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NATIONAL INSTITUTE OF RESEARCH AND INNOVATION

Expression of interest from the National Institute of Research and Innovation to participate in consortia for the Horizon Europe Research Infrastructures Calls 2027

National Institute of Research and Innovation (NIRI) expresses its interest in joining consortia preparing project applications for the Horizon Europe Research Infrastructures Calls 2027, where **NIRI may act as research infrastructure/service provider, access provider, scientific/technical partner, or R&D partner**.

NIRI is a multidisciplinary research centre conducting fundamental, applied, and translational research across health, technology, and environmental sciences. NIRI is the highest-rated research organization in Latvia, according to the international evaluation of scientific institutions conducted in 2025. It is a member of 25 international organizations and consortia, including major ESFRI infrastructures such as EU-OPENSCREEN, BBMRI, EATRIS, and INSTRUCT, ensuring access to world-class research infrastructures and networks. NIRI has a strong track record in innovation and knowledge transfer, having developed 18 original drugs, more than 100 technologies, 9 vaccines, as well as establishing a biobank and a genome platform.

NIRI offers a broad range of R&D services and access to core facilities, providing expertise, advanced equipment, analytical platforms, and research infrastructure:

Area/core facility	Services/capabilities
Drug discovery and development	Synthetic hit-to-lead and lead optimization, *in silico* design and virtual high-throughput screening, natural products as leads, fragment-based lead discovery, structural biology: X-ray and NMR, biochemical and biophysical assays, recombinant protein production, MoA studies
Preclinical drug development, laboratory animal core facility	**Animal models of neurological and neurodegenerative diseases**. Stroke, traumatic brain injury, neuropathic pain, inflammatory pain, acute pain, epilepsy, depression, cognition and dementia, anxiety models **Experimental models of cardiovascular diseases**. Organ bath experiments, isolated heart according to Langendorff, measurement of blood pressure, echocardiographic assessment of cardiac anatomy and function, assessment of antiarrhythmic activity, myocardial infarction *in vivo* in rats, experimental atherosclerosis in mice **Drug metabolism and pharmacokinetics**. Pharmacokinetic assays, single and repeated dose safety (toxicity) studies ***In vitro* ADMET studies**. Plasma protein binding, chemical, microsomal, plasma, and blood stability, identification of metabolites, solubility and LogP/LogD assays **Animal models for cancer research**. Immunocompetent syngeneic orthotopic rodent models of breast cancer, melanoma, and prostate cancer for preclinical evaluation of anti-cancer and immunotherapeutic strategies **Animal models for vaccine efficacy testing**. Assessment of the immunogenicity, safety, and protective efficacy of novel vaccine candidates **Animal facilities**. Mice, rat, and hamster housing in individually ventilated cages in compliance with relevant EU animal welfare rules, surgery rooms and equipment (isoflurane anaesthesia system, intraoperative physiological monitoring system, etc.), quarantine, housing of extremely immunocompromised, germ-free, or gnotobiotic mice (ISOCage P cage system), designated rooms for immunodeficient and transgenic mice housing and procedures/surgery (individually ventilated cages, BLS2 laminar flow cabinet, isoflurane anaesthesia system, etc.), designated ABSL3 rooms for housing and procedures/surgery for mouse models for infectious diseases (individually ventilated cages, BLS2 laminar flow cabinet, isoflurane anaesthesia system, dedicated autoclave, etc.), consulting scientific personnel on the planning of procedures involving laboratory animals, training of scientific personnel for the work with laboratory rodents, *in vivo* 3D bioluminescence and fluorescence with IVIS and micro-CT imaging **Contract-based animal research services** (custom-designed animal studies)
Synthetic chemistry	Synthesis of reference compounds, asymmetric synthesis, separation of enantiomers, electrochemistry (batch and flow), photochemistry (batch and flow), fluorochemistry, selenium chemistry, nucleotide chemistry, C–H activation
Analytical chemistry	**Mass spectrometry services**. HRMS systems Synapt GII q-ToF, IT-ToF with UHPLC front-end, MS/MS analyses with UHPLC front-end, MALDI-TOF MS/MS

	Chromatography. HPLC/UHPLC systems with UV, PDA, MS, fluorescence, and ELSD detectors, gas chromatography with FID, TCD, and MS detectors **Microanalysis**. C, H, N, S elemental analysis **NMR facility**. 300 MHz, 400 MHz, and 600 MHz solution state spectroscopy equipment for detailed molecular analysis 1D; 2D, H, C, F, N, B, Si, 800MHz NMR system for solid state NMR studies **X-ray diffractometry**. Single crystal and powder X-ray diffractometry systems
Manufacturing technologies	Route scouting, route optimization, kilo-scale synthesis, impurity profiling, polymorphism testing, GMP stability testing, method validation, and QC analyses
Bioinformatics core facility	Whole-genome sequencing data analysis, whole-metagenome sequencing data analysis, population genetics data analysis, 16S rRNA sequencing data analysis, whole-transcriptome data analysis, *de novo* sequencing data analysis of microorganisms, consultations on the planning of high-throughput parallel sequencing experiments
Biotechnology core facility	Development and optimization of cultivation protocols for producers of recombinant proteins with microbiology support, development and optimization of recombinant protein purification protocols, application services for centrifuges and ultracentrifuges, bioreactor-fermentor support, contract studies, consultations for scientific personnel and industry in purification of recombinant proteins
Cell biology and microscopy core facility	Cell culture maintenance, cell banking and cell culture storage, establishment of primary cell cultures, routine mycoplasma testing, student training in cell culture techniques, cell analysis and sorting (FACSAria, BD, CYTEK Aurora, CYTEK Aurora CS), fluorescence microscopy (LEICA DMI 3000 B, LEICA DM 3000, and LEICA CTR6000), ELISPOT assays (ImmunoSpot CTL), Tecan Infinite F200 microplate reader, CellDrop FL automated cell counter (DeNovix), biochemistry laboratory for cell and tissue processing, LEICA TCS SP8 confocal microscope (visualisation of live and fixed cells, cell monitoring under normoxic and hypoxic conditions)
Genome centre	**Biospecimens and related data**. Collection of high-quality biological samples from more than 45 000 volunteers, manual and automated isolation of DNA and RNA from various types of biological material (including blood, feces, biopsies) and quality control, manual and automated sample pretreatment (including blood plasma, serum centrifugation, and aliquoting), storage and maintenance of sample collections in low and ultra-low temperature conditions, issuance of samples stored in LatBiobank and related data for research purposes, extraction of data from national health databases and registries related to the samples stored in the biobank **Molecular analyses**. Next-generation sequencing using MGI Tech, Illumina, Oxford Nanopore Technologies and Element Biosciences sequencing platforms: 1) whole genome sequencing (for genomes of various sizes); 2) transcriptome/metatranscriptome sequencing; 3) metagenomic sequencing (shot-gun and 16S rRNA gene variable region sequencing); 4) targeted amplification-based sequencing of specific genes, genomes; 5) spatial omics (transcriptomics, proteomics); 6) implementation and development of other next-generation sequencing applications). Manual and automated DNA/cDNA library preparation and quality control. Sanger sequencing (analysis of the length of any genome, any region, fragment), digital PCR for absolute quantification of biomarkers, and gene expression levels, qPCR. **Consultations** in establishing and maintaining biobanks following the principles of good international practice, organization of collection of high-quality biological samples, primary processing, in developing the design of genetic studies, evaluating the ethical aspects of the research, in developing the methodological design of studies based on next-generation sequencing.

NIRI welcomes the opportunity to collaborate with ESFRI infrastructures, higher education institutions, research institutes, and research-supporting organizations to advance excellence in research and innovation.

For further discussion on aligning NIRI expertise and strategic priorities with the consortium's vision and objectives, please contact:

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