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EFFECTS OF SEQUENTIAL EXPOSURE TO PHYSICAL EXERCISE AND COGNITIVE TRAINING ON HIPPOCAMPAL NEUROGENESIS IN MICE

POSTER SESSION 07 - SECTION: ADULT NEUROGENESIS

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AIMS: Physical exercise and cognitive training hippocampal dependent tasks are known to enhance adult hippocampal neurogenesis (AHN). Here we aimed to evaluate the effect of either a moderate-intensity exercise protocol, a working memory task and the combination of both treatments on mice AHN. METHODS: Adult male C57BL6/J mice (*N*=34) were submitted to a scheduled treadmill exercise protocol for 12 days (EX-groups) or remained at home cage (SED-groups). 24 hours later, animals either were perfused or trained in a spatial learning task in the Water Maze (WM groups) for 8 days while control groups remained at home cage (CAGE groups). Bromodeoxyuridine (BrdU) was injected at the beginning of every experimental procedure to label hippocampal cells that proliferated during the initial exercise sessions. RESULTS: Mice submitted to scheduled exercise showed an increased number of $BrdU^+$ and $PCNA^+$ dentate granule cells (DGCs) in the short but not in the long-term when compared to sedentary groups. Conversely, training in the WM solely reduced the amount of $BrdU^+$ and $PCNA^+$ DGCs compared to CAGE group. However, animals submitted to scheduled exercise and WM training showed increased proliferation/survival of DGCs in the long-term compared to all other groups. CONCLUSIONS: Our data suggests that the combination of moderate-intensity exercise with spatial training has a powerful neurogenic effect in the DG, being a valuable non-pharmacological strategy for the treatment of neurodegenerative diseases associated with impaired AHN. Funding: PSI2017-82604; PRE2018-085673; FPU20/00908; 08-2021-AREA3; B1-2020_06; Posdoc_21_00222; Posdoctoral_a32. I Plan Propio de Investigación, Transferencia y Divulgación Científica de la Universidad de Málaga.