

Unravelling the sleep-brain age-cognition connections in community-dwelling older adults

2026.

2790483

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The two distinct profiles of the sleep-glymphatic function-cognition connections observed in relation to brain-PAD scores suggest that a preserved brain age may serve as a protective factor against age-related decline in glymphatic function.

INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES
▪ The interplay between glymphatic function and sleep quality is crucial for brain health and cognitive longevity in late adulthood. ▪ Beyond chronological age, whether brain age has specific effects on the associations between glymphatic function, sleep quality and cognition are understudied in cognitive unimpaired adults.	▪ Structural and diffusion magnetic resonance imaging (MRI) data from the Cambridge Centre for Ageing and Neuroscience project (N=582, age range: 18-87 years) were used to calculate brain age metrics and the diffusion tensor imaging analysis along the perivascular space (DTI-ALPS) index. ▪ Brain age metrics comprised estimated brain age and the brain predicted age difference (brain-PAD). Subjective sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI).	Leftward asymmetry of the DTI-ALPS index was consistently observed across brain age-specific groups. The brain-PAD score was significantly correlated with a lower left DTI-ALPS index. Adults with a positive brain-PAD score exhibited a robust correlation between DTI-ALPS indices and sleep quality features, whereas those with a negative brain-PAD score showed a reliable correlation between DTI-ALPS indices and cognition. Mediation analyses further revealed that the relationship between left DTI-ALPS index and sleep efficiency was mediated by brain age.	This study provides the first demonstration that lateral differences in the DTI-ALPS index vary according to brain ageing statuses. The two distinct profiles of the sleep-glymphatic function-cognition connections observed in relation to brain-PAD scores suggest that a preserved brain age may serve as a protective factor against age-related decline in glymphatic function. These findings may underscore the translational potential of brain age model as both clinical biomarkers and modifiable targets for interventions aimed at promoting healthy longevity and brain resilience.	 醒腦 & 好瞓 HK-ASAP CONTACT  Please contact: Dr. LU Hanna Email: hannalu@cuhk.edu.hk 