

Investigation of Aspects of Neuron Function in Schizophrenia Using hiPSC Cells

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Schizophrenia is a debilitating neurological disorder characterized by hallucinations, paranoia, and delusions. Identifying how schizophrenia specifically causes changes in the structure and function of the brain would lead to more effective and widely-applicable treatments for diagnosed patients. This project studied four aspects of human neurons in relation to schizophrenia using differentiated stem cells: neuronal migration, the ratios of neurons to supporting cells, expression of genes related to schizophrenia, and neuronal activity. Neuronal activity was measured by allowing cells to migrate over time in culture and imaging the area traveled. Cell type ratios were measured through staining for cell type marker proteins. The expression of the NRXN1 gene was measured through RNA extraction, and neural activity was measured through the use of MEA electrode plates. Neuronal migration decreased by an average 71% and the ratios of cell types also decreased significantly. RNA sequencing identified a form of the NRXN1 gene in patients not present in controls, and neuronal activity also decreased by a significant amount in one patient group but not another. These results indicate a correlation between schizophrenia and each aspect that was studied, offering a more complete picture of how the disorder causes changes in the brain. It also indicates possible differences between groups within patient populations which still need to be explored. Additionally, the specific relationship to schizophrenia symptoms is unknown.

Awards Won:

Fourth Award of \$500

National Anti-Vivisection Society: Second Award of \$5,000