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Failure in recycling cellular membrane may be a trigger of Parkinson's

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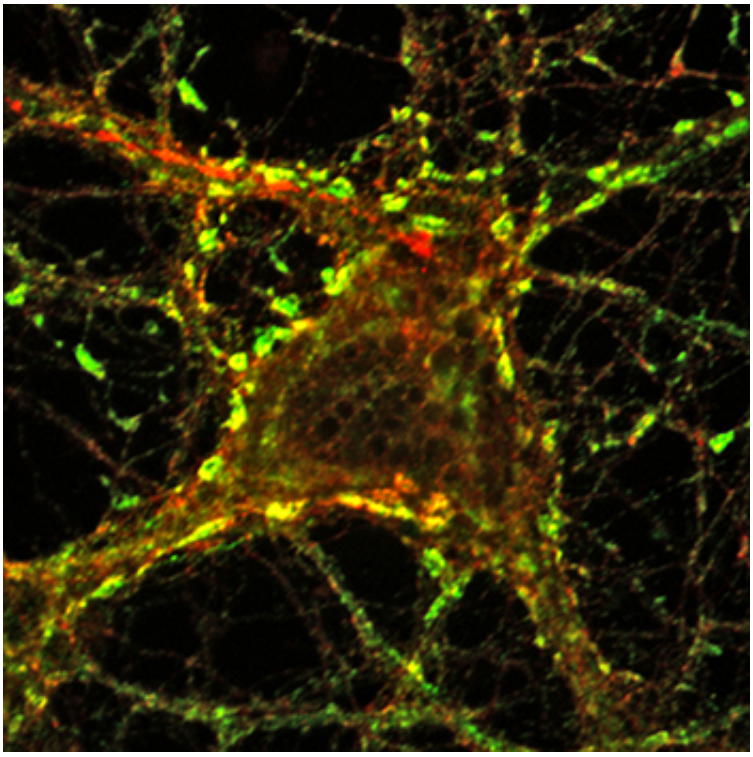

Immunofluorescence image of cultured neurons from mouse model of Parkinson's disease shows abnormal accumulations of proteins at presynaptic nerve terminals making contact with the cell body of target neuron. Credit: Yale University

A genetic mutation found in patients with early-onset Parkinson's disease has been used to create a mouse model of the disease. The advance adds to growing evidence that—at least in a subset of patients—the

neurodegenerative disorder may arise from the neuron's inability to efficiently recycle membranes of the packets that store and transport neurotransmitters.

A team led by Yale's Pietro De Camilli, a Howard Hughes Medical Institute researcher and professor of neuroscience and cell biology, wanted to assess the impact of a mutation in the synaptojanin 1 gene found in six patients who developed Parkinson's in their 20s and 30s. The work spearheaded by Mian Cao, a member of the De Camilli lab, recreated the patients' mutation in mice, which developed movement problems and epilepsy similar to the neurological problems found in Parkinson's.

Synaptojanin 1 plays a key role in the reformation of packets of neurotransmitters within the cell after neurotransmitters are released into the junction between neurons. This process, called endocytosis, is crucial to the fundamental function of the nervous system. However, defects were observed in neurons of a brain circuit involved in Parkinson's disease.

"It's very striking that several genes implicated in Parkinson's seem to be directly or indirectly related to endocytic function," De Camilli says. The study was published Feb. 22 in the journal *Neuron*.

More information: Mian Cao et al. Parkinson Sac Domain Mutation in Synaptojanin 1 Impairs Clathrin Uncoating at Synapses and Triggers Dystrophic Changes in Dopaminergic Axons, *Neuron* (2017). DOI: 10.1016/j.neuron.2017.01.019

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