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RESTING STATE FUNCTIONAL CONNECTIVITY MARKERS FOR THE EFFICACY OF COGNITIVE PAIN MODULATION IN AGING

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A growing number of studies suggest that aging is associated with a decrease in efficacy of cognitive pain modulation. Resting state functional connectivity (rsFC) analysis of the brain offers one way of investigating the potential neural mechanisms that may underly this age-related decline. In this study, 32 young (26.7 ± 4.3 years) and 32 healthy older (68.3 ± 7.1 years) adults underwent a 6-minute resting state fMRI scan, as well as a pain distraction paradigm. In the latter, participants received painful heat stimuli while performing either an easy or a difficult working memory task. We performed region-of-interest (ROI) to ROI rsFC analysis of the imaging data, focusing on regions implicated in pain processing and descending pain control. We then examined the relationship between rsFC parameters and the magnitude of the distraction effect (the reduction in perceived pain intensity during the difficult vs the easy task). Older adults showed reduced connectivity compared to young adults between several descending pain modulatory regions, including the ACC and PAG, the right secondary somatosensory cortex (SII) and right dorsolateral prefrontal cortex and between the ACC and left amygdala. Importantly, rsFC in older adults correlated positively with the distraction effect, between several regions including the right SI and right amygdala, the left SI and right insula and between the ACC and left amygdala. Our findings thus demonstrate, for the first time, that reduced cognitive pain modulation in older age is directly associated with decreased rsFC within key nodes of the descending pain control network.

Keywords: *pain, cognitive pain modulation, aging, functional connectivity, resting state fMRI*

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