REGISTRATION FORM

THIS IS A REGISTRATION FORM FOR HOST INSTITUTIONS WANTING TO ESTABLISH A DIOSCURI CENTRE OF SCIENTIFIC EXCELLENCE.

1. **Research institution data:**

   Łukasiewicz Research Network – PORT Polish Center for Technology Development,

   Sieć Badawcza Łukasiewicz – PORT Polski Ośrodek Rozwoju Technologii

   Stabłowicka 147, 54-066 Wrocław, PL

2. **Type of research institution[1]:**

   Institute of Lukasiewicz Centre

3. **Head of the institution:**

   Dr. Andrzej Dybczyński, Director

4. **Contact information of designated person(s) for applicants and the NCN:**

   Beata Lubicka, International Project Specialist, beata.lubicka@port.org.pl tel. 727665560**,** Sieć Badawcza Łukasiewicz – PORT Polski Ośrodek Rozwoju Technologii ul. Stabłowicka 147, 54-066 Wrocław, PL

5. **Research discipline in which the strong international position of the institution ensures establishing a Dioscuri Centre:**

   Applied life sciences and biotechnology

1 As specified in “Addressees of the call”

6. Description of important research achievements from the selected discipline from the last 5 years including a list of the most important publications, patents, other:

a) **Selected Publications**:

- **M. Misiak**, **M. Skowicki**, **A. Kowalczyk**, K. Prorok, S. Arabasz, **T. Lipiński**, A. Bednarkiewicz. *Biofunctionalized upconverting CaF2:Yb,Tm nanoparticles for Candida albicans detection and imaging*. Nano Research 10, 3333–3345 (2017) IF= 7.354
- A. Żywicka, K. Fijałkowski, **A. Junka**, J. Grzesiak, M. El Fray, *Modification of Bacterial Cellulose with Quaternary Ammonium Compounds Based on Fatty Acids and Amino Acids and the Effect on Antimicrobial Activity*. Biomacromolecules 19(5), 1528−1538 (2018) IF= 5.738
- **G. Chodaczek**, **M. Toporkiewicz**, M.A. Zal, T. Zal, *Epidermal T Cell Dendrites Serve as Conduits for Bidirectional Trafficking of Granular Cargo.* Frontiers in Immunology 22;9:1430 (2018) IF=5.511
- A. Żywicka, **A. Junka**, P. Szymczyk, **G. Chodaczek**, J. Grzesiak, P.P. Sedghizadeh, K. Fijałkowski, *Bacterial cellulose yield increased over 500% by supplementation of medium with vegetable oil*. Carbohydrate Polymers 199, 294-303 (2018) IF=4.811
- R. Petrus, **P. Sobota**, A new, simple, and efficient strategy for the preparation of active antifungal biodegradable materials via ring-opening polymerization of L-lactide with zinc aryloxides. Dalton Transaction 11;48(23), 8193-8208 (2019) IF=4.052

b) **Selected patents**:

In cooperation with 732 scientists from Wroclaw and Poland, 152 Research & Development projects have been implemented at ŁUKASIEWICZ – PORT in the nano and biotechnology fields. As the result, 95 Polish and 30 European patent applications have been prepared. So far 72 patents have been granted including 26 European and 4 American ones. Exemplary patents granted in the area of **Applied life sciences and biotechnology**:

• US9890194/PAT.220297 An epitope and its use • EP16846943.5/US15759822 A method for detection and selection of hybridoma cells producing the desired antibodies • EP2656078 A method of differentiating oncogenic changes of the thyroid, a kit to embody the method and the use of metallothionein (MT) for differentiating oncogenic changes of the thyroid • EP3058094 Method for detection of decreased susceptibility for anticancer adjuvant chemotherapy in breast cancer patients • EP2680821 Liposome formulation comprising an anti-tumour active substance, method for its preparation and pharmaceutical compositions comprising it • US10197572/EP3158340 Method and kit for detection of deltanoid-resistant leukemia cells and antibody for use therein • US9074017/EP2705048 Pure albumin and its method of preparation and detection • EP3003389/US9878051 Bordetella pertussis LOS-derived oligosaccharide with pertussis toxin glycoconjugate and its application in the prophylaxis and treatment of infections caused by Bordetella pertussis • PAT.229904 Method of preparing esters of lactic and lactylatic acid in alcoholysis reaction of aliphatic poliester • PAT.229194 Neoglycoconjugate of Escherichia coli R1 LOS oligosaccharide and Clostridium difficile toxoid and its application in anti-bacterial vaccines • PAT.228355 Method for detection of decreased susceptibility for anticancer adjuvant chemotherapy in breast cancer patients • PAT.227390 Method and kit for detection of deltanoid-resistant leukemia cells and antibody for use therein.

c) **Other scientific achievements:**

During the III Polish Congress of Entrepreneurship (November 2015) the ŁUKASIEWICZ – PORT was awarded the Polish Innovation Award 2015 by the Polish Agency for Enterprise.

During the 10th edition of the International Fair of Inventions and Innovations INTARG 2017, the invention implemented in the BioMed project of the ŁUKASIEWICZ – PORT entitled: "The method of detecting reduced susceptibility to anti-cancer adjuvant chemotherapy in patients with breast cancer" was awarded the title of Innovation Leader 2017.

7. List of no more than 3 important research projects from the selected discipline awarded in national and international calls to the institution in the last 5 years:

1. **BBMRI.pl** ***Creation of Polish Biobanking Network within Biobanking and Biomolecular Resources Research Infrastructure BBMRI-ERIC.*** Funded by the Ministry of Science and Higher Education, total budget: € 9,5 mln for years 2017-2021. Polish Biobanking Network (PBN) is a unique research infrastructure in Poland created by the BBMRI.pl consortium, and is a full member of European Research Infrastructure BBMRI-ERIC. BBMRI.pl consortium consists of seven major biobanking centers and academic institutions in Poland, such as:

    1) **Leader:** Łukasiewicz Research Network – PORT Polish Center For Technology Development, Wroclaw
    2) Medical University of Gdansk
    3) Medical University of Warsaw
    4) University of Lodz
    5) Medical University of Lublin
    6) Wroclaw Medical University
    7) Regional Science and Technology Center – Checiny

PBN helps in organization of Polish biobanking facilities to be a part of the BBMRI-ERIC network. PBN intends to establish a multi-center cooperation between scientific and clinical teams from all over Europe. The main project tasks include:

a. Identification and characterization of entities interested in joining PBN.
b. Common Service IT for PBN.
c. Verification of SOPs that exist in Polish biobanking institutions, implementation of common solutions.
d. Creation of Polish National Biobanking Node
e. Introduction of a unified quality control system for national biobanks.
f. Ethical, legal and social issues.

In 2019 ŁUKASIEWICZ – PORT submitted the application for the Polish Roadmap of Research Infrastructures.

2. **DegScreen** ***Development and implementation of an innovative platform for screening analysis of therapeutic degron-type compounds.*** Project financed by the National Centre for Research and Development under the Smart Growth Operational Programme 2014-2020 total amount €1,16 million. Principal Investigator - Dr. Jakub Siednienko. Project Consortium Łukasiewicz Research Network – PORT Polish Center for Technology Development with Captor Therapeutics Ltd. proposed an innovative DegScreen technology – a two-step high-throughput screening of low molecular weight compounds which induce the degradation of protein target. The technology will be implemented commercially as a service which enables screening for: • compounds active towards a chosen protein to be used as potential drug precursors, • auxiliary compounds for determination of protein function or their role in pathogenic processes, • assessment of the drug candidate polypharmacological profile.

3. **GreenAmber** ***Green succinic acid production technology based on renewable and waste materials***. Project supported by the National Centre for Research and Development under the Smart Growth Operational Programme 2014-2020 total amount € 0,6 million. Project Consortium Łukasiewicz Research Network – PORT Polish Center for Technology Development with Zakłady Azotowe PUŁAWY SA, Principal Investigator - MSc Wojciech Woźny. The aim of this project is development of an innovative succinic acid production pipeline based on unique biocatalytic qualities of highly efficient Enterobacter species. This process will enable the use of waste materials and other by-products of industrial production. In this project, the existing metabolic pathways of Enterobacter species will be genetically engineered to increase the production of succinic acid for industry applications.

8. Description of the available laboratory and office space for the Dioscuri Centre):

Łukasiewicz Research Network – PORT Polish Center for Technology Development is a unique center built on the largest infrastructural project in Poland in the R&D area, with over 23.000 m^2 of fully-equipped laboratory and office space. For Dioscuri Centre we offer open-space laboratories dedicated for research groups and modern, fully furnished offices ranging from 12 to 35 m^2. The laboratories are fully equipped and dedicated for: nucleic acid analysis, microbiology, cell biology and signalling, light and electron microscopy, histology, radioisotopic analysis, protein biochemistry and analytical chemistry. The list of laboratories includes: Biobank , Bioimaging, Cell Culture, DNA Analysis, Elemental Analysis, Flow Cytometry, Infrared Spectroscopy, Mass Spectrometry and Chromatography, Microbiology, Molecular Interactions, Nanobioengineering, Nuclear Magnetic Resonance, Virology and Cell Biology.

Main services for Dioscuri Centre:

NUCLEIC ACID ANALYSIS - high throughput nucleic acids isolation from different materials, genotyping of single known and unknown mutations, DNA methylation analysis, HLA testing, metagenomic analysis and determination of the presence of specific bacteria species.

MICROBIOLOGY - identification of bacteria species using Real-time PCR and PCR, MALDI-biotyper, sterility testing of products.

CELL BIOLOGY & SIGNALLING - cell line development, new drug testing in cell models, analysis of transcription factor expression, analysis of protein phosphorylation.

MICROSCOPIC ANALYSIS - sample preparation, SEM/STEM analysis of biological material in normal and cryo-conditions, widefield and confocal microscopy analysis.

PROTEIN BIOCHEMISTRY - protein production and purification, construction of expression vectors and optimization of target gene expression conditions, adaptation to production in different types of bioreactors, qualitative and quantitative protein analysis and molecular interactions analysis.

ISOTOPIC ANALYSES AND SERVICES - focusing especially on differential proteomics/phosphoproteomics analysis based on electrophoretic techniques, radioisotopes

MASS SPECTROMETRY - proteomics, metabolomics, lipidomics and testing of potential components of new drugs and cosmetics, identification and determination of the structure of potentially therapeutic substances.

ANALYTICAL CHEMISTRY based on chromatographic methods in analytical, semi-preparative and preparative scale, spectroscopic methods: NMR, FT-IR, GC-MS, LC-MS, MS/MS, UV-VIS, CD, ASA, ICP-OES, diffractometry, thermal analysis: DSC, TGA.

R&D SERVICE

Development of therapeutic agents • Discovery and validation of biomarkers and biomarker signatures for diagnostic use, control of therapies and therapy development • Development of new vaccines • Research on immunomodulatory properties of substances • Hybridoma technology and monoclonal antibodies • Functionalisation of nanoparticles and surfaces for bioimaging, detectors and diagnostic tests • Development of new strategies for antiviral therapies • Modulation of endogenous signalling pathways for autoimmune diseases treatment • Examination of signalling pathways in immune system cells.

9. List of the available research equipment for the Dioscuri Centre:

Łukasiewicz Research Network – PORT Polish Center for Technology Development is ready to support the Dioscuri Leader to establish collaborations within ŁUKASIEWICZ - PORT research leaders, local Universities and Research Institutes, support his/her applications for research and R&D grants, build scientific collaborations and relations with local SME.

Nucleic acids analysis:

Robot for DNA/RNA/protein isolation QIASymphony (Qiagen)
Homogenisers: TissueLyzerII (Qiagen) and CryoMill (Retsch)
Spectrophoto- and spectrofluorimeter NanoDrop 8000 and 3300 (ThermoFisher Scientific)
Real-time PCR thermal cycler (CEIVD) Rotor Gene Q (Qiagen)
Pipetting robot Piro (DORNIER-LTF)
Capillary electrophoresis Fragment Analyzer (Advanced Analytical)
Pyrosequencer PyroMark Q24 (Qiagen)

Cell cultures:

Class II Laminar Flow Cabinets (LaboGene)
CO_2 incubators (Binder)
Bioreactors: Biostat STR 50l, Biostat RM, Biostat B Twin (Sartorius)
Roller bottles incubator
Reverse-phase contrast microscopes
Electroporators
Automatic cell counter
Microbial incubators and bioreactors

Protein engieneering:

HPLC/FPLC (Dionex Ultimate 3000/AKTA Explorer)
Multifunctional workstation (Tecan FreedomEVO 150/8) with multimode plate reader Infinite 200 Pro for all detection techniques
Multimode microplate readers (2104 EnVision, EnSpire Multimode Plate Reader, Spectra MaxPlus 384)
Highthroughput differential scanning calorimeter (MicroCal VP-Capilary DSC)
Isothermal titration calorimetry (ITC) – MicroCal ITC200
Zetasizer DLS/SLS (Nano ZS)
Circular Dichroism (CD) Spectropolarimeter (Jasco J – 815)

Isotopic analysis:

Automatic high throughput a/b liquid scintillation & luminescence counter
Automatic high throughput gamma counter / spectrometer g
Systems for high resolution imaging of multifluorescent-, chemifluorescent- and radioisotope-labeled samples
Systems for 1D and 2D electrophoresis and blotting of proteins and nucleic acids
Cell culture systems
Liquid chromatography systems (FPLC, HPLC)
Spectrofluorophotometer (FP-8500-JASCO Corp)
Spectrophotometers (Cary 300, Agilent 8453)

Flow cytometry:

Flow cytometer BD LSR Fortessa
Flow cytometer BD FACS Canto II
Flow cytometer BD FACS Calibur
Sorter BD FASC Aria Fusion

Histology:

Laser microdissection system Leica LMD 7000
Vacuum infiltration processor VIP 6 SAKURA
Tissue embedding console system TEC 5 SAKURA
Automated slide stainer PRISMA SAKURA
Automated glass coverslipper SAKURA
Rotary microtome AutoSection SAKURA
Histology slides prepration set
Microtom with cryostat CRYO 3 SAKURA
Vibratome
Microscope with color camera

Microscopy:

Inverted fluorescence microscope – Carl Zeiss AxioVert A1 with PlasDIC contrast
Spinning disk confocal microscope Zeiss Cell Observer SD
Laser scanning confocal microscope Leica SP8 MP
Image analysis software [Imaris, Huygens Professional, Image-Pro Premier, SlideBook
Cross beam scanning electron microscope with ion beam Auriga 60, Zeiss
Ultramicrotome EM UC7, Leica
Cryo chamber FC7, Leica
Automatic contrasting device EM AC20, Leica
High vacuum sputter EM ACE600, Leica
Tissue processor EM TP, Leica

Analytical chemistry:

iCE3500 AAS Spectrometer (Thermo Scientific)
VP100 Continuous Flow Vapour Generator producing hydride and mercury cold vapours (Thermo Scientific)
EC100 electric furnace for atomization of samples processed by a hydride generation device (Thermo Scientific)
ETHOS One microwave digestion labstation with HPR-1000/10S high-pressure segmented rotor (Milestone)
Muffle furnace, ball mill, homogenizers
FT-IR Nicolet 6700 Spectrometer (Thermo Scientific)
FT-IR Nicolet iN10 Microscope (Thermo Scientific)
High-resolution hybrid mass spectrometer LTQ Orbitrap Elite ETD (Thermo Fisher Scientific)
Maxis Impact Mass Spectrometer (Bruker)
MALDI-TOF with biotyper, image prep and sample preparation robot (Bruker)
The 700 MHz Bruker AVANCE III HD NMR spectrometer
Bruker SCION TQ – Gas chromatograph with triple quadrupole mass spectrometer
Agilent 7890A Gas chromatograph with two detectors – FID, ECD
Thermo GC-MS ITQ — Gas chromatograph with ion trap

The above described equipment will be available to the Dioscuri Leader in jointly agreed scope and conditions.

10. List of the additional benefits (other than listed in call text) that the Institution declares to provide for the Dioscuri Centre:

ŁUKASIEWICZ – PORT strategy and organizational rules facilitate the high degree of novelty approaches in research and efficient transfer of research results into innovative future technologies. The location of ŁUKASIEWICZ – PORT is absolutely unique; in historical, green Campus Pracze: 11000 m^2 of lab space on 27 ha of campus area, 100 ha of an area surrounding the Campus, intended by the city of Wroclaw for R&D investments, 13 km from the centre of Wroclaw, dedicated parking lot, and an old park nearby, excellent communication thanks to the proximity of motorway bypass, airport and train station 100 meters from the campus.

In order to best facilitate and increase the success of sustainable operation of the Dioscuri Centre ŁUKASIEWICZ – PORT declares the following organizational and scientific benefits for the Leader:

a) Attractive relocation package for the leader and the family including: travel costs, the free Polish language course, free health insurance and housing allowance and free canteen access.
b) Supporting the on-boarding installation and start-up package for the lab.
c) The organizational support from HR in the adaptation to the new environment and the personal assistance to help in understanding the organization. HR will assist in relocating, setting of formalities in Polish offices, banks and other institutions, finding accommodation and leisure activities.
d) Support in selection and supervision of other team members, in line with the profiles needed to conduct the research and in accordance with Code of Conduct for the Recruitment of Researchers HR excellence rules and institution management practices;
e) Guarantee the authority to publish as senior author and invite as co-authors those who have contributed substantially to the work;
f) Organization of international science and business oriented conferences as well as science promoting events as Researchers' Nights.
g) The organization support in obtaining the international grants from Horizon Europe as well as from Polish funding programs. Support in submitting applications, building scientific collaborations and relations with Hi-Tech SMEs. e.g. SensDx, Nanopure, Merck KGaA, Dr Irena Eris, Mabion, Biotts, Polpharma Biologics, Ardigen S.A.
h) Project management; financial reporting, project administration according the implemented methodology (PRINCE2 modified with the institution's own solutions) at every stage of a project. The support includes also documentation of the progress (milestones and expenses), the risks management, contingency plans, and application of the adequate financial procedures.
i) Commercialization of research results, building the IPR portfolio of complementary projects and creating a foundation for innovative application solutions, long-term investment based on demonstrators and cooperation with big companies, e.g. Roche Poland, Pfizer, Amgen biotechnology Ltd, Selvita, B Braun. Joint ventures according to the concept of an industrial partner.
j) The Institute Council with a senior advisory role composed of 12 international members. The Council will be, representing business, academia and public domain. As ŁUKASIEWICZ - PORT aspire to build world-class institution, Council shall represent two major fields of the Institute's areas of interest - biotechnology and materials engineering.

11. Other information about the internationalisation of the research institution, international researchers employed at the institution, the availability of English language seminars:

Internal scientific seminars and invited lecture seminars are presented in English weekly. They cover topics of biotechnology, nanotechnology and engineering. Most of scientific groups leaders and laboratory heads used to work abroad worldwide for a few years, before joining ŁUKASIEWICZ – PORT: Elżbieta Gocek, PhD, biotechnologist, worked at Rutgers, The State University of New Jersey, Newark, NJ, USA; Anna Tracewska, PhD, Molecular biology specialist, worked in Radboud University Medical Center, Nijmegen, the Netherlands; Grzegorz Chodaczek, PhD, immunologist, worked at La Jolla Institute for Allergy and Immunology (LJI), La Jolla, California, USA; Tomasz Lipiński, PhD, immunochemist, worked at University of Alberta, Edmonton, Canada; Jakub Siednienko, PhD, immunologist, worked at the Institute of Immunology at the National University of Ireland in Maynooth; Wojciech Wozny, PROTEOSYS AG, Mainz, Germany; Wojciech Antosz, PhD, Universität Regensburg, Regensburg, Germany.

Since 2012 ŁUKASIEWICZ - PORT participates in the biggest European network of Biobanks. The ERIC status allows pulling together biobanks and biomolecular resources into a pan-European facility. BBMRI-ERIC provides access to the collections of partner biobanks and biomolecular resources, their expertise and services on a non-profit basis. BBMRI aims to improve accessibility and interoperability between academic and industrial parties to benefit personalized medicine, disease prevention to promote development of new diagnostics, devices and medicines. Financed (€4,96 mln) from H2020-INFRADEV-3-2015 as part of the ESFRI. The Polish participation of €8,6 mln was secured from 2016 by the Minister of Science and Higher Education who submitted Poland's membership in the International Organization associating biobanking institutions from Europe (BBMRI-ERIC). Founding members of BBMRI-ERIC are Austria, Belgium, Czech Republic, Estonia, France, Germany, Finland, Greece, Italy, Malta, the Netherlands and Sweden, Poland, Norway and more states are expected to join in the coming years. Observers are Switzerland, Turkey, Cyprus and IARC/WHO (The World Health Organization's International Agency for Research on Cancer). The Office is based in Graz, Austria with Erik Steinfelder as its Director General. This specific legal form is designed to facilitate the joint establishment and operation of research infrastructures of European interest.

ŁUKASIEWICZ - PORT participates in the international scientific project focusing on pathogenesis of inflammation of the nervous system induced by HSV-1 and 2 infection with the Swedish partner University of Gothenburg, Department of Rheumatology and Inflammation Research.

ŁUKASIEWICZ – PORT was a partner of conference „Science: Polish Perspectives" in October 2015 in Cambridge, UK.

Collaborations with the biggest international pharmaceutical companies:

- Since 2018 has cooperated with Roche Poland, a leader among companies providing innovative solutions in the field of healthcare. As a part of the agreement, the partners declared cooperation for the development of biotechnology and genomic profiling in Poland. Cooperation between ŁUKASIEWICZ – PORT and Roche Poland is the first step in starting work on creating genomic databases of people suffering from cancer open to Polish scientists.
- In October 2019 ŁUKASIEWICZ – PORT signed with Amgen Biotechnology a letter of intent regarding a cooperation in projects in the field of personalized medicine. ŁUKASIEWICZ – PORT and Amgen in Poland plan to prepare a joint project in the field of personalized medicine, covering the collection and processing of large amounts of epidemiological data. These data are to be collected in Biobank at ŁUKASIEWICZ – PORT.