AbstractID: 8719 Title: Endogenous MRI Biomarker to Track Neurological Disorder

Purpose: The existing literature strongly supports the hypothesis that low T2 values are correlated with the presence of brain iron. Mineralized iron particles associated with tissue ferritin provide an endogenous contrast mechanism leading to decrease T2 in specific brain regions. The effect is enhanced when imaging at higher field strength. This has suggested the use of iron-dependent MR contrast for the study and monitoring of neurological diseases related to iron dysmetabolism. **Method and Materials:** Twelve subjects (5 AD & 7 normal) were imaged on 3 Tesla scanner with a dual spin echo sequence, (TR = 4000, TE= 30, 80, NEX=1, 20 cm FOV, 256x128 matrix, 55 coronal slices each 1.5 mm thick, scan time of 11 minutes). The apparent T2 values were calculated using the dual echo images. The T2 values within the brain were delineated using especially developed brain mask. Based on a low T2 window (T2 = 10-47 msec), voxels were delineated and hypothesized to contain high concentration (HC) iron. In addition, five regions of interests (ROI) were drawn manually on the HC iron region and another five nearby regions were drawn on what we call medium concentration iron region. The T2 mean and standard deviations of the T2 window and of the ROI were calculated. **Results:** The preliminary analysis of global brain iron indicated the T2 values for specific brain regions were shorter for AD subjects than for normal volunteers. In addition, the regional brain analysis indicated that the spin echo sequence is effective in capturing the drop in the apparent T2 values. **Conclusion:** Our results suggested that the apparent T2 values calculated from high field MR images are correlated with the presence of Alzheimer disease. Our study indicates that high field imaging may become an effective means of monitoring the progression of several important neurodegenerative diseases.