

REM sleep and emotion dysregulation in the elderly: a TMR study

Caterina Leitner^{1,2}, Viviana Greco³, Francesca Casoni², Penelope A. Lewis³, Luigi Ferini-Strambi^{1,2}, Andrea Galbiati^{1,2}

¹ *Vita-Salute San Raffaele, Milano, Italy*

² *IRCCS San Raffaele Scientific Institute, Department of Clinical Neurosciences, Neurology – Sleep Disorders Center, Milan, Italy*

³ *Cardiff University Brain Research Imaging Centre (CUBRIC), School of Psychology, Cardiff University, Cardiff, UK.*

Sleep provides a time window for reactivation and reorganization of the neuronal circuits that are activated during the diurnal emotional experience. Rapid Eye Movement (REM) sleep plays an important role in this emotional processing, specifically on the overnight emotional modulation. However, when REM sleep is disrupted, as with phasic events and frequent awakenings, its role in emotion regulation is hindered. The aim of this project is to assess the role of REM sleep in the emotion regulation process and to evaluate the overnight modulation of emotional reactivity and the impact of Targeted Memory Reactivation (TMR) in the elderly.

The experiment design consists of a single overnight session. Participants perform an arousal rating task before and after sleep, in which participants rate emotionally neutral and negative IAPS pictures, each associated with a semantically associated auditory tone. Sleep is recorded using polysomnography, and half of the sample receive auditory TMR during REM.

19 subjects have been enrolled. 10 participants were included in TMR protocol, blinded to their condition (mean age 62.4 ± 6.91 , 3M). The remaining 9 participants did not receive TMR (mean age 60 ± 6.33 , 4M). Results revealed that overnight habituation decreased with increases in arousals and awakenings during REM ($r = -0.71$; $p < 0.05$). Moreover, REM latency negatively correlated with the overnight habituation ($r = -0.93$; $p < 0.01$). Of note, the positive correlation between REM duration and overnight habituation ($r = 0.67$; $p = 0.07$) and the negative correlation between REM density and overnight habituation ($r = -0.67$; $p = 0.07$) were close to significance. Our results support a main role of REM sleep in emotional processing. Instead, no significant effect of TMR on the overnight modulation of emotional reactivity was observed.

This study shed light on the role of REM sleep in modulating daytime response to emotional stimuli and it may provide an insight regarding the insurgence of daytime mood impairment during aging.