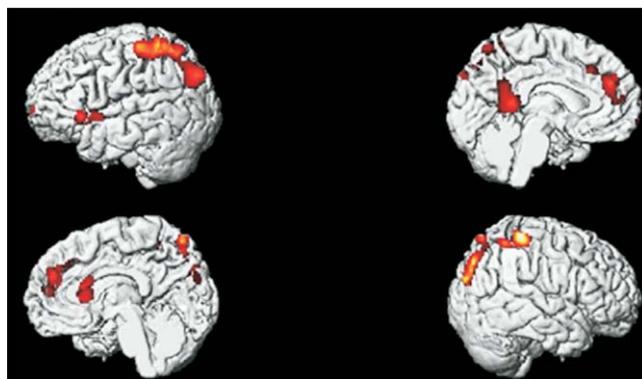


linear correlation coefficient was utilized as a measure of functional connectivity between the right middle FG and all other voxels in the brain. **Results:** Task performance was not statistically different between groups. There was no statistically significant difference in activation between groups. The right middle FG of the HC and MCI groups had strong positive linear correlation bilaterally to the visual cortex, inferior and superior parietal lobules, dorsolateral prefrontal cortex (DLPFC) and anterior cingulate. The HC group had higher positive linear correlation of the right middle FG to the visual cortex, parietal lobes and right DLPFC compared to the MCI. The MCI had higher positive linear correlation to the cuneus and inferior parietal lobule. In both groups the right middle FG had negative linear correlation to inferior parietal lobules and medial temporal regions and additionally in the HC to the medial frontal areas. In the negatively linearly correlated regions, the MCI group had smaller functional connectivity to the medial frontal areas compared to the HC because there was no linear correlation in the MCI group. **Conclusions:** The putative presence of Alzheimer's disease (AD) neuropathology in MCI affects functional connectivity from the right middle FG to the visual areas and medial frontal areas. In addition, higher linear correlation in the MCI group in the parietal lobe may indicate the initial appearance of compensatory processes. Functional connectivity can be an effective marker for detecting functional changes in MCI subjects.

O3-06-03 **PATTERNS OF AGE-RELATED REDUCED CEREBRAL BLOOD FLOW AND DIMINISHED WHITE MATTER INTEGRITY BY HIGH-FIELD PERFUSION AND DIFFUSION MRI**

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Background: While structural MRI studies found a characteristic pattern of brain volume loss in normal aging, decreased cerebral blood flow (CBF) has been controversial. In addition, degraded white matter has recently been reported in normal aging using diffusion tensor imaging (DTI). It is important to fully characterize age related changes, in order to identify patterns which distinguish aging from early AD. **Objectives:** 1) To determine the regional pattern of age-related CBF reduction and its concordance/dissociation with brain tissue loss. 2) To determine the regional variation of age-related DTI alterations in the corpus callosum (CC) and cingulum. **Methods:** Fifty-one cognitively normal (by neuropsychological testing) subjects (29 male, 22 female; Age 22-76 yrs) had structural MRI and DTI at 4 Tesla and a subgroup of 38 subjects also had perfusion MRI using arterial spin labeling (ASL). The effect of age on CBF and gray matter (GM) volume were tested using Statistical Parametric Mapping (SPM). In addition, concordance/dissociation between CBF and volume alterations was determined using non-parametric SPMs. Fractional anisotropy (FA) of DTI was used to characterize white matter in the corpus callosum and in the cingulum. **Results:** The figure shows regional CBF reductions in normal aging. Age-related CBF reductions were found in bilateral anterior cingulate and parietal regions as well as in left superior temporal and posterior cingulate ($p < 0.001$). Age-related GM loss was found in bilateral frontal, temporal, and parietal regions ($p < 0.001$). Concordant CBF decline and GM loss was found in bilateral superior temporal and right superior parietal cortex, but no region with GM/CBF dissociation was found. Age-related FA reductions occurred primarily in the anterior CC ($p < 0.0006$), while prominent FA reductions in the cingulum occurred in posterior aspects ($p = 0.01$). **Discussion:** Together, volume, CBF, and DTI findings indicate substantial involvement of parietal brain regions in normal aging, which was also found in AD. This would make it difficult to distinguish between normal aging and early AD. However, it is possible that the MRI alterations could indicate early AD. Prospective studies on healthy subjects are necessary to determine the extent to which these MRI findings are markers of early AD.



O3-06-04 **MRI ATROPHY AT BASELINE IN ALZHEIMER'S DISEASE DIFFERENTIATES FAST AND SLOW DECLINERS BETTER THAN NEUROPSYCHOLOGY: A 3-YEAR LONGITUDINAL STUDY**

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Background: The ability to determine predictive factors of rapid cognitive decline in AD has important implications for planning treatment strategies and monitoring their effects. Voxel based morphometry (VBM) allows whole brain analysis of local changes in tissue content and therefore has the potential to capture brain abnormalities predictive of rapid decline. **Objective(s):** To determine whether regional atrophy and neuropsychological factors can predict cognitive decline in very mild or mild Alzheimer's disease (AD). **Methods:** 24 mild or very mild AD patients (72.3 ± 5.9 years; $MMS = 23.5 \pm 2.8$) were followed up every 6 months during 3 years. All patients but one were treated with inhibitors of acetylcholine-esterase. All subjects were tested by a standardized neuropsychological battery including Free and Cued Recall Test (FCRT) for verbal episodic memory; face recall for visual memory; Montanes Battery for semantic memory; FAB for executive functions; copy of the Rey figure for visuo-constructive function; battery of praxia; DO 80 for naming and CANTAB for visual attention and psychomotor speed. Brain MRI was performed at baseline for patients and for 18 normal controls matched for age, gender and level of education to assess grey matter differences. Slow and fast decliners (SD and FD) were defined according to the rate of cognitive decline assessed using the MMS at the end of the 3 years of follow-up (below or above the median loss, i.e 4.5 points). **Conclusions:** There was no difference between SD and FD for age, gender, level of education, mean estimated duration of illness and standard neuropsychological data at inclusion, except for the Attentional Battery of the CANTAB assessing shifting and speed processing. VBM analysis showed more tissue loss in FD than SD in the occipito-parietal lobes, especially in the cuneus, precuneus, lingual gyri, and the calcarine fissure and surrounding cortex bilaterally. Compared to controls, FD showed a more extensive decrease in regional grey matter concentration than SD in tempo-parieto-occipital areas and prefrontal regions. This study shows that VBM analysis is more sensitive than neuropsychological battery to detect fast cognitive decliners in very mild and mild AD.