

Patients derived iPSC and brain organoids in translational psychiatric research

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Since their discovery induced pluripotent stem cells (iPSC) offered a new highway for regenerative medicine and the development of new strategies for disease treatment. On the other hand, iPSC derived from patients with specific pathology gives new perspectives for elucidating intimate mechanisms of the disease and development individualized and more effective treatment. The biggest challenge for psychiatric research at present is the lack of an appropriate link between cellular and molecular findings with the clinical symptoms. An important aspect of understanding the neurobiology of psychiatric disorders is to test the utility of the findings in the diagnostic process, which may establish such findings as biomarkers. Therefore the development of new concepts for disease modeling in the field of psychiatry and the creation of relevant humanized in vitro models as a base for downstream research is of a high need. Brain organoids generated from iPSC recapitulate the dynamics of neurogenesis, cellular variety, and intercellular communication which are affected in neurodevelopmental psychiatric disorders such as autism. They have the ability to recreate the right complexity of the brain. On the cellular, protein and gene expression level, organoids demonstrate a high similarity to the neurodevelopment in vivo and can, therefore, recapitulate early stages of the neurogenesis. Brain organoids represent a new tool for high throughput screening of chemical compounds and move forward the development of individualized drug treatment. Finally, the same platform could be used in these individuals, who are at high risk for the development of psychiatric disorders and elucidate the etiology, based on risk factor genes.

Biography

Mirolyuba Simeonova Ilieva is a Cell Biologist and has completed her PhD in Bio-Medical Nanotechnology at the Danish Technical University. She is a Research Coordinator in the Patients Centered Laboratory of Translational Psychiatry. She is developing new scientific direction in the Department of Psychiatry, University of Southern Denmark-patients derived iPSC and brain organoids for modeling neurodevelopmental psychiatric disorders.

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