Name and surname:	**Wojciech Niżański**
Academic Degree:	prof. dr hab. (Prof.)
Institute/Department:	Department of Reproduction and Clinic for Farm Animals
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ORCID:	0000-0003-1056-0784
UPWr Base of Knowledge - link:	https://bazawiedzy.upwr.edu.pl/info.seam?id=UPWr13e4e9dc71204461b94356a482f67e9c&affil=&lang=pl
Researchgate:	https://www.researchgate.net/profile/Wojciech-Nizanski/research
Personal website / Working group website:	https://bazawiedzy.upwr.edu.pl/info/author/UPWr13e4e9dc71204461b94356a482f67e9c?affil=&r=author&tab=&title=Person%2Bprofile%2B%25E2%2580%2593%2BWojciech%2BNi%25C5%25BCa%25C5%2584ski%2B%25E2%2580%2593%2BWroc%25C5%2582aw%2BUniversity%2Bof%2BEnvironmental%2Band%2BLife%2BSciences&lang=en
Participation in projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)):	1.International multicentric platform as a key element for the effective scientific research UPWr W Nizanski coordination- with partners: UGent, Uni Milano, ENVA Alfort-Paris, Vet Med Uni Vienna, Uni Padova, Bath Uni, IOWA Stae Uni, APM NAWA 2020-2023 coordinator W. Nizanski 2.„Monitoring of ecosystem of Bos bonasus" Work Package Head W. Nizanski-Establisheent of Bank of semen of euro pean bison Agreement , Funded from National Forestry, No OR.271. 3.10.2017-2023 3.Mechanism of semiochmic communications in canidae in context of sexual behaviour: study on the model of Canis familairis 2015/17/B/NZ8/02411. National Center of Science 2016-2019 OPUS, PI W. Nizanski
Do you plan to engage support of second supervisor or auxiliary supervisor?	YES
	Second supervisor (from other discipline, Polish or international research unit)
Name and surname:	Piotr Dzięgiel
Academic Degree:	prof. dr hab. (Prof.)
Faculty, Institute/Department:	Department of Human Morphology;ogy and Embryology, Wrocław Medical University
e-mail address:	piotr.dziegiel@umw.edu.pl
ORCID:	
UPWr Base of Knowledge - link or most important publications from last 3 year (JCR) / patents from last 3 years (maximum 5):	1.Targeting SOX18 Transcription Factor Activity by Small-Molecule Inhibitor Sm4 in Non-Small Lung Cancer Cell Lines. Rodak O, Mrozowska M, Rusak A, Gomułkiewicz A, Piotrowska A, Olbromski M, Podhorska-Okołów M, Ugorski M, Dzięgiel P. Int J Mol Sci. 2023 Jul 11;24(14):11316. doi: 10.3390/ijms241411316. 2.Prolactin-induced protein (PIP) increases the sensitivity of breast cancer cells to drug-induced apoptosis. Urbaniak A, Jablonska K, Suchanski J, Partynska A, Szymczak-Kulus K, Matkowski R, Maciejczyk A, Ugorski M, Dziegiel P. Sci Rep. 2023 Apr 21;13(1):6574. doi: 10.1038/s41598-023-33707-w. 3.Multimodal study of CHI3L1 inhibition and its effect on angiogenesis, migration, immune response and refractive index of cellular structures in glioblastoma. Rusak A, Buzalewicz I, Mrozowska M, Wiatrak B, Haczkiewicz-Leśniak K, Olbromski M, Kmiecik A, Krzyżak E, Pietrowska A, Moskal J, Podhorska-Okołów M, Podbielska H, Dzięgiel P. Biomed Pharmacother. 2023 May;161:114520. doi: 10.1016/j.biopha.2023.114520. Epub 2023 Mar 13. 4.Correction to: Interplay of stromal tumor-infiltrating lymphocytes, normal colonic mucosa, cancer-associated fibroblasts, clinicopathological data and the immunoregulatory molecules of patients diagnosed with colorectal cancer. Zadka Ł, Chabowski M, Grybowski D, Piotrowska A, Dzięgiel P. Cancer Immunol Immunother. 2021 Nov;70(11):3365. doi: 10.1007/s00262-021-03038-8. 5.Label-Free Quantitative Phase Imaging Reveals Spatial Heterogeneity of Extracellular Vesicles in Select Colon Disorders. Zadka Ł, Buzalewicz I, Ulatowska-Jarża A, Rusak A, Kochel M, Ceremuga I, Dzięgiel P. Am J Pathol. 2021 Dec;191(12):2147-2171. doi: 10.1016/j.ajpath.2021.08.005. Epub 2021 Aug 21.
Researchgate:	
Personal website / Working group website:	
Participation projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)):	1.2020 – 2024 kierownik projektu: „Znaczenie białka SATB1 jako nowego celu w immunoterapii raka gruczołu piersiowego z wykorzystaniem adoptywnego transferu limfocytów T" – Fundacja POLPHARMY (592 080,00 PLN) 2.2019 – 2024 kierownik projektu: „Określenie epigenetycznych mechanizmów modulacji wybranych genów z rodziny SOX oraz ich transkryptów jako potencjalnych markerów diagnostycznych i predykcyjnych w niedrobnokomórkowych rakach płuc NSCLC" – OPUS 16 Narodowe Centrum Nauki (1 974 560 PLN) 3.2017 – 2023 kierownik projketu: „Rola białka indukowanego prolaktyną (ang. Prolactin-Induced Protein – PIP) w progresji raka gruczołu piersiowego przy zastosowaniu terapii adjuwantowej" – OPUS 12 Narodowe Centrum Nauki (1 885 870 PLN)
PhD topic:	Awaking the mitochondria-the key to retard reproductive aging?
Research discipline in Doctoral School:	Veterinary Science

Short description of the research problem to be solved in the PhD (minimum 1000 characters):	As it is known, aging has a negative impact on gamete quantity and quality. Along with gamete quality and quantity decline, mitochondria, a cytoplasm organelle, that has been shown to play a crucial role in oocyte energy production, declines simultaneously, and the demanding processes of maturation, fertilization and embryonic development is compromised. The urge needs to find a solution for oocyte rejuvenation grows with the animal extinction rate. As an example, all wild felid species (Felidae) are threatened and the low number of wild felid specimens drives the need to use older individuals to reproduce in IVF programs. There's a clearly demand to develop a solution to apply to gametes, especially, in oocytes from aged animals. "Awaking up" the mitochondria, the cell energy factory, seems the solution for researchers, that are exploring whether manipulating mitochondrial activity could be a viable strategy to restore oocyte health. Notably, several drugs are under investigation for cells rejuvenation. These include SRT1720, Resveratrol and Rapamycin, being target of study in diabetes, obesity, cancer, cardiovascular, neurologic and age-related diseases. We intend to investigate these drugs on oocyte antiaging. Understanding the molecular mechanisms contributing to the maturation and aging of oocytes, recognizing the unique role of mitochondria in this process, and carefully identifying therapeutic targets to improve mitochondrial function and, consequently, oocyte health, may lead to innovative strategies for enhancing and prolonging reproductive fitness by using Assisted Technologies Techniques (ART) / gamete manipulation. Thus we would like to verify the hypothesis that tested substances exert anti-aging influence on oocyte mitochondria enabling for enhancement of efficacy and outcome of ART. We would like also to provide the insight into the molecular mechanism of influence of anti-aging substances on mitochondria function and structure. The main goal of proposed PhD topic is to improve aged female fertility, by administering anti-aging substances in the food, not requiring any handling and stressing the animal itself, specially, threated wildlife animals and obtain better results in gamete production, maturation, fertilization, blastomeres division and minimize chromosomal defects, giving rise to healthy litters, in the animal uterus itself. To achieve that purpose, we plan the use of C57BL6/J mice, an animal model in nowadays vanguard for antiaging studies for better comprising, in in vitro and in vivo study, to comprehend the possibility to improve gamete quality by administering the antiaging drug orally, comparing to in vitro administration. To achieve this knowledge, it is planned to divide the study into 3 tasks, two in vitro and one in vivo. The first two tasks are as follows: in vitro administration of SRT1720, Resveratrol, Rapamycin to culture of oocytes collected from young mice (Task 1) and old mice (Task 2). The intention of adding antiaging substance into in vitro maturation is that oocytes collected from old mice to show similar fertility parameters as oocytes from young mice. The Task 3 will take place in vivo, where the same antiaging substances will be administered orally, in daily food intake. It will be done to check if the oral administration of antiaging drugs is as beneficial as in in vitro administration. Task 1: What SRT1720, Resveratrol or Rapamycin concentrations in in vitro maturation could delay oocyte aging? To achieve that goal, oocyte maturation will be evaluated by morphological evolution - polar body extrusion (inverted microscope); cumulus cell expansion (COC measurement under a phase contrast microscope); ultrastructural changes in maturation (TEM and SEM); blastocyst formation (Miri TL system, for comprising oocyte maturation and blastomeres division and blastocyst rate, with a non-invasive technique); Task 2: What in vitro mitochondria molecular changes are associated with SRT1720, Resveratrol and Rapamycin addition? We aim to understand the molecular changes involved in optimal oocytes under co-culture with antiaging substances in in vitro maturation. Mitochondria distribution in the MII oocytes (immunofluorescence and confocal analysis - Hoechst); SIRT1 and mTOR detection (Western blotting); gene expression levels of SRIT1 and mtDNA (RT-PCR); Oxygen Consumption Rate (OCR) and Extracellular Acidification Rate (ECAR) (Seahorse); mitochondrial stress (ROS activity measurement) and analyse epigenetic changes across the entire genome (EWAS) will be performed. Task 3: If SRT1720, Resveratrol and Rapamycin are administered orally, could this method improve oocyte maturation? The aim of this task is to expose the young and old mice to antiaging substances, but this time, in orally intake, and discover the optimal concentration for oocyte maturation. Oocytes maturation will be evaluated with same parameters as in in vitro, as in Task 1 and mitochondria changes, as in Task 2. Project will be finalized when mitochondrial changes with antiaging substances administration are clarified and the answer to the ultimate goal is solved i.e. if it is possible to have equal satisfactory oocyte culture results in in vitro and in vivo administration of studied antiaging substances.
Professional skills for PhD candidate (e.g. master program, specializations, softwares, language, analytical techniques, minimum 500 characters):	English language high skill is mandatory. We prepared this offer to veterinarians interested in domestic animal/human/wildlife animals reproduction and molecular biology. Candidate should be motivated and ready to perform study necessitating laboratory and clinical work as well as able to travel to the foreign research centers to improve skills and knowledge. Basic knowledge on reproductive clinical and laboratory procedures is advisable. We expect that candidates are able to work on MS Office or similar Mac software package.
a) Project title:	0
b) Agreement number:	0
c) Number of months in the project to support PhD student (in months; starting from 1st of October 2024):	0
Project website:	