A Gut Feeling: Exploring Alzheimer's in Unexpected Places

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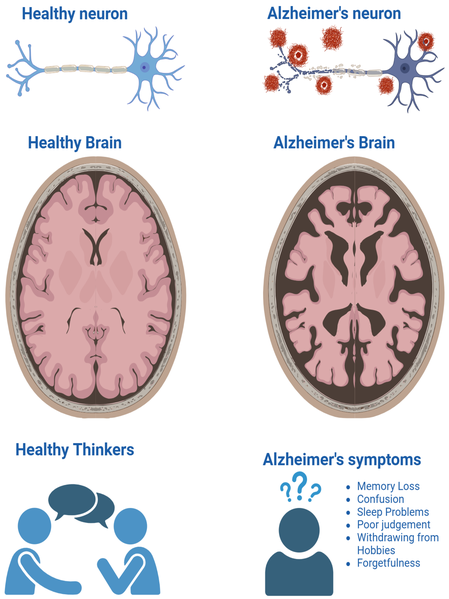
Alzheimer's Disease: More Than Just Memory Loss

Alzheimer's Overview

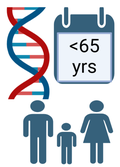
- Alzheimer's disease affects the brain, mainly in older adults, and impacts over **6 million people** in the U.S alone.
- Alzheimer's occurs when the brain cells stop working properly and harmful clumps form, **blocking communication between cells** and **causing damage over time.**
- People with Alzheimer's may struggle with daily tasks, experience personality changes, or withdraw from social activities.
- By the time symptoms appear, the brain has already been affected for years, even decades, and **there is no cure.**



Early detection is critical for future treatments!

Familial Alzheimer's

- Follows a **genetic** pattern of inheritance.
- Typically develops between **age 40-65.**
- The main risk factor is the presence of the Alzheimer's genes.



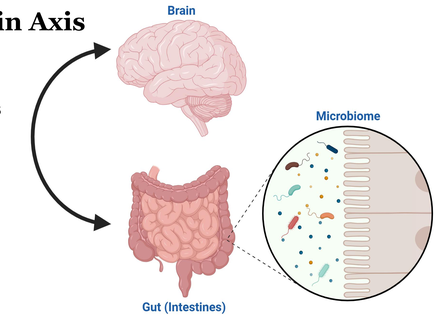
Sporadic Alzheimer's

- A multifactorial disease.
- Linked to **pollution**, **high fat** and cholesterol diet, and **aging**.
- Can be **genetic** but doesn't have to be.

Is there somewhere else we can look before symptoms occur?

The Gut-Brain Axis: A Secret Conversation

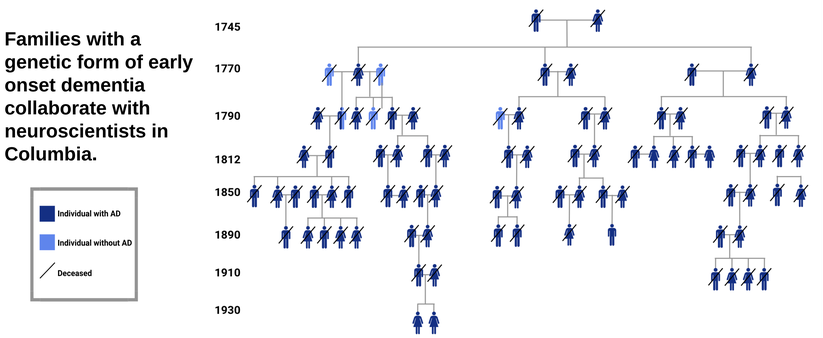
- The brain and the gut are in constant communication, so **digestion influences mood and overall health.**
- Alzheimer's has been linked to **inflammatory bowel disease** (IBD), **gastroesophageal reflux disease** (GERD), and **irritable bowel syndrome** (IBS).



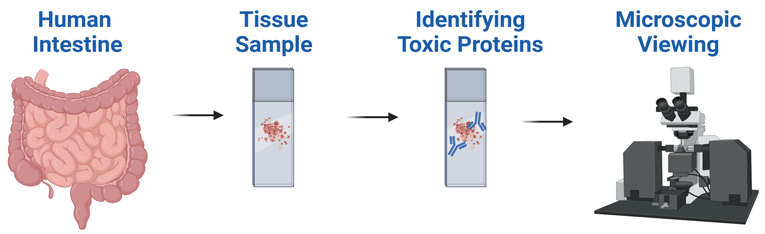
We Hope To Characterize Hallmark Alzheimer's Pathology in Gut Tissue Samples from Individuals with Familial and Sporadic Alzheimer's Disease

Who Makes this Possible?

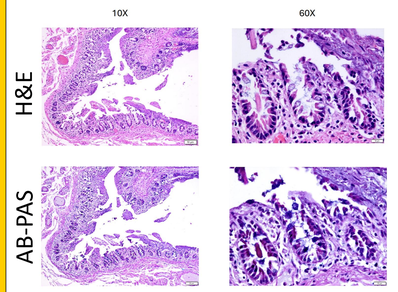
Families with a genetic form of early onset dementia collaborate with neuroscientists in Columbia.



Following The Trail

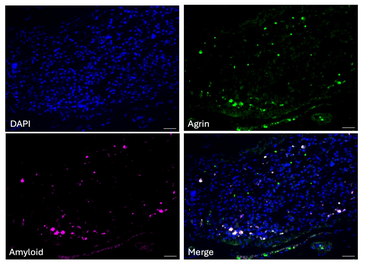


Illuminating Alzheimer's: A Look Within



Gut tissue from an individual with **familial Alzheimer's disease**.

This tissue was stained with **various dyes** to visualize the general **cells and structure** of the gut tissue.

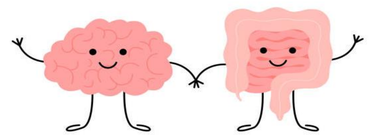


Gut tissue from an individual with **familial Alzheimer's disease**.

This tissue was stained with **fluorescent dyes** to visualize the **gut cells, markers of gut inflammation,** and **elements associated with Alzheimer's.**

Food for Thought: Digesting the Next Steps

- **Gut-Brain Axis Dysfunction**: Investigating alterations in the gut and how it contribute to neuroinflammation and amyloid pathology could provide insights into Alzheimer's disease (AD) progression.
- **Sex Differences**: Women make up 2/3 of the AD population. Exploring how gut dysfunction in AD differs between males and females could help develop precision medicine approaches for treatment and prevention.
- **Potential for Early Biomarkers and Interventions**: Identifying gut-derived biomarkers associated with AD risk could lead to novel diagnostic tools and dietary or microbiome-targeted interventions to slow disease onset.



References & Acknowledgements

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Figures and schematics created in https://BioRender.com