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Interplay between modelled depression and hypothalamo-pituitary–adrenal axis

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Abstract

It is well known that stress-related activation of the hypothalamo-pituitary-adrenal axis (HPAA) may result in depression, however information on the reverse effect of depression on the HPAA is missing. The objective of the study is to evaluate the effect of modelled depression not associated with stress on the hypothalamo-pituitary-adrenal axis (HPAA). A total of sixteen C57BL/6 mice (weight 20+/-2 g) divided into two groups were included in the study. Reserpine-induced depression was modelled in animals of Group 1 (n=8); while Group 2 mice (n=8) received normal saline. At the end of depression modelling open field, sucrose preference and forced swimming tests were performed. The concentration of corticosterone in blood was measured using ELISA. Morphometric histological changes in the adrenal and pituitary glands were assessed. All results were statistically processed using SPSS 27.0.1 software, with $p<0.05$ level of significant differences. Animals of Group 1 have higher levels of corticosterone in the blood ($p<0.05$) and significant changes in distance travelled, rearing, grooming, urination and defecation ($p<0.05$) compared to Group 2 mice. A significant increase in the volume density of the zona fasciculata ($p<0.05$), area of spongiocytes and their nuclei ($p<0.01$) was discovered in experimental animals compared to the negative control. Modelled depression, not associated with stress, results in activation of the HPAA, as demonstrated by increased serum corticosterone, hyperplasia of the adrenal cortex, hypertrophy of cells of the zona fasciculata and behavioural tests; indicating the cross-talk between modelled depression not associated with stress and the HPAA activation pattern in experimental animals. This observation prompts new solutions in treatment of depression.

Keywords: *Depression; mice and hypothalamo-pituitary-adrenal axis*