NATIONAL TUMOR BIOLOGY LABORATORY

SCIENCE AGAINST CANCER

The National Tumour Biology Laboratory aims to enhance efficiency of patient care and improve modern therapeutic procedures. At the core of its comprehensive research and development programme lies the optimisation of tumor-specific diagnostic and therapeutic procedures, and the introduction of new procedures into daily clinical practice, thereby reducing tumor-related mortality.

MAIN RESEARCH AREAS

- Development of a national, complex oncology database
- Innovative therapies based on modifications of redox systems
- Preclinical and clinical application of new therapeutic procedures

IMPLEMENTER:
National Institute of Oncology

PROJECT NUMBER: 2022-2.1.1-NL-2022-00010

FUNDING PERIOD: 01.01.2022 - 31.12.2025

OVERALL BUDGET: 2.000.000.000 HUF

PROGRAM FINANCED
FROM THE NRDI FUND

BENEFITS TO BE EXPECTED FROM LABORATORY RESEARCH

- Development of innovative cancer therapeutic approaches, early diagnostic methods as well as non-invasive and sensitive screening procedures.
- Implementation of more effective therapeutic, early diagnostic, screening and prevention procedures of malignant diseases.
- An increase in the number of cancer survivors and in the number of years spent in good health.

THE PROFESSIONAL TEAM

Representative lead researchers of the team:

Prof. Péter Nagy, DSc, Principal investigator

Prof. Péter Nagy is the scientific director of the National Institute of Oncology and the Head of the Molecular Immunology and Toxicology Department. He is full professor at the University of Veterinary Medicine and at the University of Debrecen. He is a senior official in several European organizations including: Elected Full Member of the European Academy of Cancer Research, Hungarian Delegate to the Scientific Committee for the 5th European Code Against Cancer of the WHO's International Agency for Research on Cancer (IARC), Accreditation and Designation Board Member of the Organization of European Cancer Institutes (OECI) and Member of the EURACAN Management Board. He has been the recipient of several scientific awards including the Doctorate of Science from the Hungarian Academy of Sciences (DSc), the Marie Curie Reintegration Fellowship and the Bolyai Plaque. Former Secretary General of the Hungarian Cancer Society. Secretary of the Tissue and Cell Bank and Regenerative Medicine Section of the College of Medical Profession. As an invited speaker, he is a permanent invited participant in international conferences and serves on various scientific committees, among others the Gordon Research Conference, FEBS Redox Biology Section, organizer of the 6th World Congress on Hydrogen Sulfide Biology and Medicine. Serves as editorial member for leading professional journals such as Antioxidants and Redox Signaling, Journal of Biological Chemistry, British Journal of Pharmacology, and Molecular Oncology. He publishes the results of his scientific work in major international journals such as PNAS, Science Advances, Nature Chemical Biology, Cancer Discovery, Lancet Oncology, etc. According to the science-wide author database of standardized citation indicators by Stanford University he is among the 0.5% of researchers worldwide.

Prof. Dr. Csaba Polgár is a leading researcher in the project and holds the position of Director General at the National Institute of Oncology. He has been working at the Institute's Department of Radiotherapy since 1993. He held the role of senior physician from 1999 and chief physician from 2000. In 2002, he was appointed as Deputy Head of Department, and was promoted to Head of Department in 2009, and Center Director in 2012. In 2013, he was named as Deputy Director General, and since 2018 he has been acting as Director General and Chief Physician of the Institute. Since 2009, he has been professor at the Department of Medical Training of the University of Medicine and Pharmacy of Târgu Mureş. In 2015, he was appointed as acting Head of the Department of Oncology at the Faculty of General Medicine of Semmelweis University, and since 2016 he has been Head of the Department. He obtained the following qualifications and diplomas: Radiotherapy board examination in 1997; Clinical Oncology board examination in 2000; Ph.D. diploma in 2001. He habilitated at Semmelweis University in 2007, and has been a professor at the University since 2015. In 2017, he was awarded the Doctorate of Science from the Hungarian Academy of Sciences (DSc).

Dr. Zoltán Takácsi-Nagy is a leading researcher in the project. He held the role of assistant physician from 1993, junior physician from 1997, and senior physician from 2001 at the Institute's Department of Radiotherapy. He became chief physician in 2005 and progressed to become Head of Unit in 2007. Since 2009, he has been the Deputy Director of Education. Since 2018, he has been acting as Deputy Director General of the Institute. He obtained the following qualifications and diplomas: Radiotherapy board examination in 1997; Clinical Oncology board examination in 2000; Ph.D. diploma in 2005. He habilitated at Semmelweis University in 2011. Since 2015, he has been an associate professor in the Department of Oncology at Semmelweis University.

Prof. Dr. Attila Patócs, DSc is a leading researcher in the project. Medical Director of the National Institute of Oncology and Head of the Department of Molecular Genetics, Professor Patócs is a specialist in Medical Laboratory and Molecular Genetic Diagnostics. He obtained his PhD in 2005, habilitated in 2018 at Semmelweis University, and in the same year he was awarded the Doctorate of Science from the Hungarian Academy of Sciences (DSc). Formerly, he was the Head of the Momentum Research Group responsible for the complex diagnostic care of patients with hereditary cancer syndrome at the Institute. Since 2021, he has been holding the position of Secretary General of the Hungarian Cancer Society. As a member of the National Molecular Multi-Disciplinary Team and the Professional Council of Clinical Genetics, he also professionally coordinates molecular diagnostic testing for Hungarian patients. He is a member of the European Reference Network of Rare Hereditary Endocrine Patients (ENDOERN) and the leader of the Hereditary Endocrine Tumor Syndrome Group (MTG4).

Prof. Dr. Elias Arnér is a senior researcher in the project. He is the Head of the Department of Selenoprotein Research at the National Institute of Oncology. An internationally recognized researcher in the field of selenoprotein functions, redox regulation of cellular signaling pathways, and anti-cancer therapies based on targeting these pathways. In 2009, he was appointed Professor of Biochemistry at the Karolinska Institutet in Stockholm, Sweden, and he is Head of the Department of Biochemistry, Department of Medical Biochemistry and Biophysics at Karolinska Institutet. He holds a PhD (1993) and an MD (1997) degree from the Karolinska Institutet. Since 2020, he has been leading the newly established Department at the National Institute of Oncology.

Prof. Dr. Gabriella Liszkay is a senior researcher in the project. Dermatologist, Clinical Oncologist, Head of the Department of Dermato-Oncology. She is a lead investigator in several international multi-center studies, the leader of the Dermatology Multidisciplinary Team, and the secretary of the College of Dermatology. She has been a leader in researching and introducing innovative therapies for melanoma in the clinic. Since 2019, she has been a member of the advisory board of the Central and Eastern European Academy of Oncology, and since 2020 a member of the Medical Research Council Scientific and Ethics Committee (ETT-TUKEB).

Prof. Dr. Péter Tenke is Head of the Department of Urology at the National Institute of Oncology. He is a robotic surgeon, and the first Hungarian to hold a proctorship in robotic surgery.

Dr. József Tóvári is a senior researcher in the project. He is Head of the Department of Experimental Pharmacology. He graduated with a degree in Biology from Eötvös Loránd University in 1994 and subsequently defended his PhD dissertation at Semmelweis University (SOTE) in 1999. His research group specializes in tumor progression and new therapies, for which he has won several national and international basic research and R&D grant applications as a principal investigator.

Dr. Zsolt Jurányi, PhD is a senior researcher in the project. He is the Head of Department of Clinical Radiobiology and Oncocytogenetics.

Dr. Zoltán Novák, PhD is Chief Physician of the Department of Gynaecology, Obstetrician-Gynaecologist and Gynaecological Tumor Surgeon. At his department, surgical and pharmaceutical treatments are conducted, alongside significant diagnostic activities.

Dr. József Lövey, PhD is a senior researcher in the project. His research activities include the study of radiosensitivity and radiosensitization of tumors in vitro, in vivo and clinical trials, as well as the complex treatment of neurological tumors at the institute.

Prof. Dr. Ferenc Rényi-Vámos, PhD, Med. Habil. is Chief Physician and Head of the Thoracic Center. He is Head of the Hungarian Lung Transplant Program, Professor at Semmelweis University, and Head of the Department of Thoracic Surgery at Semmelweis University.

Dr. Lajos Géczy, PhD is Head of the Pharmacotherapy Center, Head of the Department of Urogenital Tumors and Clinical Pharmacology. The main profile of his department is the treatment of uro-oncological tumors, in addition to conducting clinical pharmacology studies.

Dr. Gábor Rubovszky, PhD Chief Physician and Head of Department of Pharmacotherapy, Department of Thoracic and Visceral Tumors and Clinical Pharmacology. The department performs complex pharmacological treatment of oncology patients with solid tumors. The department extensively collaborates in scientific programs in the field of pharmacological oncology.

Dr. Ferenc Oberna, PhD Chief Physician and Head of the Head and Neck Tumors Multidisciplinary Center. Specializes in surgical rehabilitation of head and neck cancer patients with microvascular free lobes, oral rehabilitation, aesthetic facial surgery and orthognatic surgery.

Dr. István Kenessey, PhD pathologist, Head of the National Cancer Registry.

Dr. András Wéber, PhD senior epidemiologist of the project.

Dr. János Szőke, PhD Chief Physician and Head of the Center of Tumor Pathology. His primary area of interest is the pathology of lung tumors.

Dr. Erika Tóth, PhD Chief Physician and Head of the Surgery and Molecular Tumor Pathology Department, with a main focus on the pathology of head and neck tumors and lymphomas, and the molecular pathology diagnosis of solid tumors.

Dr. Dávid Tárnoki and Dr. Ádám Tárnoki, PhD, Med.Habil. are Head of Center and Head of Department of the Oncology Imaging and Invasive Diagnostics Center, respectively. They are responsible for radiogenomic research.

Dr. Ladányi Andrea, PhD is Head of the Tumor Biology Laboratory at the Department of Surgery and Molecular Pathology.

Dr. Borbála Székely, PhD clinical oncologist, assistant professor of the Department of Pharmacotherapy, Department of Thoracic and Visceral Tumors and Clinical Pharmacology.

Dr. Henriett Butz, PhD specialist in Medical Laboratory, Clinical and Molecular Genetic Diagnostics, Chief Physician and Head of Center of the Oncology Biobank Center. Her research mainly focuses on 3-dimensional modelling of tumors and research into resistance mechanisms.

POSSIBLE PARTNERSHIPS

The National Institute of Oncology maintains an extended network of international relations based on diverse bilateral agreements and cooperation. The Institute’s researchers collaborate closely with outstanding research groups across 4 continents, expanding scientific collaborations, exchanging staff and jointly training students and young scientists.

Among others:

- Twinning institutional agreement with the Karolinska Institutet and Karolinska Institutet University Hospital (Karolinska Comprehensive Cancer Center)
- Subaward agreement with Montana State University, Bozeman, MT
- Cooperation agreement with the German Cancer Research Center (Deutsches Krebsforschungszentrum), Heidelberg
- Cooperation agreement between Prof. Elias Arnér (Karolinska Institutet, Stockholm) and the National Institute of Oncology: a research laboratory was established to further deepen the international cooperation on translational research activities
- Cooperation agreement with The State Budgetary Healthcare Institution "St. Petersburg Clinical Research and Practical Center for Specialized Types of Medical Care (Oncology) named after N.P. Napalkov”, Saint Petersburg
- Cooperation agreement with George Emil Palade University of Medicine, Pharmacy, Science and Technology of Targu Mures, Targu Mures
- Cooperation agreement with the Can Tho Oncology Hospital, Can Tho
- Cooperation agreement with the University of Latvia, Riga
- Cooperation agreement with Riga East University Hospital, Riga

The Institute’s extensive international relations include the world's leading organizations (e.g. WHO, IARC, IPRI, ESO, OECI, ECCO, ESTRO, ESMO, EACS, EACR, etc.), and is the sole representative of the Central and Eastern European region in numerous international consortium projects such as the EurocanPlatform project. A notable outcome of the project was the formation of the Cancer Core Europe (CCE) Cancer Research Consortium, comprising the 7 largest centers in the EU. The consortium serves as a pillar of the “Cancer Mission” of the Horizon Europe Framework Program. The National Institute of Oncology played a key role in the program and in its development. Representing the Central and Eastern European region in the pre-mission lobbying, we participated at the Vatican Conference and the Gago meeting series — organized to develop and declare the mission — with presentations and round table moderation.

One of NTL’s key objectives and long-term plans is to actively engage in mission programs that ensure sustainability and foster development. The Institute is represented in major flagship initiatives of the Cancer Mission, such as the 4.UNCAN.eu project, where it led a Work Package on Reducing Inequalities in Cancer Research. The goal of the initial phase of the initiative was to develop a blueprint for the establishment of the Federated Cancer Research Data Hub, a project comparable to the Cancer Moonshot℠ project in the United States.
The Institute is also involved in several significant European consortial projects associated with the Cancer Mission, the Europe Beating Cancer Plan, and other initiatives:

- 4.UNCAN.eu - A Coordination and Support Action to prepare UNCAN.eu platform;
- CraNE - Network of Comprehensive Cancer Centres: Preparatory activities on creation of National Comprehensive Cancer Centres and EU Networking;
- JANE - Joint Action on Networks of Expertise;
- eCAN - Joint Action on Strengthening e-health, including telemedicine and remote monitoring for healthcare systems for cancer prevention and care;
- PCM4EU - Personalised Cancer Medicine for all EU citizens;
- CCI4EU - Comprehensive Cancer Infrastructures 4 Europe;
- ECHoS - Establishing of Cancer Mission Hubs: Networks and Synergies;
- EUonQoL - Quality of Life in Oncology: measuring what matters for cancer patients and survivors in Europe;
- PRIME ROSE - Precision Cancer Medicine Repurposing System Using Pragmatic Clinical Trials;
- ORION - Joint Action on Contribution to the Cancer Inequalities Registry to Monitor National Cancer Control Policies;
- GDI - Genomic Data Infrastructure;
- Magic Bullet Reloaded - Small Molecule Drug Conjugates for Targeted Delivery in Tumor Therapy (European Union’s H2020 research and innovation programme under Marie-Sklodovska Curie grant:);
- INTERCEPTOR - INTercEption of oRal CancEr develoPmenT;
- ERN EURACAN - European Reference Networks for Solid Tumors;
- ENDOERN - European Network of Rare Diseases of Endocrinology;

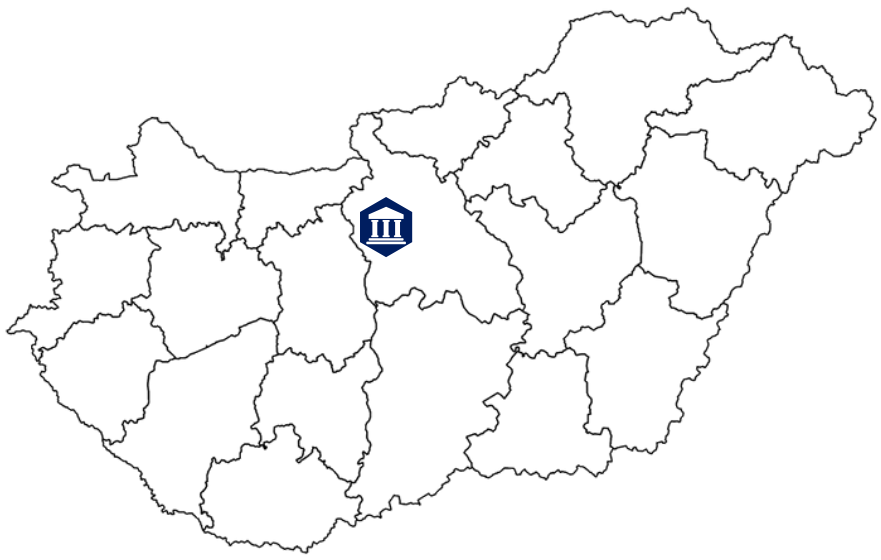
In addition to the involvement in the activities of international organizations, 14 of the Institute’s scientists serve as members of national colleges of medical professions and are also responsible for the quality of patient care in Hungary. Our leading researchers regularly organize world congresses and give invited lectures at prestigious conferences (e.g. at several Gordon, EACR, ESTRO, ESSO, etc. conferences).
The mission of the National Tumor Biology Laboratory is to establish a centralized hub for research collaboration among the various departments and clinicians at the National Institute of Oncology, while maintaining and fostering extensive networks both within Hungary and internationally. In addition to our scientific endeavours, we are committed to actively participating in doctoral and specialist training programs in collaboration with leading Hungarian Universities, and we proudly chair two Medical University Departments of Semmelweis University. We also maintain an extended network of cross-border training programs. As a testament to our dedication to global scientific advancement, we are currently engaged in the development of international joint postgraduate training programs between our Institute and the prestigious Karolinska Institutet.

TARGET GROUP

- Medical professionals and healthcare providers involved in care of cancer patients
- Researchers interested in tumor biology

PLACE OF IMPLEMENTATION:

- Budapest



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