The Neurocognitive Effects of Exogenous βeta-hydroxybutyrate Administration in Non-clinical and a Clinical mTBI Case Series

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Abstracts will be considered for both poster and platform presentations

Neurotherapeutics

βeta-hydroxybutyrate (BHB) is a ketone body produced by the liver in a process known as ketogensis. During periods of fasting or carbohydrate caloric restriction, ketones are used as an alternative fuel throughout the body, including in the brain. Although glucose is the brain's principal energy source, when limited, ketones derived from fats become the major energy source. Exogenous BHB is safe to administer orally, and enhances energy and physical performance. While growing evidence from basic science indicates significant cognitive improvement in animal models following ketone elevation, and in clinical human samples such as in Alzheimer's disease and severe traumatic brain injury, there is limited literature demonstrating beneficial neurocognitive effects of exogenous administration of ketones in non-clinical and mild traumatic brain injury (mTBI) samples. As a proof of concept pilot, we present twelve non-clinical participants and a clinical mTBI patient who underwent a single exogenous administration of 11.7g of BHB. After ingestion, non-clinical participants performed significantly better in attentional accuracy compared to pre-intervention scores ($p < 0.05$; $d = 0.65$). The clinical subject demonstrated improvements in visuo-motor reaction time, learning acquisition, attention, spatial memory, and a reduction in headache severity. The results of this pilot study suggest exogenous administration of BHB may have positive effects on attention in nonclinical participants, and poses the possibly of global neurocognitive improvement post-mTBI. More research is needed to further explore the potential benefits of exogenous BHB administration in nonclinical participants and clinical mTBI patients. Accordingly, continued subject recruitment is underway.