

Evaluation of Serine and Branched Chain Amino Acid Levels in Depression and the Beneficial Effects of Exercise in Rats

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Abstract : Objective: Amino acid neurotransmitter system dysfunction plays a major role in the pathophysiology of depression. The objective of the present study was to identify the amino acids as possible metabolite biomarkers for depression using GCMS (Gas Chromatography Mass Spectrometry) before and after exercise regimen in brain samples of depression induced animal models. Methods: Depression-like behaviour was induced by Chronic Unpredictable mild stress (CUMS). Severity of depression was measured by forced swim test (FST) and sucrose consumption test (SCT). Swimming protocol was followed for 4 weeks of exercise treatment. Brain obtained from depressed and exercise treated rats were used for the metabolite analysis by GCMS. Subsequent statistical analysis obtained by ANOVA followed by post hoc test revealed significant metabolic changes. Results: Amino acids such as alanine, glycine, serine, glutamate, homocysteine, proline and branched chain aminoacids (BCAs) Leucine, Isoleucine, Valine were determined in brain samples of control, depressed and exercised groups. Among these amino acids, the levels of D-Serine and branched chain amino acids were found to be decreased in depression induced rats. After four weeks of swimming exercise regimen, there were improvements in the levels of serine and Branched chain amino acids. Conclusion: We suggest that Serine and BCAs may be investigated as potential metabolite markers using GCMS and their beneficial metabolic changes in Exercise.

Keywords : metabolomics, depression, forced swim test, exercise, amino acid metabolites, GCMS, biomarker

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