cortical atrophy (PCA) is an uncommon AD variant presenting with progressive visuospatial symptoms, and the relationships between functional networks in PCA are unknown. We hypothesized that PCA patients would show early decreased integrity within the visual network, with corresponding increases in SN connectivity, despite relative preservation of DMN. As the medial and lateral pulvinar are anatomically interconnected with SN, DMN, and visual structures, we further hypothesized that the pulvinar nucleus might play a key role in these networks. **Methods:** 26 individuals diagnosed with PCA (all amyloid-positive or with AD-consistent CSF) and 64 matched controls were recruited through UCSF Memory and Aging Center research programs. Each completed a standardized neuropsychological battery, structural imaging, and task-free fMRI. We used voxel-based morphometry (VBM) to assess structural atrophy. For fMRI, time series from seeds for networks of interest were regressed across the whole brain and fitted to a second-level regression model for group effects analysis. Functional data analyses were atrophy-corrected using the BPM toolbox. **Results:** PCA patients show relatively preserved memory in the early stages of illness despite poor visuospatial performance; like others with AD, they also show preserved social sensitivity. As expected, VBM revealed highly significant parieto-occipital atrophy (Figure 1). PCA patients showed widespread decreased connectivity within the visual network, increased connectivity between some structures in SN, and increased connectivity between key nodes of the DMN compared to controls. Medial pulvinar connectivity mirrored SN connectivity, while lateral pulvinar connectivity mirrored DMN connectivity (Figure 2). **Conclusions:** Individuals with PCA show relatively preserved connectivity in SN and DMN despite widespread parietooccipital atrophy and decreased visual network connectivity. The striking similarity of medial and lateral pulvinar-derived connectivity maps to SN and DMN suggests an important role for the pulvinar within these networks, particularly given the close anatomic relationship between medial pulvinar and SN, and lateral pulvinar and DMN and visual regions. Thalamic subnuclei are well-poised to serve as network switches, and different subnuclei may be differentially implicated in different subtypes of AD.

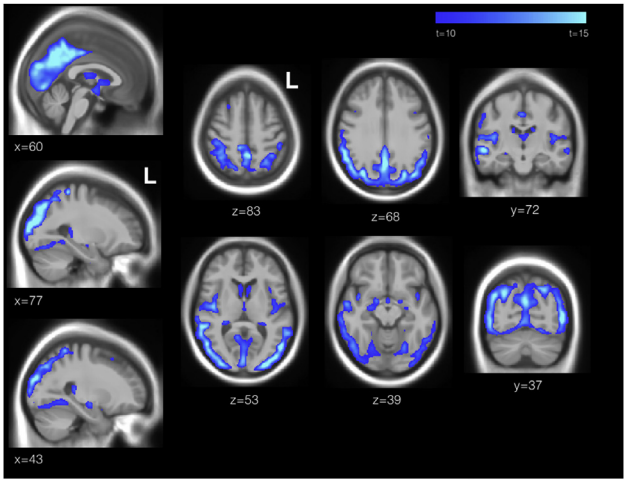

Figure 1. VBM, gray matter mask, PCA <HC.

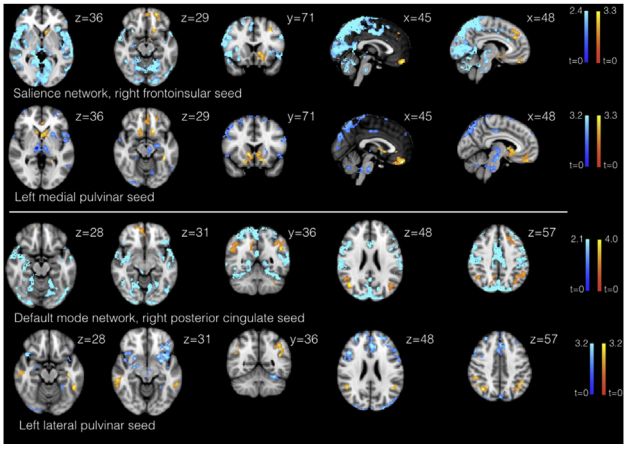

Figure 2. Seed-based analyses, PCA>HC. Joint height and extent probability threshold of $p < 0.05$, corrected at the whole brain level. BPM-corrected for voxelwise atrophy.

IC-P-032 **TRAUMATIC BRAIN INJURY EFFECTS UPON THE STRUCTURAL CONNECTOME MIRROR THOSE CAUSED BY ALZHEIMER'S DISEASE**

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Background: The extent to which mild traumatic brain injury (mTBI) modulates the risk for Alzheimer's Disease (AD) as a function of age at injury is poorly understood. In many mTBI victims, blood-brain barrier (BBB) disruption is associated with connectome reorganization, leading to neurological deterioration whose severity increases with age. *Post-mortem* histological examination of brain tissue samples collected from mTBI patients indicates that Amyloid-beta (Aβ) protein deposits are more likely to occur in regions affected by BBB disruption. **Methods:** We acquired magnetic resonance imaging (MRI) and diffusion tensor imaging (DTI) from 20 middle-aged (age: $\mu \sim 45.1$ years, $\sigma \sim 7.3$ years) and 20 older (age: $\mu \sim 68.6$ years, $\sigma \sim 8.4$ years) mTBI victims. Data were acquired both within the first few days and 6 months after injury. Multimodal MRI and DTI were combined to generate graph-theoretical representations of network models and to study their spatiotemporal dynamics. **Results:** Changes in white matter connectivity density [proportion of total tractography streamlines which connect one cortical region to the rest of the brain] are significantly and negatively correlated with the distance between cortex and the closest micro-bleeds (R^2: μ=-0.47, SEM=0.21, t_{39}=3.13, p<0.001), both in older (μ=-0.54, SEM=0.29, t_{39}=3.35, p<0.001) and younger patients (μ=-0.41, SEM=0.25, t_{39}=3.41, p<0.001). The rich club coefficients of nodes located in the vicinity of micro-bleeds were found to decrease (R^2: μ=0.44, SEM=0.19, t_{39}=3.44, p<0.001). Changes to network topology in the vicinity of micro-bleeds were found to be strongly correlated (R^2: μ=0.54, SEM=0.23, t_{39}=3.24, p<0.001) with decreases in Glasgow Outcome Score. Areas found to be associated with brain network deterioration are known to be responsible for memory formation (medial temporal lobe), personality (prefrontal cortex), cognitive control (anterior limbic areas) and language (ventromedial temporal lobe). **Conclusions:** Damage to regions often affected by AD appears to increase with age, as does the probability that brain network damage and neurological function deterioration due to mTBI is associated with these regions. Since these areas also feature substantial Aβ deposition in both AD and mTBI, this research can help to understand the relationship between AD-like

brain changes, deficits prompted by mTBI, and the extent to which mTBI may increase AD risk.

IC-P-033 LONGITUDINAL INTRINSIC FUNCTIONAL CONNECTIVITY CHANGES IN PRECLINICAL ALZHEIMER'S DISEASE: A TWO-YEAR FOLLOW UP STUDY

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Background: Although previous cross sectional studies demonstrated intrinsic functional connectivity (FC) changes in the preclinical Alzheimer's disease (AD), effects of amyloid burden in FC changes are still not yet clear on the longitudinal basis **Methods:** Sixty four florbetaben (FBB) amyloid PET defined NIA-AA preclinical AD subjects (stage 1 (N= 31) and stage2/3 (N=33)) and 32 healthy control subjects (stage 0) completed resting state functional magnetic resonance imaging (fMRI) scans. FC changes were examined for three networks of interest (default mode network (DMN), salience network (SN), and central executive network (CEN)) using independent component analysis during a 2-year follow-up. We also analyzed the group by amyloid retention with FC changes in the three networks. **Results:** Longitudinal analysis showed that the DMN of the stage 1 subjects showed significantly increased FC compared to the stage 0 and 2/3 subjects. On the other hand, stage 2/3 subjects showed decreased FC compared to stage 0 and 1 subjects. The FC of the CEN showed significantly decreased in the stage 1 and increased in stage 2/3 during the follow up periods. There were no longitudinal FC changes in SN in all subjects. In addition, there were significant group x FBB amyloid retention level interaction with FC changes in the posterior DMN. **Conclusions:** Our results of aberrant DMN FC changes and distinctive interaction patterns might reflect a biphasic trajectory of changes in FC in preclinical AD subjects. These changes might have clinical implications as surrogate markers of efficacy in clinical trials of the disease modifying agents.

IC-P-034 GRAPH-THEORY ANALYSIS SHOWS A HIGHLY EFFICIENT BUT REDUNDANT NETWORK IN MCI TAU PROPAGATION

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Background: The stages of neurofibrillary tangles (NFT) during the course of Alzheimer's disease is well understood through the Braak stages; however, the underlying mechanism behind the NFT propagation remains unclear. Here, we propose a graph theory based method to identify the patterns of NFT deposit propagation using [^{18}F]AV1451 Tau positron emission tomography (PET) images. **Methods:** [^{18}F]AV1451 images of 38 cognitively normal (CN) and 34 mild cognitive impairment (MCI) individuals were acquired from the ADNI cohort and the standardized uptake value ratio (SUVr) maps were generated using the cerebellar grey matter as the reference region. Group-based Tau networks of CN and MCI were then constructed from 201 nodes distributed across the cerebral cortex and using Pearson correlation coefficients based on 100 bootstrap samples. The networks were corrected for multiple comparisons using False Discovery Rate (FDR) and thresholded at r >= 0.5. Network measures such as density, average path length, global efficiency, clustering coefficient, and small worldness were calculated for each of the bootstrap sample. Welch two sample t-test was used to compare each measure across both subject groups. **Results:** The density of the MCI Tau network was significantly higher compared to CN [Figure 1]. Furthermore, the average path