AMYLOID BINDING IS ASSOCIATED WITH MARKERS OF WHITE MATTER MICROSTRUCTURE IN PATIENTS WITH SIGNIFICANT WHITE MATTER DISEASE

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Background

- White matter hyperintensities (WMH) may contribute to cognitive impairment
- WMH may reflect demyelination or vasogenic edema or both
- Non-specific WM binding of 18F-Florbetapir may depend on the myelination status of the WM tracts[1,2]

Objective

To determine if amyloid deposition in WM is associated with diffusion tensor imaging (DTI) changes in a population with significant WMH

Methods

- Participants: 56 patients with significant burden of WMH recruited from TIA and dementia clinics & 60 ADNI normal controls
- Measures: 3T MRI including DTI, 18F-Florbetapir PET/CT, and MMSE
- Computed Standardized uptake value ratios (SUVr) normalized to the pons
- Fractional anisotropy (FA) and mean diffusivity (MD) were normalized by whole brain metrics (FA/MD).
- Multiple linear regression and partial correlations, adjusting for age, between PET, DTI and WMH metrics, corrected for multiple comparisons using FDR

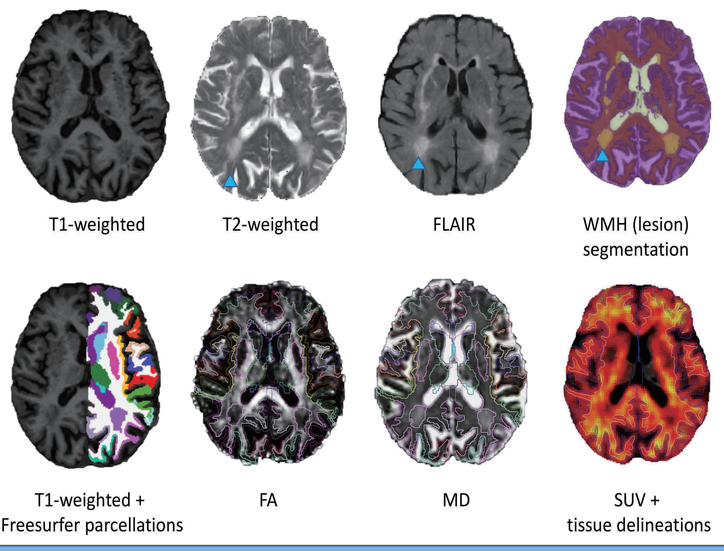


Figure 1. WMH segmentation with the *LesionExplorer*[3] pipeline using T1, T2 & FLAIR. *Freesurfer*[4] segmentation, FA, MD, and PET SUV.

Results

Figure 2

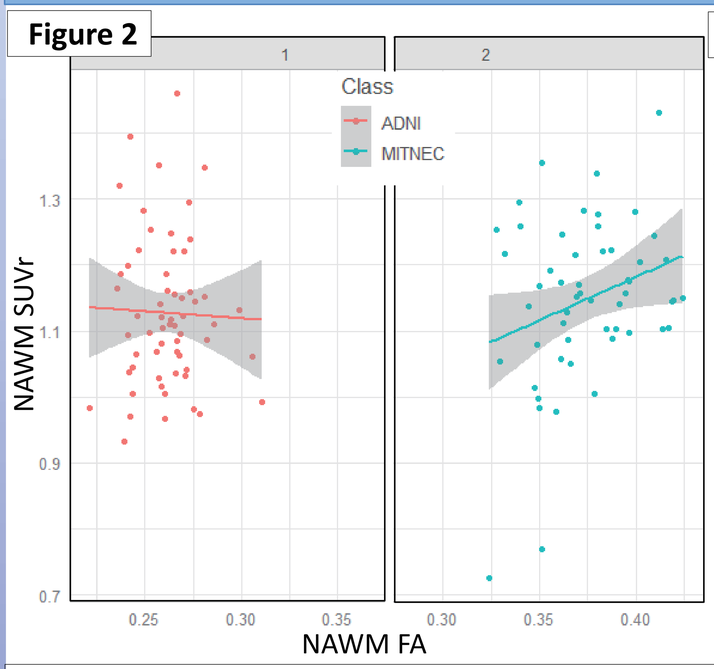


Figure 3

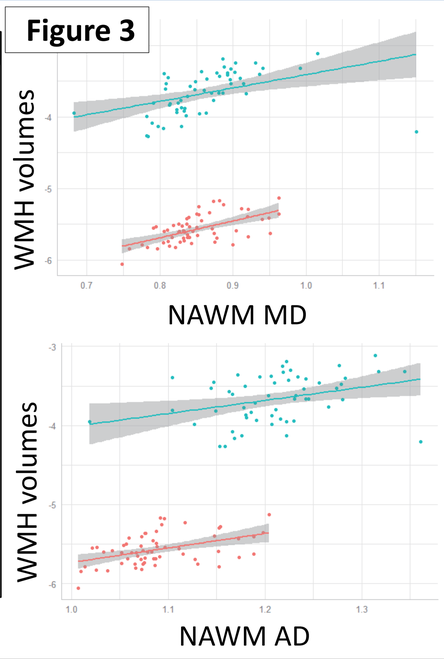


Figure 4

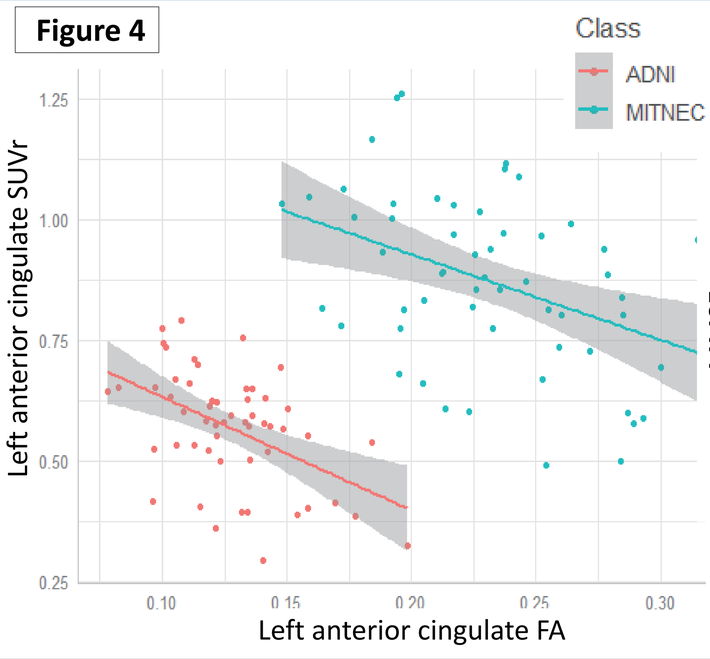
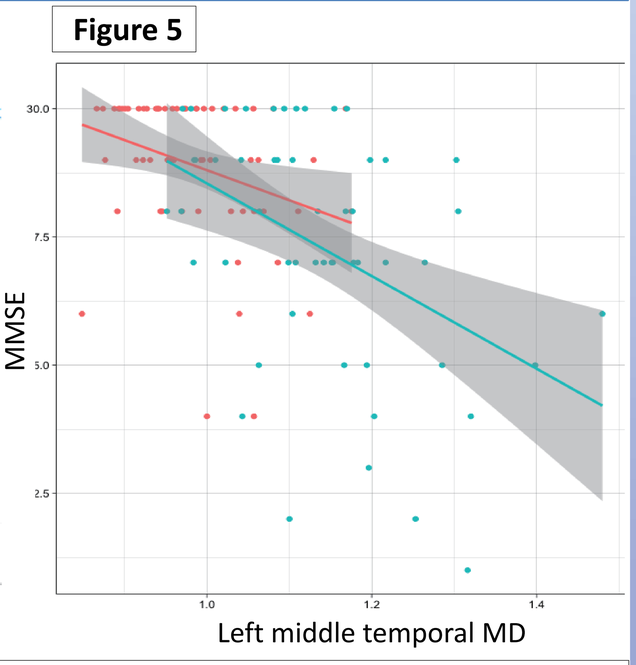


Figure 5



- NAWM SUVr was associated with FA (B=1.5, p=0.016) and negatively associated with MD (B=-0.86, p=0.03) in patients with high WMH burden (MITNEC participants) but not in those with low WMH burden (ADNI) (**Fig 2**)
- NAWM diffusivity metrics (MD and AD) were negatively associated with WMH volumes in both groups (B=-154.19, p=0.02) (**Fig 3**)
- In the cortex, FA predicted amyloid load (SUVr) in the left anterior cingulate (**Fig 4**)
- MMSE was negatively associated with MD (B=-7.8, p<0.001) and SUVr (B=-2.4, p=0.001) in the left middle temporal cortex (**Fig 5**)

Conclusion

Non-specific WM amyloid binding may reflect microstructural integrity (myelination status) in patients with high WMH load. Future work to analyze involved WM networks and free water diffusion.

References

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