ENG

Title of the project:

The molecular dialog between dendritic cells and endometrial microenvironment during equine endometrosis

Competition: OPUS 27

PI: dr Agnieszka Sadowska

Project description

Description of the position:

The main goal of the project is to determine the interactions between dendritic cells and the endometrial microenvironment during endometrosis in mares. Endometrosis is a chronic degenerative condition characterized by endometrial fibrosis with pathological changes involving adjacent tissue structures. Transcriptomic profiling of equine endometrium in different stages of endometrosis revealed increased expression of genes associated with dendritic cell maturation. Dendritic cells are a heterogeneous family of antigen-presenting cells that play a key role in regulating the inflammatory microenvironment. However, increasing evidence indicates their involvement in the development of tissue fibrosis, due to their interaction with fibroblasts in response to tissue damage or chronic inflammation. Given that the molecular basis of the interactions between dendritic cells and fibroblasts is poorly understood, this area requires further research. Identifying potential factors involved in the molecular dialogue between dendritic cells and the equine endometrial microenvironment, together with the assessment of potential interactions between these molecules, will shed more light on the role of dendritic cells in fibrosis-related processes. The results of the planned studies may be important due to their potential in the prevention and treatment of endometrosis in mares, as well as improving horse breeding rates by reducing financial losses caused by embryo loss. In the future, the project results may also indicate a new direction in the search for treatment of fibrotic diseases in humans.

The candidate will participate in the following research tasks:

1. The determination of the number and localization of endometrial dendritic cells during equine endometrosis using flow cytometry and immunohistochemical staining.
2. The determination of the impact of dendritic cells on the endometrial tissue of the mare uterus – an *in vivo* study. For this purpose, the impact of intrauterine administration of dendritic cells on the transcriptome (RNA-seq) and proteome (LC-MS) as well as remodeling of the extracellular matrix in equine endometrium (qPCR, Western-blot, ELISA, immunofluorescence staining) will be determined.
3. The determination of the impact of dendritic cell secretome on endometrial fibroblasts during equine endometrosis – an *in vitro* study. In this task, the interactions of dendritic cells and fibroblasts from the equine endometrium cultured in the *in vitro* system will be examined. For this purpose, the impact of the dendritic cell secretome on the equine endometrial fibroblast transcriptome (RNA-seq), proteome (LC-MS) and functional chharacteristics (functional tests determining cell migration and proliferation) as well as extracellular matrix remodeling (qPCR, Western-blot, ELISA, immunofluorescence staining) will be determined.

Requirements:

1. A master's degree in a field related to biology, medical biology, biotechnology, animal bioengineering, immunology or other related fields (expected before the deadline of this application);
2. Basic knowledge of reproductive physiology and pathology as well as immunology;
3. Fluent knowledge of English (spoken and written);
4. Availability, good work organization, ability to work in a team and to cope with stress;
5. Experience in cell isolation and culture as well as in using molecular biology techniques is welcome.

Recruitment process:

- Applications will be assessed in accordance with the criteria set out in the regulations for awarding research scholarships in research projects financed by the National Science;
- Only on-line applications will be considered;
- Candidates evaluated with the highest score will be invited to an actual interview, which will take place face-to-face or online;
- During the interview, the candidate will be asked to deliver a 10-minute speech. presenting his/her Master thesis and research interests;
- Final results of the recruitment will be published on IAR&FR PAS webpage within 10 days after final decision.

Important information:

- **Application deadline:** September 5th, 2025, 23:59 (Eastern European Time)
- **Application method:** application form
- **Interviews:** September 10-12, 2025 (via Zoom)
- **Location:** Olsztyn, Poland
- **Duration of the scholarship:** 48 months
- **Date of position opening:** October 1st, 2025
- **Number of positions:** 1