



The Mind Project's Parkinson's Lab Summary Report

Parkinson's disease is a degenerative neurological disorder of unknown causes. Early symptoms include a resting tremor (trembling of the hand while it's at rest) and rigidity (muscle stiffness). Parkinson's disease is considered a motor disorder as it affects the movement of the body. Patients with Parkinson's disease suffer from the loss of dopamine neurons in the substantia nigra. Known as the nigrostriatal pathway, these neurons have their cell bodies in the substantia nigra. Their axons run through the mediastantial bundle and end in the striatum.

When dopamine neurons release dopamine, the dopamine molecules will diffuse until they are taken up by a dopamine transporter or attach to a target cell. This is known as volume transmission. Volume transmission results in a background concentration of dopamine, known as dopamine tone. This allows for signals to pass smoothly from the thalamus to the motor cortex and then out to the rest of the body.

Parkinson's disease patients do not show visible symptoms until 80% of the dopamine neurons in the striatum have died. Scientists don't know how dopamine tone is maintained until then. Dr. Zigmond has put forth the increased release theory, which theorizes that the remaining dopamine neurons release more dopamine with each action potential.

Dr. Garris disagrees with this theory. He has proposed the Passive Stabilization model, which theorizes that dopamine tone is maintained because of the relationship between dopamine release and uptake. As a patient loses dopamine neurons, he or she not only loses a source of dopamine release, but also a source of dopamine uptake. Therefore, the net concentration of dopamine molecules remains the same. This stabilization is disrupted as the glia begin to compete with the dopamine neurons for the uptake of dopamine molecules.

Today, researchers continue to disagree about what the correct theory is that explains the puzzling features of Parkinson's disease. All scientists working on Parkinson's do agree, however, that a great deal more research needs to be done before we will have a complete understanding of the complex neurological mechanisms that produce proper motor function and a complete description of the causes of Parkinson's disease. We need a new generation of medical researchers to help solve the mysteries of Parkinson's.