Differentiation of specific cell types from stem cells is controlled by different signaling pathways many of which have not yet been discovered. Dopaminergic neurons are one cell type in the brain and play an important role in motor function; their loss results in Parkinson’s disease. Embryonic stem cells can be experimentally differentiated into Dopaminergic neurons. The goal of differentiation of dopaminergic neurons from embryonic stem cells is to contribute to the therapeutic strategy for Parkinson’s disease. There are ways to induce embryonic stem cells to differentiate into dopaminergic neuron cells through transcription regulation of genes as well as the use of chemicals such as cAMP and Kinase inhibitors. These methods potentiate maturation of ES cell cultures to the DA neuron. Tio et al. (2011) used apical genes involved in asymmetric cell division, inscuteable and bazooka, and notch signaling to induce additional differentiation of dopaminergic neurons in Drosophila. Pei et al. (2004) reported cAMP can potentiate dopaminergic neuron differentiation in vitro. Hwang et al. (2008) showed a kinase inhibitor, H-1152, is effective on mouse embryonic stem cells to differentiate ES cells to dopaminergic neurons. Together, these authors have demonstrated that embryonic stem cells can be experimentally differentiated into dopaminergic neurons and may potentially be used to help treat patients suffering from Parkinson’s disease.

Reference:

