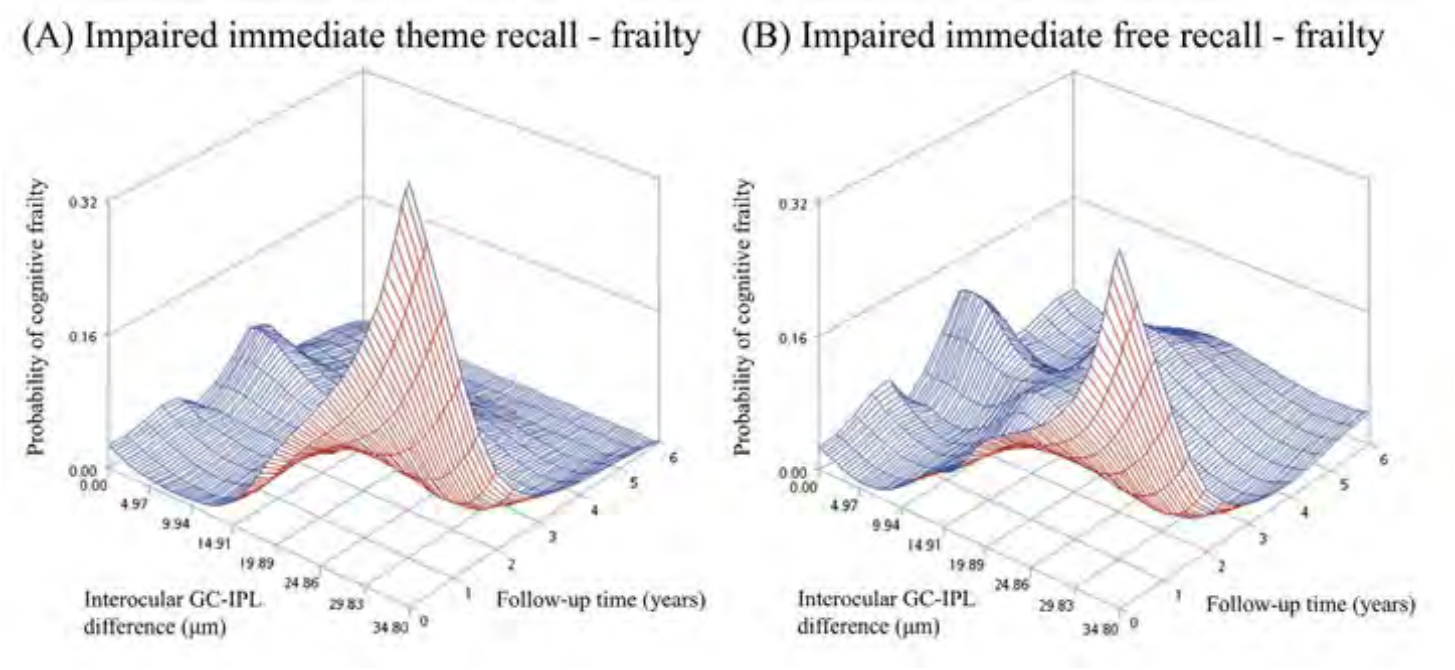
ACHIEVEMENTS

# NTU Interdisciplinary Team Discovers Link between Asymmetric Optic Nerve Thickness and Cognitive Frailty






Longitudinal changes in retinal nerve fiber layer asymmetry and cognitive frailty in older adults.

The retina's close connection to the brain has earned it the title "the window to the brain." However, the link between asymmetry in retinal nerve fiber layer thickness and cognitive frailty (a combination of mild cognitive impairment and physical frailty) remains unclear.

Supported by the National Science and Technology Council (NSTC), Prof. Yen-Ching Karen Chen of the College of Public Health, National Taiwan University (NTU), and Director Jen-Hau Chen of the Department of Geriatrics and Gerontology, NTU Hospital, Yunlin Branch, launched the "Taiwan Initiative for Geriatric Epidemiological Research" in 2011. This ongoing cohort tracks cognitive performance and frailty status in older adults every 2–3 years and has completed five waves of follow-up to identify risk factors in the preclinical phase of dementia. In collaboration with ophthalmologists Dr. Yi-Ting Hsieh of the Department of Ophthalmology at NTU Hospital, Director Yung-Sung Lee of the Glaucoma Department at Linkou Chang Gung Memorial Hospital, and Director Jeng-Min Chiou of NTU's Institute of Statistics and Data Science, the team utilized optical coherence tomography (OCT) to measure retinal nerve fiber thickness.

The research team led by Prof. Yen-Ching Karen Chen at the Institute of Epidemiology and Preventive Medicine, College of Public Health, National Taiwan University, and Director Jen-Hau Chen of the Department of Geriatric Medicine, NTU Hospital Yunlin Branch.

Click or Scan the QR code to access the full article in *Alzheimer's & Dementia*.

In 2019, Prof. Chen's group identified a U-shaped association between ganglion cell-inner plexiform layer (GC-IPL) thickness and cognitive decline, where both thinning and thickening were linked to increased risk, though the mechanism remained unclear. The current study builds on this finding by showing that asymmetric amyloid beta accumulation between eyes may lead to GC-IPL thickness asymmetry, a change that emerges in the early stages of cognitive decline. This asymmetry may represent a promising early biomarker for cognitive frailty.

Published in *Alzheimer's & Dementia*—a journal ranked among the top 1.7% in clinical neurology—in February 2025, the study drew significant attention at the 19th International Congress of the Asian Society Against Dementia held in Seoul. The findings underscore the potential of retinal nerve fiber layer thickness as a biomarker for the early detection of preclinical dementia and cognitive frailty. Compared with costly brain imaging and invasive blood tests, OCT offers a non-invasive, accessible, and scalable alternative, making it a practical and innovative early screening strategy for aging populations.

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