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P10

Sex Differences In Alzheimer's Disease Using PET Molecular Imaging

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BACKGROUND

- Alzheimer's Disease (AD) is characterized by the development of amyloid plaques (A), tau tangles (T), and neurodegeneration (N), which can be assessed by Positron Emission Tomography (PET).
- Sex differences and hormonal status contribute to biological variations in AD expression, and has been shown to modulate risk factors and potential disease-causing mechanisms.
- Greater burden of AD neuropathology in females is more consistently reported by PET for tau than amyloid plaques.

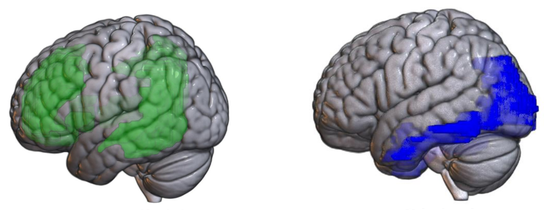
AIMS

To explore differences between sexes and within females in memory clinic cohorts using in-vivo molecular biomarkers demonstrated by PET.

METHODS

- **Sample:** 315 subjects (246 from HUG and 69 from CHUV).
- **Cognitive measures:** Mini Mental State Examination (MMSE)
- **Neuroimaging measures:**
  florbetapir (18F) or flutametamol (18F) for Aβ-PET; flortaucipir (18F) for tau-PET
- **Blood measure:** Glial Fibrillary acidic protein (GFAP) for astrocyte reactivity.
- **Statistical analyses:** t-tests and chi-square tests for sex differences, and female differences in pathological markers including Centiloid, global tau, and tau in Braak stages.
  Linear regression models to assess the correlation between age at menopause and number of children and biomarkers

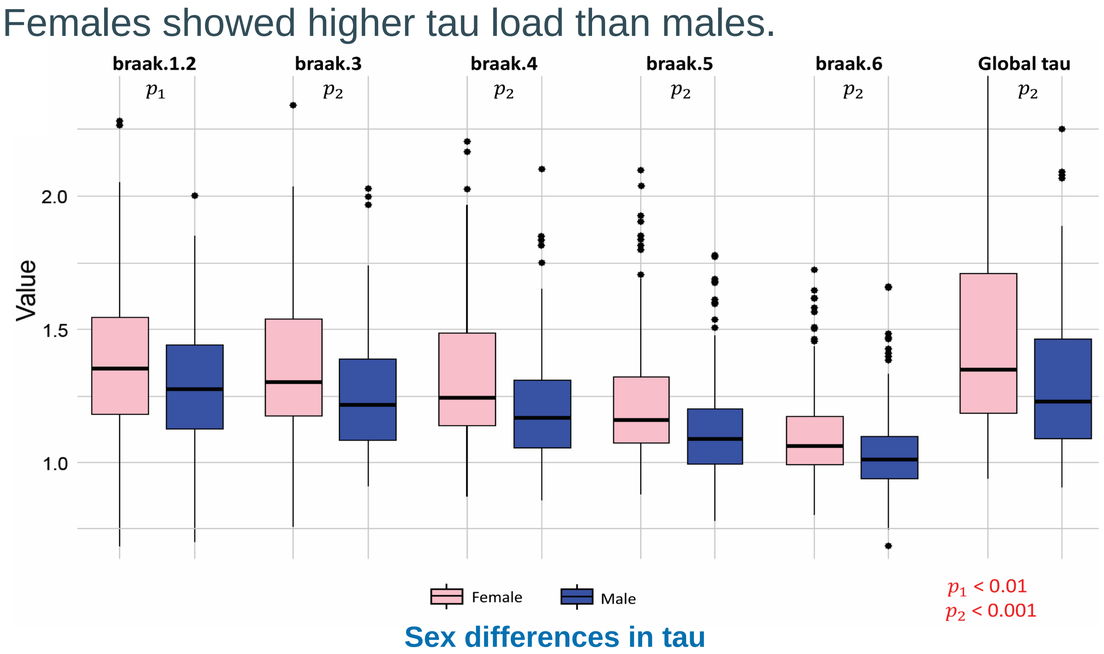
	Female	Male	P-value
Total Participants	156	159	
Age (mean ± std)	69.65 ± 9.38	70.08 ± 8.59	0.67
Education Years (mean ± std)	13.27 ± 3.82	14.07 ± 4.15	0.084
MMSE Score (mean ± std)	24.90 ± 4.46	25.04 ± 4.92	0.79
Diagnosis Stage (CU/MCI/DEM)	45/70/41	29/86/44	0.33
APOE4 (carriers/non carriers) [NA]	39/51 [66]	24/59 [76]	0.07
Global tau (mean ± std)	1.45 ± 0.34	1.29 ± 0.27	**<0.001**
Centiloid (mean ± std)	44.7 ± 48.5	40.8 ± 48.1	0.571
Hippocampal Volume (mean ± std)	0.0021 ± 0.0006	0.0021 ± 0.0005	0.39
Blood GFAP (mean ± std)	202 ± 116	170 ± 112	0.097



Centiloid | Global tau

RESULTS

- No significant differences were found in Aβ Centiloid between females and males.
- Females showed higher tau load than males.



Sex differences in tau

- No significant association were found between age at menopause and biomarkers.
- No significant association were found between number of children and biomarkers except for the blood GFAP that was negatively correlated (p= 0.014).

	Age at Menopause ≥ 45	Age at Menopause < 45	P-value
Total Participants	41	11	
Age (mean ± std)	69.73 ± 7.68	69.36 ± 4.75	0.36
Education Years (mean ± std)	13.3 ± 4.47	15.8 ± 3.95	0.039
MMSE Score (mean ± std)	24.8 ± 4.29	26.6 ± 3.07	0.20
Diagnosis Stage (CU/MCI/DEM)	14/19/8	5/3/3	**<0.001**
APOE4 (carriers/non-carriers) [NA]	19/15 [7]	3/5 [3]	**<0.001**
Global tau (mean ± std)	1.41 ± 0.36	1.38 ± 0.43	0.86
Centiloid (mean ± std)	44.6 ± 45.4	68.3 ± 54.9	0.32
Hippocampal Volume (mean ± std)	0.0021 ± 0.0006	0.0025 ± 0.0005	0.076
Blood GFAP (mean ± std)	227 ± 145	174 ± 57.3	0.17

Exploratory differences in females by age at menopause

CONCLUSION

- Females exhibit higher tau deposition compared to males at the same disease stage suggesting a potential sex-specific vulnerability to tau pathology in AD.
- We did not find significant associations between age at menopause and number of children with AD biomarkers, possibly because this information was only available in a smaller sample.
- Further investigations exploring hormonal factors are required to understand the mechanisms underlying females' vulnerability.