

# Functional and structural connectivity predict longitudinal tau accumulation in asymptomatic individuals expressing A $\beta$ pathology

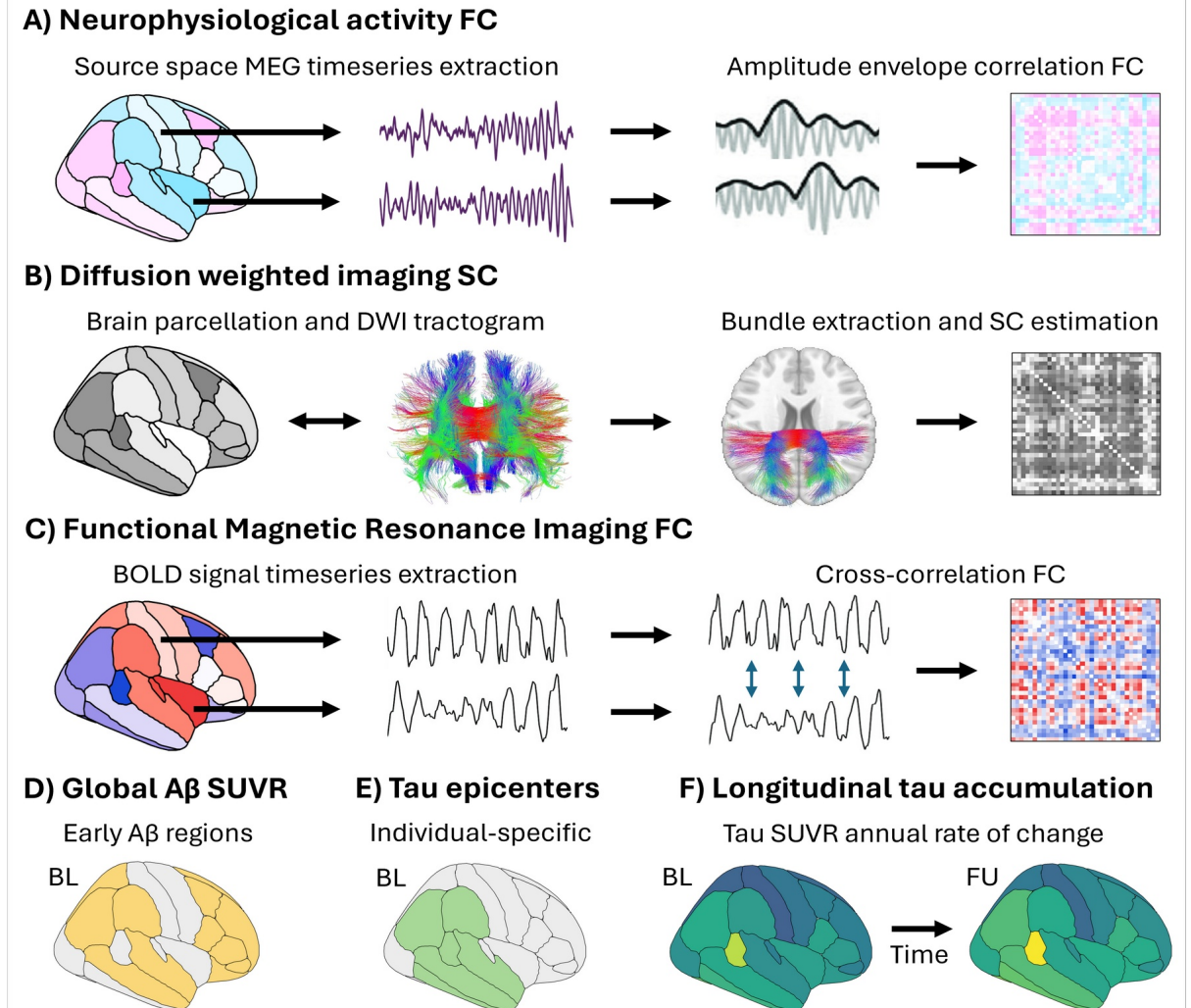
Jonathan Gallego-Rudolf, Ting Qiu, Mohammadali Javanray, Alex Wiesman, Frédéric St-Onge, Alfonso Fajardo-Valdez, Sylvain Baillet, Sylvia Villeneuve, and the PREVENT-AD research Group

## Background

- Tau pathology spreads across functionally and structurally connected brain regions, which might be facilitated by the presence of A $\beta$
- Lack of large-scale multimodal neuroimaging studies looking at how individual-specific connectomes predict longitudinal tau spreading

## Aim

- Assess whether stronger FC/SC with individual-specific tau epicenters predicts longitudinal tau accumulation in individual expressing A $\beta$  pathology



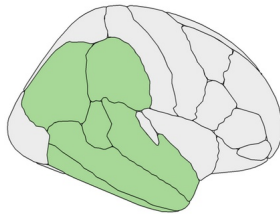
# Functional and structural connectivity predict longitudinal tau accumulation in asymptomatic individuals expressing A $\beta$ pathology

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## Methods

Individual-specific tau epicenters

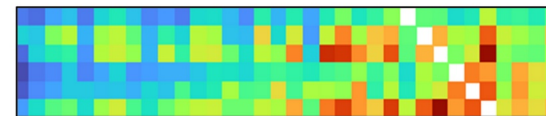
Select 6 regions with highest BL tau (epicenters)



1. Definition of individual-specific tau epicenters and null model epicenters

Epicenter FC/SC estimates

6 x 68 epicenter FC/SC matrix

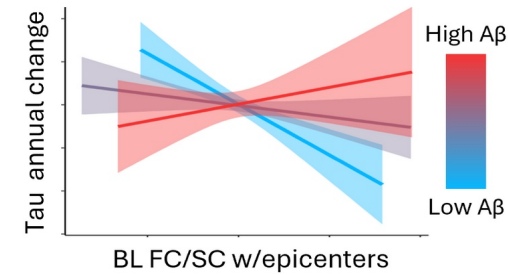


1 x 68 avg epicenter FC/SC matrix



2. Estimate FC/SC between individual-specific tau epicenters and other regions

Tau change  $\sim$  FC/SC x A $\beta$



3. Nested LME models to test if longitudinal annual tau change  $\sim$  FC/SC x A $\beta$

Original LME model

Extract FC/SC x A $\beta$  t-value from original model

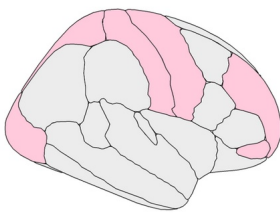
Null LME models

Extract FC/SC x A $\beta$  t-value from null model. Repeat 1000 times

4. Bootstrapping hypothesis testing for the FC/SC x A $\beta$  interaction

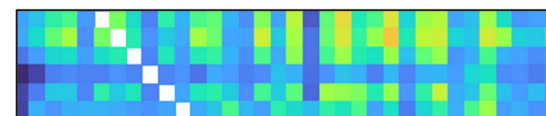
Definition of "null" epicenters

Randomly select 6 regions from bottom quartile



Null epicenter FC/SC estimates

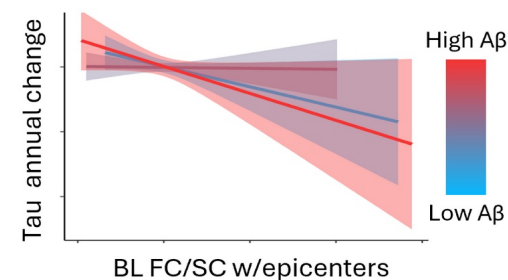
6 x 68 null epicenter FC/SC matrix



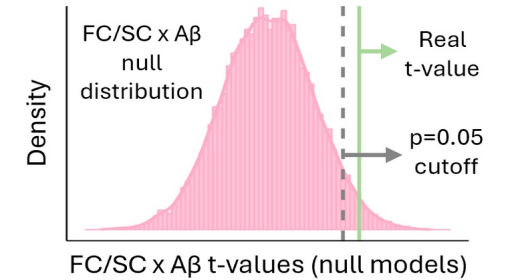
1 x 68 avg null epicenter FC/SC matrix



Tau change  $\sim$  FC/SC x A $\beta$  (null)



Hypothesis testing

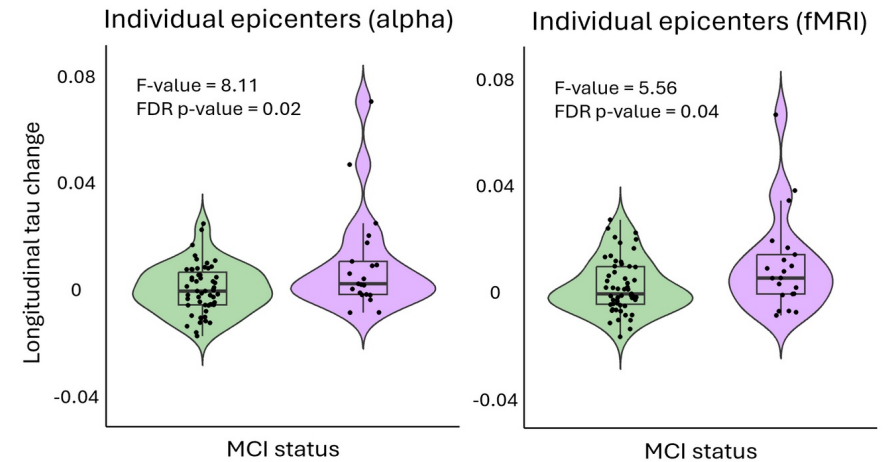
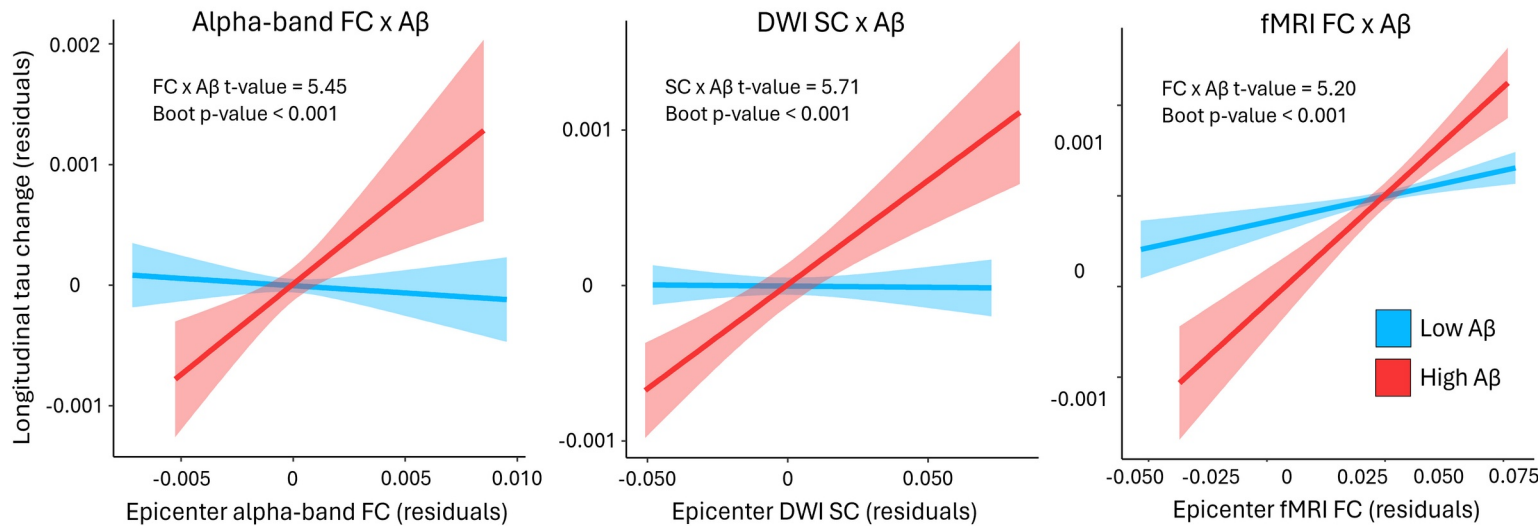
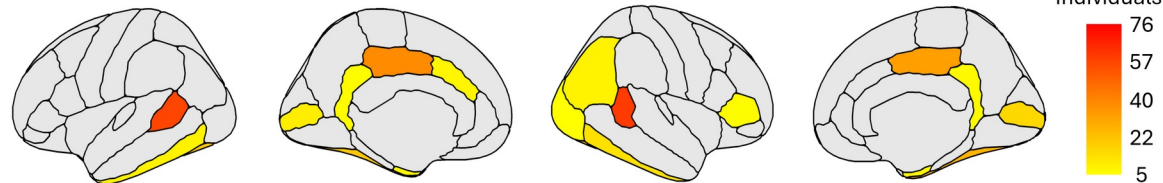


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## Results

Tau epicenters - Number of individuals (N=76)



## Conclusion

Stronger FC/SC with individual-specific tau epicenters predicts longitudinal tau spreading in the presence A $\beta$  pathology, which relates to clinical progression to MCI

## Acknowledgements