

Individual-level Cortical Morphological Brain Networks And Associations With Cognitive Function: A Population-based Study

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Ziwei Chen¹, Qianqian Xie¹, Yan Wang¹, Jiafeng Wang¹, Xiaoyu Wang¹, Chunyan Li¹, Yujia Wang¹, Yixing Wang¹, Jiahui Sun¹, Anran Yao¹, Yongxiang Wang¹, Lin Cong¹, Shi Tang¹, Tingting Hou¹, Lin Song^{1*}, Yifeng Du^{1*}, Chengxuan Qiu²

¹Shandong Provincial Hospital affiliated to Shandong First Medical University, Jinan, China, ²Karolinska Institutet-Stockholm University, Solna, Sweden.

- KEY TAKE AWAY:
1. The global topological architecture of morphological brain networks (MBNs) is disrupted at the stages of both subjective cognitive decline (SCD) and mild cognitive impairment (MCI).

2. Regional nodal topological metrics (betweenness centrality, Bc) show significant alterations in individuals with SCD and MCI.

3. Abnormal global and nodal MBNs are strongly correlated with multi-domain cognitive performance and plasma AD-related biomarkers.

INTRODUCTION	RESULTS	REFERENCES
Morphological brain networks (MBNs) may alter in the early stages of Alzheimer’s disease (AD). We characterized individual-level surface-based MBN alterations associated with subjective cognitive decline (SCD) and mild cognitive impairment (MCI), and examined their associations with cognitive function and plasma AD-related biomarkers in a rural older population.	Global graph analyses revealed reduced clustering coefficient (Cp), global/local efficiency (Eglob/Eloc), normalized clustering (γ) and small-world index (σ) in SCD and MCI relative to normal controls (NC). These declines correlated with poorer multi-domain cognitive z-scores, lower plasma Aβ42/Aβ40, and higher GFAP, p-tau217, p-tau181 (P<0.05). Meanwhile, SCD and MCI exhibited longer characteristic path length (Lp) and normalized λ versus NC; elevated Lp also linked to worse cognitive performance and increased GFAP/p-tau217 (all P<0.05). Lambda Gamma Sigma Lp Cp Eglobal Elocal	Yang, Y., Yan, M., Sun, L., Liu, X., Fang, X., Li, S., and Lin, G. (2025). Individual-level cortical morphological network analysis in idiopathic normal pressure hydrocephalus: diagnostic and prognostic insights. <i>Fluids Barriers CNS</i> 22, 43. Xu, X., Chen, P., Li, W., Xiang, Y., Xie, Z., Yu, Q., Tang, Y., and Wang, P. (2024). Topological properties analysis and identification of mild cognitive impairment based on individual morphological brain network connectome. <i>Cereb Cortex</i> 34. 10.1093/cercor/bhad450. Wang, Y., Li, Q., Yao, L., He, N., Tang, Y., Chen, L., Long, F., Chen, Y., Kemp, G.J., Lui, S., and Li, F. (2024). Shared and differing functional connectivity abnormalities of the default mode network in mild cognitive impairment and Alzheimer's disease. <i>Cereb Cortex</i> 34. 10.
METHODS	CONCLUSIONS	CONTACT
This population-based study included 1075 dementia-free participants (age ≥60 years; 58% women) in the MIND-China MRI substudy (2018-2020). We assessed cognitive function and SCD and defined MCI following international criteria. Data were analyzed using general linear regression models.	Disruptions in global and nodal properties of individual-level surface-based MBNs are potential biomarkers for SCD and MCI in older adults, with AD pathology and neuroinflammation being the underlying mechanisms.	Name: Ziwei Chen Shandong Provincial Hospital, Shandong First Medical University Email: chenziwei19990208@163.com  ALZHEIMER'S ASSOCIATION AAIC 26