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### The Impact of High Intensity Interval Training on Neurogenesis and Angiogenesis in the Dentate Gyrus

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Exercise is associated with improved neuronal health and longevity, synaptic plasticity, cerebral blood volume, overall brain volume, and neurogenesis which collectively may have the power to forestall neurodegenerative disease. **PURPOSE:** This study aims to explore the impact of high intensity interval training on individuals with mild cognitive impairment using a range of cognitive, physiological, and biomechanical measures. Specifically, this study seeks to assess the impact of high intensity interval training on neurogenesis and angiogenesis in the dentate gyrus of individuals with mild cognitive impairment versus healthy age-matched controls, as assessed by urinalysis of BDNF levels, performance on the Rey Auditory Verbal Learning Test, and postural sway as measured by observing sway variability using force plates. **METHODS:** The indices of neurogenesis and angiogenesis were assessed using the surrogate measures of maximal oxygen uptake ( $VO_{2max}$ ), cognitive function as assessed by the Rey auditory verbal learning test (RAVLT), urinalysis of brain-derived neurotrophic factor (BDNF), and medio-lateral sway jerk taken just prior to and just after a six-week training protocol. Fourteen adult males were randomized into either high intensity interval training group (HIIT) or a control group and were compared over the course of a six-week supervised training study. **RESULTS:** Significant post-protocol changes were observed among experimental (e) versus control (c) group participants in  $VO_2$  ( $e=3.16$ ,  $c=-1.16$ ;  $p=0.008$ ), cognitive function as assessed by the RAVLT ( $e=2.29$ ,  $c=.14$ ,  $p<.001$ ) and postural control ( $e=-.35$ ,  $c=6.5$ ;  $p<.001$ ). Findings reflect a positive association between increased  $VO_2$  and increased cognitive function ( $r=0.61$ ,  $p=0.02$ ), and negative associations between postural control and cognitive function ( $r=-.785$ ,  $p=.001$ ), and between postural control and  $VO_2$  ( $r=-.58$ ,  $p=.031$ ). **CONCLUSION:** High intensity interval training up-regulates neurogenesis and angiogenesis in the dentate gyrus. Therefore, high intensity interval training protocols, like the one used in this study, could forestall the onset of symptoms of neurodegenerative diseases that target the dentate gyrus.