Registration Form - declaration of willingness for establishing interdisciplinary Dioscuri Centres of Scientific Excellence

This is a registration form for Host Institutions wanting to establish an interdisciplinary Dioscuri Centre of Scientific Excellence within Dioscuri 5 call.

Registration form for Polish research institution

1. Research institution data (name and address):

   Jagiellonian University; Faculty of Biochemistry, Biophysics and Biotechnology,

   Gronostajowa 7, 30-387 Kraków, Poland

2. Type of research institution[1]:

   higher education institution

3. Head of the Institution: Prof. dr hab. Wojciech Macyk – Vice – Rector for Research.

4. Contact information of designated person(s) for applicants and the NCN: first and last name, position, e-mail address, phone number, correspondence address:

   Prof. dr hab. Joanna Kozieł (Vice-Dean for Research and International Relations), e-mail: prodziekan.wspolpraca.wbbib@uj.edu.pl, +48 506 051 845

5. Research disciplines in which the institution ensures establishing of an interdisciplinary Dioscuri Centre (select two (and if necessary three) of the domains that should be combined; select two (or if necessary three) from the 25 listed auxiliary panels of disciplines). Provide two (and if necessary three) specific NCN subpanels according to the list[2].

[2] Lists of the disciplines for each auxiliary panel of disciplines to be found here: https://www.ncn.gov.pl/en/finansowanie-nauki/panele-ncn

☐ **DOMAIN: Humanities, Social Sciences and Art Sciences** [3]

☐ Fundamental questions about human existence and the nature of reality

☐ Culture and cultural production

☐ The study of the human past

☐ Institutions, markets, space

☐ Law and political science

☐ Human nature and human society

☑ **DOMAIN: Life Sciences**[4]

☑ Molecules of Life: Biological Mechanisms, Structures and Functions

☐ Integrative Biology: from Genes and Genomes to Systems

☐ Cellular, Developmental and Regenerative Biology

☐ Physiology in Health, Disease and Ageing

☐ Neuroscience and Disorders of the Nervous System

[3] Lists of the disciplines for each auxiliary panel of disciplines to be found here: https://www.ncn.gov.pl/en/finansowanie-nauki/panele-ncn

[4] Lists of the disciplines for each auxiliary panel of disciplines to be found here: https://www.ncn.gov.pl/en/finansowanie-nauki/panele-ncn

☐ Immunity, Infection and Immunotherapy

☐ Prevention, Diagnosis and Treatment of Human Diseases

☐ Environmental Biology, Ecology and Evolution

☑ Biotechnology and Biosystems Engineering

☑ **DOMAIN: Physical Sciences and Engineering**[5]

☐ Mathematics

☐ Fundamental constituents of matter

☐ Condensed matter physics

☑ Chemistry

☐ Synthetic Chemistry and Materials Science

☐ Computer science and informatics

☐ Systems Engineering

☐ Production and processes engineering

☐ Earth sciences

☐ Materials Engineering

Specific NCN subpanels: NZ1, NZ9, ST4

6. Description of important research achievements from the selected disciplines from the last 5 years including a list of the most important publications, data bases, series of workshops, patents, policy briefs, field work/ field site, exhibitions, other:

The Faculty of Biochemistry, Biophysics and Biotechnology (FBBB) was awarded a status of the **Leading National Research Centre.** Combines **16 Departments** and 5 Laboratories and Animal Facility conducting internationally recognized **multidisciplinary research** ranging from **atomic** and **molecular** to **tissues** and **organism** levels.

FBBB currently manages 96 grants, with total funding of EUR 54.3 million. It secures an average of 25.6 grants annually from Polish and international funding agencies, with a total of EUR 43 million secured during the 2020–2025 period.

[5] Lists of the disciplines for each auxiliary panel of disciplines to be found here: https://www.ncn.gov.pl/en/finansowanie-nauki/panele-ncn

Combines **basic** and **applied** research: publishes ~ **200 per-reviewed research papers** per year; filed **39 international patents** in the period 2020-2025.

In 2020 was included in the **National Road Map for Infrastructure Investments**
Belongs to the **Excellence Initiative – Research University** in the Structural and Translational Biology Priority Research Area (**BioS PRA**).

Selected recent publications:

- Pintscher S, Pietras R, Mielecki B, Szwalec M, Wójcik-Augustyn A, Indyka P, Rawski M, Koziej Ł, Jaciuk M, Ważny G, Glatt S, Osyczka A. Molecular basis of plastoquinone reduction in plant cytochrome b6f. ***Nat Plants. 2024*** Nov;10(11):1814-1825. doi: 10.1038/s41477-024-01804-x.
- Bereta GP, Bielecka E, Marzec K, Pijanowski Ł, Biela AP, Wilk P, Kamińska M, Nowak J, Wątor-Wilk E, Grudnik P, Kowalczyk D, Kozieł J, Mydel P, Poręba M, Kantyka T. Glycosaminoglycans activate peptidylarginine deiminase 4 by enhancing calcium affinity. ***Proc Natl Acad Sci U S A.*** 2025 Nov 4;122(44):e2508369122. doi: 10.1073/pnas.2508369122.
- Silale A, Madej M, Mikruta K, Frey AM, Hart AJ, Baslé A, Scavenius C, Enghild JJ, Trost M, Hirt RP, van den Berg B. Structure of a distinct β-barrel assembly machinery complex in the Bacteroidota. ***Nat Microbiol.*** 2025 Nov;10(11):2845-2859. doi: 10.1038/s41564-025-02132-2.
- Dudko N, Dobrucki JW, Fulka H. Mechanisms underlying low mutation rates in mammalian oocytes and preimplantation embryos. ***Nucleic Acids Res.*** 2025 Aug 11;53(15):gkaf760. doi: 10.1093/nar/gkaf760.
- Zbyradowski M, Duda M, Wisniewska-Becker A, Heriyanto, Rajwa W, Fiedor J, Cvetkovic D, Pilch M, Fiedor L. Triplet-driven chemical reactivity of β-carotene and its biological implications. ***Nat Commun.*** 2022 May 5;13(1):2474. doi: 10.1038/s41467-022-30095-z.
- Rodriguez Hernandez CJ, Cruz-Cruz A, Shrestha CL, Terekhova M, Chen P, Perpich J, Potempa B, Carey K, Rohlfing M, Peeples ME, Grayson MH, Potempa J, Artyomov M, Lamont RJ, Bagaitkar J. Gingipain proteases from the bacterium Porphyromonas gingivalis confer protection against airway viral infection. ***Proc Natl Acad Sci U S A.*** 2026 May 5;123(18):e2503100123. doi: 10.1073/pnas.2503100123.
- Kordon MM, Zarębski M, Solarczyk K, Ma H, Pederson T, Dobrucki JW. STRIDE-a fluorescence method for direct, specific in situ detection of individual single- or double-strand DNA breaks in fixed cells. ***Nucleic Acids Res.*** 2020;20;48:e14.
- Szade K, Zukowska M, Szade A, Nowak W, Skulimowska I, Ciesla M, Bukowska-Strakova K, Gulati GS, Kachamakova-Trojanowska N, Kusienicka A, Einwallner E, Kijowski J, Czauderna S, Esterbauer H, Benes V, L Weissman I, Dulak J, Józkowicz A. Heme oxygenase-1 deficiency triggers exhaustion of hematopoietic stem cells. ***EMBO Rep.*** 2020; 21:e4789.

7. List of no more than 4 important research projects from the selected disciplines awarded in national and international calls to the institution in the last 5 years (title, name of PI, source of funding, amount of funding):

- Selected 4 international research projects of FBBB
- Dioscuri Centre for Structural Dynamics of Receptors; PI: Przemysław Nogły; funding: National Science Centre (NCN); 1 500 000 EUR
- What does your blood remember? The memory of hematopoietic stem cells; PI: Krzysztof Szade; funding: European Research Council (ERC); 2 500 000 EUR
- Molecular and cellular mechanisms of pro-regenerative activity of stem cell- derived extracellular vesicles (EVs) in ischemic myocardial injuries: Role of microRNAs; PI: Ewa Zuba-Surma; funding: National Science Centre (NCN); 4 494 000 PLN

- Identyfikacja i przedkliniczny rozwój niskocząsteczkowych inhibitorów replikacji i naprawy DNA na potrzeby terapii przeciwnowotworowej (eng: Identification and preclinical development of small-molecule inhibitors of DNA replication and repair for anticancer therapy); PI: Wojciech Strzałka; funding: Medical Research Agency / National Recovery and Resilience Plan (KPO); 5 076 201.25 PLN

8. Description of the available office space, working space, laboratory for the Dioscuri Centre:

The Jagiellonian University seeks to establish a Dioscuri Centre for decoding cell-surface state for selective recognition, profiling, and delivery, aimed at studying membrane-component recognition, readout, and interactions in an interdisciplinary framework combining molecular engineering, membrane biophysics, chemical biology, and cell biology. The Centre will pursue basic research on cell-surface state and membrane fingerprints, while creating a foundation for the future development of new diagnostic and therapeutic tools.

The Jagiellonian University will provide the laboratory and office space for that Centre. The laboratory will be suitable for research involving preparation and characterization of molecular constructs, quantitative measurements of molecular interactions, work with model membrane systems, and validation in cellular systems. The office space will support the scientific and organizational activities of the Centre Head and research team.

Access to relevant shared infrastructure and core facilities will be provided (see section below).

The Jagiellonian University is open for discussion with the candidate on the specifics of the laboratory and office space to be provided, as well as on the equipment and infrastructure best suited to the scientific profile of the planned Centre.

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

The Faculty of Biochemistry, Biophysics and Biotechnology (FBBB) of the Jagiellonian University combines highly specialized laboratories, shared research infrastructure, and open-access core facilities supported by expert personnel providing methodological support, user training, and assistance in experimental design and data interpretation. These facilities operate alongsideresearch groups conducting research in areas directly relevant to the planned Dioscuri Centre, including molecular and structural biology, membrane biophysics, protein biochemistry, chemical biology, cell biology, cancer-related research, microbiology, immunology, advanced imaging, and quantitative analysis of biomolecular interactions. The Faculty consists of 16 departments and 5 laboratories and employs about 240 academic staff, including almost 150 researchers, providing not only access to equipment but also to a broad pool of scientific expertise and methodological support. FBBB also hosts an Animal Facility and a Cell Bank authorized for Hospital Exemption ATMP production, while ensuring streamlined access to patient-derived samples through its strategic ties with the University Hospital, reflecting both strong basic-science capabilities and a translationally relevant environment.

A particularly important strengthening element for the planned Centre is the newly established Specjalistyczne Laboratorium Oddziaływań Biologicznych (SLOB) at FBBB. SLOB is being developed as an integrated open-access core-facility platform for advanced studies of biological interactions, combining analytical, biophysical, cytometric, and imaging technologies in one environment. Its infrastructure includes biolayer interferometry, mass photometry, circular dichroism spectroscopy, single-molecule and

time-resolved spectrofluorimetry, next-generation flow cytometry, high-resolution confocal microscopy, and an integrated data-collection and sharing system. For a Dioscuri Centre focused on decoding cell-surface state, membrane-component recognition, and selective molecular engagement, this infrastructure is particularly valuable because it enables quantitative analysis of binding kinetics, stoichiometry, structural stability, molecular dynamics, sample heterogeneity, cellular diversity, and advanced imaging, with expert support in study design, data acquisition, interpretation of results, and user training. The infrastructure is continuously being expanded and adapted to emerging research needs.

The Faculty also provides access to advanced cell-analysis and imaging infrastructure, including the Flow Cytometry Laboratory and Bioimaging Laboratory, with confocal microscopy platforms and fluorescence-activated cell sorting supported by experienced personnel. These facilities are directly relevant for cellular validation, membrane-state phenotyping, and quantitative analysis of selective recognition systems.

FBBB is located next to the Małopolska Centre of Biotechnology (MCB), whose extensively developed open-access core-facility ecosystem provides complementary infrastructure highly relevant to the planned Centre, including Genomics, Proteomics, Flow Cytometry, Cell Bank, Animal Facility, confocal microscopy, Biomolecular Interaction & Stability, and Structural Biology Core Facilities. Of particular importance are the Biomolecular Interaction & Stability Core Facility, which supports quantitative analysis of biomolecular interactions and stability, and the Structural Biology Core Facility, which provides advanced infrastructure and expertise in crystallization, X-ray crystallography, and cryo-electron microscopy workflows. Together with local expertise in protein expression, purification, molecular characterization, cancer-cell biology, and microbial studies, these facilities create a strong environment for work on binders, membrane-selective systems, and their mechanistic and structural characterization. These continuously developing core facilities provide both access to advanced instrumentation and expert methodological support for internal and external users.

The research ecosystem is further strengthened by the proximity of the SOLARIS National Synchrotron Radiation Centre at the Jagiellonian University, which provides access to advanced synchrotron-based methods relevant to structural biology, spectroscopy, imaging, and time-resolved studies. The availability of synchrotron infrastructure may support high-resolution structural and mechanistic investigations of biomolecular complexes, membrane-associated systems, and dynamic interaction processes relevant to the scientific scope of the planned Dioscuri Centre.

The location of FBBB on the Jagiellonian University campus further facilitates interaction with neighboring units in biotechnology, chemistry, physics, mathematics, and biomedical sciences. In addition, Faculty members may have access to the Academic Computer Centre CYFRONET AGH, providing high-performance computing resources relevant for computational protein-design workflows, modelling, and analysis of complex molecular and cellular datasets. The Jagiellonian University is open for discussion with the candidate on the specific equipment, core-facility open-access core-facility infrastructure, expert support that should be prioritized in order to best match the scientific profile of the planned Dioscuri Centre.

10. List of the additional benefits (other than listed in invitation call) that the Institution declares to provide for the Dioscuri Centre (i.e.: additional funds, personal benefits, other):

- FBBB will provide:
- Unlimited access to collaborate with international research institutions and research groups that FBBB has already been interacting with;

- Additional funds for scientific research within the framework of its statutory operation on the same principles as that applied to all organizational units established within the Faculty;
- Financial support of scientific projects;
- Full freedom of selection of scientific issues to be addressed;
- Opportunity to interact with Polish and foreign students, supervise MSc and PhD projects, deliver lectures and conduct seminars;
- Funds for PhD scholarships according to the rules applied by the Faculty;
- Possibility to perform educational activity;
- Possibility to fully participate in all events organized by the Faculty and the Jagiellonian University;
- Administrative and financial support during the entire funding period of the Dioscuri Centre, including support for its further development and long-term operation
- Administrative officer (who speaks English fluently) for the entire period of funding of the Dioscuri Center (and also if it continues its operation) to work full-time and only for the Dioscuri Center, employed at the expense of the scientific institution.

11. Other information about the internationalisation of the research institution e.g. international environment (international researchers community at the institution, internationalization of the management and administration), didactic in English, availability of Polish course for Foreigners etc.:

Individual research groups of FBBB JU have established various long-term and short-term collaborations with top scientists around the world. This includes joint research projects as well as long-term and short-term exchange visits of scientists. FBBB participates in student-exchange programmes, including the ERASMUS+ programme, and is part of the UNA Europa initiative. The international research environment of the Jagiellonian University is additionally strengthened by participation in European programmes supporting international mobility, interdisciplinary research, and career development of researchers, including initiatives co-funded under the Marie Skłodowska-Curie Actions (MSCA COFUND). These programmes contribute to the creation of an internationally connected research ecosystem, facilitate recruitment of talented researchers from abroad, and support the development of interdisciplinary collaborations and advanced training opportunities. International students may visit the Faculty as exchange students and participate in selected courses conducted in English and in research projects carried out in one of the Faculty departments.

FBBB conducts several courses in English for Polish and foreign students. It is a leading teaching institution in Poland, providing four independent study programmes at undergraduate, MSc and PhD levels: Biotechnology, Biochemistry, Molecular and Cellular Biophysics, and Molecular Biotechnology. The first three programmes include individual courses in English, while Molecular Biotechnology is a second-cycle MSc programme run entirely in English. The PhD programme in Biochemistry, Biophysics, Molecular Biology and Biotechnology also offers classes in English.

Several research meetings, seminars and conferences at FBBB are organized in English. Examples of international conferences, workshops and seminars organized or hosted by FBBB include:

FEBS-IUBMB-ENABLE Conference, 5th edition, to be hosted by FBBB in November 2026

13th International Workshop on EPR in Biology and Medicine, Kraków, 13–16 October 2025

Second International Symposium “Prognostic and Therapeutic Implications of RKIP and YY1 in Cancer, Autoimmune and Inflammatory Diseases”, Krakow April 9–11, 2025.

52nd Winter School of WBBiB UJ, “Biotechnology today: from Molecules to Organisms”, Kraków, 12–14 February 2025

11th International Conference on Toxic Cyanobacteria, ICTC 11, 5–10 May 2019

Periodontitis – Current State of Knowledge and Future Perspectives, 26–27 October 2018

4th Conference of the International Associated Laboratory CNRS, 28–29 May 2018

Since 2015, FBBB has hosted 31 visiting professors and lecturers from leading research institutions across 14 countries, including the USA, Japan, Brazil, Denmark, the Netherlands, Austria, France, Germany, Italy, Portugal, Sweden, Switzerland, Colombia and the United Kingdom. FBBB continues to host visiting professors and invited speakers from leading international institutions through individual research collaborations and recurring scientific seminar formats, including the Faculty Seminar series and “Tea Time at Gronostajowa Street”.

FBBB is open to employing foreign researchers who run independent research groups. The Faculty hosts the Laboratory for Structural Dynamics of Proteins / Dioscuri Centre for Structural Dynamics of Receptors, headed by Dr Przemysław Nogły. The group operates in an international research environment and includes researchers with international experience.

Some members of the Faculty have joint appointments with foreign institutions. FBBB also collaborates closely with international groups at the Małopolska Centre of Biotechnology, including Max Planck-affiliated research activities. This strengthens the international research environment available to newly recruited group leaders and visiting scientists.