INVESTIGATION OF NEW AD PLASMA BIOMARKER AND ITS POSSIBILITY

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Introduction: Abeta x-42 and phosphorylation of Tau protein in CSF are considered the most useful alzheimer’s disease (AD) diagnostic biomarkers. On the other hand, AD biomarkers using more non-invasive sample such as plasma or urine are urgently required.

Aims: To identify novel AD diagnostic biomarkers in plasma and CSF with metabolomics technology.

Methods: We performed a metabolomics focused on steroid-related with LC/APCI-MS using healthy elderly controls, MCI, AD, PD and schizophrenia patient plasma and CSF samples. ELISA of total Tau, phosphorus Tau (P181), Abeta 40, 42 and plasma ApoE4/Pan-ApoE4 ratio were performed using patient plasma and CSF.

Results: Using metabolomics technology, desmosterol was found to be decreased in AD plasma vs healthy elderly controls plasma (n=10) with a fold change and p value of 0.36 and 0.005, respectively. The analytical method was validated for desmosterol and measured control, MCI and AD plasma and CSF samples. The results showed that desmosterol level and desmosterol/cholesterol ratio were decreased in AD patient plasma and that desmosterol/cholesterol ratio levels were decreased in CSF significantly. These changes

1) were significant especially in plasma and CSF from female patients,

2) had high correlation with plasma ApoE4/Pan-ApoE4 ratio and

3) were not observed in plasma and CSF samples from PD or schizophrenia patients.

Our data revealed that this novel plasma biomarker is superior to other CSF markers based on a comparison with other markers using ROC plot.

Conclusion: Our results indicate that plasma desmosterol level can be used as new “plasma” AD biomarker.