

Antioxidant precursor molecule could improve Parkinson's

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N-acetylcysteine (NAC) is a naturally occurring molecule that replenishes one of the body's antioxidants and now shows potential benefit as part of a standard course of treatment for patients with Parkinson's disease, according to a study published in the journal, *Clinical Pharmacology & Therapeutics*. The study found improvements in dopamine levels, the primary neurotransmitter that is specifically decreased in Parkinson's disease, as well as improvements in clinical evaluations of the patients' mental and physical abilities. The study was performed by the Department of Integrative Medicine and Nutritional Sciences, as well as the Departments of Neurology and Radiology, at Thomas Jefferson University.

Current treatments for Parkinson's disease are generally limited to temporarily replacing dopamine in the brain along with medications designed to slow the progression of the disease. The destruction of dopamine nerve cells in Parkinson's disease appears to result in large part due to oxidative stress which lowers levels of glutathione, a chemical produced by the brain to counteract oxidative stress. NAC is an oral supplement, and also comes in an intravenous form that is used to protect the liver in acetaminophen overdose. Several initial studies have shown that NAC administration increases glutathione levels in the brain, but it has not been tested whether such an effect would augment [dopamine levels](#) as neurons recover function. The current study tested this by tracking dopamine re-uptake via brain scans.

"This study is an important step in understanding how N-acetylcysteine

might work as a potentially new avenue for managing Parkinson's patients. The NAC appears to enable dopamine neurons to recover some of their function," said senior author on the paper Daniel Monti, MD, Chairman of the Department of Integrative Medicine and Nutritional Sciences and Director of the Marcus Institute of Integrative Health at Thomas Jefferson University.

This study advanced earlier findings that NAC may increase dopamine function in patients with Parkinson's disease. In the study, 42 patients with Parkinson's disease continued their current treatment and were placed into two groups—the first group received a combination of oral and intravenous (IV) NAC for three months (in addition to their current treatment program); and the second group, the control patients, received only their standard-of-care Parkinson's treatment for three months. Those patients in the active group received 50mg/kg NAC intravenously once per week and 500mg NAC orally 2x per day on the non IV days.

Patients were evaluated clinically using the Unified Parkinson's Disease Rating Scale (UPDRS), which assesses a variety of symptoms including both cognitive and motor function. Patients also underwent brain scanning using DaTscan SPECT imaging which measures the amount of dopamine transporter in the basal ganglia, the area most affected by the Parkinson's disease process. This test was used to determine the level of neuronal recovery. Patients were evaluated initially and after three months of either receiving the NAC or standard of care therapy.

Compared to controls, the patients receiving NAC had improvements of 4-9% in dopamine transporter binding and also showed improvements in their UPDRS score of about 14%.

"This is an exciting study that suggests a natural molecule such as NAC can help improve [dopamine](#) function and symptoms in Parkinson's patients," said corresponding author and neuro-imaging expert Andrew

Newberg, M.D., Professor and Director of Research at the Department of Integrative Medicine and Nutritional Sciences. The investigators hope that this research will open up new avenues of treatment for Parkinson's [disease patients](#).

More information: Daniel A. Monti et al, N-Acetyl Cysteine Is Associated With Dopaminergic Improvement in Parkinson's Disease, *Clinical Pharmacology & Therapeutics* (2019). [DOI: 10.1002/cpt.1548](#)

Provided by Thomas Jefferson University

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