NATIONAL LABORATORY FOR HEALTH SECURITY

MANY DISCIPLINES FOR ONE HEALTH

The vision of the National Laboratory is to provide the scientific basis for data and analysis-based decision making in the fields of health, disease prevention and ecosystems in Hungary. The three areas are closely intertwined and new synergies will be created through innovative surveillance systems, big data methods and mathematical modelling.The NL will bring together and coordinate research teams that have been working in isolation in the country, fostering networking and creating a collaborative research community with high visibility on the international scene.

MAIN RESEARCH AREAS

- Mathematical epidemiology, network science, biostatistics
- Eco-epidemiology
- Zoonotic viruses and bacteria
- Invasion biology
- Ecological causes and consequences of invasion
- Prediction and prognostics
- Diagnostic decision support
- Data-driven health decision support

CONSORTIUM LEADER

University of Szeged

CONSORTIUM PARTNERS

Eötvös Loránd University
Hungarian University of Agriculture and Life Sciences
HUN-REN Centre for Agricultural Research
HUN-REN Centre for Ecological Research
HUN-REN Centre for Social Sciences
HUN-REN Institute for Computer Science and Control
HUN-REN Rényi Alfréd Institute of Mathematics
HUN-REN Szeged Biological Research Centre
HUN-REN Veterinary Medical Research Institute
Neumann Nonprofit Ltd.
Óbuda University
Pázmány Péter Catholic University
Semmelweis University
University of Pécs
University of Veterinary Medicine Budapest

PROJECT NUMBER: RRF-2.3.1-21-2022-00006

FUNDING PERIOD: 01.03.2022 - 28.02.2026

OVERALL BUDGET: 8.321.000.000 HUF

BENEFITS TO BE EXPECTED FROM LABORATORY RESEARCH

Preparation for any threats to health security, risk assessments for emerging pathogens, their vectors and reservoir hosts as well as invasive species; mitigating their health, social, environmental and economic impacts, and preventing national crisis. Development of AI tools for diagnostic decision support, digital and data-driven healthcare development, nationwide and system-level integration of solutions.

THE PROFESSIONAL TEAM

Division of Mathematical Epidemiology:

Beatrix Oroszi, Head of the Centre for Epidemiology and Surveillance, SOTE; former Director General of the National Centre for Epidemiology, Deputy Member of the Board of the European Centre for Disease Prevention and Control representing Hungary between 2012 and 2017.

Péter L. Simon, Professor, Director of the ELTE Institute of Mathematics, is an internationally renowned expert on network epidemiological models and author of a seminal monograph on the subject.

Viktor Müller, theoretical biologist, Deputy Dean of the ELTE Faculty of Science, researcher of ETH Zurich Institute of Integrative Biology, recognized expert in evolutionary ecology and epidemiology.

Attila Csikász-Nagy is a systems biologist, professor at the Pázmány University and fellow at King's College London. He is a recognised expert in the dynamics and modelling of molecular and cellular networks.

Tamás Ferenci is a biostatistician, Associate Professor at the Centre for Physiological Control, University of Óbuda, member of Levente Kovács's ERC research group, and a recognised expert in clinical and epidemiological statistics.

László Lovász, ELKH Rényi Institute, one of the world's leading mathematicians, needs no introduction. He is currently Thematic Leader of an ERC Synergy Grant on the mathematics of networks.

Gábor Szederkényi, scientific advisor at the ELKH SZTAKI Systems and Control Theory Research Laboratory and professor at PPKE University, is an eminent expert in control theory.

Júlia Koltai is a member of the Computational Social Science research group of the ELKH TK , an ERC and Lendület funded research group, expert in the field of communication networks, winner of the MTA Premium and Momentum grants.

Balázs Papp, Head of the Computational Systems Biology Laboratory at ELKH SZBK, HCEMM team leader, winner of Momemtum, Wellcome Trust and Frontline grants.

Division of Invasion Biology:

Senior scientists:
ÖK-ÖBI: Péter Batáry (agroe-cology, landscape ecology, urban ecology)
ÖK-ÖBI: Orsolya Valkó (plant ecology, landscape ecology, restoration)
ATK NÖVI: Ferenc Samu (plant conservation zoology, animal ecology)
MATE-VTI: Krisztián Katona, Miklós Heltai (wildlife biology)
ÁTKI: Károly Erdélyi (pathology, virology)
ÁTE: Petra Forgách (molecular epidemiology)
PTE: Kurucz Kornélia (molecular ecology)

Division of Eco-epidemiology

Prof. Eörs Szathmáry, member of the Hungarian Academy of Sciences, biologist, research professor at the ÖK Institute of Evolution, international authority on evolutionary biology, has significant experience in co-ordinating large projects (e.g. ERC Advanced Grant, FET Open, GINOP). His publication activity is outstanding, and his research interests have turned towards the evolutionary ecology of emerging pathogens in recent years. As an individual applicant, consortium leader or member, the grants he won exceed 8 million Euros. His renowned activities cover, among others, major evolutionary transitions, evolutionary dynamic modeling, classification of replicators, and the relationship between evolution and learning. Between 1996 and 2002, he was the president of IOSEB (International Organization for Systematic and Evolutionary Biology). He was a visiting researcher and professor in London, Berlin, Zurich, Paris and Munich. Member of the Executive Board and Board of the Hungarian Academy of Sciences, chairman of the Presidential Committee on Sustainable Development.

Gábor Kemenesi, PhD biologist, researcher at the National Laboratory of Virology, assistant professor at the University of Pécs. One of the leading domestic specialists in emerging infectious diseases, he does pioneering work on the subject on several continents. He is qualified for both field and laboratory testing of pathogens with the highest risk of infection (BSL-4). His scientific achievements have been awarded with several prestigious awards. His publications appear in leading scientific journals.

Miklós Gyuranecz, PhD, veterinarian, his field of research is infectious diseases, bacterial pathogens and zoonoses. He leads a research group of 15 people at the Research Institute of Veterinary Medicine, and is a titular university professor at the University of Veterinary Medicine. He is the author of 115 peer-reviewed scientific articles and 3 book chapters, and was an invited speaker at conferences 28 times. His achievements have so far been recognized with 8 different awards, including the Academic Youth Award, the Visegrád Four Youth Award, the Szent-Iványi Youth Award, the Hőgyes-Aujeszky Memorial Award, the Junior Príma Award and the Derzsy Award. As a principal investigator, between 2012 and 2019, he won a total of 2.07 million euros in research support in domestic and EU grants. His laboratory functioned as an OIE tularemia reference laboratory between 2015 and 2018. Supervisor of three defended and 4 active PhD students.

Division of Data-driven Health:

Dr. habil. Éva Belicza (fields of expertise: quality assessment of health services, patient safety). President of NEVES Association for Patient Safety.

Prof. Dr. Péter Mátyus (PhD in Organic and Medicinal Chemistry, 2017 Assistant Professor at the SE Institute of Digital Health Sciences, Lecturer at the Doctoral School of Pharmaceutical Sciences).

Péter Pollner PhD (Theoretical and mathematical physics, complex systems, networks), member of the MTA-ELTE Statistical and Biological Physics Research Group, Member of the Department of Biological Physics at ELTE and SE Centre for Health Management Training).

Prof. Dr. András Kiss (Doctor of Medicine; specialising in pathology, molecular pathological diagnostics and cytopathology). Member of several renowned international and national societies (International Academy of Pathology, Hungarian Section, International Council, Hungarian Society of Pathologists, Hungarian Society of Oncologists, Hungarian Society of Gastroenterologists).

Tamás Joó Phd is an economist, certified health policy expert and electronic information security manager. Since 2014, he has been involved in the preparation and implementation of nationally and internationally funded projects as a senior health economist at Semmelweis University, Centre for Health Management Training. She is involved in research and education in various areas related to digital health, data science, artificial intelligence, industrial influencing techniques, health security and cyber security.

Dr. Tamás Palicz (Management of Health and Public Service Organisations, Health Cybersecurity) is currently Deputy Director of the Centre for Health Management Training at Semmelweis University, with 20 years of senior management experience in health and public services.

Dr. Judit Lám PhD. pharmacist, associate professor, certified health care manager, quality and patient safety manager. She has participated in the development of the "NEVES" Patient Safety Programme and is an expert in several related international projects (e.g. PATH, PaSQ, EuroHOPE). He continuously trains healthcare managers, residents and postgraduate students on quality of healthcare and patient safety. Since 2016 he is also responsible for the operational management of HSMTC and from 2020 he will be the Deputy Dean General of the Faculty of Public Health at Semmelweis University.
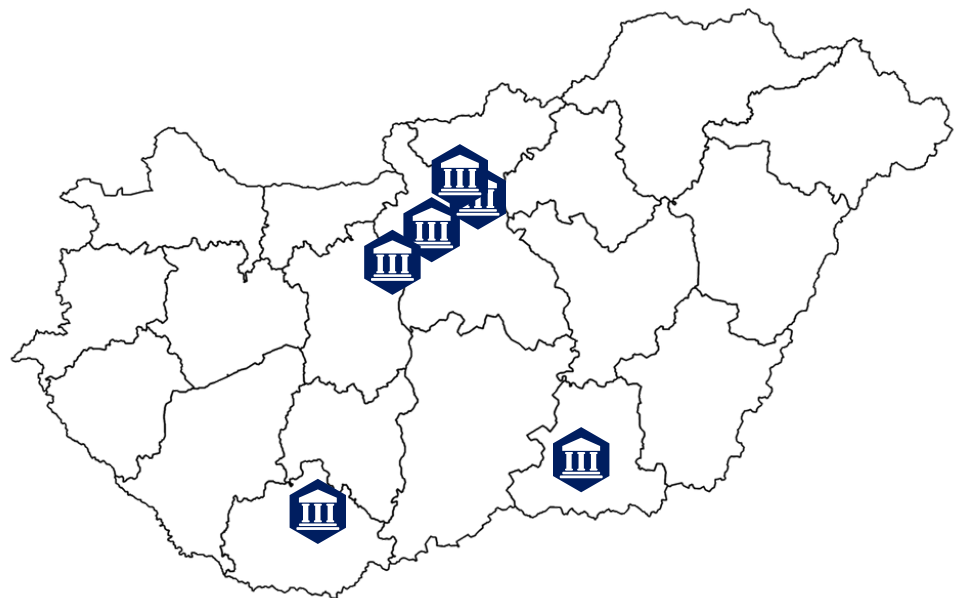
POSSIBLE PARTNERSHIPS

The activities of the national laboratory are in line with global trends, and are thus linked to the international centres of scientific excellence and European partnership programmes in the field of health security, furthermore the NL plays a proactive role in regional cooperations. An important objective is to ensure, besides public health, the social-economical exploitation of scientific results and enhancing health security for organisations, from SMEs to large companies. The national laboratory participates in data driven health R&D projects, cooperates with various government and public institutions, and assists decision-makers. The NL co-operates with healthcare providers.

TARGET GROUP

- Researchers, research teams involved in the project (higher education institutions, research-knowledge intermediary organisations, industry)
- Researchers, PhD students, young researchers involved in the implementation
- Industry decision-makers
- Existing and potential new collaborating RDI enterprises - with SMEs
- Potential international R&D partners
- General public, citizens, citizens

PLACES OF IMPLEMENTATION:

- Budapest
- Gödöllő
- Martonvásár
- Pécs
- Szeged
- Vácrátót

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