R-Steering Committee, Member of the Guideline Commission of the DGKL, Vice Speaker of the DGKL Competence Field “Molecular Diagnostics”, Delegate at the RiliBÄK Steering Group D5 and EQA consultant at Instand e.V.

His research interests focus on the development and validation of novel biomarkers and technologies, particularly protein markers, cfDNA / liquid biopsy, epigenetics, biostatistics, and hospital-integrated biofluid biobanks.

He has organized scientific conferences of ISOBM, CNAPS, MEDICA LabMed Forum, is Associate Editor of international journals Tumor Biol, J Lab Med, Diagn, J Clin Med, Front Cardiovasc Med, and has published more than 300 scientific papers.

Invariant NKT Cells in Cancer: Monitoring and Therapeutic Potential

Monika Holubová[1, 2, 3], Lenka Lukášová[2], Tereza Dekojová[2], Tomáš, Kříž[2], Pavel Jindra[2], Michal Karas[2], Robin Klieber[1, 2], Eliška Jandová[1], Daniel Lysák[2]

[1] Laboratory of Tumor Biology and Immunotherapy, Biomedical Center, Faculty of Medicine in Pilsen, Charles University, Czech Republic
[2] Department of Hematology and Oncology, University Hospital Pilsen, Czech Republic
[3] Consortium for iNKT Research and Therapy (CiRT)

Invariant NKT (iNKT) cells are a rare population of lymphocytes that play an important role in regulating immune responses. iNKT cells have a dual role in cell-mediated immunity, promoting strong anti-tumor responses while modulating pathological reactions, such as graft-versus-host disease and sepsis. There is well-documented evidence of the role of iNKT cells in cancer patients. Higher levels of iNKT cells are associated with a better prognosis and survival rate in patients with various cancers, including neuroblastoma, lung cancer, and leukemia. However, these data are typically derived from single-center studies using locally established protocols, which diminishes their validity and clinical utility. A robust dataset must be provided to eliminate bias caused by specific local data processing. Flow cytometric analysis enables the combined examination of specific markers on the surfaces of cells and inside them. Due to the increasing complexity and heterogeneity of protocols, antibody manufacturers often resort to standardized dried panels to ensure the consistency of the measured data. Monitoring iNKT cells using such a standardized panel in a multicenter study can demonstrate the significance of iNKT levels and ensure standardization between centers.

Due to the possibility of their allogeneic use, the therapeutic applications of iNKTs are increasing rapidly. Most therapies use engineered cells that express a tumor antigen-specific receptor called a CAR. Unengineered applications cover a broad spectrum of diseases and combine therapies with checkpoint molecules, chemotherapy, or bispecific antibodies.

Overall, iNKTs represent the future of cellular immunotherapy. However, there is still a significant gap in the standardization of monitoring and manufacturing, which could

increase the overall impact, economic effectiveness, and affordability of iNKT-based therapies.

Supported by the Ministry of Health of the Czech Republic in cooperation with the Czech Health Research Council under project No. NW24-03-00079 and NW25-05-00334.

Monika Holubová

Monika Holubová is the group leader of the Laboratory of Tumor Biology and Immunotherapy at the Faculty of Medicine in Pilsen at Charles University, as well as a clinical research group leader in the Department of Hematology and Oncology. She has extensive experience researching oncological diseases and their interactions with immune cells, as well as cell processing and manipulation. She is a member of the Oncology and Hematology board of the Charles University COOPERATIO program. She authored the protocol for the clinical use of mesenchymal stem cells (MSCs) to prevent and treat GvHD, NK cells to prevent and treat relapse of hematological malignancies after HSCT, and iNKTs to prevent the development of GvHD. In 2018, she assisted with a preclinical study of a new medical product using genetically manipulated CAR19-iNKT and CARBCMA-iNKT at Imperial College London as a visiting researcher. In 2017, she was awarded by the Bone Marrow Foundation for developing an MSC medical product in the Czech Republic. She is a mentor in the ISCT Mentoring Program and a graduate of the Harvard Medical School Clinical Research Training Program, which focuses on clinical trials.

She is the co-founder of the Consortium of iNKT Research and Therapy (CiRT; cirt-net.org/news.html), which brings together people from the iNKT research and therapy field. She is also the main organizer of the International Summer School of Single Cell Analysis.

Optimization and validation of digital PCR for detection of KRAS mutations in plasma of patients with metastatic colorectal carcinoma

Natálie Hříbková[1,2], Ondřej Fiala[1,3], Ondřej Vyčítal[1,4], Ondřej Šorejs[1,4], Václav Liška[1,4], Pavel Souček[1,2], Viktor Hlaváč[1,2] , Veronika Boušková[1,2]

[1] Biomedical Center, Faculty of Medicine in Pilsen, Charles University, Pilsen, Czech Republic
[2] Toxicogenomics Unit, National Institute of Public Health, Prague, Czech Republic
[3] Department of Oncology and Radiotherapeutics, Faculty of Medicine and University Hospital in Pilsen, Charles University, Pilsen
[4] Department of Surgery, Faculty of Medicine and University Hospital in Pilsen, Charles University, Pilsen, Czech Republic

Keywords: mCRC, KRAS mutations, digital PCR, ctDNA, liquid biopsy

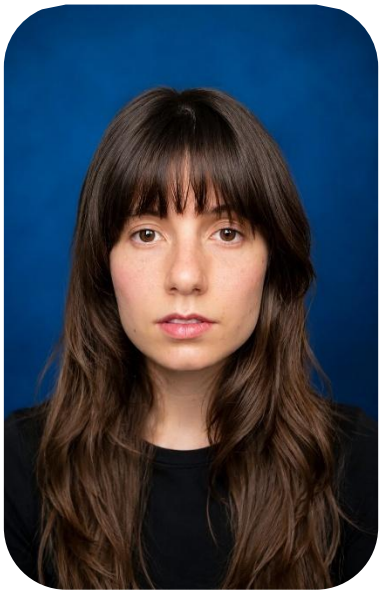
Objective:
The treatment of metastatic colorectal carcinoma (mCRC) depends on molecular profiling, particularly RAS mutation status, which predicts resistance to anti-EGFR therapy, has prognostic relevance, and represents a potential target for emerging KRAS inhibitors.

Methods:
Sensitive detection methods, including circulating tumor DNA (ctDNA) analysis, are required in clinical practice for RAS mutation analysis and monitoring. Therefore, we aimed to optimize and validate digital PCR (dPCR) assays.

Results:
dPCR assays were applied to detect KRAS mutations in plasma samples from patients with mCRC. Assays targeting KRAS G12C and G13D were optimized using the QIAcuity platform. Annealing temperature, time, and number of cycles were evaluated.

Sensitivity, specificity, and amplification efficiency were assessed using positive controls, wild-type controls, and dilution series experiments.

Conclusion:
The optimized protocol enabled reliable detection of low-frequency mutant alleles, with a limit of detection of 1:1,000 (0.1% mutant allele frequency). KRAS G13D mutation was detected in tumor and plasma samples of three selected patients, with mutant allele frequencies ranging from 3.09% to 66.17%. No mutant alleles were detected in plasma samples from patients with other KRAS mutations or from healthy controls. These results support dPCR as a sensitive and clinically applicable method for KRAS mutation testing in liquid biopsy samples from patients with mCRC.



Mgr. Natálie Hříbková

Mgr. Natálie Hříbková is a PhD student at the Faculty of Medicine in Pilsen, Charles University. She conducts her research at the Laboratory of Pharmacogenomics of the Biomedical Center, Faculty of Medicine in Pilsen, Charles University, and at the Laboratory of Toxicogenomics of the National Institute of Public Health. Her research focuses on the identification of biomarkers in liquid biopsies of solid tumours using advanced molecular genetic methods.

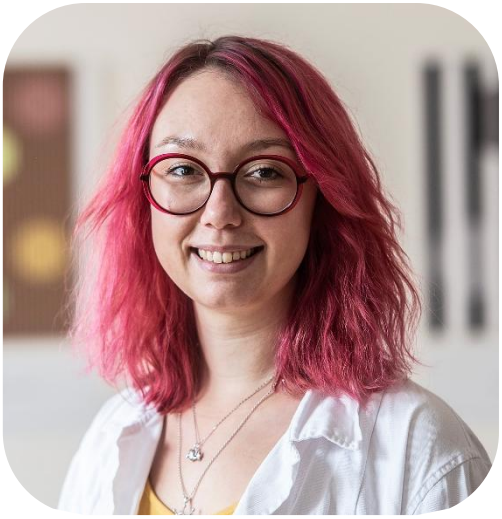
Surface markers as targets for immunotherapy

Eliška Jandová[1,2], Zia Ullah[1,2], Pavel Ostašov[1,2], Valentina S Caputo[3], Monika Holubová[1,4,5]
[1]Laboratory of Tumour Biology and Immunotherapy, Biomedical Centre, Faculty of Medicine in Pilsen, Charles University, Pilsen, CZ; [2]Department of Histology and Embryology, Faculty of Medicine in Pilsen, Charles University, Pilsen, CZ; [3]Cancer, Infection and Therapeutics Research Group, School of Allied Health and Life Sciences, London South Bank University, London, UK; [4]Department of Haematology and Oncology, University Hospital Pilsen, [5]Consortium for iNKT Research and Therapy

The introduction of targeted immunotherapy has significantly improved outcomes for patients with haematological malignancies. However, the efficacy of targeted therapy is still limited by the heterogeneous expression of surface target molecules, and by the formation of resistance through a decrease in the expression of these molecules by cancer cells, a process known as antigen escape. Understanding the regulatory mechanisms of these target molecules could help us to develop strategies to increase the efficiency of targeted immunotherapy and overcome antigen escape, thereby limiting relapse in the form of escape by target-negative clones.

The use of iNKT cells in immunotherapy is increasing, mainly thanks to the fact that they are HLA-independent, offering an opportunity for off-self therapy. Current research indicates a diverse human iNKT repertoire, comprising various subsets of iNKT cells with different levels of cytotoxic and immunomodulatory properties. These subsets can be characterised by the expression of various surface molecules, and an understanding of the link between these molecules and iNKT cell functions can establish which subset is the most potent for use as immunotherapy.

First, we investigated the use of combination therapy in multiple myeloma (MM) to limit BCMA antigen escape, and then we examined a similar approach to combat antigen heterogeneity in acute myeloid leukaemia (AML). Next, we examined the potential of targeted immunotherapy using bi-specific antibodies and iNKT cells. Our aim was to characterise the differences in cytotoxicity between CD4+ and CD4- iNKT cell subsets in order to better understand which is the more potent subset for use in treatment.



Eliška Jandová

Eliška Jandová received her Master's degree at the Faculty of Natural Sciences, Charles University, where she studied the use of cDNA as diagnostic tool in colorectal cancer. After her studies she started her PhD at the Faculty of Medicine in Pilsen at the Laboratory of Tumour Biology and Immunotherapy under supervision of Dr. Monika Holubová with consultant Dr. Valentina Caputo (LSBU and Imperial Collage, London, UK). She is trying to understand modulation of immunotherapeutic targets by cancer cells in haematological malignancies, namely acute myeloid leukaemia, with focus on usage of combination therapy to increase efficacy of targeted immunotherapy. She is also enrolled in studies focusing on CAR-iNKT for the treatment of multiple myeloma and study aiming to describe alternative splicing of KIR receptors in allogeneic hematopoietic transplantations. She is an EHA research mobility grant awardee, and she is part of the operational team of consortium for iNKT research (CiRT). In 2022 she was the first runner-up of FameLab International, and she is currently a mentor in the FameLab Academy UK and CZ.

Effect of chronic pharmacotherapy on serum levels of prostate biomarkers, derived indexes and glycosylation patterns of free form of prostate specific antigen

M. Jirásko[1], R. Kučera[1], J. Tkáč[2], T. Bertók[2]

[1] Department of Immunochemistry Diagnostics, University Hospital Pilsen
[2] Glycanostics, L.t.d., Bratislava, Slovakia

Prostate-specific antigen (PSA) and its derivatives, including free PSA (fPSA), [-2]proPSA, the fPSA/PSA ratio, and prostate health index (PHI), are commonly used in prostate cancer (PCa) diagnostics. However, chronic pharmacotherapy for benign prostatic hyperplasia (BPH) may influence these biomarkers and complicate PCa detection. This study evaluated the effects of BPH pharmacotherapy on PSA-related biomarkers and glycosylation patterns of fPSA.

A total of 564 serum samples from men aged 39–93 years were analyzed. Serum PSA, fPSA, and [-2]proPSA levels were measured using ACCESS chemiluminescence assays, while fPSA glycosylation patterns were assessed using lectin-based ELISA with Wisteria floribunda lectin (WFL), Phaseolus vulgaris lectins E and L (PHA-E, PHA-L), and Maackia amurensis lectin (MAL).

Patients treated with 5-alpha reductase inhibitors showed significantly lower levels of [-2]proPSA, fPSA, and PHI compared to untreated individuals. Alpha-blocker therapy was associated with higher fPSA levels and fPSA/PSA ratios together with lower PHI values. Glycosylation patterns remained largely unaffected by pharmacotherapy, except for increased MAL binding in patients receiving spasmolytics. These findings demonstrate that chronic BPH pharmacotherapy can substantially influence both routinely used PCa biomarkers as well as newer innovative ones and should therefore always be considered during diagnostic evaluation.

In-house method for evaluating nucleic acids in the plasma of lymphoma patients

Robin Klieber [1]

[1] Laboratory of Tumor Biology and Immunotherapy, Biomedical center, Faculty of Medicine in Pilsen, Charles University

Diffuse large B-cell lymphoma (DLBCL) is an aggressive type of non-Hodgkin lymphoma characterized by the rapid growth of malignant B-cells. DLBCL is a solid tumor for which the only monitoring option is imaging assessment. However, the molecular landscape reveals that certain molecules are associated with the development and progression of the disease. These markers can be used to develop more precise, less invasive monitoring methods. Cell-free RNA (cfRNA) and cell-free DNA (cfDNA) obtained from liquid biopsies are minimally invasive diagnostic tools that provide real-time insights into a patient's condition. However, the technical robustness, analytical challenges, and biological interpretability of cfRNA and cfDNA in DLBCL remain insufficiently characterized.

Mgr. Robin Klieber

Robin Klieber, MSc, is a leading specialist in the molecular genetics of hematological malignancies and immune cells at the Laboratory of Tumor Biology and Immunotherapy and the Department of Hematology and Oncology at University Hospital Pilsen. He is an expert in several NGS technologies and has extensive experience with single-cell platforms. His research focuses on analyzing mutations, characterizing immune cells, analyzing cell-free RNA and DNA, and evaluating alternative splicing and isoforms.

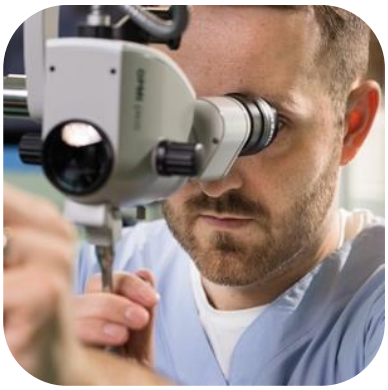
Biomarkers in Head and Neck Oncology: Are We Really Using Them?

Tomáš Kostlivý[1], David Slouka[1]

[1] Department of Otorhinolaryngology and Head and Neck Surgery, Faculty of Medicine in Pilsen, Charles University, University Hospital Pilsen

Biomarkers have become an integral part of modern medicine, including daily ENT practice, where simple laboratory parameters such as CRP, procalcitonin, or leukocyte count routinely influence clinical decision-making. In contrast, head and neck oncology represents a paradoxical situation: despite decades of intensive biomarker research and thousands of published candidates, only a limited number of biomarkers have achieved meaningful clinical implementation.

This presentation discusses biomarkers in head and neck oncology from a practical clinical perspective, focusing on the gap between biological relevance and real-world utility. Successful examples such as HPV/p16 demonstrate that clinically useful biomarkers are typically simple, reproducible, widely available, and capable of directly influencing treatment decisions. On the other hand, many promising candidates, including EGFR, TP53, or hypoxia-associated markers, failed to translate into routine practice despite clear links to tumor biology. Emerging approaches such as liquid biopsy and circulating HPV DNA offer promising opportunities for dynamic disease monitoring and early relapse detection, although sensitivity and standardization still limit routine implementation. The future of biomarker research may therefore depend less on discovering new markers and more on improving validation, clinical applicability, and integration into practical decision-making algorithms.



MUDr. Tomáš Kostlivý, Ph.D.

Born in 1989 in Plzeň. He graduated from the Faculty of Medicine in Plzeň, Charles University, in 2015. Since 2017, he has worked as a resident physician, since 2019 as an Assistant Professor, and since 2024 as the Deputy Head for Science and Education at the Department of Otorhinolaryngology and Head and Neck Surgery, Faculty of Medicine in Plzeň, Charles University and University Hospital Plzeň. His clinical and research interests focus primarily on sleep medicine and otology. He regularly publishes and lectures at national and international conferences. His current H-index is 5.

Prostate cancer diagnostics, balance between screening and overdiagnosis

Radek Kučera [1,2]

[1] Department of Immunochemistry Diagnostics, University Hospital Pilsen
[2] Department of Pharmacology and Toxicology, Faculty of Medicine in Pilsen, Charles University

Prostate cancer represents a major global health burden and is one of the most commonly diagnosed malignancies in men. According to the World Health Organization (GLOBOCAN 2022 data), approximately 1.47 million new cases of prostate cancer are diagnosed worldwide each year, making it the fourth most common cancer overall and the second most frequent cancer in men. In the same year, nearly 400,000 deaths were attributed to this disease, ranking it among the leading causes of cancer-related mortality globally.

Prostate cancer diagnostics remains a major clinical challenge, particularly in achieving an optimal balance between early detection through screening and the risk of overdiagnosis and overtreatment. Current diagnostic approaches are based on three main pillars: a panel of prostate-related biomarkers, imaging techniques, and histological verification. While screening strategies using prostate-specific antigen (PSA) have significantly contributed to earlier detection, they have also raised concerns regarding unnecessary biopsies and the identification of indolent tumors that may never become clinically significant.

Prostate cancer, diagnostic algorithm of University Hospital in Pilsen

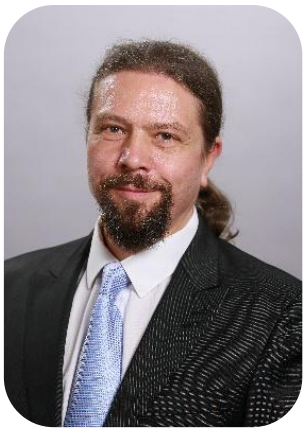
Radek Kučera [1,2], Michal Jirásko [1,2], Pavlína Černá [2], Ondřej Topolčan [1]

[1] Department of Immunochemistry Diagnostics, University Hospital Pilsen
[2] Department of Pharmacology and Toxicology, Faculty of Medicine in Pilsen, Charles University

The diagnosis of prostate cancer is currently based on three main pillars: a panel of prostate-related biomarkers, imaging techniques, and histological verification. This communication presents a diagnostic algorithm that can serve as a “roadmap” from the initial patient stratification to the final treatment decision. The algorithm is based on a review of current literature combined with our own clinical experience.

Diagnostic algorithms are a hallmark of an advanced healthcare system in which all steps are consciously coordinated and optimized to ensure proper individualization of the treatment process. The proposed diagnostic algorithm for prostate cancer was developed using prostate-specific antigen (PSA), proPSA, and the Prostate Health Index (PHI) as first-line tools for patient stratification. The algorithm then proceeds along the diagnostic pathway through imaging techniques, biopsy or active surveillance, and ultimately to the treatment decision itself.

In conclusion, the presented diagnostic algorithm for prostate cancer represents a practical tool for initial patient stratification, comprehensive staging, and assessment of tumor aggressiveness. The inclusion of proPSA and PHI in the algorithm significantly improves the accuracy and speed of the diagnostic process and enables the selection of an optimal management strategy from the outset. The use of advanced diagnostic techniques allows a shift toward a higher level of care for oncology patients. This diagnostic algorithm has become the standard of care in our hospital and will continue to be validated and refined based on our ongoing results.



prof. PharmDr. Radek Kučera, Ph.D.

Prof. PharmDr. Radek Kučera, Ph.D. (born August 11, 1968, Pilsen) is a full professor specializing in medical chemistry, biochemistry, and pharmacology. He graduated from the Faculty of Pharmacy at Charles University, with a focus on pharmaceutical chemistry, biochemistry, radioimmunochemistry, and clinical pharmacology. During his career, he obtained two attestations in analytical chemistry and completed additional training in business and medical management. He earned his Ph.D. degree and later completed his habilitation at the Faculty of Medicine in Pilsen, Charles University, where he was appointed full professor in 2021.

He began his professional career in 1991 at the District Hospital in Klatovy, working at the Department of Nuclear Medicine. He also gained substantial experience in the private sector, working as a product specialist for immunoassays at Beckman Coulter. Since 2013, he has served as an analytical supervisor at the Department of Immunochemistry Diagnostics at the University Hospital in Pilsen. Since 2010, he has been involved in teaching medical chemistry at the Faculty of Medicine in Pilsen, Charles University. Since 2021, he has been the Head of the Department of Pharmacology and Toxicology at the same faculty.

His research focuses mainly on tumor markers in cancer diagnostics and therapy monitoring, as well as on hormones, growth factors, and therapeutic drug monitoring. He has extensive experience in supervising students at all levels, including bachelor's, master's, and Ph.D. programs. He is the author or co-author more than 100 papers in impact-factor journals. His work has received more than 1,200 citations, and his H-index is 20 according to the Web of Science.

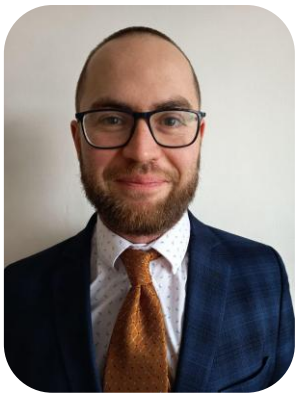
Bioethical Dilemmas in End-of-life Care

Vojtěch Linka [1,2]

[1] Center for Palliative and Supportive Medicine, Faculty of Medicine in Pilsen, Charles University

[2] Department of Psychiatry, Faculty of Medicine in Pilsen, Charles University

The lecture aims to elucidate the field of end-of-life care through the lens of contemporary bioethics. Since, in end-of-life care, standard goals of medicine, such as cure, elimination of symptoms, or substantial prolongation of life, are unattainable, healthcare providers face specific challenges and dilemmas arising from the condition of their patients: How should care be designed to best address the patient's needs? Which means are appropriate for mitigating symptoms such as pain, anxiety, or existential suffering? What role do the patient's psychological state and decision-making competence play? These clinical problems are reflected in contemporary bioethical discussions that focus primarily on which treatments and interventions are ethically justifiable and appropriate in providing good medical and psychosocial care. In the lecture, we examine one of these dilemmas, namely assisted dying (euthanasia and assisted suicide) as a means of alleviating unbearable suffering. We present a bioethical analysis of this issue with particular attention to cases of psychiatric euthanasia.



Mgr. Vojtěch Linka, PhD

Mgr. Vojtěch Linka, PhD (born July 29, 1993 in Pilsen) is an assistant professor at the Faculty of Medicine in Pilsen, Charles University, where he is responsible for teaching and research in bioethics and philosophy of medicine. He earned his PhD in philosophy at the Faculty of Arts at Charles University in Prague (doctoral thesis: Approaches to Pain in Classical Greek Philosophy and Medicine, Prague 2023). During his undergraduate studies, he spent two semesters at the Université Sorbonne, Paris 1, and Katholieke Universiteit Leuven, respectively. As part of his doctoral studies, he undertook a one-year research internship at the Institut für Klassische Philologie, Humboldt Universität, Berlin, and a three-month internship at the Faculty of Classics, Cambridge University. Vojtěch published an edited volume (Aristotle reads Hippocrates, Brill 2024, with Hynek Bartoš) and articles on topics related to the history and philosophy of ancient medicine, with his main research areas being classical Greek medicine, philosophy of medicine, and contemporary bioethics.

Mapping Molecular Escape in NEN G3: Insights from Multiparametric Liquid Biopsy

Esther Mettler[1]

[1] Department of Endocrinology and Metabolism, University Medical Center of the Johannes Gutenberg University Mainz

Keywords: Neuroendocrine neoplasms, extracellular vesicles, platelets, cell-free DNA, treatment resistence

Objective:
This study aimed to identify longitudinal liquid biopsy signatures associated with primary and acquired resistance in patients with high-grade neuroendocrine neoplasms (NEN G3) receiving combined avelumab and cabozantinib therapy.

Methods:
We analyzed cfDNA (concentration, hypomethylation, mt-cfDNA) and extracellular vesicles (EVs) (37 epitopes + PD-1/PD-L1 extension) in NEN G3 patients (n=14) from the CABOAVENEC trial at baseline and week 16 using qPCR and multiplex flow cytometry.

Results:
Non-responders showed higher baseline CD42a+ and PD-1+ EVs enrichement within CD44+ and HLA-DR+ subpopulations. By week 16, they exhibited significant increases in cfDNA, global hypomethylation, and CD29+ EVs. Notably, these dynamics were consistent across NET and NEC subtypes, indicating a universal hallmark of resistance in aggressive neuroendocrine neoplasms.

Conclusion:
NEN G3 resistance is two-phased: Initial resistance is linked to platelet–tumor engagement and pre-existing immune exhaustion, where circulating PD-1+/PD-L1+ EVs likely act as "decoys" that neutralize immunotherapy drugs before they reach the

tumor. Under therapeutic pressure, this evolves into an adaptive phase characterized by integrin-mediated remodeling and compensatory checkpoint signaling. These entity-independent markers represent promising candidates for early response monitoring and for targeting the immune–thrombo–inflammatory axis in aggressive neuroendocrine neoplasms.

Dr. Esther Maria Mettler
Department of Endocrinology and Metabolism,
University Medical Center of the Johannes
Gutenberg University Mainz

Lab Manager & Principal Investigator

esther.mettler@unimedizin-mainz.de | +49 6131175906

PROFILE:

Senior Scientist with 15+ years in Endocrine Oncology and Islet Cell Research.

Expert in molecular imaging, biomarkers, and personalized tumor therapy.

Proven track record in PI roles and managing BMBF-funded projects.

EXPERIENCE:

Lab Manager / PI, University Medical Center Mainz (2015–Present): Leading Endocrine Oncology & Islet Cell Research.

Group Leader, University Medical Center Mainz (2009–Present): Head of Experimental Islet Transplantation.

EDUCATION:

PhD (Dr. rer. physiol.), Univ. Mainz (2018): Xenogeneic islet transplants.

M.Sc. Biomedicine, Univ. Mainz (2007): Molecular imaging of NETs.

Dipl. Ing. Biotech, FH Bingen (2004).

RESEARCH & SKILLS:

Focus: Liquid Biopsy (cfDNA), Theranostics, Precision Medicine (PDX, Spheroids).

Certifications: Biosafety Officer, FELASA C (Animal Research), GMP, Radiation Protection.

PUBLICATIONS:

Featured in Clinical Cancer Research (2024), Cancers (2022),

and Xenotransplantation.

Predictive Significance of Combined Plasmatic Detection of BRAF Mutations and S100B Tumor Marker in Early-Stage Malignant Melanoma

M. Pešta[1,2], J. Polivka[2, 3, 4] M. Sharif [3], M. Gouda[5], I. Třeškova[6], V. Woznica[6], J. Windrichová[2], K. Pivovarčíková[7], R. Kučera[8], O. Topolčan[2], J. Řičař[9], F. Janků[5]

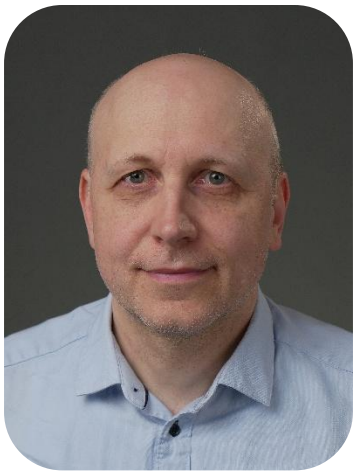
presenting author: martin.pesta@lfp.cuni.cz

[1]Department of Biology, Faculty of Medicine in Pilsen, Charles University, Pilsen, Czech Republic
[2]Department of Immunochemical Diagnostics, University Hospital Pilsen, Pilsen, Czech Republic
[3]Department of Histology and Embryology, Second Faculty of Medicine, Charles University, Prague, Czech Republic
[4]Department of Histology and Embryology, Faculty of Medicine in Pilsen, Charles University, Pilsen, Czech Republic
[5]Department of Investigational Cancer Therapeutics, The University of Texas MD Anderson Cancer Center, Houston, Texas, USA
[6]Department of Plastic Surgery, University Hospital Pilsen, Pilsen, Czech Republic University Hospital Pilsen, Pilsen, Czech Republic
[7]Department of Pathology, University Hospital Pilsen, Pilsen, Czech Republic
[8]Department of Pharmacology, Faculty of Medicine in Pilsen, Charles University, Pilsen, Czech Republic
[9]Department of Dermatovenerology, University Hospital Pilsen, Pilsen, Czech Republic, Pilsen, Czech Republic

Melanoma is the most aggressive skin cancer with ability to recur also after early-¬ stage tumor surgery. The aim was to identify early-¬ stage melanoma patients at high risk of recurrence using liquid biopsy, estimating of mutated BRAF ctDNA and the level of tumor marker S100B in plasma. Eighty patients were enrolled in the study. BRAF V600E mutation was determined in FFPE tissue and plasma samples using ultrasensitive ddPCR with pre-¬ amplification. The level of S100B was determined in plasma by immunoassay chemiluminescent method. The best prediction

of melanoma recurrence after surgery was observed in patients with combined high level of S100B (S100Bhigh) and ctDNA BRAFV600E (BRAFmut) in preoperative (57.1% vs. 12.5%, p=0.025) as well as postoperative blood samples (83.3% vs. 14.3%, resp., p=0.001) in comparison with low S100B and BRAF wild-¬ type. Similarly, patients with preoperative and postoperative S100Bhigh and BRAFmut experienced worse prognosis (DFI p=0.05, OS p=0.131 and DFI p=0.001, OS p=0.001, resp.). We observed the benefit of the estimation of combination of S100B and ctDNA BRAFmut in peripheral blood for identification of patients at high risk of recurrence and unfavorable prognosis.

The work was supported grant from the Ministry of Health of the Czech Republic—Conceptual Development of Research Organization (Faculty Hospital in Pilsen—FNPl, 00669806).



Prof. RNDr. Martin Pešta, Ph.D.

Prof. RNDr. Martin Pešta, Ph.D. is a molecular biologist specializing in tumour biology and DNA diagnostics. He studied biology at the Faculty of Science, Charles University. In 1999, he joined the HLA Laboratory of the Department of Transfusion Medicine at University Hospital Plzeň, and later worked at the Department of Medical Genetics of University Hospital Plzeň.

He has worked at the Faculty of Medicine in Plzeň, Charles University, since 2002, first at the Central Radioisotope Laboratory, then at the Department of Medical Chemistry and Biochemistry, and since 2013 he has headed the Department of Biology.

He was appointed Professor in the field of Medical Biology at the Second Faculty of Medicine, Charles University.

As part of his scientific career, he completed research stays at foreign institutions in Bonn, Dublin, and Munich. He serves as a guarantor and lecturer in the Master's and doctoral study programme Medical Biology and Genetics.

His research focuses primarily on prognostic and predictive markers of solid tumours. He has lectured at more than sixty conferences, is a member of the Czech Society for Biochemistry and Molecular Biology and the European Group on Tumour Markers, and is the author or co-author of four monographs and more than eighty publications indexed in Web of Science, which have received more than 1,700 citations; his H-index is 26.

Calcium-phosphate Disorders in Oncological Patients

Richard Pikner, Kateřina Oulehle, Jozefína Provalilová (CZ, Klatovy)

Department of Clinical Biochemistry and Bone Metabolism, Klatovska Hospital, Klatovy

Disorders of calcium–phosphate and magnesium metabolism are increasingly recognized complications in oncological patients and may arise from the malignancy itself, paraneoplastic syndromes, or adverse effects of anticancer therapy. These abnormalities contribute substantially to morbidity through muscle weakness, arrhythmias, nephrocalcinosis, osteomalacia, fractures, impaired quality of life, and increased hospitalization rates. Early recognition is therefore essential in modern oncological and supportive care.

Hypomagnesemia is among the most frequent electrolyte disturbances induced by systemic anticancer therapy. Platinum-based chemotherapeutics, particularly Cisplatin, cause persistent renal magnesium wasting through tubular injury and may additionally induce hypokalemia, hypocalcemia, and hypophosphatemia. Carboplatin and Oxaliplatin produce similar but usually milder toxicity. Epidermal growth factor receptor (EGFR) inhibitors including Cetuximab and Panitumumab are strongly associated with hypomagnesemia because EGFR signaling regulates the TRPM6 magnesium channel in the distal nephron. The risk increases with treatment duration and may become severe or refractory. Other targeted agents such as Gefitinib and Erlotinib may also contribute to renal magnesium loss. Hypomagnesemia can clinically manifest with neuromuscular irritability, tetany, seizures, and cardiac arrhythmias.

Hypophosphatemia is another clinically relevant metabolic complication in oncology. Anticancer agents associated with phosphate wasting include Ifosfamide, which may induce Fanconi syndrome, and tyrosine kinase inhibitors such as Imatinib, Sorafenib, and Sunitinib. Severe phosphate depletion may lead to respiratory insufficiency, myocardial dysfunction, osteomalacia, and skeletal fragility. An important paraneoplastic cause is tumor-induced osteomalacia (TIO), mediated by excessive secretion of fibroblast growth factor 23 (FGF23) from phosphaturic mesenchymal

tumors. FGF23 suppresses renal phosphate reabsorption and inhibits calcitriol synthesis:

Patients with TIO typically present with bone pain, muscle weakness, pseudofractures, and severe osteomalacia. Surgical tumor resection is curative in most cases, while phosphate supplementation, active vitamin D analogues, and anti-FGF23 therapy may be required in unresectable disease.

The FGF/FGFR signaling pathway has become an important therapeutic target in oncology. Selective fibroblast growth factor receptor (FGFR) inhibitors include Erdafitinib, Pemigatinib, Infigratinib, and Futibatinib. These agents primarily inhibit FGFR1–4 and are used in tumors harboring FGFR alterations, especially urothelial carcinoma and cholangiocarcinoma. Non-selective multikinase inhibitors with anti-FGFR activity include Lenvatinib, Pazopanib, Ponatinib, and Nintedanib. Unlike phosphaturic tumors, FGFR inhibition suppresses FGF23 signaling and commonly produces hyperphosphatemia, which is considered an on-target pharmacodynamic effect:

In conclusion, calcium–phosphate and magnesium disorders represent important yet often underrecognized complications of malignancy and anticancer treatment. Systematic biochemical monitoring and interdisciplinary cooperation between oncologists, nephrologists, endocrinologists, and laboratory specialists are essential for early diagnosis and optimal management.

Richard Pikner, M.D., Ph.D., EuSpLm

Nowadays he works as a head of department of Clinical Laboratories and Bone Metabolism in Klatovska Hospital and as an assistant professor both at Charles University ,Faculty of Medicine in Pilsen and at University of West Bohemia in Pilsen, Faculty of Health Studies . He specialises in osteoporosis and bone metabolism diagnosis and treatment, and endocrinology testing. He graduated in 1996 at Charles University, Faculty of Medicine in Pilsen a there he also defended Ph.D theses there. He also obtained specialisation diplomas in Internal Medicine, Clinical Biochemistry and Clinical osteology. He passed certification in Clinical Densitometry by ISCD. He is member o f several national and international societies. He serves as a vice-president of the Czech Society for Metabolic Bone Diseases and committee member of the Czech Society of Clinical Biochemistry. He is a corresponding member of Committee on Bone Metabolism, International Federation of Clinical Chemistry and Laboratory Medicine (IFCC).

One most important professional activity is now to be a clinical consultant and scientific advisor in the Czech national pilot programme: ”Osteoporotic Fracture Secondary Prevention in Adults Older 50 Years” organised by Institute of Health Information and Statistics of the Czech Republic and Early Detection of Osteoporosis – Czech National Population Programme

He participates in education and research regarding bone markers, parathyroid hormone, vitamin D and thyroid diseases. He published more than 40 articles in medical journals with more than 250 citations in available, H-index 8.

Diagnosis and Risk Stratification of Prostate Cancer Based on Liquid Biopsy

Jiri Polivka[1,2,3], Menglang Yuan[2,3], Marcio Covas Moschovas[4], Kandarp Joshi[3], Bongyong Lee[2,3], Ignacio Gonzalez-Gomez[3], Vipul Patel[4], Chetan Bettegowda[2], Ranjan J Perera[2,3]

[1] Department of Histology and Embryology, Second Faculty of Medicine, Charles University, Czech Republic

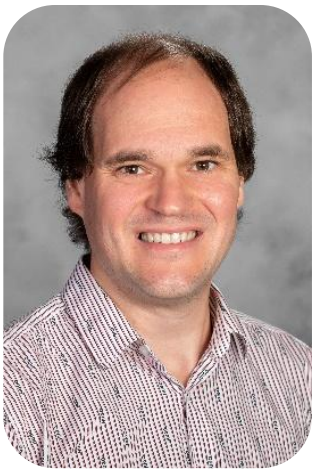
[2] Department of Neurosurgery and Oncology, Sidney Kimmel Comprehensive Cancer Center, School of Medicine, Johns Hopkins University, MD, USA

[3] Johns Hopkins All Children's Hospital, FL, USA

[4] AdventHealth Global Robotics Institute, FL, USA

Background:
Current PSA screening for prostate cancer (PCa) lacks optimal specificity, often failing to differentiate between benign and malignant conditions. We aimed to develop a novel, non-invasive liquid biopsy-based urinary biomarker panel with superior diagnostic performance.

Methods:
Following RNA-sequencing of urinary exfoliated cells and qPCR screening, a three-biomarker panel (TTC3, H4C5, EPCAM) was selected. Its diagnostic accuracy was evaluated in a large case-control cohort (development dataset: n=243; validation dataset: n=646). TTC3 oncogenic function was further validated in vitro and in vivo.
Results: The urine panel demonstrated exceptional diagnostic accuracy, identifying PCa with an AUC of 0.92 in the validation dataset, significantly outperforming the standard PCA3 assay (AUC 0.76). The panel reliably distinguished PCa from benign conditions (BPH, prostatitis) and maintained high accuracy even in PSA-negative cases. Furthermore, functional studies confirmed that TTC3 depletion significantly suppressed tumor growth.
Conclusion:
This non-invasive, urine-based biomarker panel offers a highly sensitive and specific diagnostic tool for PCa, providing a promising foundation for future clinical diagnostic assays.



Jiří Polívka, Ph.D.

Associate Professor of Anatomy, Histology and Embryology at the Second Faculty of Medicine, and Faculty of Medicine in Pilsen, Charles University. He graduated in Physical and Mathematical Modeling from the Faculty of Applied Sciences at the University of West Bohemia in Pilsen and from the Masaryk Institute of Advanced Studies at the Czech Technical University in Prague. He completed his postgraduate studies at the Faculty of Medicine in Pilsen where he continued his career as an Assistant Professor at the Department of Histology and Embryology and a researcher at the Biomedical Center. He also works as a researcher at the Department of Neurology and the Department of Immunochemical Diagnostics at the University Hospital Pilsen. Since 2026, he has served as the Head of the Department of Histology and Embryology at the Second Faculty of Medicine, Charles University. His research focuses on molecular oncology, targeted cancer therapy, and personalized medicine. Since 2022, he has held the position of Secretary General of the European Association for Predictive, Preventive and Personalized Medicine (EPMA, epmanet.eu). He is the member of editorial board of the *EPMA Journal* (IF 5.9, Q1, Springer) and the book series *Advances in Predictive, Preventive and Personalized Medicine* (Springer). He closely collaborates with major research centers in the USA, including Johns Hopkins All Children's Hospital and The University of Texas MD Anderson Cancer Center. His publication record includes more than 2,000 citations and an h-index of 23 (WoS).

Circulating miR-200 family as a potential biomarker for metastatic colorectal cancer

Bhavana Hemantha Rao[1], Natalie Hříbková[1,2], Lucie Heczko[1], Ondřej Fiala[1,3], Ondřej Šorejs[1,3], Ondřej Vyčítal[1,4], Václav Liška[1,4], Pavel Souček[5,2], Viktor Hlaváč[5,2], Veronika Boušková[5,2]

[1] Biomedical Center, Faculty of Medicine in Pilsen, Charles University, Pilsen, Czech Republic

[2] Toxicogenomics Unit, National Institute of Public Health, Prague, Czech Republic

[3] Department of Oncology and Radiotherapeutics, Faculty of Medicine and University Hospital in Pilsen, Charles University, Pilsen, Czech Republic

[4] Department of Surgery, Faculty of Medicine and University Hospital in Pilsen, Charles University, Pilsen, Czech Republic

[5] Biomedical Center, Faculty of Medicine in Pilsen, Charles University, Pilsen, Czech Republic

Keywords: liquid biopsy; circulating miRNA; metastatic CRC Objective:

To evaluate circulating miR-200 family members and selected miR-17/92 cluster miRNAs as non-invasive biomarkers for detection, progression monitoring, and survival prediction in metastatic colorectal cancer during systemic treatment.

Methods:

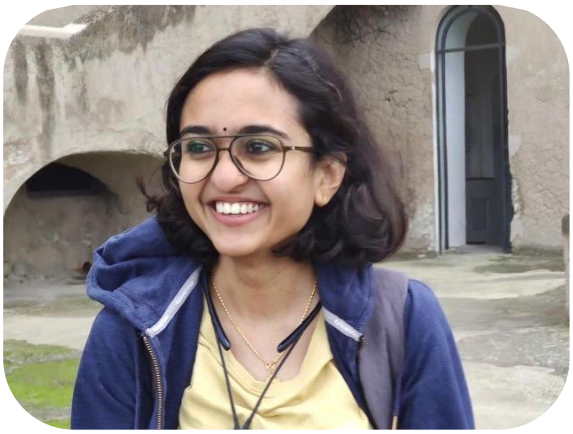
Plasma from 30 patients with metastatic colorectal cancer collected before, during, and after treatment, and from 12 healthy controls, was analysed by quantitative real-time PCR. Statistical analysis used Kruskal-Wallis tests with BH correction.

Results:

miR-200a-3p, miR-200b-3p, miR-200c-3p, miR-141-3p, and miR-18a-3p differed significantly between controls and patients. Dynamic changes in miR-200b-3p and miR-200c-3p were associated with overall survival. miR-18a-3p correlated with survival in wild-type RAS patients. Metastatic liver tissue showed strong miR-200 upregulation.

Conclusion:
Circulating miR-200 family members, particularly miR-200a-3p, miR-141-3p, and miR-200c-3p, represent promising biomarkers for monitoring metastatic colorectal cancer progression and treatment response. Their longitudinal dynamics may provide prognostic information and support personalised disease management. Larger prospective studies are needed for clinical validation.

This work was supported by GAUK 183424, PRIMUS/25/MED/007, and the Czech Health Research Council grant NW25J-08-00050.



Bhavana Hemantha Rao

Bhavana Hemantha Rao is a final-year PhD candidate in Experimental Surgery at the Faculty of Medicine in Pilsen, Charles University, Czech Republic. Her research focuses on gastrointestinal cancers, particularly the identification of prognostic biomarkers and therapeutic targets in pancreatic and colorectal cancers using next-generation sequencing (NGS) techniques. She is currently expanding her work into liquid biopsy for the early detection of pancreatic cancer.
She is an active member of the ISOBM Young Scientist Group. With a Master's degree in Genetics and a Bachelor's in Biochemistry, she brings strong expertise in molecular biology, RNA sequencing, mammalian cell culture, and bioinformatics. She has presented her research at several international conferences, including the ESMO Gastrointestinal Cancer Congress, and is also a member of ESMO and TRANSPAN.

Cancer screening programme

Drahomíra Springer, Tomáš Zima

Institute of Medical Biochemistry and Laboratory Diagnostics, 1st Faculty of Medicine, Charles University and General University Hospital, Prague, Czech Republic

Cancer screening is the process – medical tests to detect cancer in people who do not have any symptoms of the disease. The primary goal is early detection to improve treatment outcomes and survival rates or even prevent cancer from developing by finding and treating precancerous lesions. Cancer screening is a form of secondary prevention that reduces mortality without altering disease incidence.

Colorectal cancer (CRC) is one of most common cause of cancer-related death. CRC screening options include a high-sensitivity faecal immunochemical test (FIT). A recent systematic review and meta-analysis demonstrated FIT's high accuracy in detecting CRC, with an overall accuracy of 95%, sensitivity of 79%, and specificity of 94%. Colonoscopy every 10 years or frequently due to findings or family history is the most precise screening methods. CRC incidence and mortality have decreased, primarily due to effective screening practices.

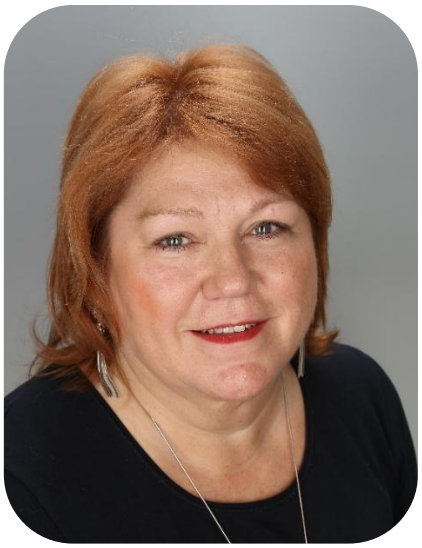
Prostate cancer ranks as the second leading cause of cancer-related deaths in men globally, following lung cancer. The guideline recommends that men with at least a 10-year life expectancy should have the option to discuss prostate cancer screening with their healthcare provider. This discussion should include information about the uncertainties, benefits, and risks associated with serum prostate-specific antigen (PSA) testing, with or without a digital rectal exam (DRE), to make an informed decision. Czech screening programme put scheme combine the levels of PSA and MRI.

Breast cancer is the most common cancer among women. Widely accepted breast cancer screening modalities include mammography, breast magnetic resonance imaging (MRI), breast ultrasound, and breast self-examinations. Due to breast cancer

screening, most cases are diagnosed at stage I, which has a 5-year survival rate of 100%. Cervical cancer screening programme was introduced in 2008 in the Czech Republic, and it is intended for women over 15 years old, performed annually, part of the examination is also testing for the presence of HPV for women aged 35, 45 and 55.

Lung cancer early detection programme is intended for people aged 55–74 years, active or former smokers with 20 or more pack-years. The form of examination is low-dose CT in an accredited radiology centre. Screening programmes lead to reduce mortality and incidence of cancers mostly demonstrated in breast and colorectal cancer. The information of screening programmes into public is very important role of us increasing the effectiveness of these preventive programmes.

Acknowledgement: Supported by research projects the Cooperatio, MH CZ DRO VFN 64165



doc. Ing. Drahomíra Springer, Ph.D.

She is a graduate of the Faculty of Food and Biochemical Technology, majoring in Fermentation Chemistry and Bioengineering, University of Chemical Technology in Prague. She works at the Institute of Medical Biochemistry and Laboratory Diagnostics of the General Faculty Hospital and teaches at the 1st Medical Faculty of Charles University in Prague. She has worked for many years on the ČSKB ČLS JEP committee. This year she was elected its chair for the second time. Since 2022, she has been the head of the Department of Clinical Biochemistry of the IPVZ Prague. Her professional work is focused on immunoanalytical determination of tumor markers, thyroid function parameters, and for many years she has been dedicated to the issue of examination during pregnancy, both the diagnosis of Down syndrome and the detection of thyroid function disorders. She is the author of at least 30 original articles, 7 chapters in monographs and many presentations at international and Czech professional meetings. She received the ČSKB award for the best publication of the year (2010 and 2018).

The Role of the Hospital Chaplain in the Palliative Care Process

Klára Suchomelová[1]

[1] Department of Hospital Chaplaincy, University Hospital Pilsen

The World Health Organization (WHO) recognizes the spiritual dimension as one of the four fundamental pillars of human health. However, integrating spiritual care remains a challenge. In the palliative care process, a hospital chaplain not only provides emotional support and spiritual counselling but also participates impartially and confidentially in addressing the patient's ethical issues. The inclusion of chaplains in palliative care teams leads to a more rational use of healthcare services at the end of life and facilitates difficult decisions. Studies show that the integration of chaplains into palliative care teams can significantly contribute to mediating conflicts of values in stressful and high-pressure clinical environments. Hospital chaplains play a role not only in supporting patients, their families, and loved ones, but also serve as a source of support for healthcare providers who are at high risk of burnout or exhaustion.

Mgr. Klára Suchomelová

Mgr. Klára Suchomelová, (born October 1, 2001, in Prague) is a hospital chaplain and a doctoral student specializing in practical and ecumenical theology and theological ethics. She earned her degree in Catholic Theology from the Catholic Theological Faculty of Charles University in Prague. During her career to date, she has expanded her qualifications by completing a specialized course for hospital chaplains at the Protestant Theological Faculty of Charles University, and she is currently enrolled in

a 1.5-year course in basic psychotherapy accredited by the Institute for Biosynthetic Psychotherapy. In October 2025, she began her doctoral studies (Ph.D.) at the Protestant Theological Faculty of Charles University. She began her professional career in healthcare spiritual care in November 2025 at the University Hospital in Plzeň, where she serves as a hospital chaplain.

Her research focuses primarily on the topic of trust in pastoral care and its role in the healing process, which is also the central theme of her dissertation. She is the author and co-author of scholarly texts (published under the name Klára Vopatová), for example in the collective monograph "Co znamená být duchovní?" (Karolinum Press, 2025).

From PSA to Glycobiomarkers: The Evolution of Prostate Cancer Biomarker Diagnostics

Ákos Szegedi MD[1]

[1] Jahn Ferenc South Pest Central Hospital and Clinic, Budapest, Hungary

Keywords: prostate cancer; PSA; biomarkers; kallikrein; Prostate Health Index; 4Kscore; glycobiomarkers; multiparametric MRI; clinically significant prostate cancer; risk-adapted screening

Objective:
PSA's limited specificity continues to result in unnecessary biopsies and overdetection of clinically insignificant disease. This lecture traces biomarker development from conventional PSA testing to contemporary glycan-based diagnostics and their potential role in future clinical practice.

Methods:
A narrative review was conducted, encompassing PSA derivatives, kallikrein-based models, multiparametric MRI integration, and emerging glycobiomarker research, with focus on diagnostic accuracy and clinical applicability in prostate cancer detection.

Results:
PSA derivatives and kallikrein-based models, including PHI and 4Kscore, demonstrate superior predictive accuracy over total PSA in the diagnostic grey zone. Multiparametric MRI has reduced unnecessary biopsies. Emerging glycobiomarkers may improve discrimination between benign conditions and clinically significant prostate cancer with potential to enhance selective detection of aggressive disease.

Conclusion:
PSA-based screening has enabled widespread prostate cancer detection for over three decades; however, its limited specificity continues to drive unnecessary procedures and overdiagnosis. Next-generation biomarkers, including kallikrein-based

models and qualitative analysis of PSA glycosylation patterns, offer improved discrimination of clinically significant disease. The integration of serum biomarkers, imaging, and molecular profiling may support personalized and risk-adapted diagnostic algorithms, representing a meaningful advance in the selective detection of aggressive prostate cancer.

Ákos Szegedi MD
Jahn Ferenc South Pest Central Hospital and Clinic,
Budapest, Hungary

Dr. Ákos Szegedi received his MD degree from Semmelweis University, Faculty of Medicine, in 2022, with a thesis focusing on diagnostic and predictive plasma biomarkers in acute graft-versus-host disease. Since September 2022, he has been working as a resident physician at the Department
of Urology, Jahn Ferenc South-Pest Hospital, Budapest, where his clinical practice encompasses uro-oncological surgery, including robot-assisted radical cystectomy and prostate cancer diagnostics. From February 2026, he is enrolled in the Doctoral School of Medical Sciences at the University of Debrecen, Molecular Medicine Program, under the supervision of Prof. Dr. András Guttman. His PhD project focuses on the evaluation of diagnostic performance of prostate cancer prognostic approaches based on PSA N-glycan structure characterization. His research interests include translational biomarker development, MRI-targeted prostate biopsy, and the clinical implications of biopsy grading discordance on oncological outcomes. He has authored publications in international and Hungarian
peer-reviewed journals and has presented his work at the Hungarian Urological Association congresses and at the FUN Congress.

From Measurement to Meaning: The Role of Immunoassays in Assessing Tumor Biological Activity in Surgical Patients

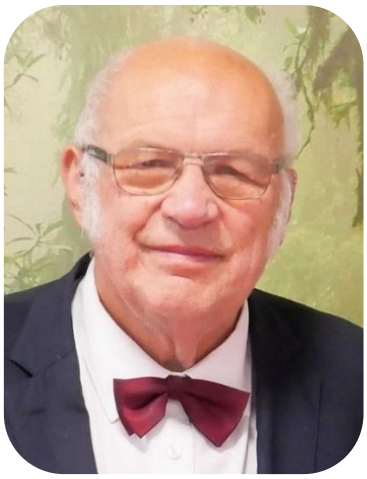
Ondřej Topolčan[1], Martina Peštová[1], Jiří Moláček[2]

[1] Department of Immunochemistry Diagnostics, University Hospital Pilsen and Faculty of Medicine in Pilsen, Charles University, Czech Republic
[2] Department of Surgery, University Hospital Pilsen and Faculty of Medicine in Pilsen, Charles University, Czech Republic

Abstract

Modern surgical oncology increasingly requires not only precise anatomical characterization of tumors but also a deeper understanding of their biological behavior. Immunoassays represent a valuable tool for assessing tumor activity through circulating biomarkers that reflect tumor burden, proliferation, invasiveness, metastatic potential, and response to therapy. This narrative review summarizes current clinical experience and published evidence regarding the use of immunoassay-based tumor markers in solid malignancies, particularly colorectal, pancreatic, breast, hepatobiliary, and lung cancers, with emphasis on commonly utilized biomarkers such as CEA, CA 19-9, CA 15-3, CA 125, CYFRA 21-1, HE4, AFP, and selected indicators of tissue remodeling and inflammation. Beyond their diagnostic role, these biomarkers provide clinically relevant information associated with tumor stage, extent of disease, and overall tumor burden, while their dynamic changes during neoadjuvant treatment may reflect therapeutic response and help identify patients who may benefit from radical surgical intervention. Postoperative monitoring enables early detection of residual disease and recurrence, often preceding radiological findings, and the use of combined biomarker panels enhances diagnostic accuracy and allows better characterization of tumor aggressiveness compared with individual markers alone. In gastrointestinal malignancies, particularly pancreatic and colorectal cancer, biomarker dynamics may support assessment of resectability, prediction of recurrence risk, and evaluation of treatment efficacy. Importantly, integration of immunoassay data with histopathological, radiological, and molecular findings contributes to more accurate risk stratification and individualized treatment planning. Emerging biomarkers, including HE4 and multiplex

protein signatures, further expand the potential to capture tumor biology and improve prognostic evaluation. Overall, immunoassays are evolving from simple quantitative measurements to complex tools providing insight into tumor biology, and when interpreted within a multidisciplinary framework, they significantly enhance surgical decision-making, treatment monitoring, prognostic assessment, and the advancement of personalized oncological care, with future development expected through integration with molecular profiling, artificial intelligence, and multimodal predictive models.



Prof. MUDr. Ondřej Topolčan, CSc.

Prof. MUDr. Ondřej Topolčan, CSc. is Deputy Director for Science and Research at University Hospital Pilsen, and Head of the Department of Immunochemistry Diagnostics, University Hospital Pilsen and Faculty of Medicine in Pilsen, Charles University, Czech Republic. He is a recognized expert in immunochemistry, clinical biochemistry, tumor biomarkers, personalized medicine, translational oncology, and biobanking.

His scientific work focuses on the development and clinical application of immunoassays and biomarkers in oncology, endocrinology, and metabolic diseases, with particular emphasis on the translation of laboratory findings into routine clinical practice. He has authored and co-authored numerous peer-reviewed scientific publications, book chapters, and invited lectures at national and international conferences.

As Deputy Director for Science and Research, he coordinates institutional research activities, supports multidisciplinary collaboration, and promotes the integration of innovative diagnostic approaches into patient care. His research impact is reflected by an **H-index of 39**, demonstrating a long-standing contribution to biomedical research and laboratory medicine.

Prof. Topolčan is actively involved in national and international scientific societies, research projects, and educational activities, contributing to the advancement of laboratory diagnostics and precision medicine.

Beyond the bench: A Focus on Novel Neurodegenerative Disease RUO Assays

Dr. Matilda Merve Tuglu

Scientific Marketing Manager
Beckman Coulter Diagnostics

Driven by epidemiological factors such as population growth and longer life expectancies, cases of neurodegenerative diseases (NDD) are projected to triple by 2050. This alarming increase will place significant financial and emotional burdens on patients, caregivers, and healthcare systems. Current diagnostic methods are limited by non-specific clinical symptoms, challenges in early detection, and the invasive, high-cost nature of available procedures, creating an urgent need for affordable, scalable, and accessible blood-based diagnostics.

Beckman Coulter (BEC) is addressing these critical gaps by leveraging decades of IVD expertise. We develop best-in-class, high-sensitive, and easy-to-use immunoassay solutions that empower healthcare providers and researchers. Our innovative NDD assays provide the specificity and sensitivity essential for accurately measuring vital neurodegenerative biomarkers. BEC is committed to broadening global access to NDD biomarker solutions, and improving outcomes for those who are impacted.

Matilda Merve Tuglu, MD, PhD

Dr. Matilda Merve Tuglu is a medical doctor who graduated from a highly regarded Gazi Medical Faculty in Turkey. Subsequently, she dedicated a decade to clinical practice, serving as a primary care and emergency care physician. Dr. Tuglu further augmented her academic credentials by achieving a Ph.D. in Pharmacology from a distinguished institution such as Ankara University, Faculty of Medicine. Her professional background encompasses extensive medical management expertise, cultivated within diverse pharmaceutical organizations, with a strong focus on neurology disorders. She currently holds the position of Scientific Marketing Manager at Beckman Coulter, where her primary responsibilities include strategic oversight of scientific events and leadership of scientific research initiatives.

Development and testing boron derivatives of anti-androgenic drugs on prostate cancer cell lines.

Roman Viták[1], Adam Anthony Needle[2], Petr Šlechta[2], Marta Kučerová-Chlupáčová[2], Martin Doležal[2], Radek Kučera[1]

[1] Charles University, Faculty of Medicine in Pilsen

[2] Charles University, Faculty of Pharmacy in Hradec Králové

Objective:

To develop new boron-containing derivatives of nonsteroidal antiandrogens by replacing nitro or nitrile groups with boron groups and evaluate their potential in models of androgen-dependent and castration-resistant prostate cancer.

Methods:

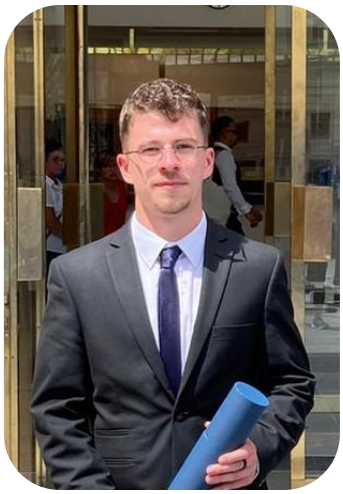
First and second generation boron derivatives of antiandrogens were synthesized and characterized. Antiproliferative activity was evaluated in LAPC-4 and PC-3 cells using WST-1 assays, while selectivity was determined in HK-2 cells.

Results:

Several first-generation boron derivatives showed higher antiproliferative activity and improved selectivity compared to flutamide and bicalutamide, especially in LAPC-4 cells. A five-step synthesis of novel boron analogs inspired by enzalutamide was optimized, and preliminary in silico studies indicated promising interactions with androgen receptors.

Conclusion:

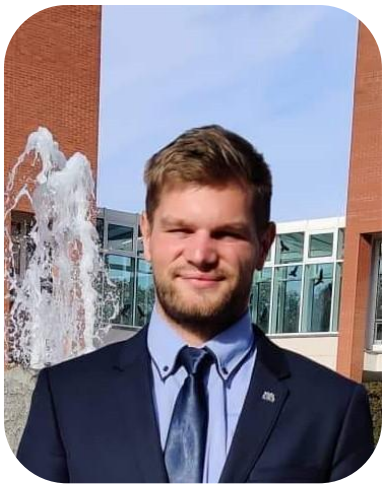
Replacing nitro or nitrile groups with boronic acids represents a promising strategy in the design of new antiandrogens. Boron-containing derivatives have demonstrated favorable antiproliferative activity against prostate cancer cell lines while exhibiting lower toxicity to non-cancerous cells compared to current antiandrogens. Furthermore, newly prepared second-generation analogs inspired by enzalutamide extend the applicability of this concept and provide a basis for further biological evaluation and androgen receptor binding studies.



Mgr. Adam Anthony Needle

Mgr. Adam Anthony Needle (born March 20, 2000, Rychnov nad Kněžnou) is a PhD student in the program Pharmaceutical Chemistry at the Faculty of Pharmacy in Hradec Králové, Charles University, since 2024. He earned his master's degree in pharmacy. He is a member of the research group Design and Development of New Antimicrobial Agents at the Department of Pharmaceutical Chemistry and Pharmaceutical Analysis, whose domain is developing novel antimicrobial compounds. Recently, his attention has been aimed at boron compounds – benzoxaboroles as antimycobacterial agents and boronic acids as anticancer compounds representing potential covalent drugs.

He is co-author of the research article Design, Synthesis and Antimicrobial Evaluation of New N-(1-Hydroxy-1,3-dihydrobenzo[c][1,2]oxaborol-6-yl)(hetero)aryl-2-carboxamides as Potential Inhibitors of Mycobacterial Leucyl-tRNA Synthetase published in *Int. J. Mol. Sci.* **2023**, 24(3), 2951. Recent research activity has been presented at conferences, the 53rd Conference Synthesis and Analysis of Drugs 2025 in Kurdějov and the Paul Ehrlich MedChem 2026 conference in Pula, Italy. He is a consultant for four master's students.



Mgr. et Bc. Roman Viták

Mgr. et Bc. Roman Viták is a PhD candidate specializing in medical pharmacology and experimental oncology at the Faculty of Medicine in Pilsen, Charles University. His academic background combines expertise in bioorganic chemistry and toxicology, providing him with a multidisciplinary perspective on biomedical research and translational pharmacology.

He studied Toxicology and Analysis of Harmful Substances at the University of Hradec Králové, followed by a master's degree in Bioorganic Chemistry at the same institution. During his studies, he focused on molecular and biochemical mechanisms associated with neurodegeneration and cancer biology, including gene expression changes in amyloid beta-rich environments.

Since 2022, he has been working as a researcher at the Department of Pharmacology and Toxicology, Faculty of Medicine in Pilsen, Charles University. His research focuses primarily on the in vitro evaluation of androgen receptor antagonists and boron derivatives in prostate cancer cell lines. In addition to his research activities, he is involved in teaching as a part-time lecturer in Toxicology for Laboratory Diagnostics in Healthcare at the Faculty of Health Studies, University of West Bohemia.

He is the author and co-author of scientific publications focused on anti-androgenic compounds, prostate cancer biomarkers, and vitamin D supplementation. His work has been presented at national and international scientific conferences.

Insights into Oncological and Palliative Treatment and Care

Samuel Vokurka[1,2]

[1] Department of Oncology and Radiotherapeutics, University Hospital, Faculty of Medicine in Pilsen, Charles University
[2] Center for Palliative and Supportive Medicine, Faculty of Medicine in Pilsen, Charles University

Oncological treatment—typically comprising chemotherapy, radiotherapy, hormonal therapy, and modern targeted therapy—offers higher chances of long-term survival and reduces the risk of oncological recurrence when malignancy is detected early. In the case of metastatic disease, the prospects for a complete cure are minimal. Although such an outcome may occur in certain cases through a combination of surgical interventions and the aforementioned oncological treatments, the primary goal for the vast majority of patients is to prolong survival while maintaining a good quality of life, acknowledging that the disease is incurable. However, thanks to modern treatment modalities (primarily immunotherapy with checkpoint inhibitors including anti-PD-1/PD-L1, anti-CTLA-4, and anti-LAG-3) and specific targeted therapy, a significant improvement in overall survival is achievable even in previously virtually untreatable, rapidly progressing diseases, such as metastatic melanoma, renal cell carcinoma, or prostate cancer, among others. For all oncological patients, regular monitoring of disease progression is essential, utilizing clinical assessment, imaging modalities, and tumour markers. These markers serve as supportive tools that complement the clinical picture and guide decision-making regarding the timing of treatment initiation or modification. For patients with incurable oncological disease, it is crucial to be aware of the options for collaboration with palliative care specialists. In cases of prognostically unfavourable diseases with a life expectancy of less than one year, early engagement with a professional palliative team is advisable. Oncological and palliative care should be delivered concurrently to ensure that the transition to end-of-life care—following the cessation of active oncological treatment—is natural and seamless. The timely integration of palliative medicine into the care of patients with an unfavourable prognosis constitutes a key component of comprehensive care, which demonstrably improves both quality of life and patient survival.

Prof. MUDr. Samuel Vokurka, Ph.D.

Prof. MUDr. Samuel Vokurka, Ph.D. (born February 6, 1972, Pisek) is a full professor specializing in clinical oncology and supportive care in medicine. He graduated from the Faculty of Medicine in Pilsen at Charles University. During his career, he obtained three attestations: in internal medicine, hematology, and clinical oncology. He earned his Ph.D. degree and later completed his habilitation at the Faculty of Medicine in Pilsen, Charles University, where he was appointed full professor in 2018. He began his professional career in 1996 at the Department of Hematology and Oncology at the University Hospital and Faculty of Medicine in Pilsen, Charles University. In 2016, he moved to the Department of Oncology and Radiotherapy, where he has focused on the systemic treatment of solid cancers and comprehensive supportive care for oncological patients. He has been leading the Supportive Care Group of the Czech Oncological Society since 2018. In 2024, he established the Center for Palliative and Supportive Medicine at the Faculty of Medicine in Pilsen. His research, in cooperation with colleagues from the Biomedical Center of the Faculty of Medicine in Pilsen, focuses on markers predicting therapy response and specific treatment toxicity in patients with melanoma. He has also been involved in the long-term monitoring of the safety of granulocyte colony-stimulating growth factors, as well as many supportive care projects in cancer. He is the lead author of 8 books and the author or co-author of more than 190 papers. His work has received more than 800 citations, and his H-index is 15 according to the Web of Science.

LncRNA SH3GL3-5:3 level in serum is associated with prognosis in metastatic prostate cancer treated by ARTA agents

Jindra Windrichová[1], Ondřej Fiala[2,3], Hana Grundmannová[1], Jiří Polívka[3], Martin Pešta [4] Ondřej Topolčan[1], Jindřich Fínek[2]
windrichovaj@fnplzen.cz

[1] Department of Immunochemistry Diagnostics, University Hospital in Pilsen, Czech Republic
[2] Department of Oncology and Radiotherapeutics, Faculty of Medicine and University Hospital in Pilsen, Charles University, Czech Republic
[3] Biomedical Center, Faculty of Medicine in Pilsen, Charles University, Czech Republic
[4] Department of Biology, Charles University, Faculty of Medicine in Pilsen, Czech Republic

In the present retrospective study we focused on the prognostic role of serum long non-coding RNA (lncRNAs) in metastatic castration-resistant prostate cancer patients treated with the next-generation androgen receptor signaling inhibitors (ARSIs) represented by abiraterone acetate or enzalutamide. Using TaqMan Human Prostate Cancer Array Card (Thermo Fisher Scientific) was tested more than 70 lncRNAs candidates. Expression of lncRNA Hs05299364_s1 corresponding to Lnc-SH3GL3-5 was analysed as statistically significant. It was identified as the sole independent risk factor significantly associated with shorter PFS and OS, i.e., disease progression and death. An antisense lncRNA localized within the HDGFRP3 locus, may represent a novel regulator of transcriptional and epigenetic programs associated with prostate cancer progression and response to androgen receptor–targeted therapy (ARTA). Integrative analyses suggested that Lnc-SH3GL3-5 is functionally linked to HDGFRP3-mediated chromatin and transcriptional networks involving CDK12, CDK13, BRPF1, and BAZ2B, participating in RNA polymerase II transcription and adaptive transcriptional plasticity. Given the role of CDK12/13 in AR pathway, dysregulation of the Lnc-SH3GL3-5/HDGFRP3 axis may contribute to resistance-associated transcriptional reprogramming. These findings position Lnc-SH3GL3-5 as a potential biomarker and mechanistic modulator of (ARSIs) response in prostate cancer.
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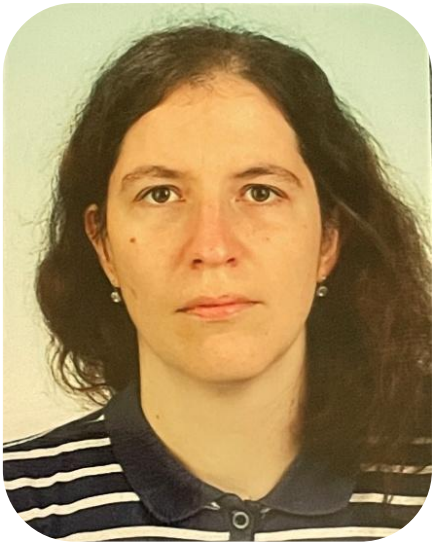

RNDr. Jindra Windrichová, Ph.D.

Jindra Windrichová (born May 3, 1982, Pilsen, maiden name Vrzalová) is a bioanalytic and researcher at the Department of Immunochemical Diagnostics, University Hospital Pilsen. She graduated from the Faculty of Pharmacy in Hradec Králové, Charles University, specializing in Healthcare Bioanalytics in 2005. During her career, she obtained two specialized qualifications as a bioanalyst for nuclear medicine and clinical biochemistry attestations in analytical chemistry. She completed her doctoral studies and earned her Ph.D. degree at the Faculty of Medicine in Pilsen, Charles University, in internal medicine with a focus on multiplex analysis.

In 2004, she received the Josef Hlávka Award and in 2009, the Dr. Grafton Chase Award from the American Clinical Laboratory Immunoassay Society (CLAS).

As an expert guarantor and lecturer, she contributed to the courses of Chemistry, Analytical Chemistry, Good Laboratory Practice for the Health Laboratory Technician program at the University of West Bohemia in Pilsen, Faculty of Health Studies and she teaches laboratory courses in Medical Chemistry and Biochemistry for General Medicine program at the Faculty of Medicine in Pilsen, Charles University.

She collaborates on research projects and participates in both international and national grant initiatives within the Faculty of Medicine in Pilsen and University Hospital Pilsen, primarily focusing on biomarker research in cancer diagnostics and endocrinology, growth factors and others using multiplex analysis and modern molecular biology techniques. She is the co-author or author of more than 60 articles published in international peer-reviewed journals, with more than 900 citations and H-index of 19 according Scopus.