Schizophrenia is a complex neurological disorder. Current therapies are limited to disease management, as a basic understanding of the underlying cellular defects remains unavailable. While the microdeletion 22q11.2 is known to be associated with schizophrenia, a human cellular model has yet to be established. Although animal models have been used to study the function of this genetic region, they do not fully mimic the disease as it presents in humans, forcing researchers to rely on brain recordings with poor resolution. This technology describes a series of human induced pluripotent stem cells (iPSCs), stem cells that have been derived from adult tissue, from schizophrenic patients bearing the microdeletion. As 22q11.2 is the only microdeletion known to correlate with psychiatric disorders, these cells represent the most precise cellular model of human schizophrenia to date. Once iPSCs lines have been generated, they can be propagated indefinitely, allowing them to be a great tool in schizophrenia drug screening and are more cost efficient than animal models. As such, this technology provides a robust, low cost, and highly accurate method of studying the pathophysiology of schizophrenia.

Patient-derived iPSCs for efficient schizophrenia characterization and drug candidate screening

This technology achieves an accurate cellular model of 22q11.2 positive schizophrenia. The iPSCs were generated from five schizophrenic carriers of the 22q11.2 microdeletion alongside an equal number of their unaffected, first-degree relatives. Skin samples were provided via biopsy and used to isolate fibroblasts, which were introduced to a discrete set of compounds that transformed them into pluripotent stem cells. These cells can be quickly grown in cell culture and propagated indefinitely, giving them a competitive advantage over traditional mouse models. Once the lines are established, they can be easily transported and tested for physiological defects that are present in human schizophrenia but absent in mice. Additionally, 22q11.2 bearing iPSCs may be used to find target compounds for 22q11.2 associated psychiatric disorders, a drug development market with few promising candidates and many previous failures.

This technology is currently undergoing cellular and electrophysiological characterization, which is anticipated to both further our understanding of schizophrenia and demonstrate its utility in drug development.
Lead Inventor:

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Applications:

• Basic research tool for 22q11.2 characterization
• Drug screening tool for schizophrenia field
• Basic research tool for other 22q11.2-positive psychiatric disorders, such as Autism

Advantages:

• Can establish causative association between microdeletion and schizophrenia
• Utilizes cells from humans over animal models
• iPSCs cell lines can be propagated indefinitely and shared easily
• Applicable to other psychiatric disorders involving 22q11.2 microdeletion

Patent information:

Tech Ventures Reference: IR CU15262

Related Publications:


Inventors

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