

## Registration form

This is a registration form for Host Institutions wanting to establish a Dioscuri Centre of Scientific Excellence within Dioscuri 4 call.

### Registration form for Polish research institution

1. Research institution data (name and address):

**Wroclaw University of Environmental and Life Sciences - UPWr**

**ul. C.K. Norwida 25**

**50-375 Wroclaw**

**Poland**

Website: <https://upwr.edu.pl/en/>

2. Type of research institution<sup>1</sup> (select one from the 9 listed options):

**1) higher education institution**

3. Head of the institution:

**prof. dr hab inż. Jarosław Bosy**

**Rector**

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. Wojciech Niżański**

**Head of Department Reproduction and Clinic of Farm Animals**

Wroclaw University of Environmental and Life Sciences

pl. Grunwaldzki 49, 50-366 Wroclaw, Poland;

phone 00 48 71 32 05 315

e-mail [wojciech.nizanski@upwr.edu.pl](mailto:wojciech.nizanski@upwr.edu.pl)

5. Research discipline in which the strong international position of the institution ensures establishing a Dioscuri Centre (select one from the 25 listed disciplines):

**Applied life sciences and biotechnology**

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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 (up to one page in A4 format):

The UPWr is one of the best specialized research Universities in Poland with three major Priority Research Areas: Veterinary Medicine, Food and Environment. The UPWr was ranked 12 among all Polish Universities in the Excellence Initiative – Research University, competition in 2019. Research on veterinary medicine is interdisciplinary and strongly connected with medical sciences and biology. The veterinary discipline in UPWr is involved in clinical sciences and also pro-clinical sciences: immunology, biochemistry, pharmacology and toxicology, food hygiene.

**The Department of Reproduction and Clinic of Farm Animals in UPWr Veterinary Discipline, as a potential Dioscuri Center site, has been involved mostly in research projects regarding: application of biotechnological methods in reproduction of dogs, domestic cats and wild feline species; modification of the antioxidant defence system and the properties of cell membranes of birds preserved spermatozoa and evaluation of the influence of the various factors on the behavior and physiology of the animals.**

Experimental findings on reproduction of the domestic cat made by our research team constitute an invaluable scientific database which may be further exploited in research on wild Felids breeding. We created a **unique Bank of somatic cells and gametes of domestic cats and wild felines** in which somatic cells from 14 species of wild felids and 10 breeds of domestic cats are deposited [1-9]. This bank and the developed reproductive biotechnology procedures constitute the basis for the European bank of genetic resources of endangered species - BioArk, created under the current project NAWA APM (<http://nawa.upwr.edu.pl/>).

In our studies related with avian semen we revealed that chicken semen is characterized by high antioxidant activity, which, however, is not able to completely counteract peroxidative sperm injury during cryopreservation. Therefore, we started developing additives for the diluent, modifying the antioxidant system or cell membranes, used for the preservation of chicken semen in order to obtain the best sperm motility and survivability. Our achievements [10-13] have a large application potential.

Our research are also focused on the issue of semiochemical communication especially in the context of sex pheromones. We were evaluating the mechanisms of semiochemical signals detection as well as behavioral and physiological modification observed in the signal recipients. [14-17].

**Selected publications:** 1. Fontbonne et al. 2020. Theriogenology 28,339-345. 2. Kij et al. 2020. Theriogenology 157,372–377. 3. Niżański et al. 2020 Animals 10(12), 1-24. 4. Sowińska et al. 2020. Animals 10(8),1–13. 5. Kochan et al. 2019 J Vet Sci 63,457-464. 6. Niżański, Prochowska 2019. Reprod Domest Anim 54,46-46. 7. Nowak et al. 2019. Cryoletters 40,226-230. 8. Prochowska et al. 2019. Theriogenology, 131,140-145. 9. Prochowska et al. 2019. Reprod Domest Anim 54,719-726. 10. Grandhaye et al. 2020. Animals 10(2),1–16. 11. Mehaisen et al. 2020. Anim Reprod Sci 212,1–7. 12. Partyka. et al. 2018. Anim Reprod Sci 193,235-244. 13. Partyka et al. 2017. BioMed Res Int 1-8,7279341. 14. Dzięcioł et al 2020. Front. Vet. Sci. 7,1–8. 15. Woszczyło et al. 2020. Animals 10(11):2112. 16. Jezierski et al. 2019. J Vet Behav, 29,25-30. 17. Dzięcioł et al. 2018. Anim Reprod Sci 197,87-92.

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 (title, name of PI, source of funding, amount of funding):

1. **International multicentric platform as a key element for effective scientific research** (ScienceNet). PI: Wojciech Niżański, NAWA, 1 995 240 PLN
2. **Improvement of effectiveness of wild cats genetic resources protection program by establishment of cell banks and implementation of in vitro embryo production to the practice.** PI: Wojciech Niżański, NCBiR, 2 782 173,81 PLN
3. **Mechanisms of semiochemical communication in canines in the context of sexual behavior: the research with the use of the domestic dog (Canis familiaris) as a model species.** PI: Wojciech Niżański, NCN, 733 700 PLN

8. Description of the available laboratory and office space for the Dioscuri Centre (up to one page in A4 format):

The building of the Department of Reproduction and Farm Animals has two floors office area, 63.75 square meters of laboratory space and an ambulatory part divided into two blocks: large and small animals.

The laboratory complex includes: the **IVF laboratory** and **Laboratory of Animal Behavior Analysis** located on the first floor, **Assisted Reproductive Techniques Laboratory** and **Reproductive Endocrinology Laboratory** located in the small animals block.

There is a dedicated social room with a desk and a computer at the disposal of the scientist, ensuring comfortable conditions for research work.

Additionally, the experimental dog's kennel (HPD 0057) and the well-equipped small animal clinic creates possibilities to improve practical skills and conduct research related to clinical cases.

Most of the research staff have a degree in veterinary sciences and extensive professional experience. Their scientific know-how ensures that all veterinary procedures are implemented in a safe manner. It is worth highlighting that in 1997, the Department of Reproduction **set up the first Polish Pet and Wild Animal Semen and Somatic Cells Bank**, which is a part of the Network of Semen Banks of the European Veterinary Society for Small Animal Reproduction (**EVSSAR**).

**Assisted Reproductive Techniques Laboratory with CASA system** was opened in 2006. The laboratory analyses about 500 thousand samples of semen obtained from pet animals annually. Routine activities include assessment of semen quality from Semen Collection Centres as well as Cattle and Pig Breeding Centres. The **Laboratory of In Vitro Fertilization of Feline Species** was opened in 2009 followed by establishment of the Laboratory of Reproductive Endocrinology in 2011. The later institution provides services – it performs about 2-3 thousand hormone analysis annually and it's the only laboratory in Poland specialising in animal endocrinology. The Laboratory of In Vitro Fertilization of Feline Species represents **one of a very few such labs in Europe**. Based on the laboratory results it is possible to compile doctoral and habilitation dissertations. **Veterinary Outpatient Clinic**, a part of the Reproduction Department, is involved in implementing techniques developed by the research team. The Clinic looks after approximately 5 thousand animal patients every year and treats breeding disorders utilizing various biotechnological methods. What is more, the Department provides a wide selection of training courses regarding promoting application of biotechnological methods in farm, pet and wild animal breeding as well as sharing results obtained by the research team, for example workshops for active doctors and scientists on abdominal ultrasound including reproductive system and artificial insemination of small animals, training on farm animal ultrasound, series of training sessions for vets on ultrasound of reproductive system and mammary glands of cows (Wroclaw), one-day training sessions for farmers and kennel or feline club members on implementing procedures of assisted reproduction devised by the Department (Gdynia, Warszawa, Katowice, Poznań, Darłowo, Rzeszów, Jelenia Góra, Wrocław, Bytom and other cities) and series of training sessions on application of reproductive biotechnologies financed by EU ("Modern diagnostic techniques applied in animal breeding: endoscopy, ultrasound and biotechnologies used in animal breeding: cell cultures, IVF, semen selection") realized within the project "The modernization of vocational education in the Lower Silesia II" which is co-financed by the European Union.

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

### Available research equipment in Department of Reproduction and Clinic of Farm Animals:

1. Blood chemistry analyzer (Reflovet Plus)
2. Hematology analyzer (Mindray BC-2800 VET)
3. Hematology Analyzer ProCytex Dx (Idexx)
4. Blood chemistry analyzer Catalyst One (Idexx)
5. Chemistry analyzer DRI-CHEM AU 10V (Fuji)
6. Automated Immunoassay Analyzer AIA-360
7. Computer Assisted Semen Analyzer Hamilton Thorne Biosciences (IVOS)
8. Stereoscopic microscopes
9. Microscope Edipse E200 (Nikon)
10. Inverted fluorescence microscope (Olympus IX73)
11. Microscope AccuScope with camera Exelis

12. Fluorescence microscope (Olympus BX53)
  13. Microplate reader Elx800 (BioTek)
  14. Rigid endoscopy – for laparoscopy and vaginoscopy
  15. Fiberscope Q10
  16. Kit for endoscopic insemination of dogs
  17. Ultrasound Honda 1500 (Honda)
  18. Ultrasound Honda 2000 (Honda)
  19. Ultrasound (Dramiński)
  20. Ultrasound My Lab Gold (ESOATE)
  21. Ultrasound MY Lab ONE Color Doppler (ESOATE)
  22. Ultrasound kit Easy Scan-5 positions
  23. Centrifuge MPW-56 (MPW) 2x
  24. Centrifuge Eppendorf 5810R
  25. Thermostat Q-CELL (Poll Lab)
  26. MiniVIDAS (Biomerieux) multi-parameter automatic immunodiagnostic analyzer - hormone level analysis
  27. Laminar chamber ESCO Airstream Max
  28. Laminar chamber Holten HV 2448
  29. Ultrasonograph Esaote-MyLab 25 Gold (Color Doppler)
  30. Endoscope – uretheroscopic URS (Storz)
  31. Flow cytometer (Guava EasyCyte5)
  32. Spectrophotometer (DeNovix)
  33. Thermocycler T100 (Bio-Rad)
  34. Thermocycler Real Time PCR CFX96 (Bio-Rad)
  35. Molecular Imager Gel Doc XR+ (Bio-Rad)
  36. Ultrafreezer -80C (PANASONIC)
  37. Freezer Planer
  38. Set for team ultrasound
  39. Micromanipulator for embryo and ICSI Narishige MM-89
  40. Incubator NewBrunswick Galaxy 48R
  41. Incubator Eppendorf CellXpert C170i
  42. Primo Vision Time Lapse system
  43. EEG
  44. miniQEEG
  45. QEEG
  46. HR
  47. GSR
  48. TEMP sensors
  49. Olphactometer compatible with the MRI
  50. Infrared camera
  51. OBSERVER XT software
- Access to: MRI ( 1,5T; 3T), GC-MS, HPLC

**Moreover the Principal Investigator will have guaranteed access to use the entire infrastructure of the veterinary discipline, primarily Center of Innovative Technologies in Veterinary Research (CIT): a multi-omic center for basic and preclinical research with equipment: flow cytometer LSRFortessa X20, 3rd generation sequencer (Nanopore Mk1C), LC/Q-TOF Agilent 6545 Q-TOF, TECAN plate reader.**

**10.** List of the additional benefits (other than listed in call text) that the Institution declares to provide for the Dioscuri Centre (i.e.: additional funds, personal benefits, other) (*up to one page in A4 format*):

The implementation of the HRS4R Strategy at UPWr translates into an increase in national and international mobility, conducting international scientific teams and consortia, participation in recognized international scientific networks. The prestigious HR Excellence in Research distinction offers a friendly environment for scientific work, and the recruitment rules applied in it are fully transparent.

The Dioscuri Centre - created at UPWr favorable, international working environment - will be a lighthouse of scientific excellence in Poland. The initiative is fully supported by UPWr authorities who declares to ensure:

**1) additional funding:**

- Apart from 25k EUR/year funding (obligatory in the proposal), UPWr will offer 20k EUR/year additionally for DC. This additional funds are in line with UPWr Excellence Initiative strategy which assumes systemic mechanism for financing excellence research (Leading Research Groups) and doctoral school
- family allowance (for DC leader whose family stays in Poland for at least 3 months): 300 EUR gross per month
- Special needs allowance: € 200 per month (if eligible)

**2) professional assistance from English-speaking administrative staff, among others:**

- provide administrative support in recognition of national and international research programmes and grant schemes (International Research Office)
- support in all matters relating to knowledge transfer and Intellectual Property Right (Centre of Innovation and Knowledge Transfer)
- assistance in relocation, visa procedures, mobility grants/travels in Poland and abroad (International Relations Office)

**3) research networking and support:**

- provide integration in academic community by attending scientific seminars held in English, introducing to doctoral school and participating in networking events in Wroclaw academic community
- provide support in recruitment procedure of DC research team
- support the DC research team in obtaining the required consents, opinions, authorisations or permits if the research carried out within the fellowship requires formal certification with ethical standards

**4) social benefits:**

- provide (in cooperation with Wroclaw Municipality) a flat for DC leader and his/her family
- assistance (in cooperation with Wroclaw Municipality) in getting a place in nursery, kindergarten, school
- others: Multisport programme; language courses on preferable conditions at UPWr Language Centre; loans from UPWr social allowance available on preferable financial conditions)

**11.** Other information about the internationalisation of the research institution, international researchers employed at the institution, the availability of English language seminars etc. (*up to one page in A4 format*):

Within the last years as stated in the UPWr Excellence Initiative strategy (<https://upwr.edu.pl/en/research/research-university>), following actions strongly linked to internationalisation were implemented:

- **increasing scientific excellence through international cooperation** - the outcome: since 2018 UPWr has tripled funds within international programmes (avg. per year doctoral students mobilities 40 (incoming), 70 (outgoing), staff mobilities - 50 (incoming); 500 (outgoing);
- **new approach to UPWr doctoral training** - outcome: 70% of the doctorates are run within dedicated, externally funded projects; 42% are fully implemented in English with foreign co-supervision and the mandatory one year international research internship; currently, 21% of PhD candidates are from abroad

- **increasing the competences of administration staff** - outcome: establishment of new units dedicated to international grant applications (International Research Office) and project implementation (Centre for Project Implementation and Finance)

The internationalisation is not only at University level, but is also vivid **in the Department Reproduction and Clinic of Farm Animals**.

- 1) Doctorates with foreign co-promotion in Department of Reproduction and Clinic of Farm Animals e.g.: dr Natalia Sowińska (Mikołajewska) the Institute for Zoo and Wildlife Research in Berlin (co-supervision K. Jewgenow-W.Niżański); dr Anna Grabowska - University of Vienna (co-supervision prof. Ch. Aurich-J. Twardoń); dr Rafał Kolenda - Free University Berlin (supervision prof. Lothar K. Wieler)
- 2) The Head of the Department was elected as the President of EVSSAR (European Veterinary Society For Small Animal Reproduction) from 2011 to 2013 and for EVSAR Board 2007-2013, and he was Course Master and the organizer of Wrocław International Master ESAVS-EVSSAR Courses 2017 and 2019 in Department of Reproduction. He is also co-organizer of World Veterinary Congress WSAVA 2021 and was co-organizer of EVSAR Congresses in Toulouse 2013, ISCFR Whistler Canada 2012. He was chosen as main organizer of International EVSSAR Congresses in Wrocław 2009 and 2014.
- 3) PhD students of veterinary discipline are supervised by professors with collaboration with co-supervisor from international research universities from other disciplines to improve visibility and interdisciplinary research.
- 4) Each year, about 15-20 foreign students complete their veterinary studies at the Faculty of Veterinary Medicine within the English Division.
- 5) Each year, at least three international conferences are held in UPWr veterinary discipline e.g. Problems in reproduction of small animals – fertility, pregnancy and neonate, International Congress on Bovine Veterinary (Polanica Zdrój) and International Congress of Equine Medicine
- 6) Currently Department of Reproduction UPWr coordinates as Leader the European Network called 'ScienceNet' comprising veterinary centers involved in studies on the use of Assisted Reproductive Technologies to increase fertility potential of domestic animals and to rescue endangered animal species. Partners coordinated by UPWr include Ghent University (prof. Ann van Soom), Milano University (prof. G. Cecilia Luvoni), Veterinary University in Vienna (prof. Christine Aurich, prof. Sabine Schaefer-Somi), Ecole Nationale Veterinaire d'Alfort (prof. Alain Fontbonne).
- 7) In last few years we published several JCR papers with co-workers from abroad on the basis of our fruitful international scientific collaboration. These include e.g. 10 papers with French researchers, 7 with German, 5 with Portuguese, 4 with Belgium, 3 with England, 2 with Austria, 1 with Brasil, 1 with Denmark and 1 with Egypt.