CeNT-40-2024

Director of Centre of New Technologies of the University of Warsaw, with the Project Leader, announce opening of the competition for the position of 2 PhD Students in the Laboratory of the Molecular Biology of Cancer – Centre of New Technologies of the University of Warsaw.

JOB OFFER

Position in the project:	PhD Student
Laboratory:	Laboratory of the Molecular Biology of Cancer
Scientific discipline:	Life sciences
Keywords:	Breast cancer, metastasis, EMT, cancer stem cells, cancer cell plasticity, tumor heterogeneity, circulating tumor cells
Job type (employment contract/stipend):	Stipend
Part-time/full-time:	Full-time
Number of job offers:	2
Remuneration/stipend amount/month:	5000 PLN gross gross/month
Position starts on:	January 1st 2025
Maximum period of contract/stipend agreement:	12 months
Institution:	Centre of New Technologies, University of Warsaw
Project leader:	Dr hab. Agnieszka Kobielak, Associate Professor
Project title:	Transcriptional and functional characterization of invasive breast cancer cells isolated using novel in vivo reporter system.
NCN programme:	Opus 19
Project description:	Highly heterogeneous breast cancers are the most commonly diagnosed cancer in women worldwide. The majority of breast cancer-related deaths are a consequence of inoperable metastatic disease. Therefore, understanding how tumor cells invade other tissues and contribute to the heterogeneity and generation of more resistant-to-treatment cancer cells are fundamental challenges in cancer research. Carcinomas are cancer types that arise from epithelial tissues, which are typically well organized and have cells connected tightly to each other. Epithelial-to-mesenchymal transition (EMT) is a dynamic process that endows epithelial cells with enhanced motility and invasiveness by dynamic changes like loss of connections between epithelial cells and increased motility as a single cell, allowing them to spread and invade surrounding tissue. A critical aspect of EMT's role in cancer is that EMT generates circulating tumor cells (CTCs). CTCs are tumor cells released into blood and/or lymphatic vessels that can circulate in the human body, which are predestined sources of metastasis as the “seeds.” EMT was also

	considered important in forming so-called cancer stem cells, cells that are more resistant to therapies and can survive in the body for long periods, giving rise to new tumors and disease recurrence. Although the contribution of EMT to initial tumor cell invasiveness has been confirmed, its role in the whole process of metastasis remains debated. Most importantly, observing EMT in vivo in human carcinomas remains challenging. One significant difficulty is caused by the transient, reversible nature of EMT, since cancer cells that went through EMT invaded tissues and spread to the bloodstream, once at the distant organ, can go back to the epithelial state and form metastatic tumor growth. Because only a tiny minority of carcinoma cells may be invasive and undergo an EMT in primary tumors, the functional characterization, cancer stem cell potential, and changes in gene expression in such cells can be masked by the bulk of non-metastatic cells. Detecting such transient cells will be critical to assess the contribution of EMT to the behavior of high-grade carcinomas. Another major challenge in such studies is identifying reliable molecular markers to define cells undergoing EMT in human tumors. Data from our laboratory indicate that the relatively novel protein catulin is highly expressed in different types of invasive carcinoma cells. In vitro, data indicate that an upregulation of catulin expression correlates with the transition of tumor cells from an epithelial to mesenchymal morphology, and the removal of catulin in human cancer cell lines dramatically decreases the migratory and invasive potential of those cells. We also reported that catulin is highly expressed in malignant human breast cancers and correlates with the aggressive behavior of those tumors. As α-catulin expression and function correlate with the early onset of tumor cell invasion, we developed a reporter system using catulin regulatory element and fluorescent protein, which will allow us to mark, track, and isolate a small minority of carcinoma cells that may be invasive and undergo an EMT in primary tumors as well as give rise to CTCs. Analysis of those cells will lead to the characterization of early detection markers of invasion, an understanding of early signaling pathways involved in tumor invasion, and, more importantly, the development of a targeting strategy against invasive cancer stem cells. We also established three-dimensional tumor spheroid-based functional assays for newly characterized target validation. This functional test, combined with data obtained using our reporter system, will give us a strong indication of potential new markers of invasion and novel targets for anti-metastasis therapeutics
Key responsibilities include:	-to commit adequate time and effort to the project; - to display initiative in identifying and resolving problems relating to the research; - to manage their work efficiently and increase the visibility through the publications;
Profile of candidates/requirements:	The competition is open for persons who meet the conditions specified in the regulations on the allocation of resources for the implementation of tasks financed by the National Science Centre for Opus 19 grant. MSc degree in biology or related discipline. The MSc degree should be obtained before the date of employment in

	the project. - Confirmed status of a PhD student (on the date of starting work in the project at the latest). **Required qualifications:** -MSc in biology or related fields or MD -Good knowledge of English, -Teamwork skills. **Experience in laboratory work:** gel electrophoresis, PCR, RT-PCR, q-PCR, DNA/RNA/Protein extraction and purification, DNA cloning, lentiviruses, western blot, cryo- and paraffin-sectioning, immunofluorescent and immunohistochemistry staining, microscopy: fluorescent and confocal laser scanning microscopy, mammalian cell culture, FACS sorting, laboratory animals - mice handling, work with breast cancer models -Knowledge of Adobe Photoshop, Adobe Illustrator, PowerPoint,
Required documents:	1. Cover letter 2. Current curriculum vitae 3. Copy of MSc certificate (or, if the MSc certificate has not been obtained yet, a certificate/document about the date of MSc defense); 4. Document confirming the status of the PhD Student (to be provided before starting work on the project); 5. Signed information on the personal data processing. 6. Two or more letters of recommendation from a scientist who is familiar with the Candidate (submitted directly to the email address below) Before entering the competition, candidates are obliged to familiarise themselves with the Internal Reporting Procedure.
We offer:	- work in an active research team in an excellent scientific environment - comprehensive training in molecular and cell biology and cancer development and progression -participation in scientific seminars and conferences - a competitive stipend (5000 PLN gross /month) -stipend agreement for a period of a maximum of 12 months
Please submit the following documents to:	a.kobielak@cent.uw.edu.pl (entitle your email “PhD POSITION”).
Application deadline:	18.12.2024

Date of announcing the results:	20.12.2024
Method of notification about the results:	Email CeNT website: https://cent.uw.edu.pl/en/career/