Name and surname:	**Liliana Kiczak**
Academic Degree:	dr hab. inż. (DSc.)
Institute/Department:	Department of Biochemistry and Molecular Biology
e-mail address:	liliana.kiczak@upwr.edu.pl
ORCID:	https://orcid.org/0000-0002-4721-6891
UPWr Base of Knowledge - link:	https://bazawiedzy.upwr.edu.pl/info/author/UPWr319343019c8a4bb99f0d9180b7336880?r=publication&ps=20&tab=publications&sort=&title=Profil%2Bosoby%2B%25E2%2580%2593%2BLiliana%2BKiczak%2B%25E2%2580%2593%2BUniwersytet%2BPrzyrodniczy%2Bwe%2BWroc%25C5%2582awiu&lang=pl&pn=1&qp=
Researchgate:	
Personal website / Working group website:	
Participation in projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)):	2015-2019 Integrated device system for transcatheter closure of paraVAlvular LEaks (VALE) STRATEGMED2/269488/7/NCBR/2015, RF 2015-2020 Molecular imaging (including nanotechnology) for monitoring of implanted stem cells and their pro-regenerative functions – STEMNanoT Grant NCBiR PBS nr PBS3/A7/27/2015, RF
Do you plan to engage support of second supervisor or auxiliary supervisor?	YES
	Auxiliary supervisor
Name and surname:	Jarosław Suchański
Academic Degree:	dr inż. (Dr. Eng.)
Faculty, Institute/Department:	Departament of Biochemistry and Molecular Biology
e-mail address:	jaroslaw.suchanski@upwr.edu.pl
ORCID:	https://orcid.org/0000-0002-2672-1020
UPWr Base of Knowledge - link or most important publications from last 3 year (JCR) / patents from last 3 years (maximum 5):	https://bazawiedzy.upwr.edu.pl/info/author/UPWrcf9b86cf27444a4e8c38d40ebeac5e51?r=publication&ps=20&tab=publications&sort=&title=Profil%2Bosoby%2B%25E2%2580%2593%2BJaros%25C5%2582aw%2BSucha%25C5%2584ski%2B%25E2%2580%2593%2BUniwersytet%2BPrzyrodniczy%2Bwe%2BWroc%25C5%2582awiu&lang=pl&pn=1&qp=
Researchgate:	
Personal website / Working group website:	

Projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)):	PI 2019-2020 The role of galactosylceramidase (GALC) and prosposin (PSAP), key proteins involved in galactosylceramide (GalCer) degradation, in the resistance of breast cancer cells to doxorubicin-induced apoptosis, 2019/03/X/NZ1/00090, NCN, Miniatura 3 RF 2020-2024 Galactosylceramide as a regulator of apoptotic gene expression and modulator of drug resistance in breast cancer cells. 2019/35/B/NZ5/01392, NCN, OPUS 18
PhD topic:	Sulfolipids as multifunctional molecules in breast cancer progression
Research discipline in Doctoral School:	Veterinary Science
Short description of the research problem to be solved in the PhD (minimum 1000 characters):	Sulfate-based lipids (Sulfolipids, SLs) are a class of sulfate-containing glycosphingolipids (GSLs) distributed on the surface of diverse cancer cells. SLs appear to be involved in key stages of metastasis and could be interesting not only for a better understanding of breast cancer biology but also from a practical point of view since GSLs represent an attractive target for innovative anti-tumor therapies. Sulfatide (SM4), the simplest SL synthesized by galactosylceramide sulfotransferase (CST) is especially abundant in various types of carcinomas including colon, ovarian and gastric cancers, renal cell and hepatocellular carcinomas, as well as lung, ovarian, and breast cancer. To assess, whether the presence of SM4 affects gene expression associated with invasion promotion we applied Illumina NextSeq 500 sequencing and bioinformatic analyses for identification differentially expressed genes (DEGs) in breast cancer cells overexpressing CST compared to controls. Among all DEGs, adhesion molecules, integrin receptors, matrix metalloproteinases and chemoattractants with their respective ligands and receptors were selected. Finally, we correlated high expression of CST with enhanced expression of two genes encoding invasion-related proteins: LAMB4 and ITGAV. Importantly, high CST expression correlated with down-regulated expression of BOLA2 gene, known to be involved in the apoptosis through CIAPIN1 pathway. Selected genes obviously do not exhaust the possibility of other involvement of SLs in the regulation of cancer cell invasiveness/apoptosis, but they indicate the potential involvement of these glycolipids in many alternative signalling pathways which enhance tumorigenic potential.

	Based on the abovementioned data, the objective of the project is explaining the dualistic role of sulfolipids in primary tumor. Our preliminary data strongly suggests that SM4 can shift the balance in BCC from pro-malignant properties (sulfatides act as malignancy-related adhesive molecules) to reduced-malignant properties (sulfatides act as pro-apoptotic molecules) and we speculate that similar effects can be observed from other SLs. It seems crucial to clarify how membrane-anchored SM4 can regulate the expression of genes involved in cell invasiveness and apoptosis and may have the opposite effect on the nature of tumor malignancy. Limiting the impact of molecules which are involved in invasiveness, together with “pushing” these cells towards the process of apoptosis seems to be an interesting strategy to prevent an initial and key step in cancer metastasis.
Professional skills for PhD candidate (e.g. master program, specializations, softwares, language, analytical techniques, minimum 500 characters):	The candidate should be a graduate student in a field of the natural science (molecular biology, biochemistry, or biotechnology). The candidate should have a laboratory work experience in various molecular and biochemical methods: the promoter activity analysis and transcription factors characterization, molecular cloning, isolation of glycolipids. The candidate must be also familiar with molecular biology techniques like: western blot, PCR, RT-PCR, flow cytometry, molecular imaging. He/she should has experience in eukaryotic and bacterial cell culture. Ability to critically analyze and interpret data. Good written and spoken English.
a) Project title:	none
b) Agreement number:	none
c) Number of months in the project to support PhD student (in months; starting from 1st of October 2024):	0
Project website:	