DPhil Project: Rethinking Resilience in Dementia

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Project description

Resilience is broadly defined as the capacity to maintain healthy functioning despite adversity. Most conceptual models of resilience have two essential components: **exposure to adversity (risk)** and **positive adaptation (resilience)**. This DPhil project will ask why some individuals remain cognitively healthy into old age despite substantial biological and social risk for dementia. Most resilience research has largely examined single sources of adversity (e.g. genetic or lifestyle risk) or individual resilience mechanisms (e.g. molecular, immune, or psychological resilience) in isolation. This project will adopt an integrated framework to understand how multiple interacting mechanisms can preserve cognitive function despite cumulative risk.

Using multi-modal data from large population cohorts (e.g. Whitehall II and UK Biobank), this project will examine the lifestyle, behavioural, health, immune, and social determinants of the following resilience phenotypes:

- APOE ε4 carriers who remain dementia-free into advanced age.
- Older adults with elevated blood-based biomarkers of Alzheimer's disease, who maintain normal cognition.
- Older adults with significant vascular disease or multimorbidity who preserve cognitive function.
- Older adults with advancing neuropathology on longitudinal MRI scans, but slower longitudinal cognitive decline
- Older adults with social and structural determinants of dementia (education access, economic stability, indices of deprivation, neighbourhood air pollution) who remain dementia-free into advanced age.

The DPhil student will be trained in conducting systematic reviews as well as advanced neuroimaging analysis methods, epidemiological statistics, longitudinal modelling, and latent modelling.