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Challenging the neuroprotective potential of physical exercise: Insights into plasticity-related mechanisms in the aging brain

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Mild cognitive impairment (MCI) is a prodromal stage of Alzheimer disease (AD). To date, therapeutic approaches to AD are symptomatic and of modest e cacy. Nonetheless, studies in animal and human populations suggested that physical training results in structural and functional brain changes. e current project aims at exploring brain mechanisms mediating the neuroprotective e ect of di erent types of physical exercise among patients with amnestic MCI (aMCI). Speci cally, we performed a comprehensive study to examine the e ect of aerobic and non-aerobic training. Neuropsychological evaluations, assessment of neurotrophic factor (BDNF), cardiorespiratory tness assessment and fMRI have been performed before the physical training and following the intervention. 24 participants su ering of aMCI carried out their activity routines 3 d/wk during 4 months under supervision of an experienced trainer. Inter-SC and GLM methods have been used for data analysis. Following intensive individual training, we found improvement in memory and executive functions in both physical training groups. In the fMRI, we found reliable responses in regions that are related to higher order processing of information: temporo-parietal junction, marginal and supramarginal gyri, frontal areas. Hippocampal activation in memory encoding task increased following aerobic intervention. Increased BDNF was correlated with improved cognition, with no association with the type of exercise. e physical training results in functional and structural changes in a-MCI. Our ndings demonstrated that cognitive performance can be a ected by exercise of both types. e insights gained from the study may have important scienti c value and clinical implications for individuals at the early stages of AD.

Biography

Yulia Lerner has completed her PhD at the Weizmann Institute of Science in 1994. Then she has been trained as a neuroscientist and conducted fruitful research at the New York University and Princeton University. Currently, she is a PI in the Neurocognitive lab at the Functional Brain Center, in the Tel Aviv Sourasky Medical Center. She has performed numerous cutting-edge studies that were published in frst-rate journals.

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