AIBL/Australian ADNI: CLINICAL UPDATE

Dr Kathryn Ellis
AIBL national manager and cognitive stream co-leader
On behalf of the AIBL management team
OVERVIEW: AIBL is the most comprehensive, longitudinal study of its kind in Australia, and aims to discover a way to develop biomarkers, diagnose patients earlier and prevent disease onset.

COHORT
N = 1,112 (aged 60+ yrs)

Healthy Controls
Subjective Memory Complainers
Mild cognitive Impairment
Alzheimer’s Disease

METHODOLOGY
Cognitive and clinical assessment
Biomarkers
Vascular
Diet & Lifestyle
Neuroimaging
AIBL: Longitudinal cohort

Baseline (1,112)
- Psychometrics
- Bloods
- MRI/PET
- Lifestyle
- Genotype

18M (972)
- Psychometrics
- Bloods
- MRI/PET

36M (824)
- Psychometrics
- Bloods
- MRI/PET

Non-Return:
- 112
Deceased:
- NMC 2
- SMC 4
- MCI 5
- AD 17

Non-Return:
- 120
Deceased:
- NMC 3
- SMC 3
- MCI 4
- AD 34

Non-Return:
- 11
Deceased:
- NMC 3
- SMC 4
- MCI 5
- AD 17

Non-Return:
- 120
Deceased:
- NMC 2
- SMC 4
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See AAIC poster P3-093 on Tuesday 1 – 3.30pm. Ellis et al.
Healthy to MCI transition over 18 and 36 months

Survival analysis was conducted to examine transition rates.

HC to MCI transition was 2.5% at 18-months (17 cases).

HC to MCI transition was 5.7% by 36-months (additional 18 cases).
MCI to AD transition over 18 and 36 months

MCI to AD transition was 30.5% at 18-months (32 cases)

MCI to AD transition was 80% by 36-months (additional 16 cases).

By the 36 month time-point only 26 of the original 133 MCI cases were still in this category.
Comparing “stable” and “transition” groups

Demographic characteristics of “stable” groups (those who remain in the same category) and “transition” groups (those who change category towards disease classifications) over the initial 18-month period

<table>
<thead>
<tr>
<th></th>
<th>HC Stable (N = 685)</th>
<th>HC transitioned to MCI (N = 17)</th>
<th>MCI stable (N = 63)</th>
<th>MCI transitioned to AD (N = 32)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>69.7 (6.8)</td>
<td>71.7 (7.0)</td>
<td>75.5 (7.7)</td>
<td>76.4 (7.3)</td>
</tr>
<tr>
<td>Percentage female</td>
<td>58.7%</td>
<td>41.2%</td>
<td>53.8%</td>
<td>59.4%</td>
</tr>
<tr>
<td>Percentage APOE ε4</td>
<td>26.3%</td>
<td>47.1%</td>
<td>36.9%*</td>
<td>78.1%*</td>
</tr>
<tr>
<td>Education (&lt;=12 years)</td>
<td>45.2%</td>
<td>70.6%</td>
<td>52.3%</td>
<td>68.8%</td>
</tr>
<tr>
<td>Premorbid IQ</td>
<td>43.1 (6.0)</td>
<td>42.8 (5.4)</td>
<td>40.2 (9.3)</td>
<td>41.3 (7.4)</td>
</tr>
<tr>
<td>HADS-D</td>
<td>2.6 (2.2)</td>
<td>2.8 (2.5)</td>
<td>3.7 (2.8)</td>
<td>3.2 (2.2)</td>
</tr>
<tr>
<td>HADS-A</td>
<td>4.3 (2.9)</td>
<td>4.5 (2.1)</td>
<td>5.0 (3.0)</td>
<td>4.5 (2.5)</td>
</tr>
</tbody>
</table>
A number of collaborative projects examining conversion/transition from HC within AIBL

Evidence of bimodality in AIBL HC group – higher performers less likely to convert to MCI or AD - using a number of statistical models

Cognition combined with biomarkers is aiding in detection of “at risk” HC population
Magnitude of decline over 18 months (ApoE ε4+)

- Psychomotor
- Attention
- Pattern Separation
- Working memory
- Paired associate learning
- Verbal learning
- Verbal memory
- Memory Composite
- Speed Composite

Lim et al. See AAIC oral presentation: Tuesday 11.30 to 13 00, Session O3-05.
Magnitude of decline over 18 months (High Aβ)

Lim et al. See AAIC oral presentation: Tuesday 11.30 to 13 00, Session O3-05.
Physical activity (PA) and Aβ: Effect of the APOE ε4 allele

• Non APOE ε4 carriers who were engaged in high levels of exercise had significantly lower plasma Aβ<sub>1-42/1-40</sub> ratio.

• APOE ε4 carriers who were engaged in high levels of exercise showed lower [<sup>11</sup>C] PiB PET levels than ε4 carriers with lower levels of exercise.

• This may reflect different mechanisms at play for APOE ε4 carriage and Aβ in the brain versus the periphery.

Fig 1. Plasma Aβ and PA

Fig 2. PiB and PA

Brown et al. 2012, accepted Molecular Psychiatry.
Higher Medeteranian Diet (MeDi) Score is associated with lower PiB SUVR

Controlling for age, APOE genotype, gender and years of education.

Rainey-Smith et al. manuscript in preparation.
Parallel studies

**aibl ROCS**
Characterize the cognitive performance of a group of 205 healthy older adults, and adults with MCI, and AD over short test-retest intervals (10 times over 18-months).

**aibl ACTIVE**
RCT of physical activity to delay the progression of white matter hyperintensities on MRI in older adults at risk of cognitive decline.

**aibl WHAP**
Prospective data from midlife, 3 cognitive timepoints over 20 years prior. 100 participants seen so far 80% retention from 2002 cognitive test.
AIBL is a large collaborative study and a complete list of contributors can be found at www.aibl.csiro.au

This research is funded in part by the Science and Industry Endowment Fund.

We thank all who took part in the study.