

There is room for the improvement of efficacy of brain tumour diagnostics and treatment

Prof. dr hab. Bożena Kamińska-Kaczmarek of the Nencki Institute of Experimental Biology, Polish Academy of Sciences is convinced that malignant brain tumours can be diagnosed and treated more effectively than they currently are. To this end, she wants to create a specialised platform for comprehensive diagnostics and personalised treatment in neuro-oncology, which will still be friendly to the average user. The project is supported by the Foundation for Polish Science in the framework of the TEAM-TECH Core Facility 1/2016 competition.



Prof. dr hab. Bożena Kamińska-Kaczmarek. Photo: OneHD

The platform will be based on new generation sequencing (NGS) technologies, innovative calculation methodologies and cellular modelling of brain tumours. These technologies have contributed to immense progress in the understanding of tumour formation, identification of tumour-promoting genetic disorders and discovery of new biomarkers enabling better tumour diagnostics and treatment. Examination of a few hundred or thousand genes in a tumour sample using the NGS method allows for precise diagnostics of genetic alterations, evaluation of malignancy and immune system response, and prediction of tumour response to therapy. Owing to that, optimal treatment can be selected for the patient depending on his or her specific combination of genetic disorders. These are called personalised therapies. Such a procedure, i.e. genetic testing of a tumour before the decision regarding its treatment is made, is recommended by the World Health Organization. Unfortunately, molecular diagnostics of tumours in Poland leaves a lot to be desired, and with respect to brain tumours, it is almost non-existent. As a result, the average life expectancy in patients with malignant gliomas is only 15 months, despite tumour resection and an aggressive and toxic therapy.

A new platform focusing on genetic testing of brain tumours (especially poorly understood brain tumours in children) is expected to improve the situation. A set of genetic/epigenetic tests will be created as part of the project to enable the molecular classification of brain tumours and identification of key tumour-promoting defects in individual patients. An interactive information platform will be established that will allow to look for experimental therapies for patients in Poland and abroad, as well as treatments with combinations of known medicines. The further goal of the project is to design an innovative set of genetic and

epigenetic tests for the molecular classification of brain tumours in children. Such a set of tests could aid doctors in diagnosing paediatric brain tumours and it could reveal new treatment options. Childhood brain tumours, while being the second most deadly tumour in children, are poorly understood in molecular terms and in principle, no effective therapies exist. Most therapies are developed with adult patients in mind and cannot be used in children. Further, there are no experimental models to develop new therapeutics for the treatment of paediatric brain tumours. Therefore, a huge need exists for a set of genetic tests dedicated for childhood brain tumours. Cellular models of childhood brain tumours with defined genetic defects will also be created as part of the project, in order to search for small molecular compounds with a therapeutic potential.

Setting up the platform, the team of professor Kamińska-Kaczmarek will closely cooperate with the Polish Glioma Consortium and the Children's Memorial Health Institute, promoting smooth flow of information to doctors.