TATIANA A. MISHCHENKO

University	National Research Lobachevsky State University of Nizhny Novgorod
Level of English proficiency	Upper-intermediate
Educational program and field of the educational program for which the applicant will be accepted	1.5. Biological Sciences 1.5.5. Human and animal physiology
List of research projects of the potential supervisor (participation/leadership)	Research team leader: 1. Russian Science Foundation №22-15-00376 New prospects of glioma therapy: analysis of immunogenic mechanisms of ferroptosis, 2022-2024 (stage 2023-2024) 2. Competitiveness Enhancement Programme of the National Research Nizhny Novgorod State University (competition of research groups led by young scientists) funded by the Programme 5-100 "Role of chronic prenatal hypoxia in the development of epileptiform activity" 2020-2021 (order 466-OP dated 27.08.2020) 3. Presidential Grant MK-1485.2019.4 "Investigation of the role of inter-astrocytic interactions in the functioning of neuronal networks in normal conditions and in hypoxic damage", 2019-2020. Core researcher: 1. Russian Science Foundation №18-15-00-00279 "Mechanisms of cell death in photodynamic therapy of neuro-oncological diseases", 2018-2020, extension 2021-2022. 2. Russian Science Foundation №18-75-10071 "Investigation of the role of neuronal kinome representatives in the implementation of adaptation mechanisms of the CNS under the influence of ischaemia factors", extension 2021-2023. Research team participant: 1. State assignment of the Ministry of Science and Higher Education of the Russian Federation No. FSWR-2023-0032 "Influence of urban ecosystems on the adaptation potential of the human body", 2023-2025. 2. State assignment of the Ministry of Science and Higher Education of the Russian Federation No. 0729-2020-0061 (basic part) "Molecular basis of adaptation of living systems", 2020-2022. 3. Project of the Ministry of Science and Higher Education of the Russian Federation "Creation and development of a world-class scientific centre "Photonics Centre" (agreement No. 075-15-2020-927 dated 13.11.2020), 2020-2025. 4. Major scientific project of the Ministry of Science and Higher Education of the Russian Federation "Reliable and logically transparent artificial intelligence: technology, verification and application in socially significant and infectious diseases" (agreement No. 075-15-2020-808 dated 05.10.2020), 2020-2022.
List of the topics offered for the prospective scientific research	Investigation of immunogenic properties of ferroptosis and its role in the development of oncological processes in vitro and in vivo Development of approaches to immunotherapy of brain tumours (gliomas) using the mechanisms of immunogenic cell death. Features of functional activity of nervous system cells in the development of oncological processes.

Research supervisor:

Tatiana A. Mishchenko

Candidate of Biology Science (Russia)

Associate professor

(Lobachevsky State University of Nizhny Novgorod)

Physiology

Supervisor's research interests

1. Research in the field of neuro-oncology: regulated forms of cell death, immunogenic cell death, antitumour therapy, immunotherapy, antitumour vaccination
2. Research in the field of neurophysiology: peculiarities of functional activity of brain neuronal networks under various stress factors (including hypoxia-ischaemic conditions, tumour processes).
3. Research of biocompatibility of nanomaterials and tissue-engineered constructs (scaffolds) with cells of the nervous system: targeted delivery systems, diagnosis and therapy of malignant brain tumours.

Research highlights

The postgraduate student's work will be performed (depending on the chosen topic) using the following methods:

- cultivation of permanent cell lines and primary cell cultures (including primary cultures of cells from different sections of the mouse brain, primary cultures of dendritic cells from mouse bone marrow);
- assessment of cell culture viability and cell death pathways;
- method of registration of spontaneous bioelectrical (technology of multielectrode registration of extracellular action potentials MEA) and calcium neural network activity (method of Ca2+ imaging);
- technique of recording functional activity of the mitochondrial apparatus of nervous system cells using a high-resolution respirometer;
- immunocyto(histo)chemistry;
- flow cytometry;
- methodology of vaccination in heterotopic and orthotopic tumour models in prophylactic and therapeutic modes in vivo;
- a complex of behavioural testing to assess the physiological state of the animal and the ability to learn and remember information;
- histological analysis of tissues and organs.

Supervisor's specific requirements

Basic knowledge of central nervous system physiology, immunology and oncology.
Ability to search for relevant scientific literature in English-language search databases of biomedical data with subsequent analysis of the material.
Proficient use of statistical data analysis software (GraphPad Prizm, R or other).
Experience in writing scientific articles and presenting papers at scientific conferences.
Good command of English.
Responsibility and diligence.

Supervisor's publications 2021-2025:

ORCID: https://orcid.org/0000-0003-4463-5035
WoS (Hirsch index 17) 37 publications
Scopus (Hirsch index 19) 43 publications
RSCI (Hirsch index 19) 48 publications

	1. Mishchenko TA, Olajide OJ, Gorshkova EN, Vedunova MV, Krysko DV. Regulated cell death modalities: breaking resistance of temozolomide glioblastoma therapy // Trends Cancer. 2025;11(5):430-432. doi:10.1016/j.trecan.2025.01.007 2. Mishchenko T., Balalaeva I., Gorokhova A., Vedunova M., Krysko D.V. Which cell death modality wins the contest for photodynamic therapy of cancer? // Cell Death Dis. 2022.13(5):455. doi: 10.1038/s41419-022-04851-4. 3. Vedunova M., Turubanova V., Vershinina O., Savyuk M., Efimova I., Mishchenko T., Raedt R., Vral A., Vanhove C., Korsakova D., Bachert C., Coppieters F., Agostinis P., Garg A.D., Ivanchenko M., Krysko O., Krysko D.V. DC vaccines loaded with glioma cells killed by photodynamic therapy induce Th17 anti-tumor immunity and provide a four-gene signature for glioma prognosis. Cell Death Dis. 2022 Dec 21;13(12):1062. doi: 10.1038/s41419-022-05514-0. 4. Mishchenko T.A., Balalaeva I.V., Klimenko M.O., Brilkina A.A., Peskova N.N., Guryev E.L., Krysko D.V., Vedunova M.V. Far-Red Fluorescent Murine Glioma Model for Accurate Assessment of Brain Tumor Progression. Cancers (Basel). 2022 Aug 6;14(15):3822. doi: 10.3390/cancers14153822. 5. Mishchenko T.A., Klimenko M.O., Kuznetsova A.I., Yarkov R.S., Savelyev A.G., Sochilina A.V., Mariyanats A.O., Popov V.K., Khaydukov E.V., Zvyagin A.V. and Vedunova M.V. 3D-printed hyaluronic acid hydrogel scaffolds impregnated with neurotrophic factors (BDNF, GDNF) for post-traumatic brain tissue reconstruction // Front. Bioeng. Biotechnol. 2022. 10:895406. doi: 10.3389/fbioe.2022.895406. 6. Mishchenko T.A., Balalaeva I.V., Vedunova M.V., Krysko D.V. Ferroptosis and Photodynamic Therapy Synergism: Enhancing AntiCancer Treatment. Trends in cancer. 2021. https://doi.org/10.1016/j.trecan.2021.01.013.
	Results of intellectual activity 2021-2025: 1. Мищенко Т.А., Кузнецова А.И., Савельев А.Г., Хайдуков Е.В., Ведунова М.В. Способ in vitro определения биосовместимости скаффолдов для нейротрансплантации. Патент на изобретение № 277 6455 от 21.07.2022 дата приоритета 30.12.2020 2. 2. Новожилова М.О., Мищенко Т.А., Ведунова М.В. Способ in vivo определения биосовместимости скаффолдов для нейротрансплантации. Патент на изобретение RU 2 812 608 Дата регистрации: 30.01.2024