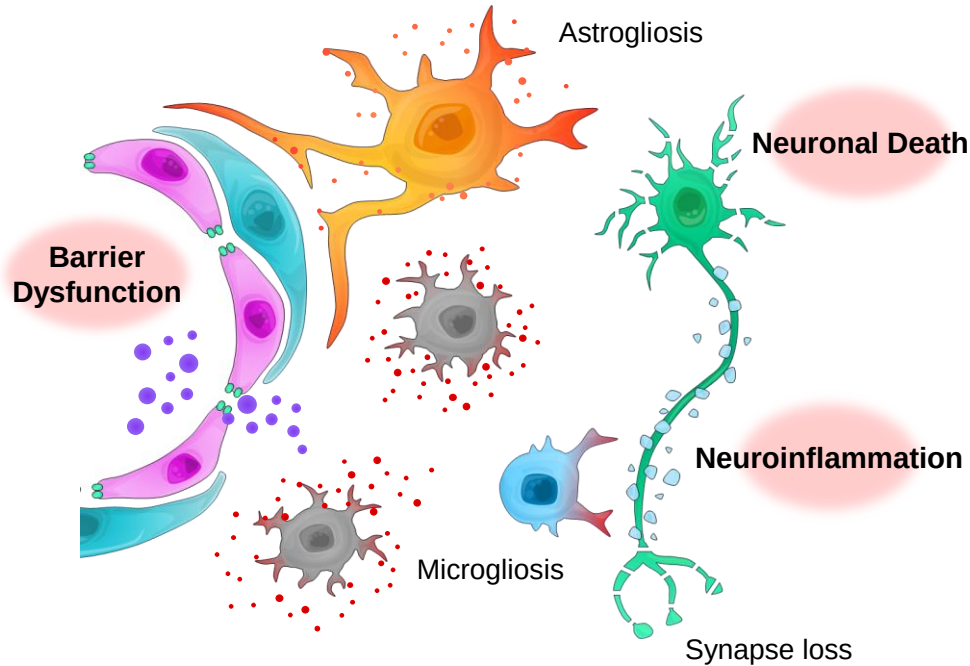


The $A\beta_{42}:A\beta_{40}$ ratio in amyloid plaques and its role in blood-brain barrier dysfunction

Goethe University Frankfurt
Institute of Pharmaceutical Technology
Windbergs Lab

Stefanie Gier

Pathophysiological hallmarks of Morbus Alzheimer

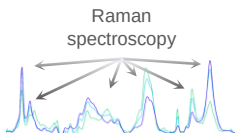


Use of animal models in Alzheimer research

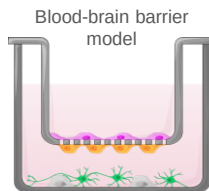
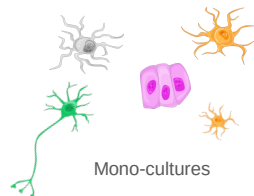
Animal-free *in vitro* approaches

Influence of different A β oligomers

A β
aggregation
kinetics



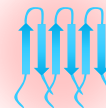
Cell-based
studies



A β variants
80-90% A β_{40}
5-10% A β_{42}
5% other variants



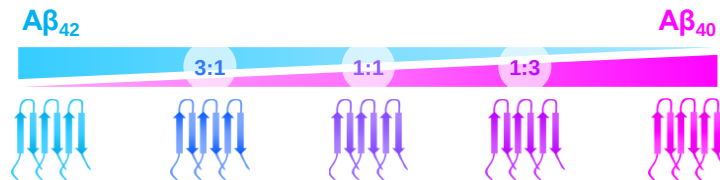
Monomers



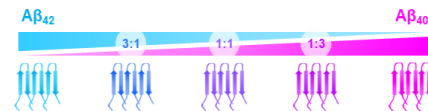
Oligomers



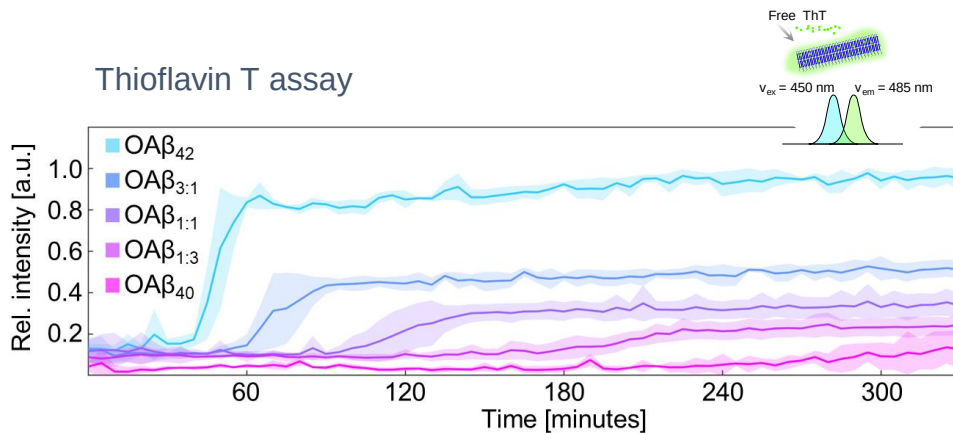
Fibrils



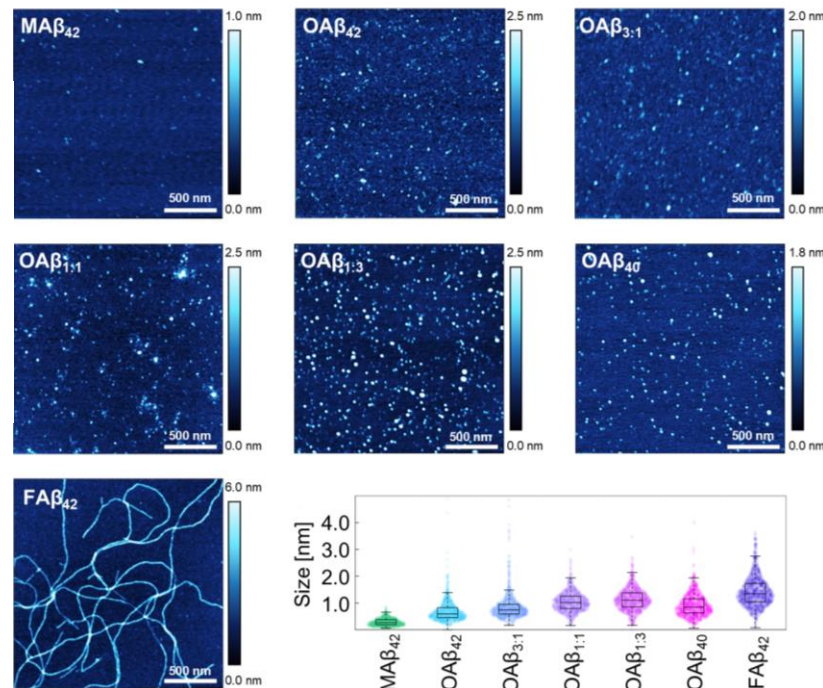
Effects of A β_{40} on oligomer aggregation and size



Thioflavin T assay



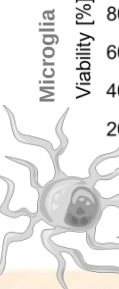
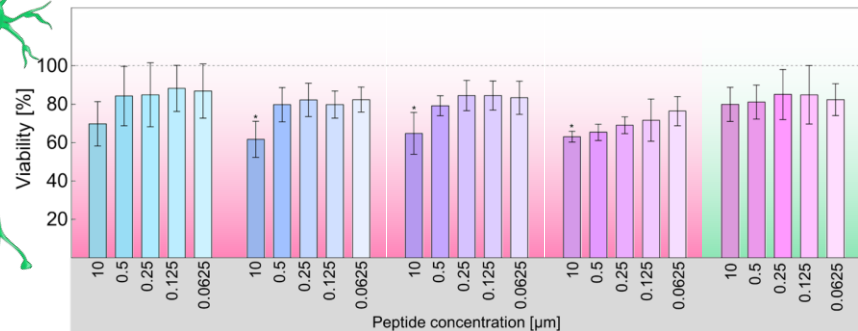
Addition of A β_{40} slows aggregation and slightly increases size of mixed oligomers



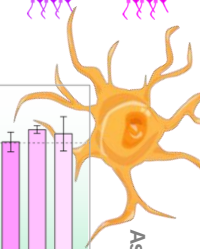
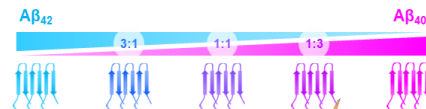
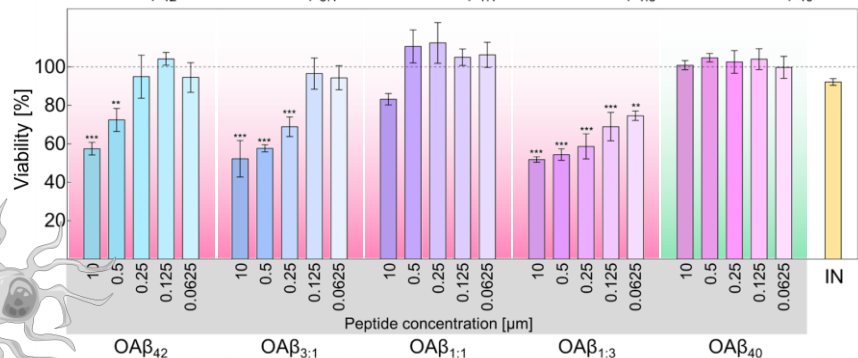
Cytotoxicity of mixed oligomers



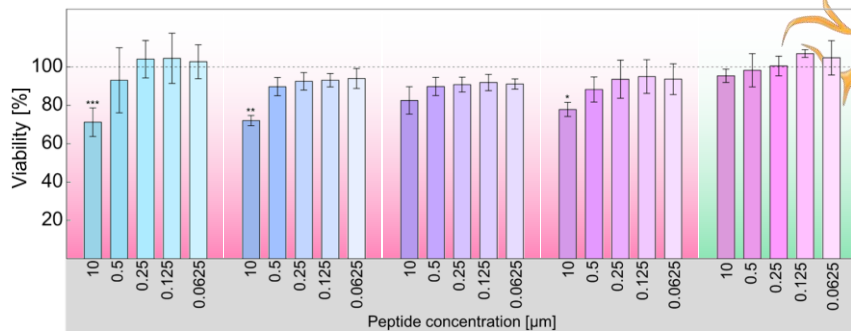
Neurons



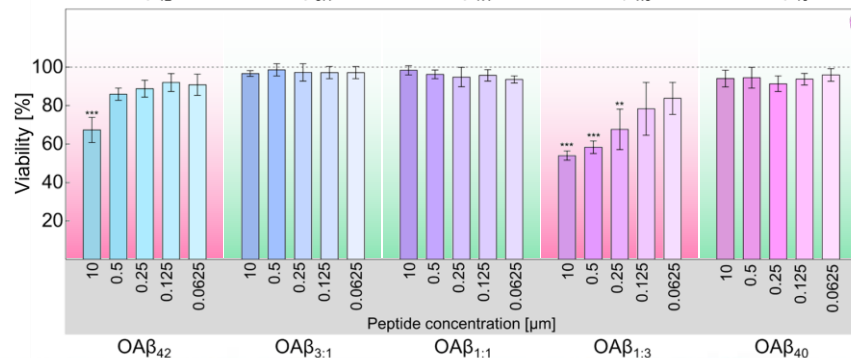
Microglia



Astroglia

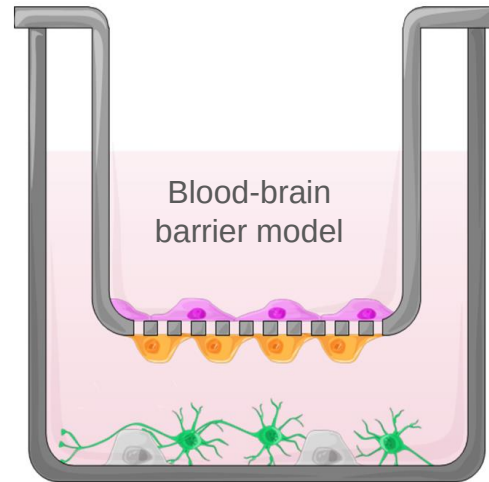
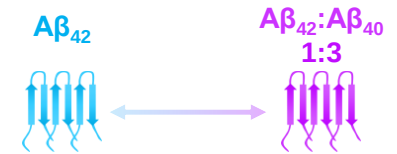


Endothelial cells

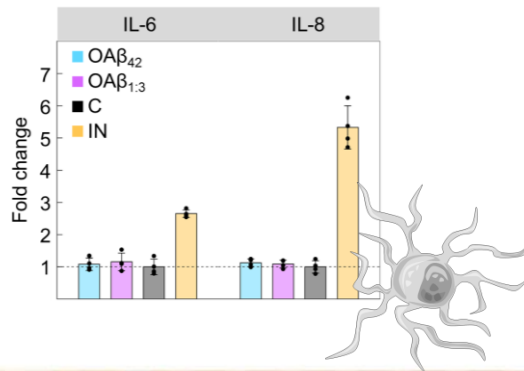
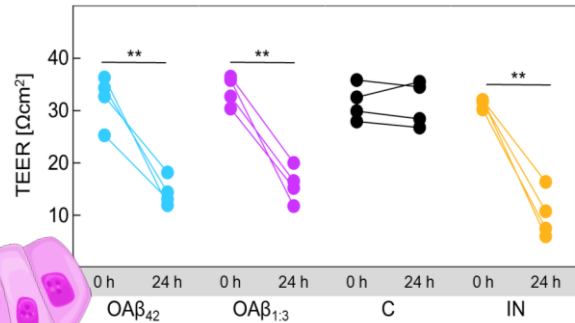
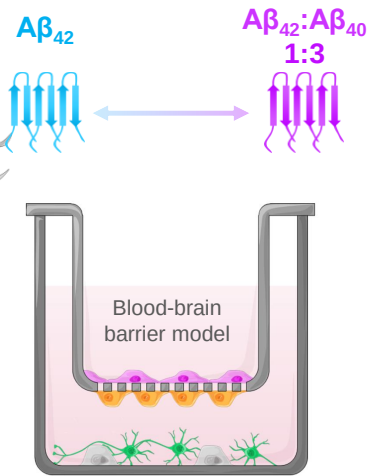
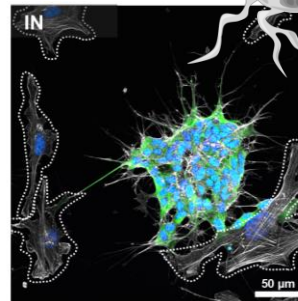
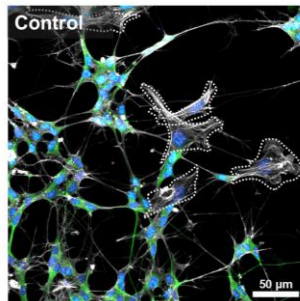
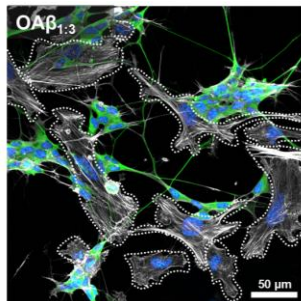
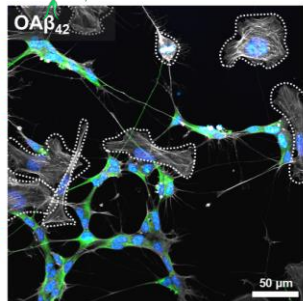
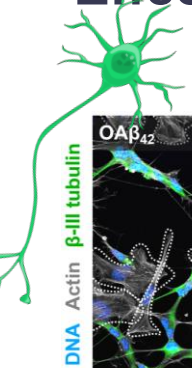


IN: Inflammation control

Effects of mixed oligomers on the BBB



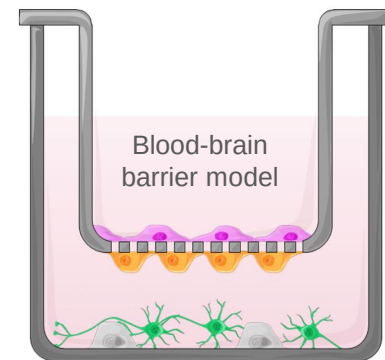
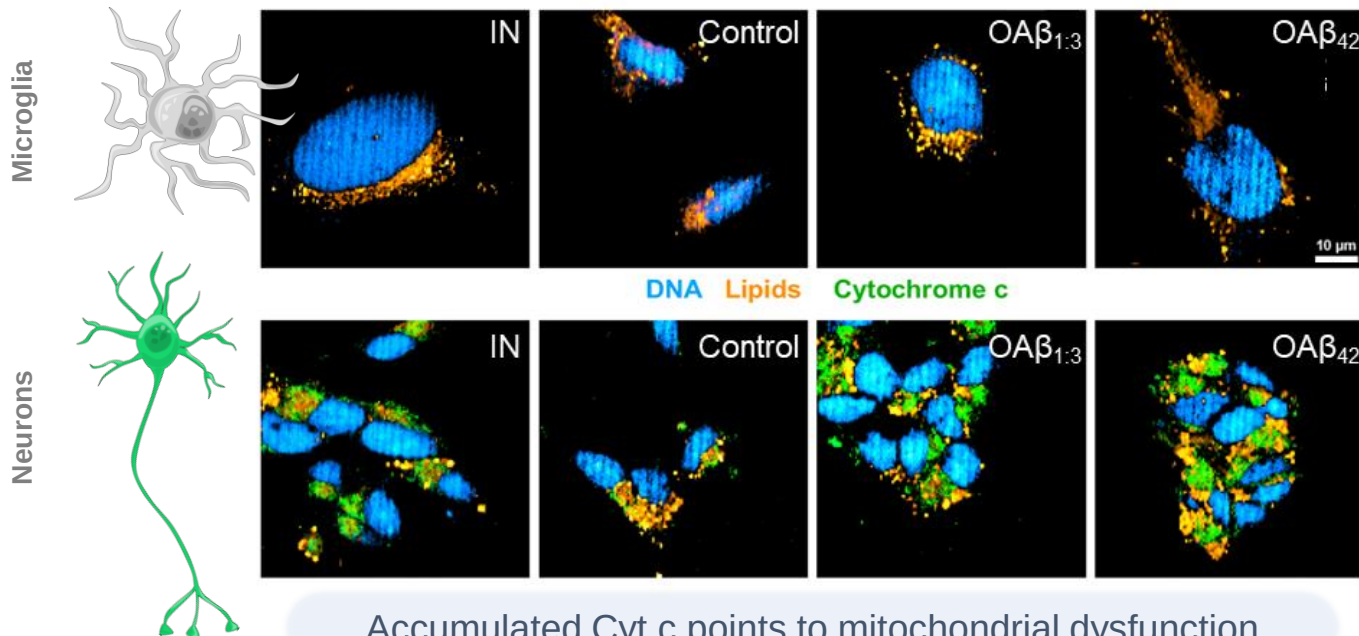
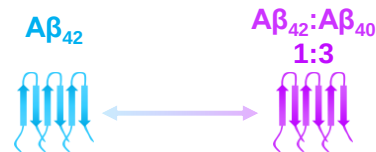
Effects of mixed oligomers on the BBB



Disrupted barrier integrity

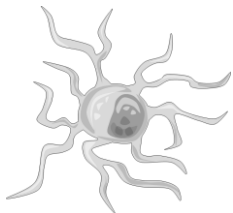
Prominent differences compared to standard inflammation control

Raman analysis of BBB-associated neurons and microglia

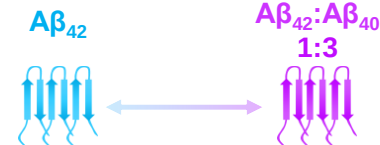
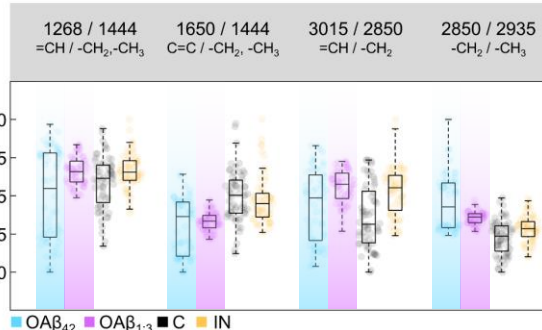
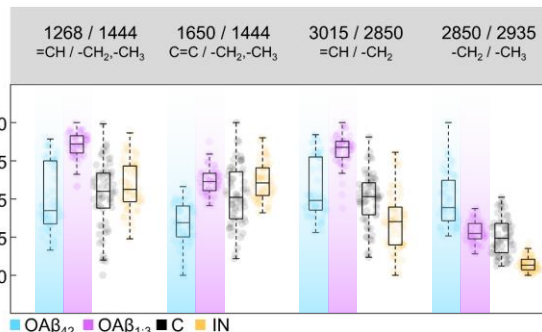
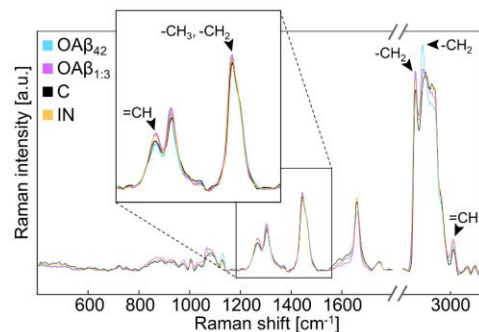
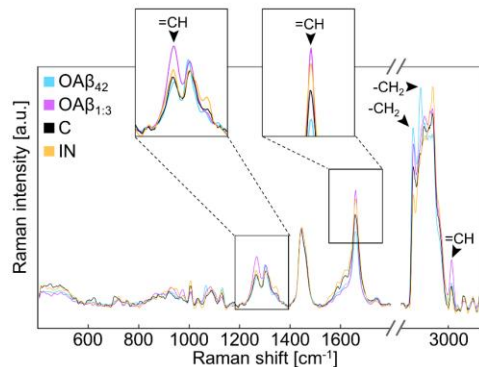
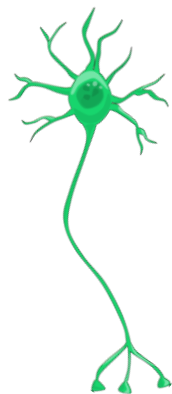


Changes in lipid droplets

Microglia



Neurons



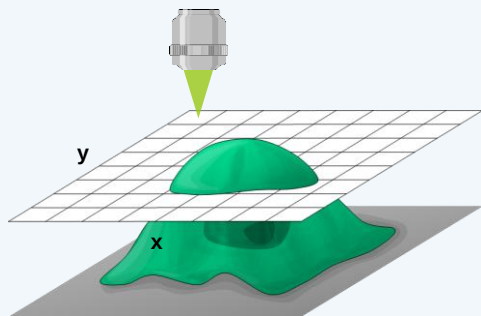
Increase in lipid chain lengths



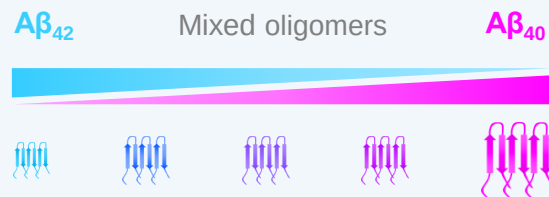
Increase of unsaturated lipids

IN: Inflammation control

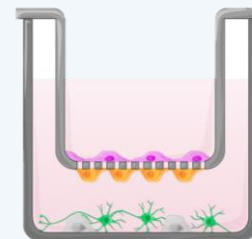
Conclusion



Implementation of
Raman microscopy



Understudied role of
"benign" Aβ₄₀



Importance of animal-free
research approaches

Acknowledgements

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Thank you for your attention



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