Polytechnic PhD student from Kazakhstan on the development of treatments for Alzheimer’s disease

Nikita Zernov is a PhD student at the Institute of Biomedical Systems and Biotechnology (IBSB) from Kazakhstan. At Polytechnic University, Nikita is a researcher at the Laboratory of Molecular Neurodegeneration, whose team is developing a pharmacological solution for the treatment of Alzheimer’s disease. Nikita is one of the winners of the Best International Grant for PhD (BIG PhD) competition, which took place within the Priority 2030 strategic academic leadership program to support the best foreign PhD students of SPbPU and their research supervisors. In an interview with SPbPU International Office, Nikita Zernov spoke about the impact of the competition on the realization of his scientific ideas and about the research that has a serious chance to contribute to solving one of the global problems for all mankind.

— Nikita, when did you decide to continue your postgraduate studies and why did you choose Polytechnic University?

— For as long as I can remember, I always wanted to do science. I finished my master’s degree at Polytech, and here I decided to grow further in the scientific field. I work in the Laboratory of Molecular Neurodegeneration of the IBSB. More

than 10 years ago, it was created by Ilya Bezprozvanny, a graduate of SPbPU, who is now one of the world's leading scientists in the field of neurobiology. I am very happy with how my scientific activities are developing, and I appreciate the opportunities that Polytechnic University gives me.

— **You are one of the winners of the BIG PhD competition for international PhD students. Why did you decide to participate? Were you confident of success?**

— The BIG PhD competition gives full resources to implement research activities. Of course, I had a little doubt in winning — at Polytechnic University there are a lot of foreign PhD students, and it was clear that only the most promising projects will receive financial support. Nevertheless, I decided to participate, and I was among the best. My scientific advisor, Doctor of Biology Elena Popugaeva, and I are very happy about this victory. The support of the university had a major impact on the implementation of our scientific ideas.

— **What was necessary to participate in the competition? What stages did you find the most difficult? How long did the preparation take?**

— It was necessary to compile a portfolio application, which included a resume of the postgraduate student and supervisor, a detailed description of the research project, and so on. Preparation took about a week. It should be taken into account that we were not developing a project from scratch. We had a scientific groundwork for a specific study.

— **Could you please tell, what kind of project is this?**

— We are developing a pharmacological solution for the treatment of Alzheimer's disease. As part of my PhD thesis, I am studying the pharmacological potential of various chemical compounds — prototypes of future drugs. In more detail, I investigate the ability of compounds to prevent the development of pathological manifestations of Alzheimer's disease. For this purpose, I use cellular and animal models of Alzheimer's disease.

— **Please tell more about what you do in the project?**

— I search for and study pharmacological agents aimed at changing the function of a molecular target. Specifically, we used bioinformatic methods to find compounds that are able to bind to the target molecule, then tested whether these compounds change the function of the target molecule, then investigated whether these compounds have protective properties in cellular and animal models of Alzheimer's disease. In the next steps, we will need to identify the effects of the compounds under study on animal memory and determine their level of toxicity. If all these tests are positive, the compounds could be recommended for clinical tests in humans.

— **What are you interested in your scientific field in general?**

— Alzheimer’s disease is one of the most common diseases, especially affecting the elderly. Patients suffer from impaired memory, first short-term and then long-term. The result is dementia. This is a huge problem for mankind, which is complicated by the fact that so far the exact causes and pathways of Alzheimer’s are poorly understood. It is also very difficult to diagnose this disease in its early stages. These are the real challenges of modern science which make you feel personally involved in solving one of the global problems for the whole world.

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