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Modeling of psychiatric disorders using iPSC technology

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iPSC technology has enabled us to more accurately model the pathology of human diseases in drug discovery research. Schizophrenia is characterized by positive symptoms such as hallucinations and delusions, negative symptoms such as blunted affect and social withdrawal and cognitive dysfunction. Previous studies have suggested that the abnormal development of neuronal cells, impaired synaptic functions, and impaired neural circuit functions are the causes of psychiatric disorders, however, much remains unknown about the molecular and cellular etiology of these disorders. To analyze the molecular and cellular etiology of psychiatric disorders and to identify the molecular mechanisms behind the inter-individual variability of response to antipsychotics, we established iPSCs from patients with schizophrenia for which there is existing clinical information, such as treatment history describing their responsiveness to antipsychotic drugs, and differentiated these iPSCs into neurons. As an example, we found evidences suggesting that differential synaptic function is a potential candidate for the molecular basis of response to antipsychotics. Pathological studies using clinical information and iPSC-derived neurons from patients can be powerful for understanding the molecular and cellular etiology of psychiatric disorders.