Anschutz | Colorado Clinical and Translational Sciences Institute (CCTSI)

Aging Cats as a Model for Neurodegeneration

Aidan Flanagan

B.S., Molecular, Cellular and Integrated Neuroscience

Department of Veterinary Medicine and Biomedical Sciences at Colorado State University

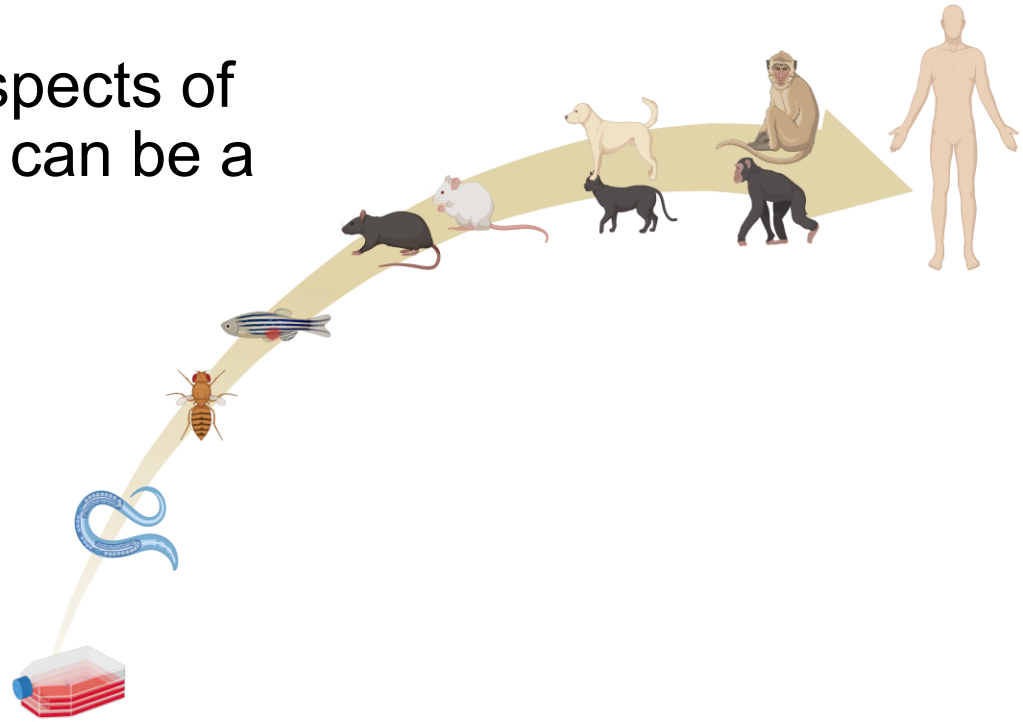
Advisor: Dr. Julie Moreno

What's Missing from Current Alzheimer's Models?

- Genetically modified mice models are important mechanistically but lack key components of lifestyle and natural aging.

- There is a need for an intermediary between mice models and human clinical trials for age related diseases.

- Because companion cats replicate important aspects of natural aging and lifestyle, we believe that they can be a powerful model for brain aging and disease.

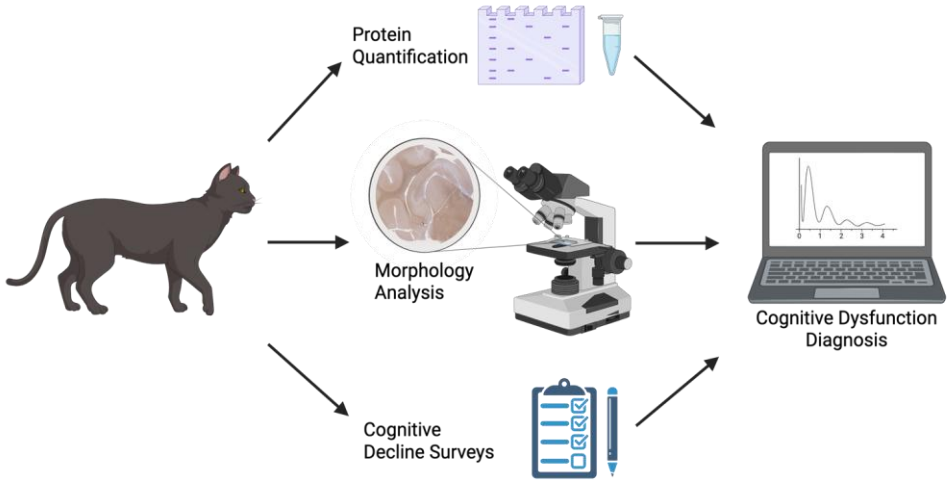


University of Colorado Anschutz

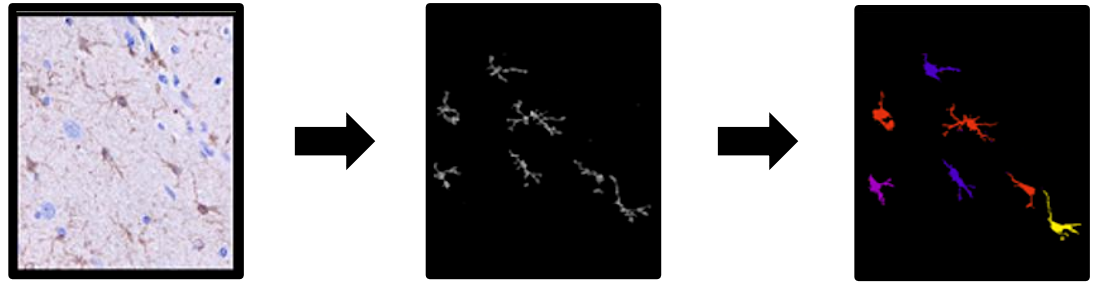
Colorado Clinical and Translational Sciences Institute (CCTSI)

Experimental Setup: client-owned cats

- Cats in the study are clinically observed and surveyed at the CSU VTH for signs of Feline Cognitive Dysfunction.
- Brains are obtained after death of natural causes to investigate common aging markers such as glia dysfunction and misfolded proteins.



Juvenile ● Mature ▲ Aged ■

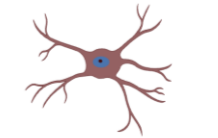


University of Colorado Anschutz

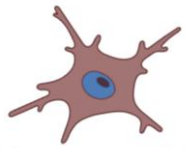
Colorado Clinical and Translational Sciences Institute (CCTSI)

Glia Show Four Distinct Phenotypes

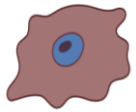
- 4 distinct morphological phenotypes have been identified with cluster separation in primary component analysis visualization.



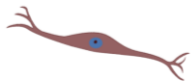
Ramified



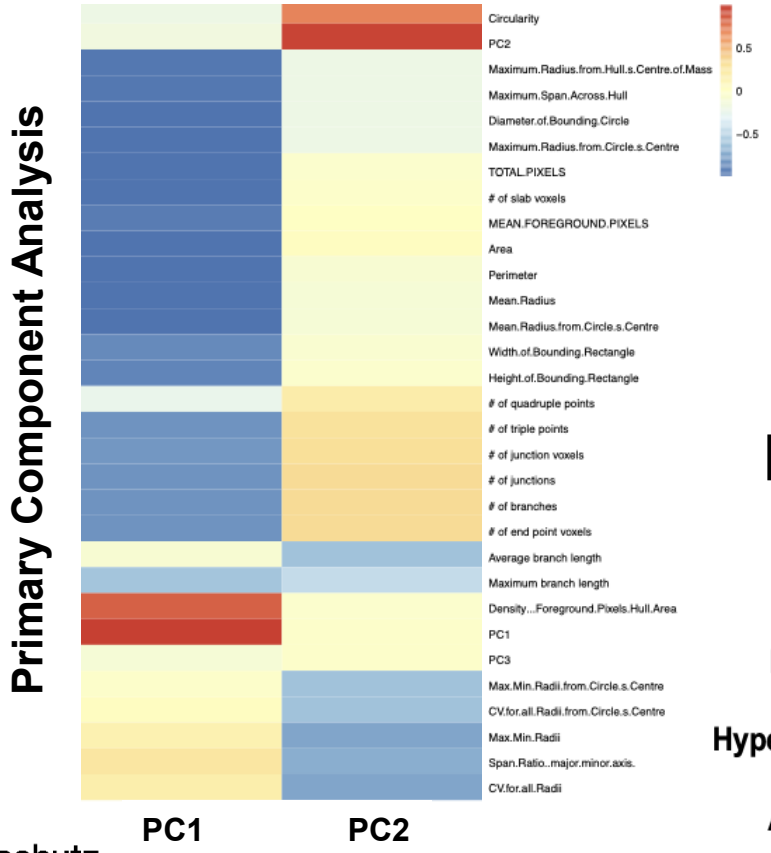
Hypertrophic

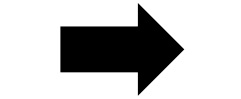


Ameboid

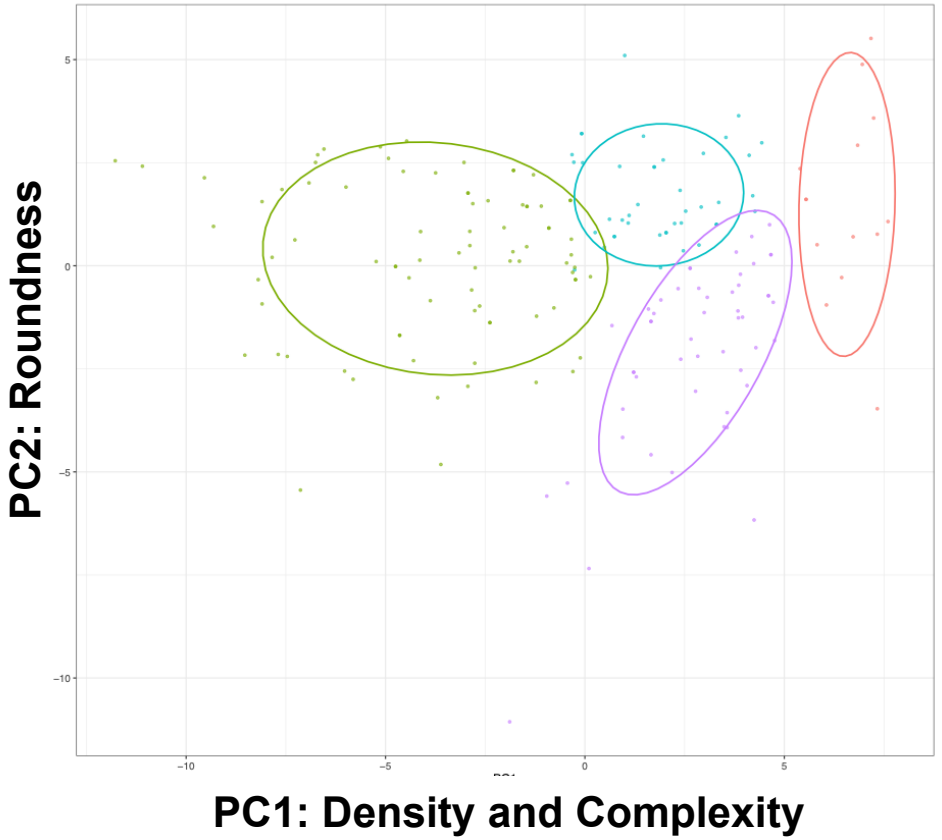


Rod-Shaped





Ramified
Hypertrophic
Ameboid
Rod-Shaped

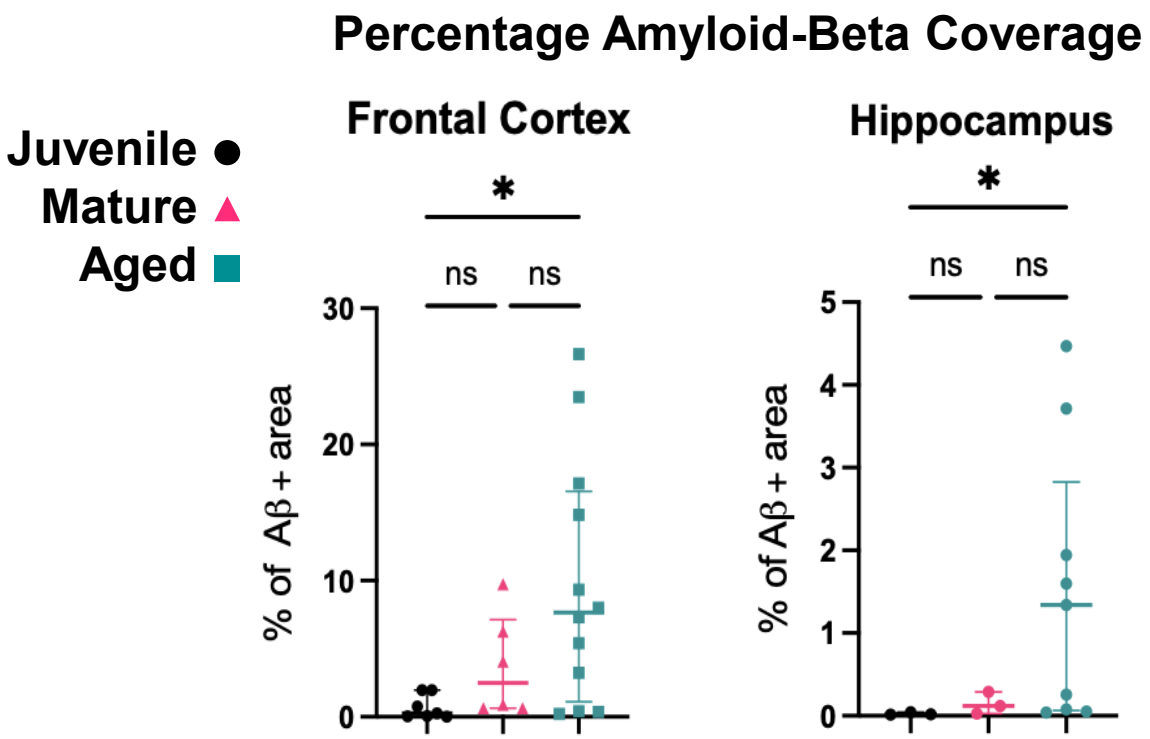


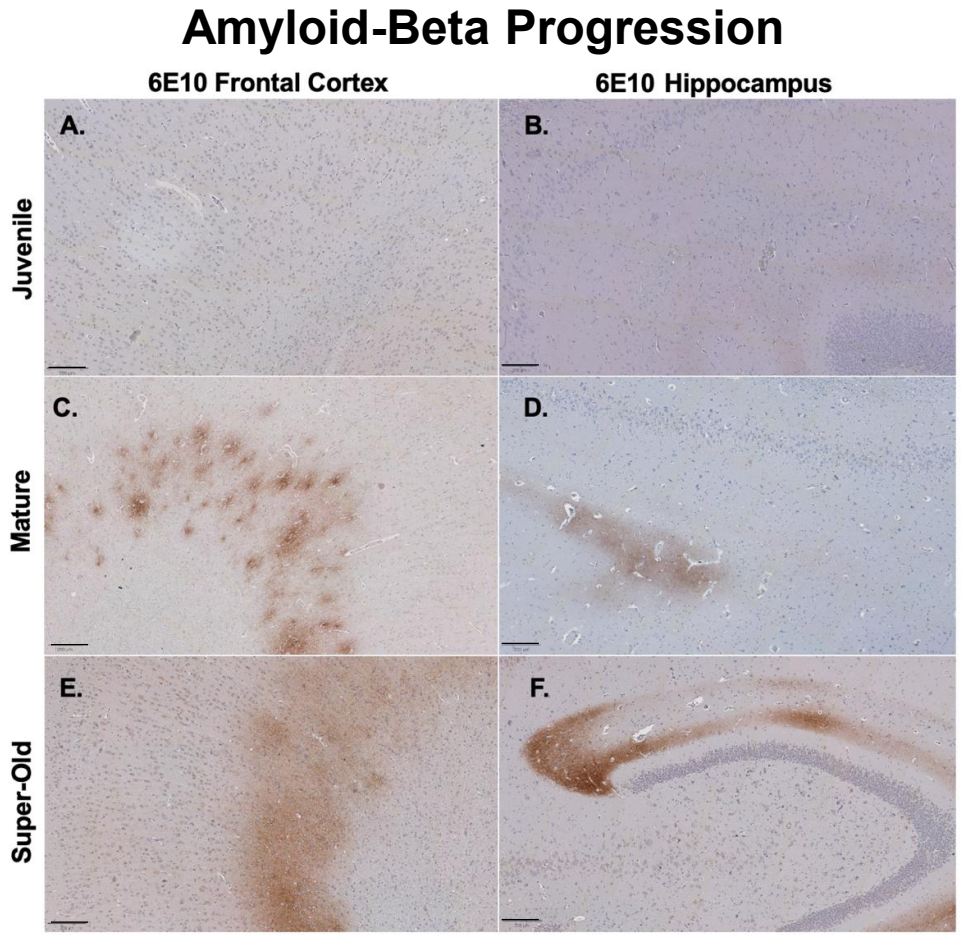
University of Colorado Anschutz

Colorado Clinical and Translational Sciences Institute (CCTSI)

Amyloid-β Burden Increases with Age

- Aβ coverage increases significantly in both the hippocampus and frontal cortex with age.
- Plaque proliferation shows similarities to Alzheimer's pathology staging.





University of Colorado Anschutz

Colorado Clinical and Translational Sciences Institute (CCTSI)

Feline Aging Recreates Core Features of AD Pathology

Conclusion:

- Aging cats naturally reproduce key AD neuropathology, Amyloid-β, and glial signatures, without genetic engineering.
- The heterogeneity between amyloid and glia trajectories mirrors what's seen in human AD, reinforcing FCD as a legitimate translational model.

Future directions:

- Apply formal Thal-equivalent staging criteria to feline tissue for direct cross-species comparison.
- Complete the glia-pathology correlation analysis to establish functional and mechanistic links.

University of Colorado Anschutz
Colorado Clinical and Translational Sciences Institute (CCTSI)

THANK YOU

Colorado State University

Mentors
Dr. Julie Moreno
Dr. Abdullatif Alsulami

Collaborators
Carolyn Dobkins
Payton Schrader
Sean Boland
Dr. Stephanie McGrath