

Characterizing a Link between the Gut Microbiome and Attention Deficit Hyperactivity Disorder *by Hassan Akram*

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The role of microbiome is emerging slowly in various fields, including in the field of mental health. Gut microbiome has been related to anxiety, autism, mood disorder and to memory impairments; however its interplay with higher cognition such as Executive Functions (EF) and Emotion Regulation (ER) still remains an open question. ADHD, a highly prevalent mental disorder, is associated with EF and ER dysfunction. Given that microbiome influences the brain through the release of neurotransmitters such as, dopamine, BDNF and serotonin (5-HT) as well as some other molecules like butyrate, this study aims to link microbiome with EF/ER neural circuitry in ADHD and healthy controls. Consequently, the proposed project will involve 30 participants 15 with ADHD and 15 healthy controls. Individual cognitive abilities will be assessed using neurocognitive tasks, such as N-Back task, developed by Stollstorff Lab and behavioral questionnaires. Fecal samples will be collected from each individual using a Gut Kit. Each sample will then be analyzed using 16S MiSeq Illumina sequencing to further look at the differential abundance of various bacteria, their co-occurrence etc. Participant will also be asked to account for their food intake in 24 hours prior to sampling and 24 hours after collecting the sample using the 24 Hour Recall System by NIH. In all, it is hypothesized that the gut microbiome composition will differ between ADHD and the healthy control. The human microbiome is quite malleable and, provided that a link is formed between ADHD and microbiome, a plausible treatment at an earlier developmental stage can be applied using diet, probiotic supplements and exercise.