

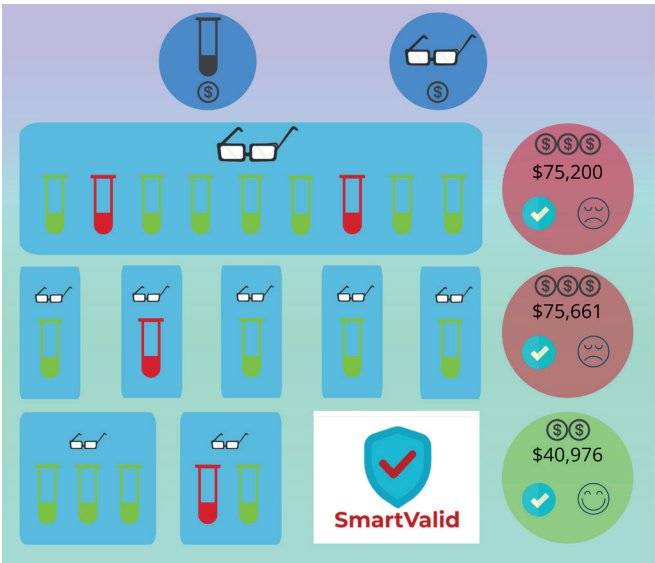
COMPUTATIONAL MEDICINE  
RESEARCH GROUP

Choose Your Sample Size Smarter — Save Time, Money, and Effort

Optimize your study design with SMARTVALID, our proprietary system powered by advanced statistical learning algorithms. SMARTVALID helps you determine the optimal sample size for validating the efficiency of your product — whether it’s a diagnostic test, AI-based tool, or bio-pharma methodology — in a cost-effective and scientifically robust way.

When dealing with heterogeneous populations, SMARTVALID can even leverage that diversity to maintain the same statistical power with fewer samples compared to standard methods — accelerating your validation process and reducing expenses.

Beyond advanced biostatistics, our Computational Medicine Group offers expertise in developing computational, data-driven, and AI-based predictive models and high-resolution computer simulations of biomedical systems — supporting you from concept to clinical validation.



ABOUT THE HEADQUARTERS

Located in Szeged, Hungary, the headquarters of the Hungarian Center of Excellence for Molecular Medicine (HCEMM) serve as the operational and administrative Center of the organization. It provides the infrastructure and coordination necessary to connect HCEMM’s nationwide research network and international partnerships.

The Szeged headquarters play a key role in ensuring efficient communication between research groups, project management teams, and external collaborators. It also supports the strategic planning and implementation of HCEMM’s scientific programs, fostering collaboration between academia and industry.

Beyond coordination, the headquarters represent HCEMM’s commitment to creating a dynamic research environment that drives innovation, strengthens Hungary’s scientific landscape, and promotes the translation of discoveries into realworld healthcare benefits.

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RESEARCH  
AT HCEMM



ABOUT THE HCEMM

The Hungarian Center of Excellence for Molecular Medicine is a distributed Institute whose scientists develop advanced diagnostics for the early detection of diseases, companion diagnostics to monitor disease progress and treatment options supporting healthy aging in collaboration with industrial and academic partners.

The HCEMM program is currently funded by an H2020 Teaming Grant (where Semmelweis University, the University of Szeged and the Hun- Ren Biological Research Center, Szeged, cooperate with their advanced partner, the European Molecular Biology Laboratory, headquartered in Heidelberg, Germany), a Thematic Excellence award, as well as a National Laboratory award from the Hungarian government.

The various activities are coordinated by HCEMM Kft., headquartered in Szeged, Hungary. HCEMM operates at the intersection of academic and industrial research, focusing on topics related to translational medicine up to Phase I Clinical trials. The goal is to enhance the quality of life for an aging Hungarian population while simultaneously reducing the cost of healthcare provision through innovative applications in the field of molecular medicine.



This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 739593.

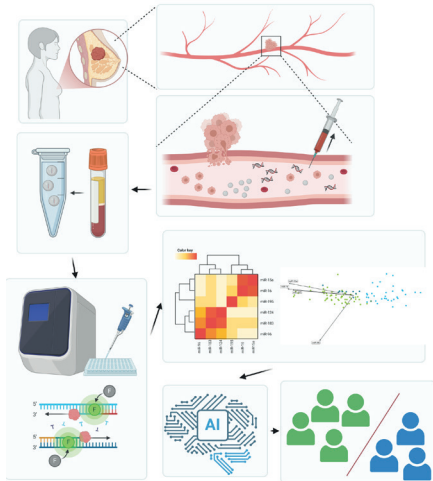
GENOME INTEGRITY AND DNA REPAIR CORE GROUP

**Blood-Based microRNA Profiling:**  
Standardized in-house protocol for miRNA extraction and quantification from blood, plasma, and serum. Supporting clinical trial monitoring, and early-stage diagnostic development.

**Circulating DNA (cfDNA) Diagnostics:**  
NGS-based serum cfDNA workflows provide non-invasive platform for disease progression, treatment response, and early diagnostics to detect specific pathogen mutation profile of a specific cancer.

High-Capacity Multi-Omics Data Analysis and Integration NGS and proteomics bioinformatics for large-scale data processing on our high-performance server. We offer integrated transcriptomics, miRNA sequencing, genome, and proteomics analyses for efficient biomarker discovery and therapeutic target validation.

- Why collaborate with us?**
- ISO-compliant, standardized lab services.
  - Expertise in liquid biopsy.
  - We combine diagnostic innovation with research to deliver reliable solutions for industrial partners.

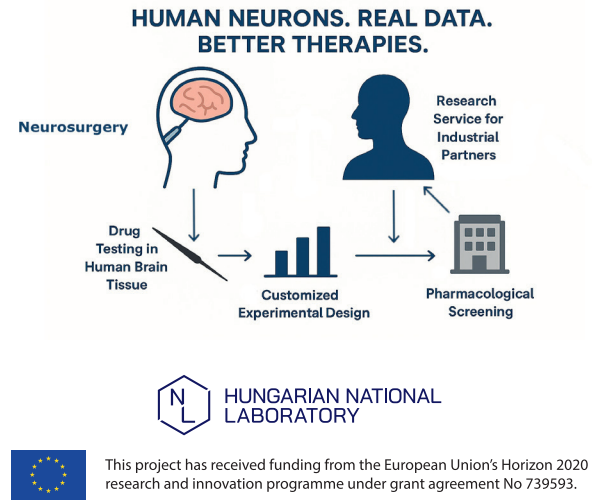


HUMAN NEURON PHYSIOLOGY AND THERAPY CORE GROUP

Human Neuron Physiology and Therapy Team offers a research service for industrial partners developing central nervous system (CNS) drugs, providing direct investigation of drug effects in living human brain tissue resected during neurosurgical operations.

By applying whole-cell microelectrode electrophysiology in acute human brain slices, we functionally evaluate compounds in native human neurons. Complementary microanatomical tissue analyses support functional findings, while customized experimental designs and comprehensive data analysis — provided in collaboration with the HCEMM Statistics Team — ensure scientifically robust and targeted outcomes.

Continuous access to ethically licensed human brain tissue is maintained through our collaboration with two neurosurgical hospitals. In addition, the HCEMM Legal Office and Translational Medicine Core Group support our partners with contract management, regulatory compliance, and translational guidance.



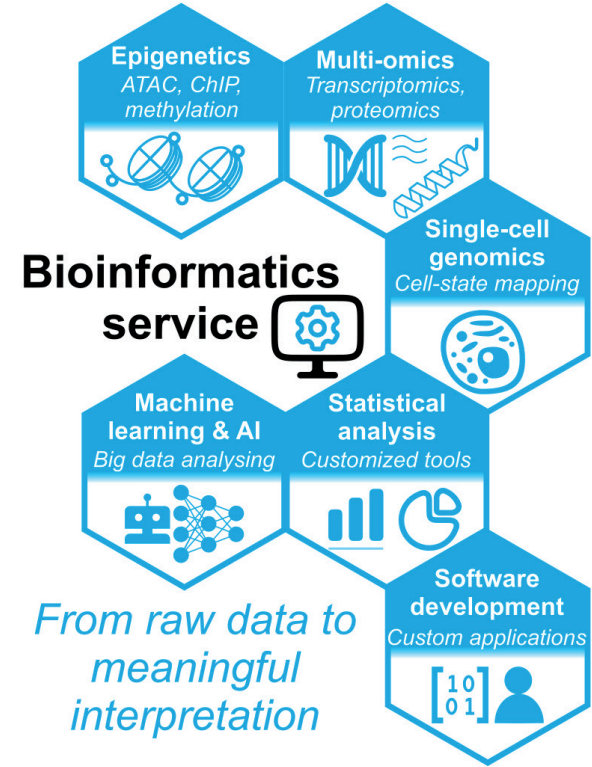
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CANCER GENOMICS AND EPIGENETICS CORE GROUP

The Cancer Genomics and Epigenetics team specializes in transforming complex biomedical data into meaningful insights. We provide comprehensive bioinformatics support, from raw data processing to fully analyzed, interpretable datasets.

By integrating experimental results with large public databases, we help uncover biological patterns and clinically relevant associations. In addition, we develop and apply machine learning and AI tools to classify patient samples and predict outcomes.

Our goal is to bridge data science and translational medicine to support precision diagnostics and research.



CANCER MICROBIOME CORE GROUP

Our mission is to pioneer next-generation technologies that reveal the complex cellular landscape of host-pathogen interactions.

We develop experimental methodologies and advanced immunostaining techniques, integrating confocal microscopy for high-resolution cellular mapping.

Our research harnesses the power of AI-based image analysis to uncover new biological insights with precision and speed. In parallel, we are advancing personalized, microbiome-based cancer risk assessment tools designed for early diagnostics.

Together, these innovations aim to transform biomedical research and clinical practice through intelligent, data-driven discovery.

