

Gut-Brain and Parkinson's Disease Seminar: Understanding the connection between the gut and brain in Parkinson's Disease

January 10, 2026



Stanford
MEDICINE

Kathleen Poston, MD, MS

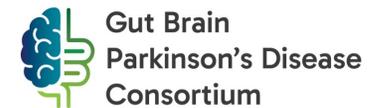
Edward F. and Irene Thiele Pimley Professor in Neurology & Neurological Sciences

Division Director, Movement Disorders

Vice-Chair for Research

Stanford University

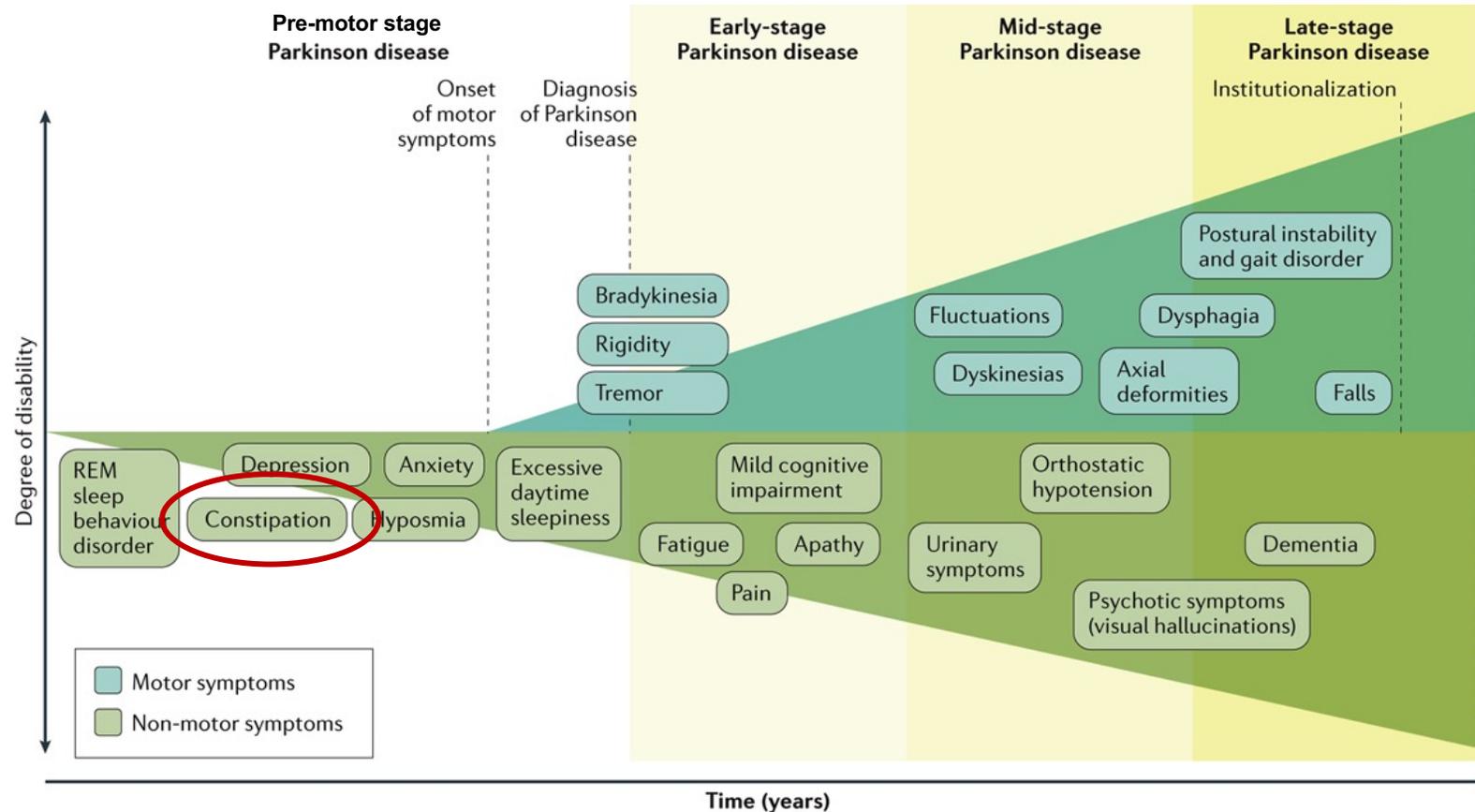
On behalf of the Stanford Movement Disorders Center, Clinical and Research Faculty: **Welcome!**

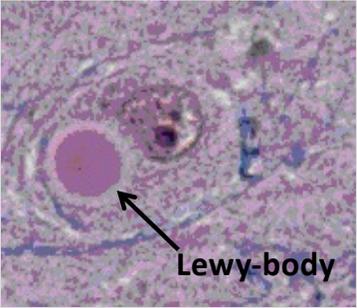
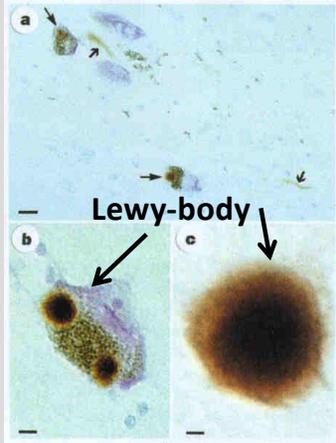
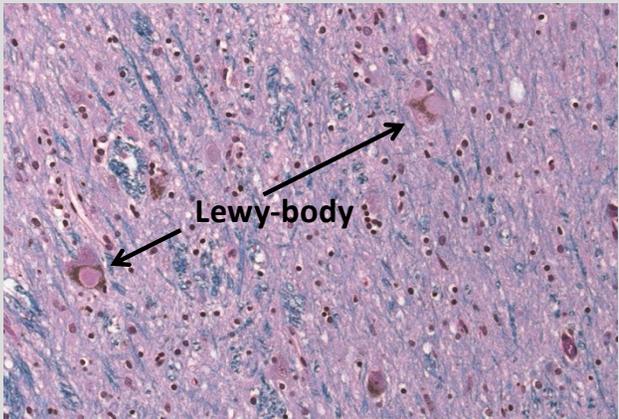
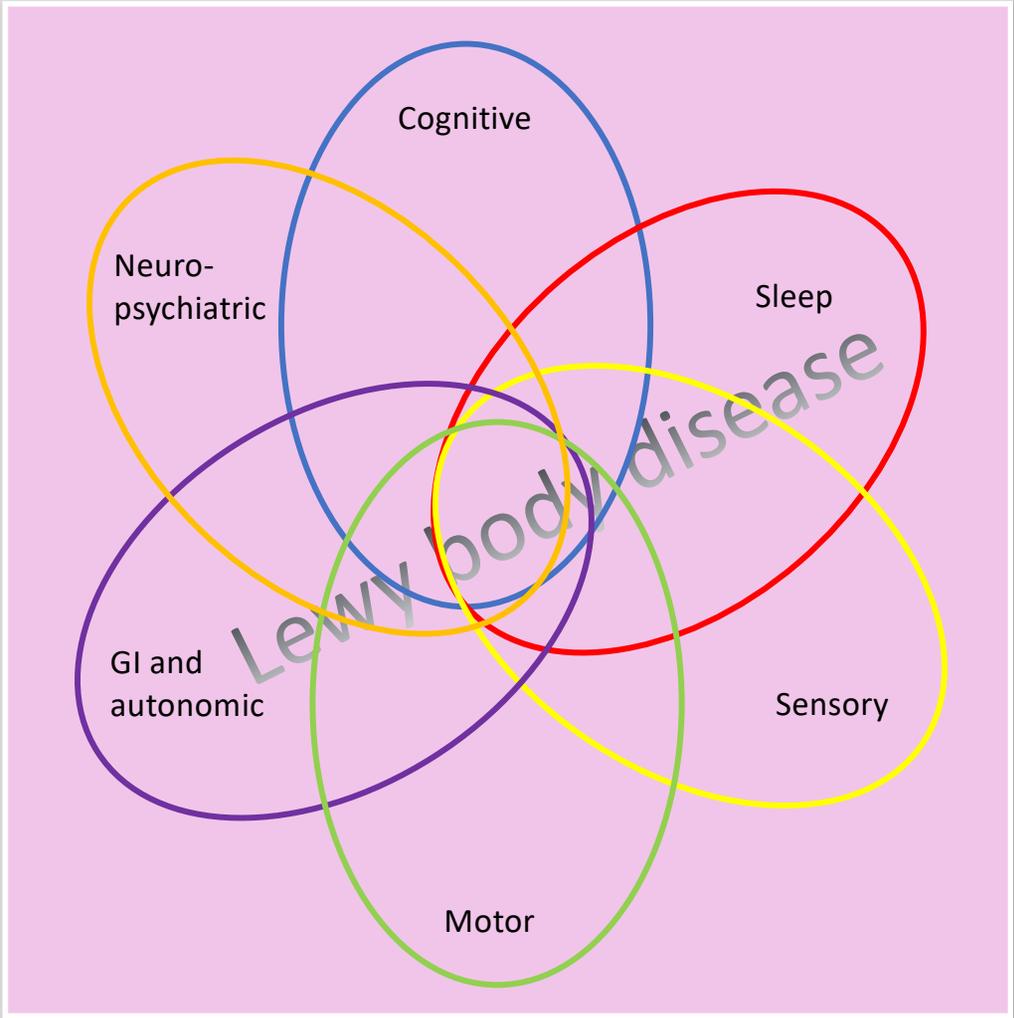


Why am I a Non-Motor movement disorders specialist?

- Estimates suggest that Parkinson's affects **nearly 1 million people in the United States** and **more than 6 million people worldwide**.

The Spectrum of Motor and Non-Motor Symptoms in Parkinson's disease

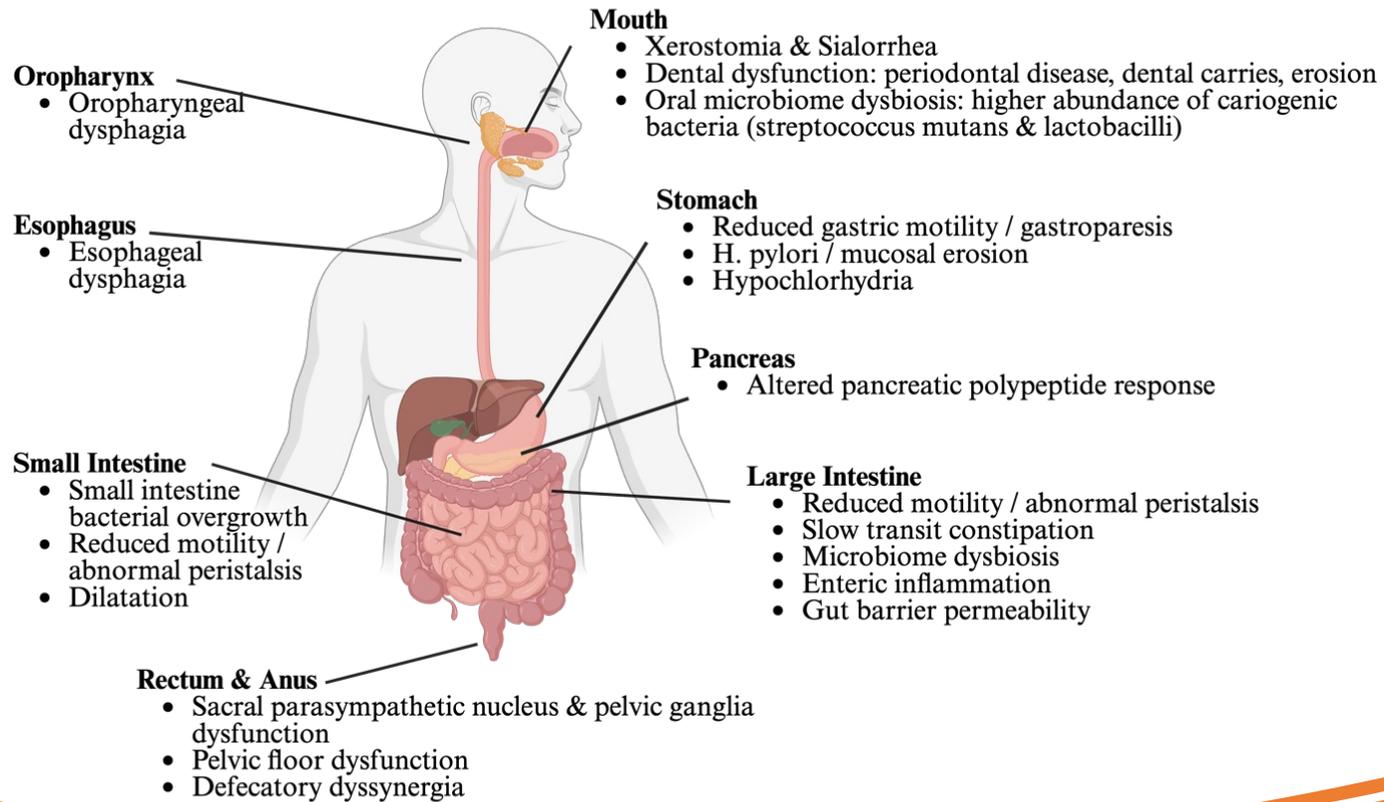


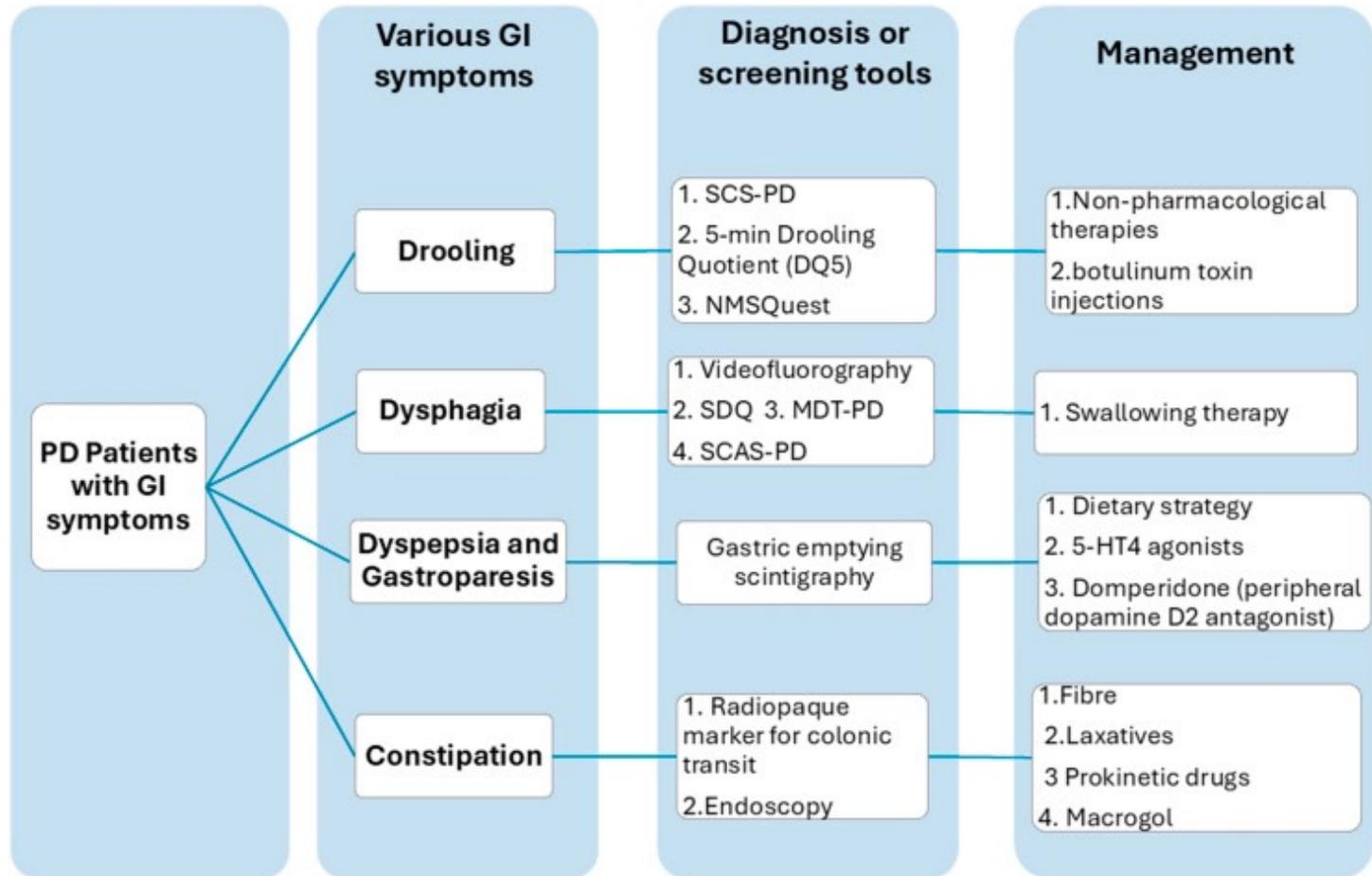


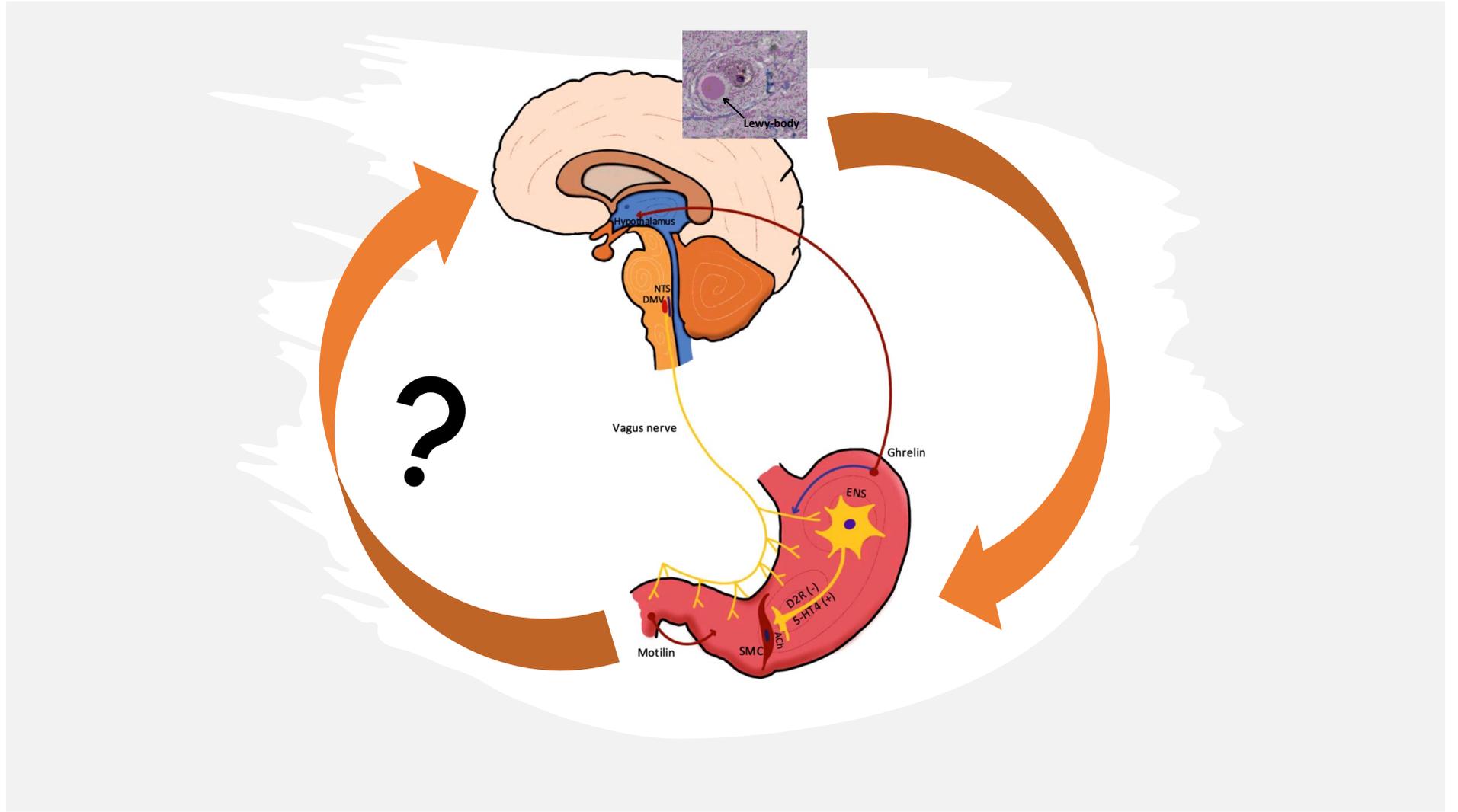
Why am I a Non-Motor movement disorders specialist?

- Estimates suggest that Parkinson's affects **nearly 1 million people in the United States** and **more than 6 million people worldwide**.
- The experience of living with Parkinson's over the course of a lifetime is **unique to each person**.
- As symptoms and progression vary from person to person, neither you nor your doctor can predict which symptoms you will get, when you will get them or how severe they will be.
- Even though broad paths of similarity are observed among individuals as the disease progresses, there is no guarantee you will experience what you see in others.

Gastrointestinal Tract Dysfunction in Parkinson's disease

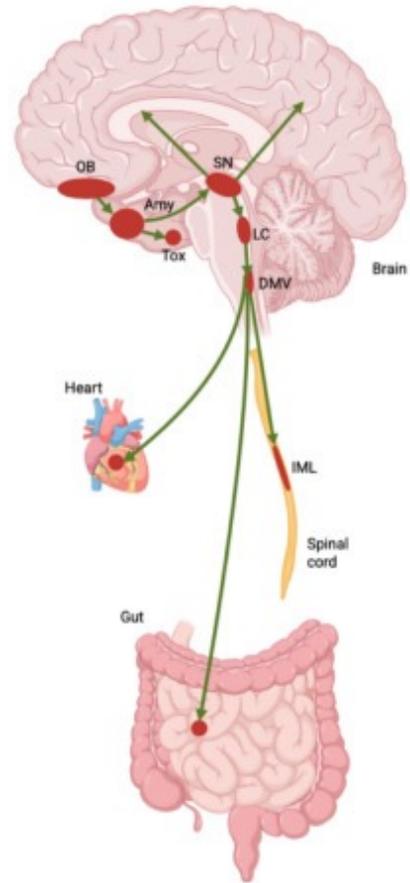




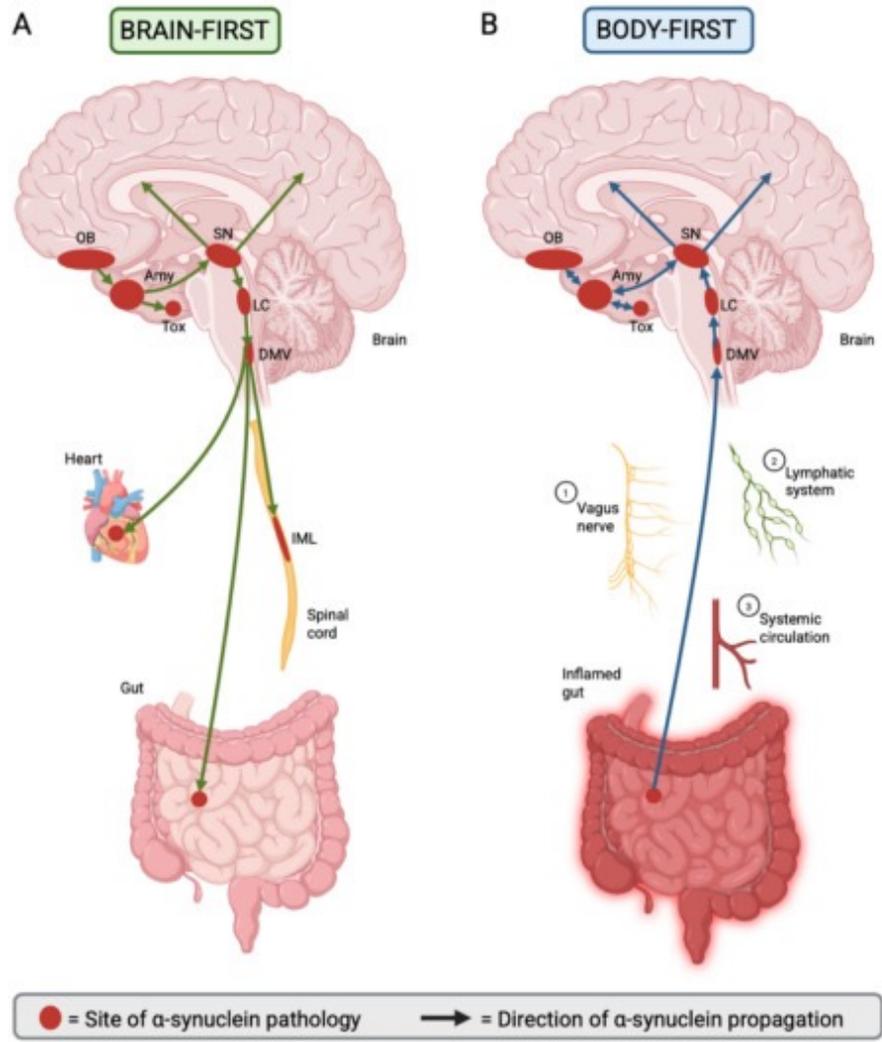


A

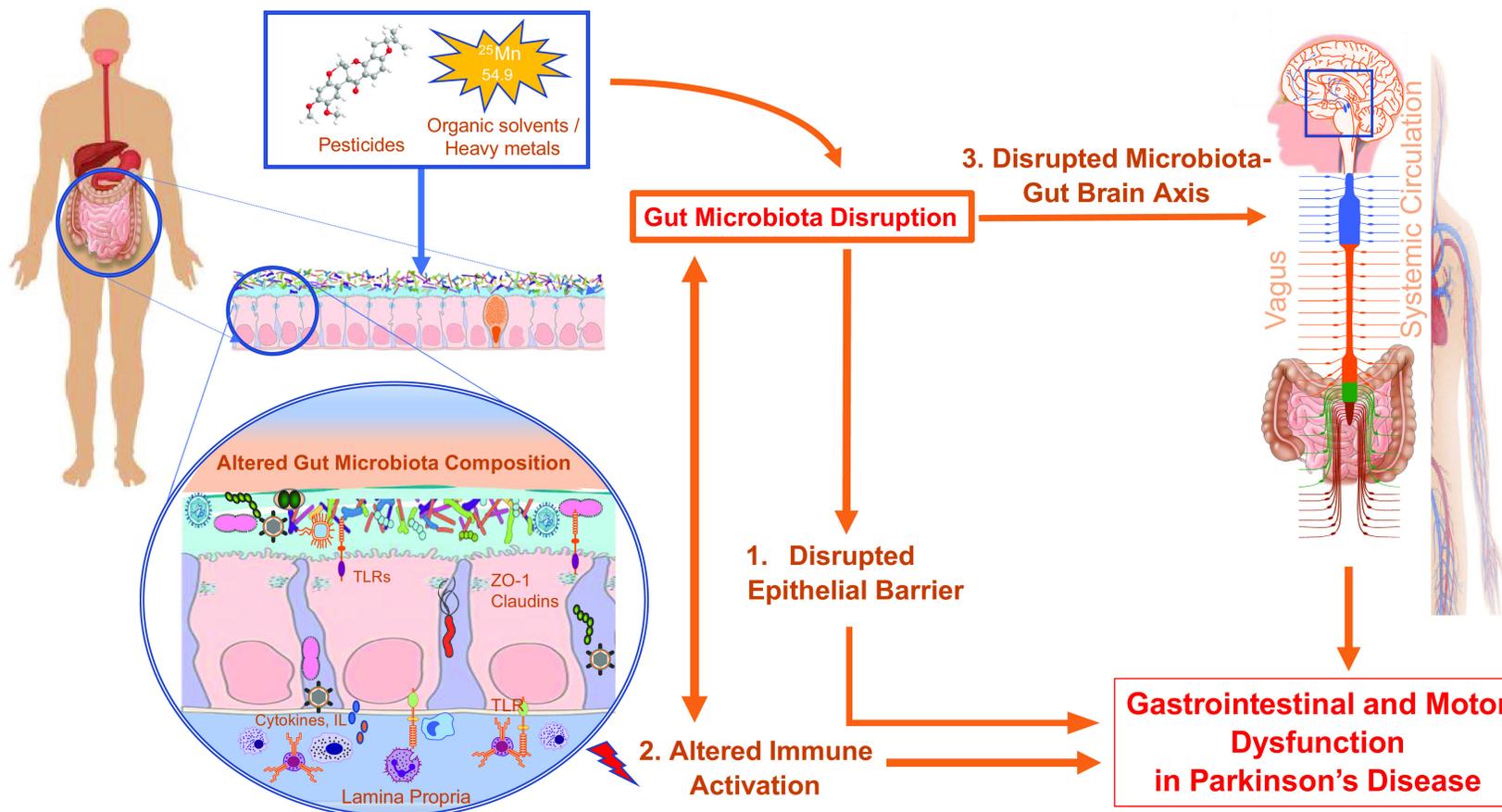
BRAIN-FIRST

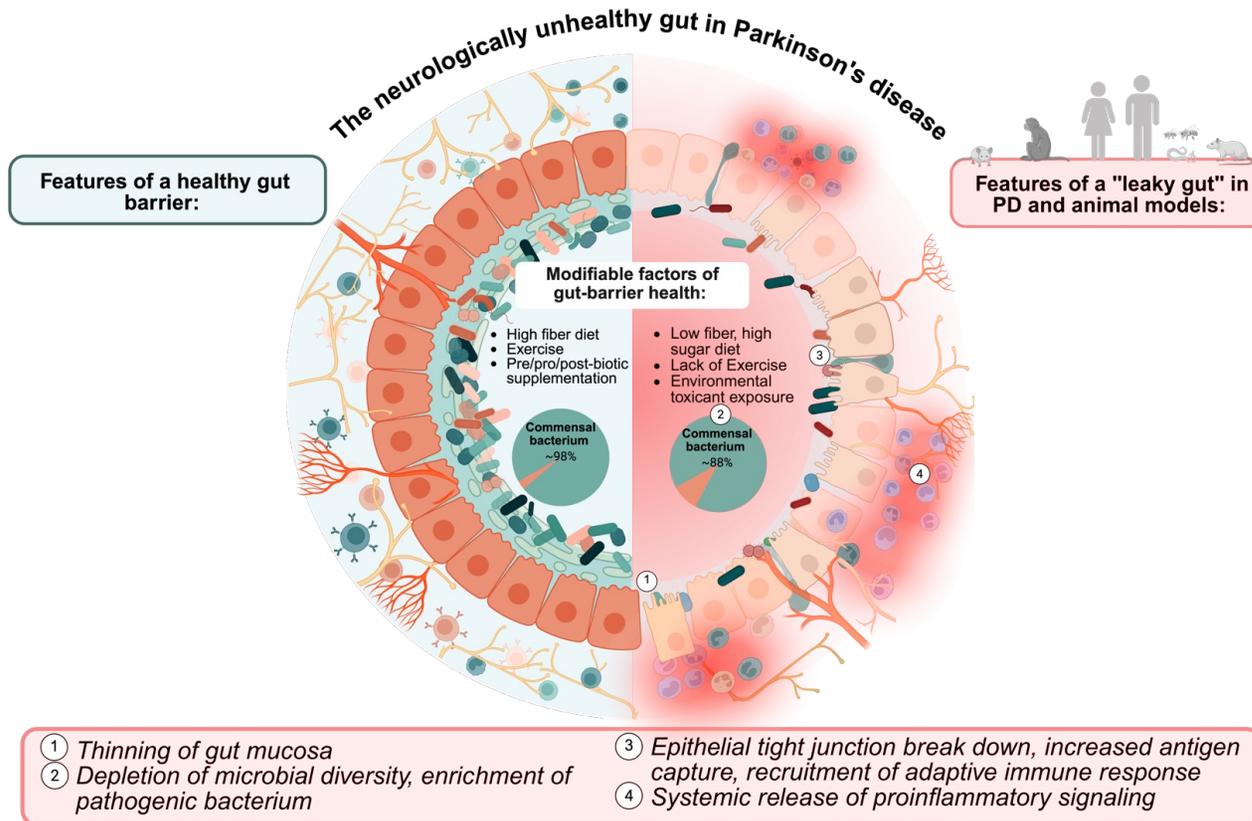


● = Site of α -synuclein pathology → = Direction of α -synuclein propagation

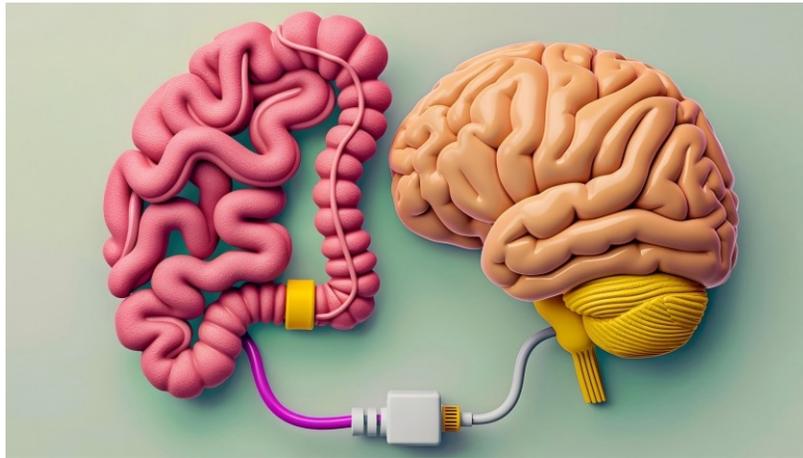


Environmental Toxins!





Visual schematic of the neurologically unhealthy gut in individuals living with Parkinson's disease

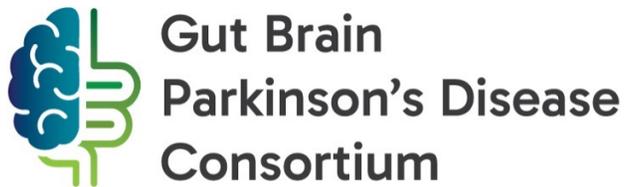


  **National Institutes of Health**
Turning Discovery Into Health

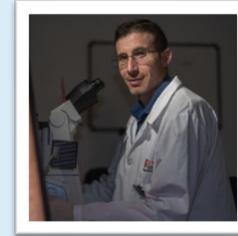


 **Gut Brain
Parkinson's Disease
Consortium**

Stanford University



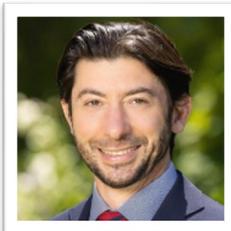
Co-Leader
Kathleen Poston,
MS, MD
Neurology



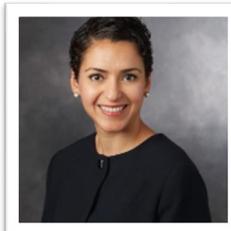
Co-Leader
Laren Becker,
MD, PhD
Gastroenterology



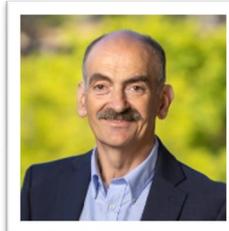
Todd
Coleman, PhD
Engineering



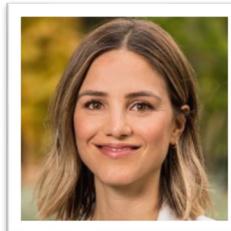
Mitch Miglis,
MD
Neurology



Leila Neshatian,
MD, MSc
Gastroenterology



Mehrdad
Shamloo, PhD
Neuroscience



Bianca
Palushaj, MD
Neurology



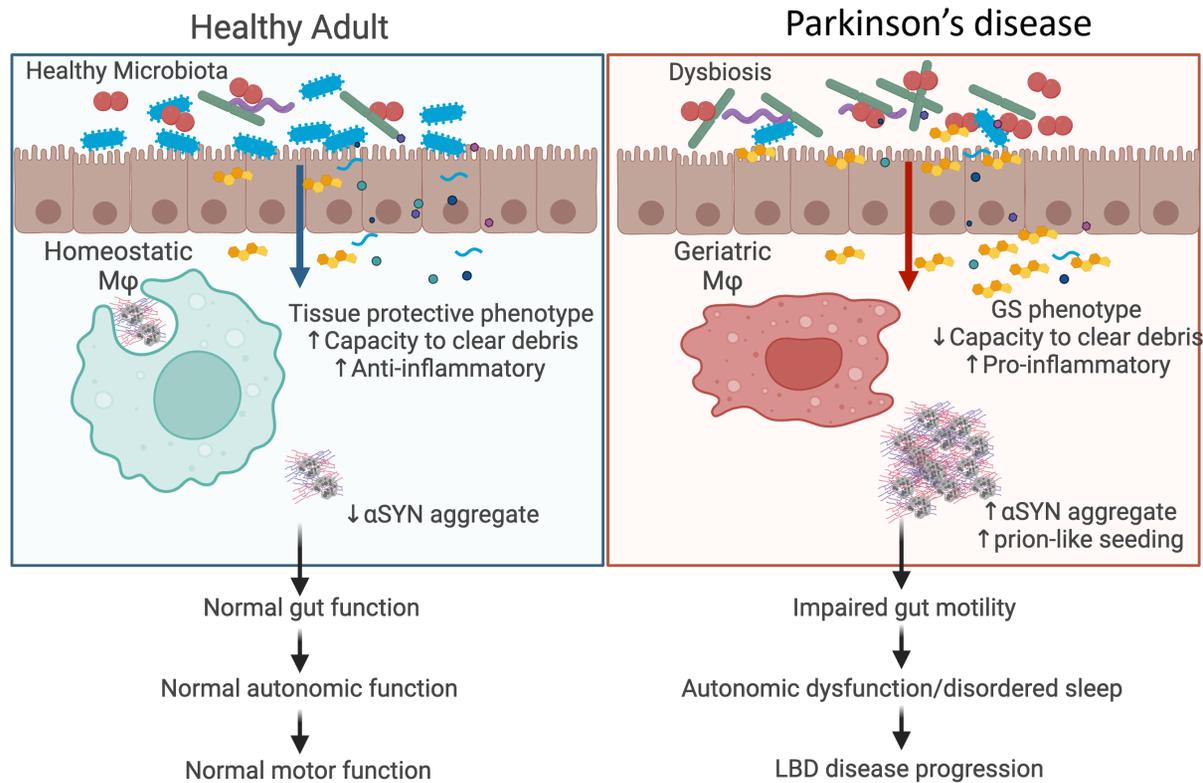
Thomas Montine,
MD, PhD
Pathology



Ami Bhatt,
MD, PhD
Neuroscience/GI

Hypothesis: Altered gut neuroimmune interactions, mediated by microbial derived factors, promotes disease progression in Parkinson's.

Figure 1. Hypothesis



Stanford University



Gut Brain Parkinson's Disease Consortium



Study all GI symptoms in people
with Parkinson's

Across all 5 Centers enroll people with Parkinson's and
people living in the household

Study all aspects of GI function, from swallowing to gut
transit time to colon biopsies to stools samples



Study Gut-Brain activity people with
Parkinson's

Using an innovative wearable device study the gut
activity and the brain activity at the same time

Study changes before and after eating



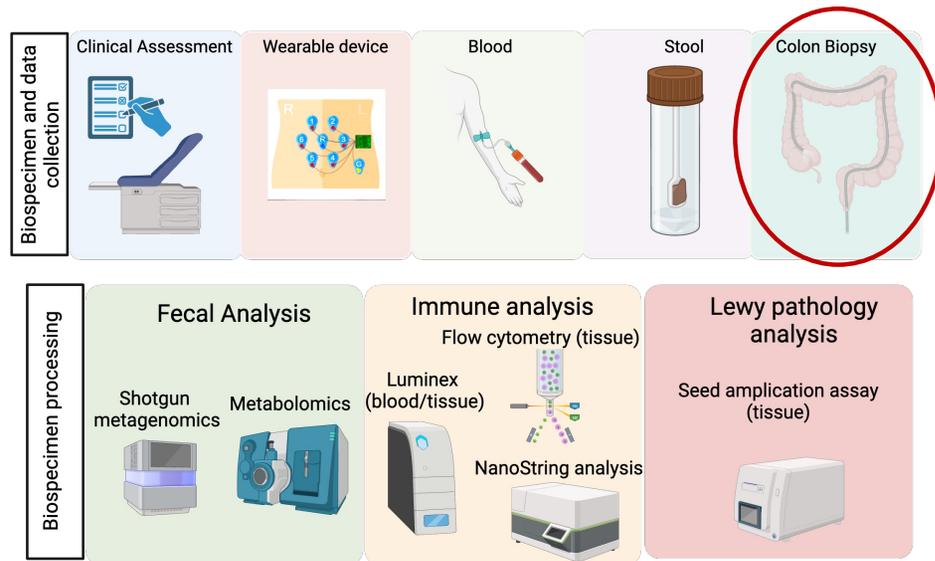
Perform experiments in mouse
model to study GI immune function

Use a mouse model of Parkinson's to study the impact
of immune function on alpha-synuclein



Gut Brain
Parkinson's Disease
Consortium

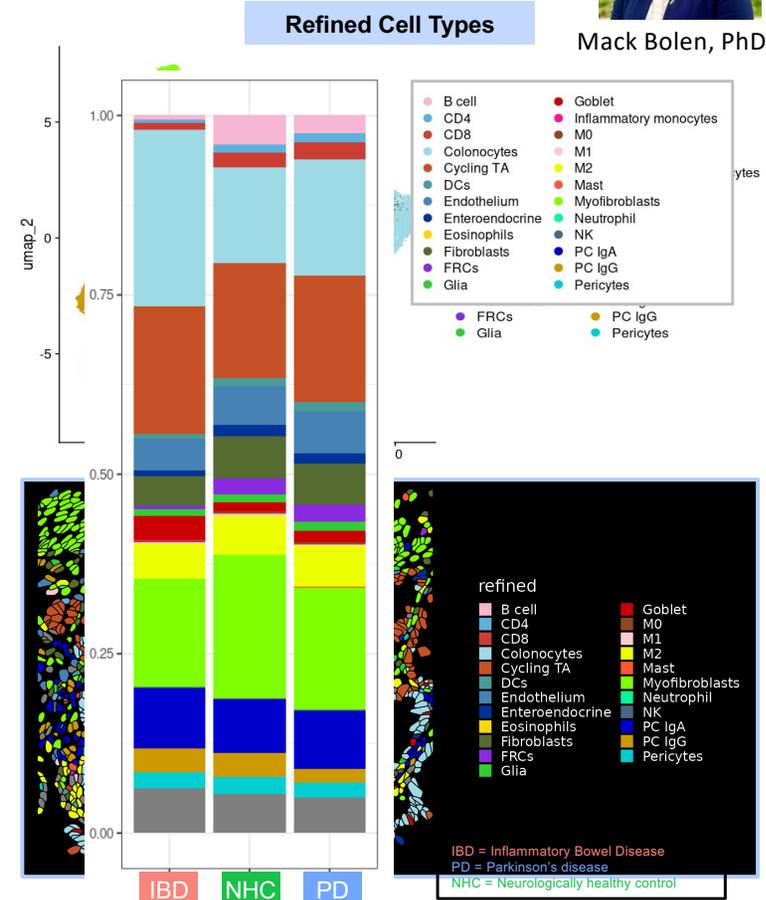
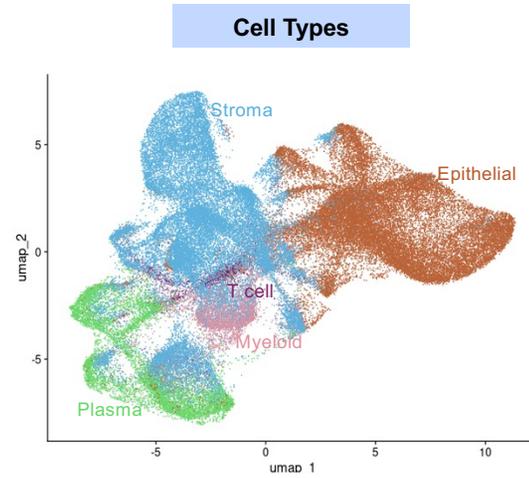
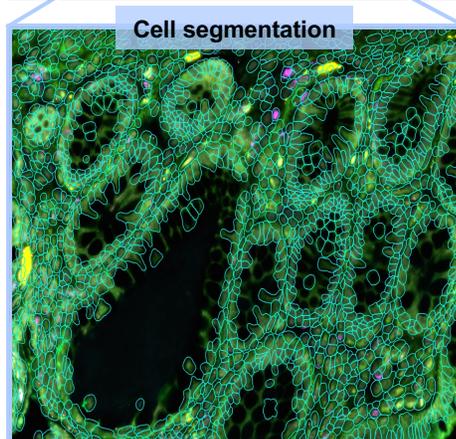
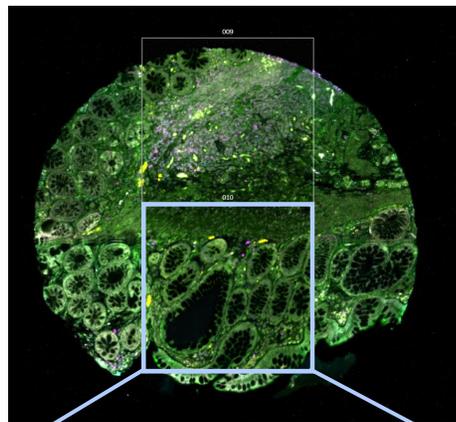
Stanford
University



Spatial molecular imaging provides deep immune phenotyping of colon biopsies from those living with Inflammatory Bowel Disease (IBD), Parkinson's disease (PD) and Neurologically healthy controls (NHC).



Mack Bolen, PhD



What if we could diagnose people with Parkinson's disease during a routine colonoscopy, before they ever developed any clinical symptoms...

Thank you

