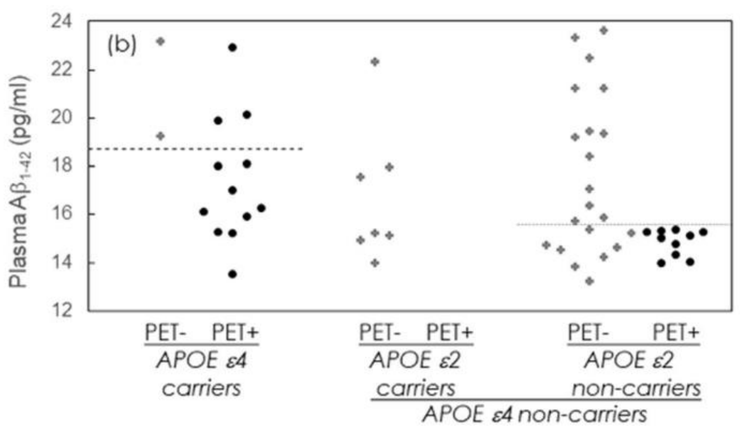
The Role of Plasma Biomarkers in Prodromal Stage of Dementia

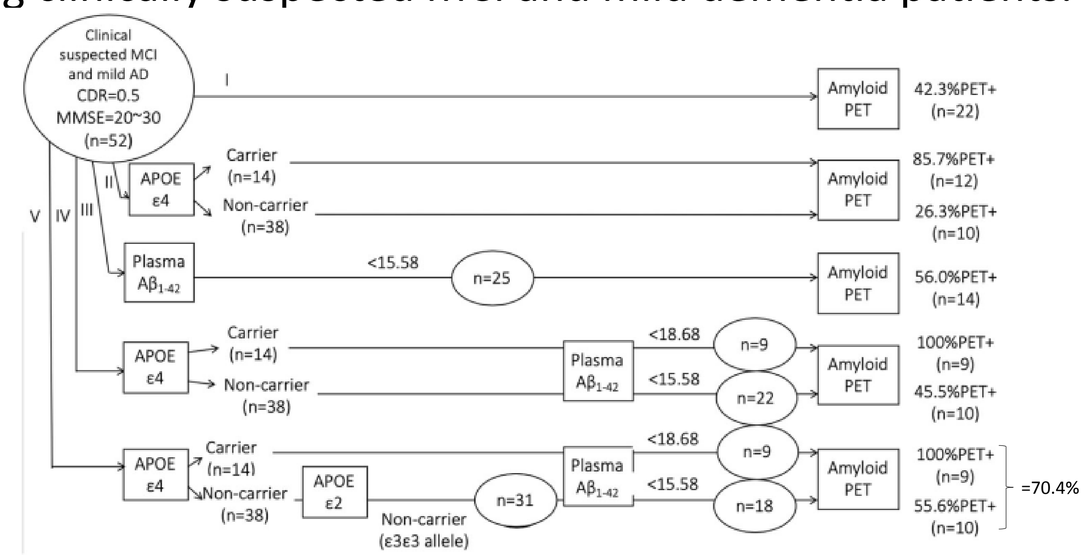
Brain Research Center (Neurodegeneration) E-mail: brc.nymu2@gmail.com; Director: Prof. Pei-Ning Wang (pnwang@vghtpe.gov.tw)

Plasma amyloid assay as a pre-screening tool for amyloid positron emission tomography imaging in early-stage Alzheimer' s disease

Alzheimers Res Ther. 2019 Dec 27;11(1):111.

- Amyloid PET-positive (PET+) participants had lower plasma $A\beta_{1–42}$ levels than amyloid PET-negative (PET-)subjects.
- APOE ε4 carriers had higher plasma $A\beta_{1–42}$ than non-carriers.
- The algorithm involving the combination of plasma $A\beta_{1–42}$ and APOE genotyping successfully increased detection of amyloid PET+ patients from 42.3 to 70.4% among clinically suspected MCI and mild dementia patients.





Prediction of Cerebral Amyloid Pathology Based on Plasma Amyloid and Tau Related Markers

Front Neurol. 2021 Oct 4;12:619388

- Pyroglutamate-modified β-amyloid peptide ($A\beta_{pE}$) is crucial for AD pathophysiological process.
- In participants with unimpaired cognition, mild cognitive impairment, or very mild dementia, both plasma $A\beta_{pE3–40}$ levels and $A\beta_{pE3–40}$/t-tau ratios correlated negatively with short-term memory and global cognition scores, while correlating positively with PET standardized uptake value ratios (SUVRs).
- Plasma $A\beta_{pE3-40}$/t-tau had the best discriminatory ability and was a strong predictor of Aβ PET positivity after controlling for relevant demographic covariates.

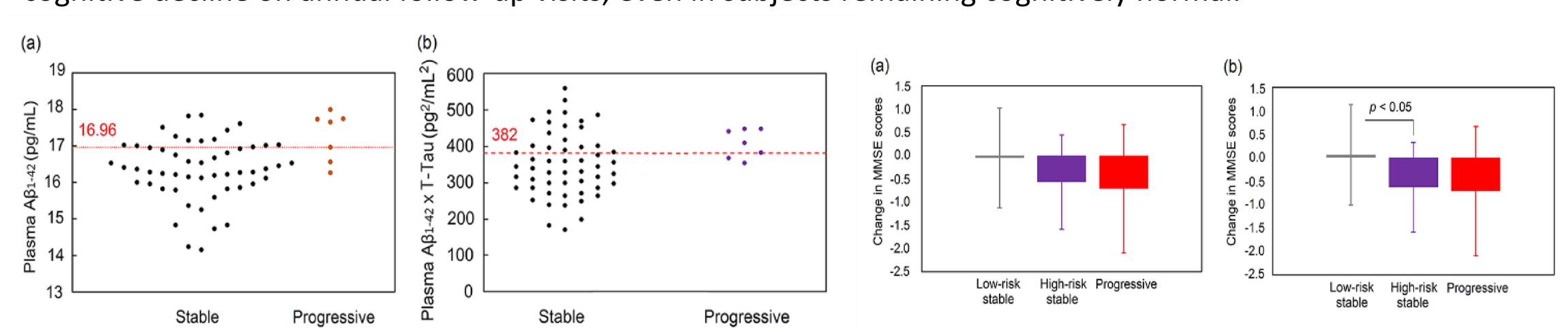
Aβ PET biomarker	Spearman r_s				
	SUVR	Short-term memory	Semantic memory	Executive function	Global cognition
$A\beta_{pE3–40}$	0.343*	−0.481**	−0.084	0.268	−0.337*
t-tau	−0.041	0.300*	0.286	−0.248	0.305
Aβ42	−0.007	0.391**	0.353*	−0.216	0.379*
$A\beta_{pE3–40}$/t-tau	0.305*	−0.483**	−0.140	0.359*	−0.343*
Aβ42/t-tau	0.073	−0.261	−0.236	0.229	−0.287

SUVR, standardized uptake value ratio. $^*p < 0.05$, $^{**}p < 0.01$.

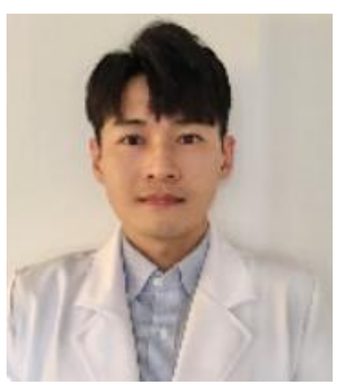
Predictive Value of Plasma Amyloid and Tau in Cognitively Normal Adults

Unpublished data

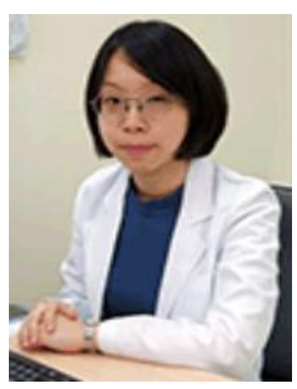
- The baseline levels of plasma biomarkers (Aβ 1-42 , t-tau, and Aβ1-42 × t-tau) were significantly higher in the subjects who declined from normal cognition to mild cognitive impairment than those who remained cognitively normal (p = 0.005, p = 0.007, and p = 0.005, respectively).
- Higher plasma biomarker levels (Aβ1-42 ≥ 16.96 pg/ml and Aβ 1-42 × t-tau ≥ 382 pg2/ml2) predicted more cognitive decline on annual follow-up visits, even in subjects remaining cognitively normal.




Prof. Pei-Ning Wang


Dr. Ting-Bin Chen


Dr. Yi-Jung Lee


Dr. Szu-Ying Lin