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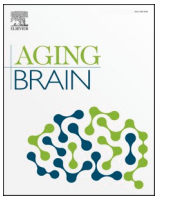

Editorial

Sleep-memory relationships during brain aging

Sleep disturbances have reached epidemic proportions [1]. In parallel with increases in sleep loss, the prevalence of memory problems is rising across all age groups. This has fuelled research commitment to the understanding of the role of sleep in memory consolidation. Notably, however, the role of sleep in memory processes in young children and aged individuals, is currently not receiving the attention it deserves. This Special Issue of *Aging Brain* is dedicated to "*Sleep and memory during brain development and aging*".

In an original article presented here, Gao and Scullin [2] analyze longitudinal changes in sleep micro-architecture with aging. In contrast with the more-common cross-sectional approach which often leads to oversimplified interpretations that suggest that sleep changes uniformly with age, this study demonstrates a non-linear change in aging and substantial interindividual variability in the trajectories of sleep microarchitecture.

The article by Kroeger & Vetrivelan [3] provides an overview of sleep amount and quality at different stages of life, from perinatal life to old age. The authors highlight specific brain regions that regulate the sleep-wake cycle and describe how these change with aging. They discuss how reduced sleep amount and quality in aged brains impact the memory process and removal of metabolic waste, leading to cognitive decline and diseases such as Alzheimer's disease. In a related review, *Vibha Madan Jha* [4] discusses how sleep disorders exacerbate cognitive deterioration as individuals age, focusing on age-related alterations in sleep architecture. In addition, the author highlights how women's sleep and memory are influenced by reproductive events.

The review by Kanishka & Jha [5] focuses on sleep and compensatory brain mechanisms relevant to memory. The authors consider repair process, which in some cases, may act as a defense mechanism against disease progression in the aged brain. In addition, they discuss the dynamic nature of the brain and its ability to adapt to new experiences – a challenge since the adaptive ability of the aged brain may be compromised by limitations in structural and morphometric flexibility or degeneration, for example.

The final article in this collection compares structural changes in the brains of older adults and young children and examines their impact on the sleep-dependent memory consolidation process. Here, Kumar et al., [6] authors work around a novel hypothesis, namely, that memory deficits in young and aged brains may be underpinned by commonalities in sleep patterns and sleep-related oscillations, which, in turn, are accompanied by similar changes in brain structure.

The different and fascinating areas of research covered in this Special Issue on sleep and memory across the lifespan are intended to inspire new ideas and collaborative scrutiny. Although much progress has been made in recent years, we are optimistic that future research will resolve more "mysteries" surrounding the relationship between sleep and memory as the brain develops and ages.

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