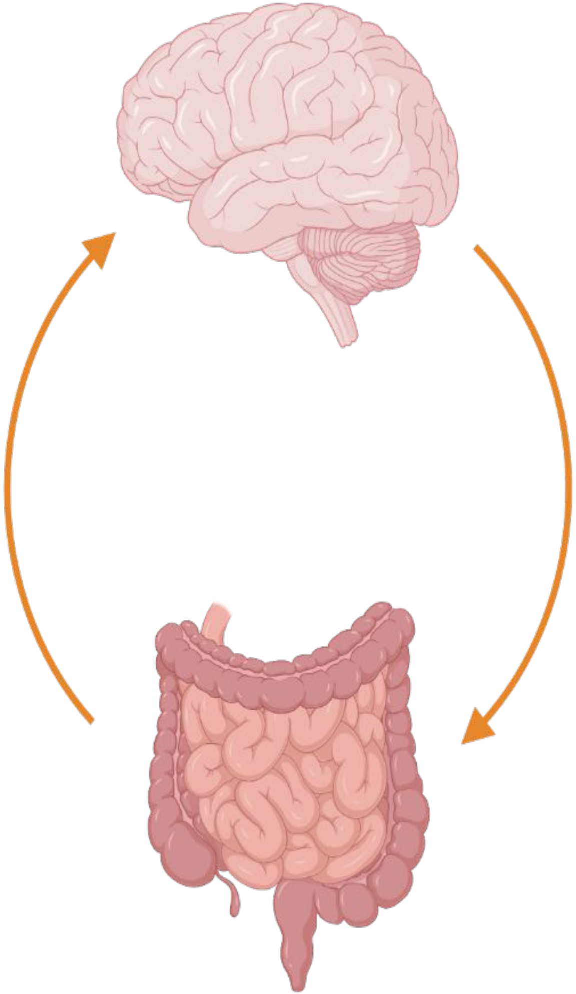
Columbia
University
Neuroscience
Outreach

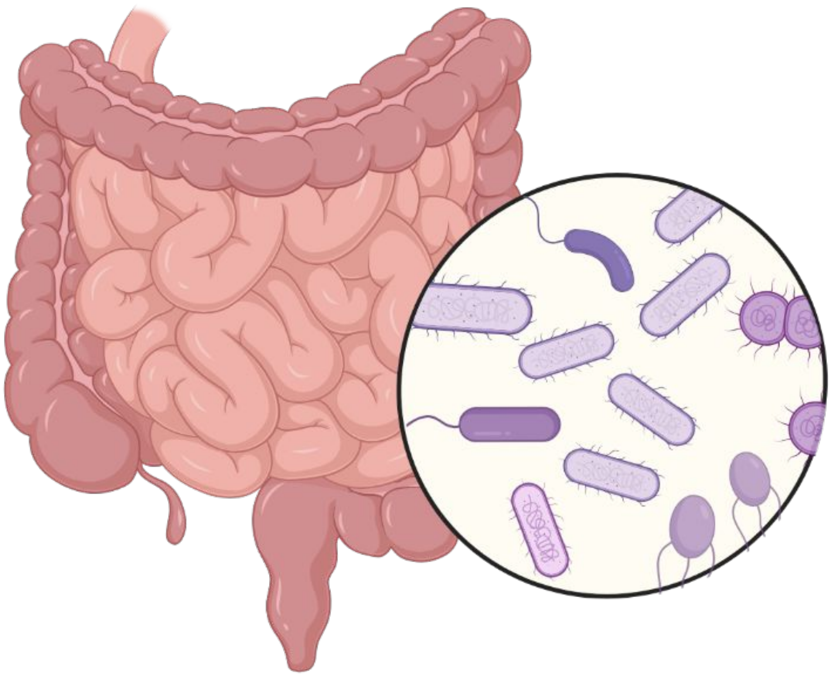
Gut-Brain Axis!

What do you know about how the gut communicates with the brain?



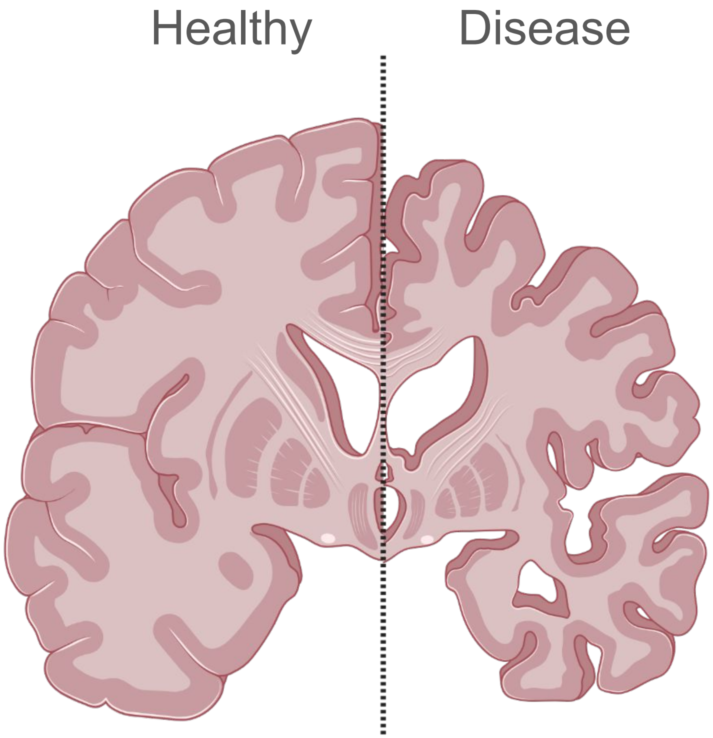
Microbiome in Human Disease

- Changes in the microbiome have been associated with many diseases, including depression, anxiety, and neurodegenerative diseases (Alzheimer's disease, Parkinson's disease, etc.)



Alzheimer's Disease (AD)

- Most common form of cognitive impairment -> affects 6 million Americans.



Gut Microbiome in Alzheimer's Disease

When looking at fecal samples from patients with AD, scientists observe:

- Change in bacteria that comprise their microbiome.
- Increase in pro-inflammatory cytokines such as IL-6 and IL-1β.

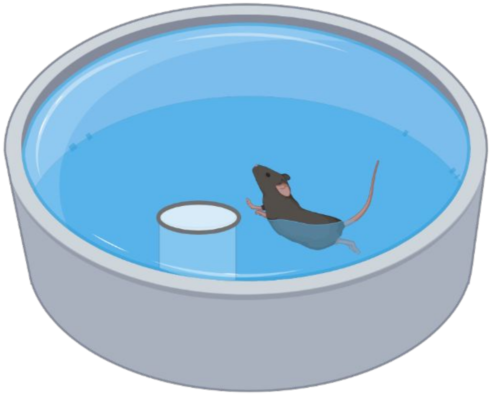
Are there any other reasons why the bacteria in the gut microbiome of these patients are different?

What questions do you have about the microbiome in Alzheimer’s disease?

What type of animals do we need to test whether certain bacteria impact AD pathology?

How would we know whether this variable (altering the microbiome) plays a role in Alzheimer's disease?

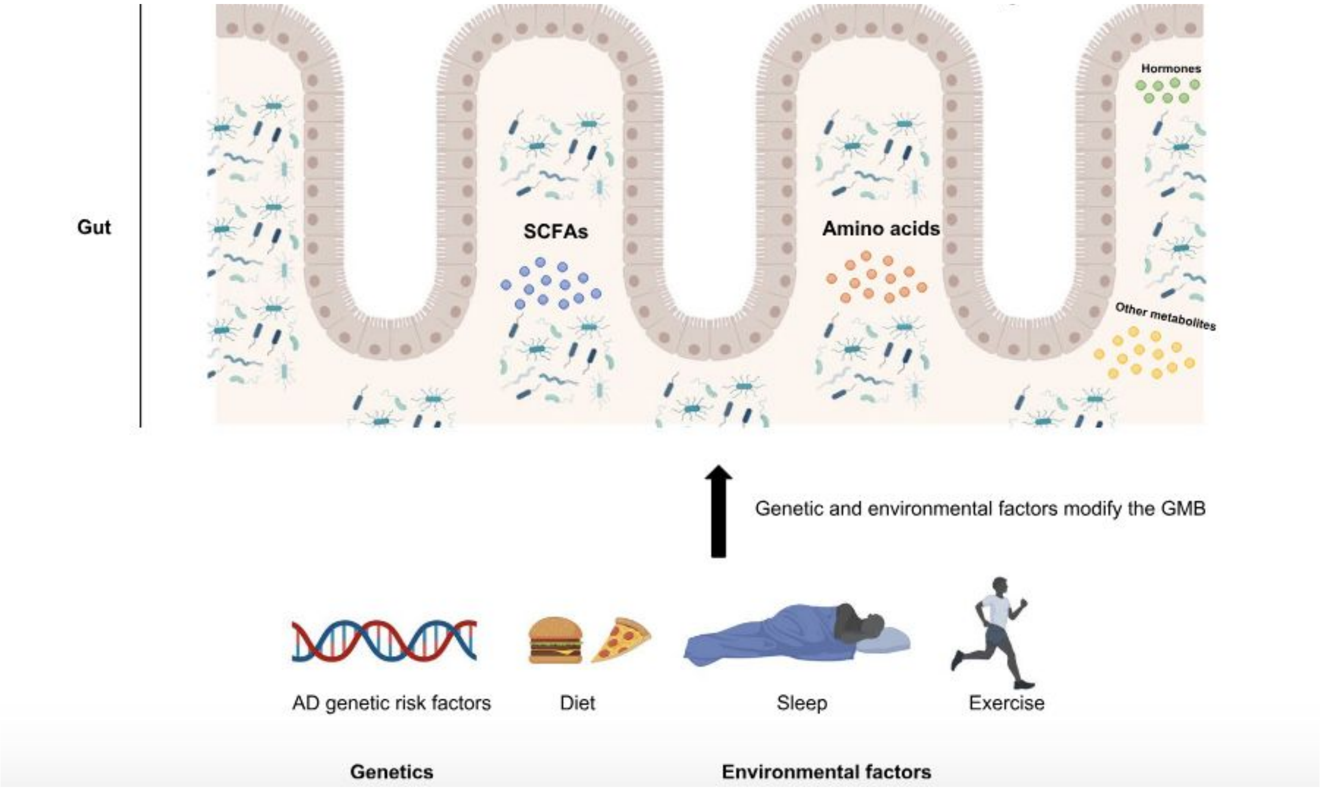
- Pathology: Amyloid-beta plaques, tau tangles
- Behavior: Morris Water Maze, etc.



Aβ plaques

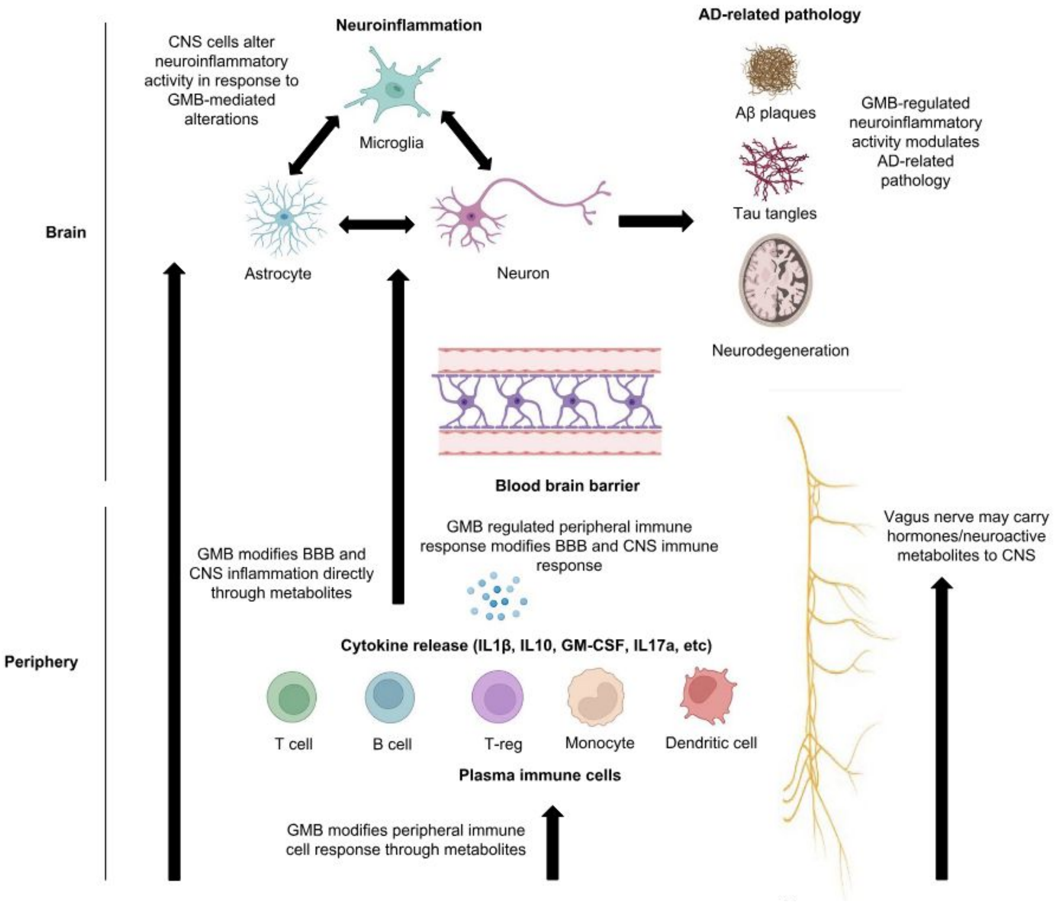
Tau tangles

Summary - Microbiome in Alzheimer's Disease



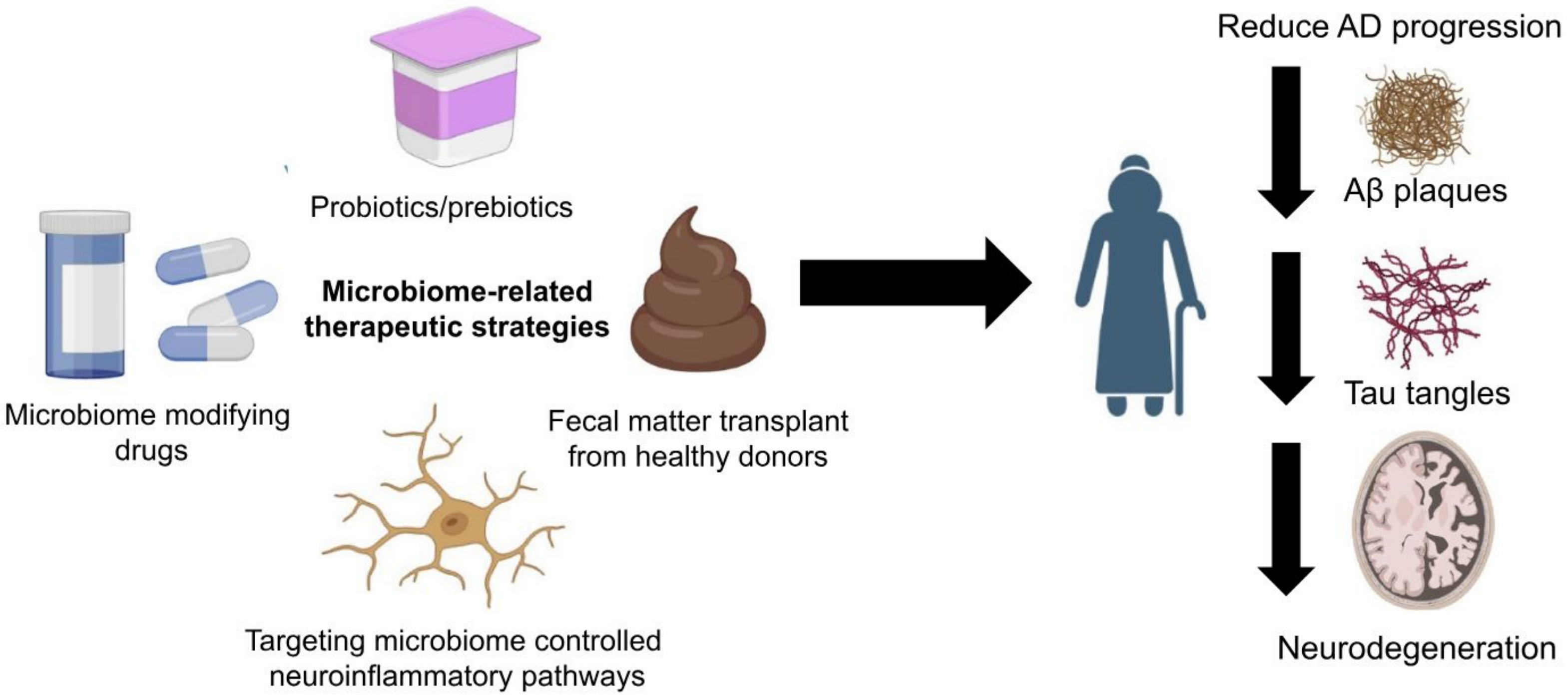
Chandra et al., *Mol Neurodegeneration* (2023)

Summary - Microbiome in Alzheimer's Disease



Chandra et al., *Mol Neurodegeneration* (2023)

What does this mean for treating Alzheimer’s disease?



Any questions for some scientists?