

## 209 - Sleep and Brain Health in Older Adults

Mounting evidence suggests that sleep plays an important role in the maintenance of health in later life. Poor sleep may increase the risk for poor cognitive outcomes and psychopathology, as well as medical conditions common in older adulthood. This Symposium will feature presentations discussing links of sleep/wake disturbances with physical and mental health outcomes. Presenters will integrate novel findings with results from prior research and translate them into practical suggestions to enhance clinical care.

### Cerebral functional connectivity during sleep in young and older individuals

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Sleep modifications are a hallmark of the aging process and a reliable biomarker of cerebral and cognitive health in older individuals. However, how functional connectivity during sleep is modified in older individuals and whether it may contribute to age-related modifications of sleep quality is not known. In one study, we used imaginary coherence to estimate EEG connectivity during Non-rapid-eye-movement (NREM) and Rapid-eye-movement (REM) sleep in 30 young (14 women; 20-30 years) and 29 older (18 women; 50-70 years) individuals. Older individuals showed lower EEG connectivity in stage N2 but higher EEG connectivity in REM and stage N3 compared to the younger cohort. Age-related differences in N3 were driven by the first sleep cycle. EEG connectivity was lower in REM than N3, especially in younger individuals. Exploratory analyses, controlling for the effects of age, indicated that higher EEG connectivity in N2 and REM sleep was associated with specific cognitive functions. In a second study, we combined electroencephalography and functional Magnetic Resonance Imaging (fMRI) to examine functional connectivity differences between wakefulness and light sleep (N1 and N2) and between N2 vs N1 in 16 young (7 women; 20-30 years), and 17 older healthy individuals (8 women; 50-70 years). Comparison between N2 and wakefulness revealed extended inter- and intra- network connectivity decreases common to both young and older individuals. When comparing N2 to N1, common age-group decreases in connectivity were less extensive but involved similar inter and intra-networks. Significant interactions with age group were observed when contrasting N2 and N1. Young individuals showed large connectivity decreases in N2 as compared to N1 between specific regions of the dorsal attentional network, sensorimotor network, default-mode network, limbic network, central-executive network, and salience network. In contrast, older participants showed lower decreases in connectivity or even increases in connectivity between basal ganglia and several cerebral regions as well as between specific frontal regions. Together, these findings suggest a reduced ability of the older brain to disconnect during sleep that may impede optimal disengagement for loss of responsiveness, promote lighter and fragmented sleep, and contribute to age effects on sleep-dependent brain functions.

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### Associations of sleep quality with cognitive and brain alterations in aging.

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