

POSTER - DNA AND GENOMICS

**MICROBIOME ANALYSIS OF SHORT-CHAIN FATTY ACIDS
SUPPLEMENTATION IN AN EXPERIMENTAL MODEL OF MAJOR
DEPRESSIVE DISORDER**

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Major Depressive Disorder (MDD) is a complex mental health disorder affecting over 280 million individuals worldwide. In recent years, the microbiota-gut-brain axis has emerged as a promising field for understanding the pathophysiology of MDD. Microbial metabolites such as Short-Chain Fatty Acids (SCFA) - acetate, butyrate, and propionate - have gained attention for their potential role in MDD. However, the precise mechanisms by which these metabolites contribute to MDD pathophysiology remain unclear. This study investigates the effects of oral SCFA supplementation in adult male Wistar rats subjected to Chronic Unpredictable Mild Stress (CUMS), a widely recognized experimental model to study depression-like behavior. A subset of control and CUMS-exposed rats received different supplementations: sodium acetate at a concentration of 60 mM, sodium butyrate at 40 mM, sodium propionate at 50 mM, or a mixture of these SCFAs. The gut microbiome was evaluated through 16S rRNA sequencing of fecal samples collected from five animals in each group using the

Ion S5™ System. Alpha diversity was assessed using the Shannon index, and Beta diversity was explored through PCoA based on Bray-Curtis dissimilarity. The LefSe method was employed to detect variations in taxonomic abundance at the genus level. ASV sequences and their abundance were used for predicting metabolic pathways in PICRUSt2. Microbiome analysis revealed notable differences between CUMS-exposed and control groups. Results demonstrated that propionate supplementation significantly alleviated anhedonia in stressed animals, and this ameliorative effect was potentially associated with the modulation of gut bacterial communities, mitigating gut dysbiosis induced by chronic stress. Notably, CUMS-resilient animals exhibited distinct microbial and predicted metabolic profiles resembling those of control animals, indicating resilience-associated gut microbiome patterns. These findings suggest a potential association between gut dysbiosis and stress response, and propionate could be a promising target for future interventions. However, further studies are needed to elucidate the underlying mechanisms of these effects.

Palavras-chave: depression; short-chain fatty acids; microbiome.