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Voluntary running improves depressive behaviours and the structure of the hippocampus in rats: A possible impact of myokines

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This study investigated the impact of voluntary exercise on depressive behaviours, serum and hippocampal levels of myokines, and histopathological features of hippocampal formation in rats. Depressed rats were allowed to voluntarily run on a wheel for 3 weeks. Locomotor activity was assessed by a force swimming test and the myokine levels in sera and hippocampal homogenates were measured using enzyme-linked Immunosorbent assay. Brain sections were analysed for hippocampal structure and neuronal counts. Voluntary running produced significant increase in the distance moved by rats and significant decrease in immobility duration. After voluntary running, there were significant increases in serum and hippocampal Brain-Derived Neurotrophic Factor (BDNF) and Macrophage Migration Inhibitory Factor (MIF), significant increase in hippocampal Vascular Endothelial Growth Factor (VEGF), and significant decrease in serum Interleukin-6 (IL-6). Significant correlation was detected between the serum levels of BDNF and MIF ($r = 0.276$) as well as IL-6 ($r = 0.340$). In addition, significant correlation was observed between hippocampal BDNF levels and MIF ($r = 0.500$) and VEGF levels ($r = 0.279$). After voluntary running, there was significant decrease in number degenerated neurons in hippocampal areas and significant increase in number of healthy neurons in the upper limb of the dentate gyrus, but not in its lower limb, compared to depression group. This study showed the relation of myokines to the development and/or relief of depression, as well as the correlation between serum and hippocampal myokine levels. Attention should be paid to study the biological effects of myokines on different hippocampal area that could respond differently to treatments.

Biography

Maha K. Desouky has her a great experience in the field of human health and how to deal with cases of depression and mental imbalance and this experience as a result of research and employment in mental health hospitals in the Arab countries and also to study in the universities of the same countries.

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