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How bacteria in the gut influence neurodegenerative disorders

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Humans have roughly as many bacterial cells in their bodies as human cells, and most of those bacteria live in the gut. New research released today reveals links between the gut microbiome—the population of microorganisms living in the gastrointestinal tract—and brain diseases such as Parkinson's and Alzheimer's, including potential new ways to track and treat these diseases. The studies were presented at Neuroscience 2017, the annual meeting of the Society for Neuroscience and the world's largest source of emerging news about brain science and health.

Almost 100 trillion microbes—some beneficial and some harmful—live in the human gastrointestinal tract at any time, helping to regulate immune function and inflammation, two factors hypothesized to play a role in neurodegenerative diseases like Parkinson's and Alzheimer's. As brain-focused cures for such diseases remain elusive, scientists are looking to the microbiome for new insight and novel strategies.

Today's new findings show that:

- Metabolites derived from the microbiome block protein misfolding in test tubes and prevent neurodegeneration in a fly model of a disease related to Parkinson's, hinting that gut-derived metabolites may hold therapeutic promise (Lap Ho, abstract 573.23, see attached summary).
- A rat model of Parkinson's disease displays increased levels of an inflammatory protein in the colon, identifying a possible new

biomarker for the disease (Doris J. M. Doudet, abstract 133.13, see attached summary).

- Nonhuman primates that received stomach injections of a protein associated with Parkinson's disease show signs of the disease in their brains, revealing that pathology can spread from the gut to the brain (Erwan Bezard, abstract 131.02, see attached summary).
- A gene associated with risk for Alzheimer's disease influences the gut microbiome of mice, potentiating a novel treatment strategy (Ishita Parikh, abstract 476.02, see attached summary).
- Probiotic treatment corrects memory problems in an Alzheimer's mouse model, suggesting that altering the microbiome may help delay the disease (Harpreet Kaur, abstract 126.23, see attached summary).

"The results presented today add to the growing body of evidence showing the influence of the gut on the brain and the crucial relationship between the two," said press conference moderator Tracy Bale, PhD, of the University of Maryland School of Medicine and Center for Brain Development and Maternal Mental Health. "Targeting the gut introduces a different and promising angle to tackle brain disorders across the lifespan."

Provided by Society for Neuroscience