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The impact of the gut microbiome on host fatigue in ME/CFS patients

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Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) is a debilitating long-term multisystem disorder that centres around fatigue that is inexplicably persistent in its severity and its inability to be relieved by rest. Gut dysbiosis, energy metabolism issues and oxidative stress are focal points of ME/CFS research. We have completed a metabolomic study that has enabled the observation of these issues through the metabolic analysis of blood serum, urine and feces with the quantitation of fecal microbes. We present a workflow for studying associations between gut bacteria and the host metabolism by using correlational analysis within the ME/CFS and healthy control cohorts. Samples were collected from a cohort of 34 females with ME/CFS (34.9 ± 1.8 SE years old) and 25 healthy non-ME/CFS female participants (33.0 ± 1.6 SE years old) and all samples underwent metabolic profiling via 1D 1H NMR spectroscopy experiments. In the healthy control group we observed a strong association between fecal short chain fatty acids (SCFAs) and many metabolites in the blood and urine highlighting the potential impact of diet on host metabolism. In the ME/CFS cohort, blood glucose was elevated while blood lactate, urine pyruvate, and urine alanine were reduced indicating a glycolysis anomaly. The increase of blood aspartate and decrease of blood glutamate suggest an increase in gluconeogenesis. The increase of fecal SCFAs appears to be positively correlated with enhanced gluconeogenesis within the host, which suggests that gut bacteria may play a role in the fatigue phenotype of ME/CFS sufferers.

Biography

Christopher William Armstrong is pursuing his PhD at the University of Melbourne in the Department of Biochemistry and Molecular Biology. His focus has been on the development of metabolomic methods for studying the impact of the gut microbiome on health with a focus on ME/CFS. He has conducted two separate case-control studies and is now beginning a longitudinal study using personalized-omics methods to define ME/CFS as it pertains to the individual. He has 4 first-author publications to date.

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