

A Cell-Based Model for Parkinson's Disease Melton

Abstract

Parkinson's disease is the most common degenerative movement disorder. Parkinson's is a complex neurodegenerative disease thought to be caused by a combination of genetic and environmental factors. The disease pathology results from the loss of a specialized subset of dopaminergic neurons in the substantia nigra located in the ventral midbrain. Progress towards understanding this disease has been hindered by a lack of patient material available for study and an absence of accurate models. While most forms of this disease are sporadic, a few are inherited and an even smaller number have been directly linked to a genetic abnormality. One rare familial form of Parkinson's has been characterized as a dominant autosomal mutation in the alpha-Synuclein gene. Here, I describe the generation of human embryonic stem cell lines that carry an inducible form of the A53T alpha-Synuclein gene. Further, I show that these cells can be differentiated into midbrain dopaminergic neurons in vitro. Together these findings form the basis for a cell-based model of Parkinson's Disease. Thus, these cell lines can be used to further our understanding of this disease and as potential sources of material for cell replacement therapy.