male and 670 females, aged 20-91), who joined the Hiroshima University observational study first initiated in 2005, underwent a simplified Pocket Smell Identification Test (mPST) developed in collaboration with Sensonics US company for the Japanese population, that is aimed at detecting loss of ability to correctly identify 4 odors (soap, grape, onion and rose) with the perfect score for the test set to 4. Each participant also self-assessed their smell abilities and received the MMSE. Statistical analysis was conducted to see any relationship between parameters such as age, sex, olfactory function loss and mental decline. **Results:** Analysis indicated an association between self-estimation of smell identification capabilities and mPST. For participants under 50 years old, the mPST score value from 3.59 to 3.79 was determined as the average range. The score gradually decreased to 3 and 2 at 69 and 87 years old, respectively, as estimated from the loess smoothed curve. Our data indicated a gender difference with male seeing an earlier decline in olfactory functions compared to females according to age. We also observed a concordance between aging, the risk of losing olfactory capabilities and worsening performance of mental abilities as determined by MMSE. **Conclusions:** Overall, our study demonstrates the utility of a non-invasive simplified smell identification test to detect slight decrease in mental capabilities in a Japanese population. Further studies should be conducted to assess to usefulness of such simple test to assist very-early MCI or dementia clinical trials and improve clinical practice in Japan.

**P2-252**  
ASSOCIATION OF HDL SUBSPECIES WITH OR WITHOUT APOLIPOPROTEIN E WITH ALZHEIMER’S DISEASE NEUROPATHOLOGY: THE GINKGO EVALUATION OF MEMORY STUDY

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**Background:** High-density lipoprotein (HDL) cholesterol concentrations have been inconsistently associated with cognitive decline and Alzheimer’s disease (AD). While the APOE genotype is one of the strongest risk factors for AD, it has yet to be examined whether the association of HDL and AD reflects the extent to which HDL contains apolipoprotein E (apoE) that may mediate the functional importance of HDL. Thus, we investigated whether the association of HDL and AD neuropathology differs by the presence and absence of apoE on HDL. **Methods:** Among 170 participants (42% women, age 84-96 years) of the Ginkgo Evaluation of Memory Study (2000-2008) who remained free of dementia throughout the trial and had amyloid β (Aβ) brain burden measured by Pittsburgh Compound B-positron emission tomography in 2009, plasma total HDL (by apoA-I) and HDL containing or lacking apoE and total apoE were measured by ELISA. We evaluated the cross-sectional associations of apoE and HDL, and HDL with or without apoE (per SD increments) with high Aβ deposition (standardized uptake value ratio ≥ 1.57) in Poisson regression models with robust error variance adjusted for age, sex, education, race/ethnicity, alcohol intake, smoking status, BMI, history of heart disease or type 2 diabetes, systolic blood pressure, and intake of antihypertensive and lipid lowering medications. **Results:** Approximately 7.6% of the HDL contained apoE and high Aβ deposition was detected in 94 participants (55%). The prevalence ratio (PR) for high Aβ deposition per SD increase in HDL was 1.08 (95% CI: 0.95, 1.24). The HDL subspecies were differentially associated with high Aβ deposition (p for heterogeneity = 0.03). The PR per SD increment of HDL with apoE was 0.86 (95% CI: 0.69, 1.06) and 1.16 for HDL without apoE (95% CI: 1.01, 1.33). No evidence for effect modification by sex, lipid lowering medication intake, mild cognitive impairment at baseline or APOE genotype was observed (all p>0.05). Total plasma apoE and apoE in HDL were not associated with high Aβ deposition (PR: 0.92; 95% CI: 0.79,1.08 and 0.91; 95% CI: 0.78,1.07; respectively). **Conclusions:** The association of HDL and AD neuropathology differs by the presence and absence of apoE.

**P2-253**  
EYE MOVEMENT BEHAVIOR IN MCI AND AD: USING AUTOMATIC CLASSIFICATION ALGORITHMS TO IDENTIFY COGNITIVE DECLINE

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**Background:** Eye movement-based paradigms have proved to be an effective tool to identify cognitive decline in several clinical conditions, namely in dementia (Pereira et al., 2014; Armstrong, 2009; Rizzo et al., 2000). Several studies have been conducted in order to characterize AD and MCI profile, however, MCI profile is yet to be defined (Crutch et al., 2009). Eye movement analysis is often based on single parameters, resulting in some degree of variability in subjects’ performance. By combining other oculomotor measures, eye movement analysis may become a more accurate way of screening progression to early AD. **Methods:** Machine Learning Methods were first applied to classify 3 groups of subjects.
(AD=33; MCI=52; Normal Controls= 43). First, we investigate the capacity of the defined oculomotor parameters (in a combination of 556 variables) to distinguish between AD and normal control groups. With this purpose, we selected the most capable parameters using an heuristic algorithm. Then, classification models were trained on a multidimensional representation of eye movements from a subsample of the 3 groups. MCI data was tested with the classifiers after training the model, to verify if MCI subjects would have an oculomotor pattern similar to either AD or normal control group.

**Results:** Automatic classification algorithms were able to distinguish between AD subjects and normal controls, with good levels of performance, having the best results reached 85% of accuracy, 70% of sensitivity and 18% of error. Also, the classifiers successfully classified 18 MCI subjects with an AD oculomotor profile.

**Conclusions:** Different oculomotor parameters, when combined together, significantly improve the ability to accurately distinguish between healthy and impaired subjects. Eye movement analysis reveals the potential to detect early oculomotor deficits in MCI patients similar to AD subjects, and suggests a promising approach for detecting early AD.

**Table 1**
Selection of automatic classification algorithms to distinguish between AD subjects and normal controls

<table>
<thead>
<tr>
<th>Methods</th>
<th>Accuracy</th>
<th>Sensitivity</th>
<th>Error</th>
<th>AUC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algorithm 1</td>
<td>85%</td>
<td>70%</td>
<td>18%</td>
<td>0.803</td>
</tr>
<tr>
<td>Algorithm 2</td>
<td>76.7%</td>
<td>74.2%</td>
<td>20.3%</td>
<td>0.757</td>
</tr>
<tr>
<td>Algorithm 3</td>
<td>81%</td>
<td>62%</td>
<td>23%</td>
<td>0.750</td>
</tr>
</tbody>
</table>

**P2-254**

**SERUM FERRITIN IS INCREASED IN A SUBSET OF PATIENTS WITH FRONTALTEMPORAL DEMENTIA**

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**Background:** Frontotemporal dementia (FTD) is a common cause of early-onset dementia. Recent studies have shown a role for inflammation and an altered immune response in FTD. Serum levels of ferritin, an iron carrier and storage protein, are increased in inflammatory disorders and can therefore be a surrogate marker of inflammation. In this study we aimed to evaluate whether serum ferritin levels are increased in patients with FTD. **Methods:** Using a latex fixation test we measured ferritin levels in serum samples of 133 patients meeting diagnostic criteria for an FTD spectrum disorder (60 behavioural variant FTD, 6 FTD with motor neurone disease (MND), 23 semantic variant primary progressive aphasia (PPA), 31 nonfluent variant PPA, 8 PPA-not otherwise specified, 4 with corticobasal syndrome/progressive supranuclear palsy, 1 with inclusion body myositis with Paget’s disease and FTD) as well as 16 patients with logopenic variant PPA and 26 healthy controls. Pathological and genetic status (presence of GRN, C9orf72, MAPT, Tbk1, VCP, SQSTM1 mutations) was noted when available. No significant difference in age or gender was seen between the groups. **Results:** Mean (standard deviation) ferritin levels (ng/ml) in the FTD group were 115.4 (111.0), 113.0 (85.5) in the logopenic variant PPA group and 80.7 (55.2) in the controls. Although there was no significant difference between the disease groups there was a subset of patients with FTD with very high ferritin levels. Stratifying the FTD cohort according to clinical diagnosis, patients with FTD-MND (134.9 (136.5)) had the highest levels. 40 patients had tested positive for genetic mutations: the GRN mutation group (n=9) had the highest ferritin levels (164.5 (186.3), followed by individuals with C9orf72 (n=16) mutations (115.9 (129.8)). Combining genetic and pathological cases, levels were higher in those with definite or likely TDP-43 pathology (n=29: 142.0 (149.1)) compared to individuals with tau pathology (n=13: 96.3 (79.0)). Ferritin concentration did not correlate with disease duration in any of the groups. **Conclusion:** This study shows a trend for increased serum ferritin levels in FTD, particularly in those with TDP-43opathies, including those clinically with FTD-MND and genetically with GRN and C9orf72 mutations. This study adds further evidence for the role of inflammation in FTD.