

New research implicates natural toxin as triggering Parkinson's disease

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In new research from Saint Louis University, investigators have found evidence that a toxin produced by the brain is responsible for the series of cellular events that lead to Parkinson's disease. The study, published in *PLoS One*, found that the brain toxin DOPAL plays a key role in killing the dopamine neurons which trigger the illness.

In earlier research, Saint Louis University investigators found that DOPAL seemed to be responsible for killing healthy dopamine cells, which in turn causes Parkinson disease to develop. Now, research in an animal model gives them further reason to suspect the chemical as the culprit.

Parkinson's disease is a debilitating neurodegenerative movement disorder, affecting 2 percent of individuals older than age 65 and 4 to 5 percent older than 85 years. The disorder is due to a loss of dopamine neurons and is characterized by bradykinesia and tremors while at rest.

Saint Louis University investigators found that DOPAL, a breakdown product of dopamine, killed healthy dopamine cells and produced an [animal model](#) of Parkinson's disease, giving them evidence to suspect that DOPAL is the culprit.

Dopamine, a vital chemical that allows for coordinated function of neurons controlling the body's muscles and movements, is produced by [nerve cells](#) in the substantia nigra. When 80 percent of these cells die or become damaged, symptoms of Parkinson's disease begin to appear,

including tremors, slowness of movement, rigidity and stiffness, and difficulty with balance.

Lead researcher, W. Michael Panneton, Ph.D., professor of pharmacological and physiological science at Saint Louis University School of Medicine, says the research offers a big step forward in the understanding of Parkinson disease.

"In Parkinson disease, we knew that the death of dopamine cells is responsible for patients' symptoms," said Panneton. "But no one knew why the cells are dying."

From a cellular perspective, doctors know some pieces of the puzzle. They know that Parkinson patients have a loss of dopamine neurons in a part of the brain called the substantia nigra, leading to severe dopamine loss in another part of the brain called the striatum, and the aggregation of a protein called alpha-synuclein.

Alpha-synuclein is found throughout the brain. In some people, the protein clumps together. Researchers found that it is DOPAL that causes alpha-synuclein protein in the brain to aggregate. This induces further increases of DOPAL leading to the death of the dopamine-producing cells, which in turn causes Parkinson's symptoms to develop.

Currently, the main approach to Parkinson's disease is to treat symptoms by replacing dopamine that's lost when the cells die. This approach however does not prevent the loss of [dopamine neurons](#) causing Parkinson's disease.

This new research opens up promising new research avenues to prevent dopamine neuron loss and the progression of [Parkinson's disease](#).

Provided by Saint Louis University

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