addition, it altered diagnostic work-up and healthcare management plan of young onset dementia patients visiting a tertiary memory clinic.

IC-01-05 *IN VIVO* BRAAK STAGING USING 18F-AV1451 TAU PET IMAGING

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Background: Alzheimer's disease (AD) related tau pathology has previously been classified into six consecutive Braak stages describing the gradual regional deposition of hyperphosphorylated tau protein over the course of the disease. Positron emission tomography (PET) using the ligand 18F-AV1451 (previously T807) now renders possible the *in vivo* assessment and staging of tau pathology and its relationship with cerebral glucose metabolism as measured with 18F-FDG. **Methods:** Nineteen elderly and two young normal controls (NCs), as well as eight AD patients (Table 1), underwent 18F-AV1451 PET scanning (80-100 min tissue ratio, cerebellar gray matter reference). Structural magnetic resonance (MR) images were co-registered to the respective PET images and segmented into regions of interest (ROIs) corresponding anatomically to the transentorhinal (I/II), limbic (III/IV), and isocortical (V/VI) Braak stages using FreeSurfer v5.1 (Figure 1). High AV1451 binding was identified by calculating a ratio of voxels > 2 SD above NC mean over total voxel count within each ROI. In addition, seventeen NCs and five AD patients also received 18F-FDG PET scans (30-60 min tissue ratio, pontine reference). **Results:** We found clear separation of NCs from AD patients throughout all Braak stages (Figure 2). Linear regression identified higher AV1451 uptake in early stage Braak ROIs as being highly predictive of higher uptake in later stage Braak ROIs, independent of ApoE status or age (Figure 3). Furthermore, linear regression of mean 18F-AV1451 uptake in Braak ROIs on 18F-FDG uptake in a predefined set of ROIs covering regions typically susceptible for AD-related hypometabolism yielded significant negative relationships in Braak ROIs I/II and III/IV. **Conclusions:** Our findings demonstrate the potential of tau PET imaging with 18F-AV1451 as a marker of AD-related tau pathology in the context of traditional cross-sectional Braak staging. Higher binding in early stage Braak ROIs suggests higher uptake in later stage Braak ROIs. In addition, higher 18F-AV1451 uptake in earlier stage Braak ROIs (I/II and III/IV) appeared to predict lower glucose metabolism in regions typically exhibiting AD-related hypometabolism in our population of NCs and AD patients, highlighting a spatially disentangled relationship between early Braak stage tau pathology and decreased cerebral glucose metabolism.

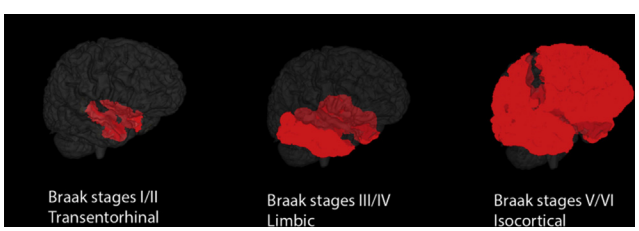
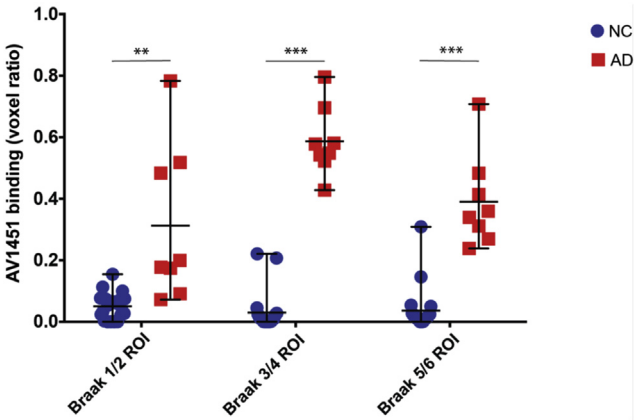


Figure 1. Combined FreeSurfer ROIs



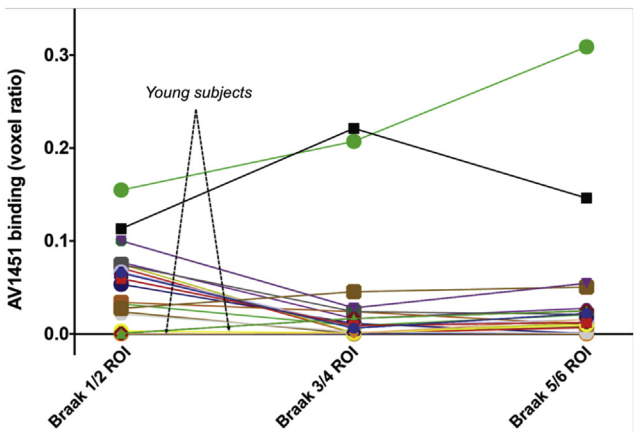


Table 1
Demographics

	NC (n=21)	AD (n=8)
Age	73 ± 10.6	66.3 ±8.2
Education	13.2 ±6.2	16.1 ±2.5
MMSE	28.9 ±1.2	22.3 ±4.9
ApoE ε4 (0/1/2/na)	11/5/0/5	2/1/2/3
Gender	13F/8M	6F/2M