UNIWERSYTET WARSZAWSKI

CeNT CENTRUM NOWYCH TECHNOLOGII

CeNT-53-2025

Director of Centre of New Technologies of the University of Warsaw, with the Project Leader, announce opening of the competition for the position of PhD Student 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, vascular mimicry, plasticity
Job type (employment contract/stipend):	stipend
Number of job offers:	3
Remuneration/stipend amount/month:	4000 - 5000 gross gross
Position starts on:	January 1st 2026
Maximum period of contract/stipend agreement:	29 months with a possibility of extension for another 19 months
Institution:	Centre of New Technologies, University of Warsaw
Project leader:	Dr hab. Agnieszka Kobielak, Associate Professor
Project title:	Defining the transcriptional and epigenetic state of tumor cells with increased plasticity and the epithelial-endothelial transition and their role in vascular mimicry, circulating tumor cell formation, and breast cancer metastasis.
NCN programme:	OPUS 26
Project description:	Human breast cancer (BC) is the most commonly diagnosed cancer in women worldwide and one of the leading causes of cancer-related deaths. Despite the development of new therapeutic agents, Triple Negative Breast Cancer (TNBC), a very metastatic subtype of breast cancer that is prevalent among young women, remains a critical healthcare issue, and new treatments are desperately needed. In healthy tissue, cells are well-organized and connected tightly with each other. However, during cancer development and progression, tumor cells undergo the epithelial-to-mesenchymal transition (EMT), a dynamic process that endows epithelial cells with enhanced motility and invasiveness by dynamic changes like loss of connections between epithelial cells. In addition, EMT increases the motility of tumor cells, allowing them to invade surrounding tissue and spread to distant organs. A critical aspect of EMT's role in cancer is its contribution to generating circulating tumor cells (CTCs). CTCs are tumor cells released into the blood and lymphatic vessels that can survive and give rise to metastasis. EMT is also suggested to be important in the formation of so-called cancer stem cells. These cells are more resistant to therapies and can

	survive in the body for long periods, leading to new tumors and disease recurrence. Recent studies have also shown that cancer stem cells and epithelial-to-endothelial transition (EET), a subtype of epithelial-to-mesenchymal transition (EMT), can promote the process of vasculogenic mimicry (VM), a newly defined pattern of tumor microvascularization by which aggressive tumor cells can form vessel-like structures themselves, independently of angiogenesis involving new blood vessels formation. VM is strongly associated with a poor prognosis in several types of cancer, especially in aggressive metastatic TNBC. However, the biological features of tumor cells that form VM and their role in tumor metastasis remain unknown. Although the molecular mechanisms underlying VM are poorly understood, the epithelial-to-mesenchymal transition (EMT) is believed to play a crucial role in the initial steps of cancer stem cell plasticity. Therefore, we recently developed a reporter system using a human breast cancer model to label and track tumor cells undergoing EMT in vivo. Transcriptional analysis of highly invasive cancer cells isolated using this system revealed enrichment in genes essential for cellular movement, cell invasion, and, interestingly, tumor-vasculature interactions. Our analysis of tumors with a reporter system let us identify a rare population of cancer cells with increased plasticity, expressing endothelial marker MCAM and participating in vascular mimicry. We hypothesize that the MCAM-positive breast cancer cells represent cells with stem cell potential, capable of self-renewal and differentiation into endothelial-like cells, critically involved in tumor vascular mimicry and metastasis. Moreover, specific targeting of this cell population and related molecular pathways could thus provide novel strategies to eradicate cancers currently resistant to conventional therapy. Therefore, this proposed research aims to determine the fundamental molecular mechanisms underlying this phenomenon in the triple-negative breast cancer model to characterize potential targets of VM. We plan to characterize transcriptional markers and signaling pathways and define the epigenetic landscape of the endothelial transition state of the tumor cells undergoing vasculogenic mimicry. Both analyses will allow us to characterize new potential targets of VM that will be tested in the 3D system since anti-angiogenic therapy based on the classical tumor angiogenesis model is not entirely effective. We will also address how cells undergoing vasculogenic mimicry participate in the circulating tumor cells and metastasis formation. We will combine single-cell technology to decipher the importance of MCAM expression in vasculogenic mimicry and tumor spread. This project focuses on the crucial mechanisms by which tumor cells differentiate into endothelial-like cells and on possible therapeutic strategies to combat these alternative tumor vascularization mechanisms, since conventional anti-angiogenic agents have little effect on VM-positive tumors due to the absence of typical endothelial cells.
Key responsibilities include:	-to perform project tasks; - to display initiative in identifying and resolving problems relating to the research; -be responsible for carrying out the overall project tasks - to manage his/her work efficiently and increase the visibility through the publications; The position offered will not be related to activities covered by the protection of minors.
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 26 grant.[1]

[1] Annex to NCN Council Resolution No 50/2023 of 11 May 2023 amending the Regulations on awarding funding for research tasks funded by the National Science Centre as regards research projects

	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). -Good knowledge of English, -required experience in working with mouse models and an appropriate training certificate authorizing work with laboratory animals in Poland. -experience in working with epithelial stem cells and cancer stem cells in the field of breast cancer -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, -Knowledge of Adobe Photoshop, Adobe Illustrator, PowerPoint -Team work skills,
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 PhD Student (to be provided before starting work in the project); 5. Three letters of recommendation from a scientist who is familiar with the Candidate (submitted directly to email address below). 6. Signed information on the personal data processing. Before entering the competition, candidates are obliged to familiarise themselves with Internal Reporting Procedure.
We offer:	- work in 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 Please learn more about career development opportunities at the University of Warsaw.
Please submit the following documents to:	a.kobielak@cent.uw.edu.pl
Application deadline:	7.12.2025
Date of announcing the results:	15.12.2025
Method of notification about the results:	Email, CeNT website