REFERENCES

THE AGING BRAIN

The brain has a colossal energy requirement for its size zzz- a whopping 25% of the body’s oxygen consumption is used by an organ that is roughly 2% of an adult’s body weight for glucose oxidation [5]. Almost 97% of a healthy adult’s brain fuel requirement is satisfied by glucose, the remainder comes from ketones [5, 6]. However, under certain conditions, ketones can provide up to two-thirds of the brain’s fuel requirement [7]. This is important, as glucose uptake in the brains of the elderly may be some 10-15% lower than the uptake in the non-elderly. This value in Alzheimer’s disease is 20-25% [8-11]. Furthermore, it has been proposed that glucose use and/or uptake by the brain can diminish long before clinical cognitive decline is noted, especially if one has genetic Alzheimer’s predisposition [11]. To compound matters, animal studies performed suggest that aged rats have an increased susceptibility to glucose depletion in the brain and that in many cases cognitive processes are operating under glucose deficit conditions that may contribute to age-related deficits in learning and memory [12-14].

Evaluation of MCTs in Rats [15]

- Feeding MCTs for 3 weeks resulted in an increase in circulating ketones in both young and old animals
- Cognitive function was improved in aged rats fed MCTs both under normal conditions and when challenged by reduced oxygen

The T-maze test, used for general cognitive function, is based on the innate preference of animals to explore an area (an arm) that has not been previously explored (called alternations). The MCT supplementation in aged rats resulted in a higher alternation rate compared with aged control rats. Adapted from data in [15]

THE USE OF CAPTEX MCTs FOR COGNITIVE IMPROVEMENT

The use of a ketone promoting diet has been demonstrated to be helpful in those with epilepsy, and is being researched for its promise in use for Parkinson’s disease, brain tumors, and stroke. Several studies have been performed to describe the efficacy of MCTs for increasing ketones and for supporting cognitive function both in animals and humans.

Evaluation of MCTs in Dogs [16]

- The dogs supplemented with MCT showed significantly better performance in most of the test protocols (landmark discrimination learning ability, egocentric visual spatial function and attention) than the control group
- The more difficult tasks showed greater effects of MCT supplementation compared with easier tasks
- Those dogs supplemented with MCTs showed significantly elevated levels of ketones

Evaluation of MCTs in Humans [17]

- Consumption of MCTs increased circulating ketones
- Higher ketone values were associated with greater improvement in paragraph recall
- MCT treatment improved performance on cognitive testing for subjects without the genetic marker for Alzheimer’s disease

The oral supplementation of MCTs succeeded in raising ketone levels almost 8 times baseline level 90 minutes after consumption in both groups. Patients with Alzheimer’s disease without the genetic marker show cognitive improvements in response to the increase in ketones. These elevations were associated with better cognitive scores (indicated by a negative score), as a measure of mental status change and paragraph recall. Adapted from data in [17]

COGNITIVE VITALITY

Cognition can be defined as the act or process of knowing, perceiving, or knowing. It is a group of processes that includes attention, memory, learning, reasoning, and problem solving, the creation and understanding of language, and decision making. Unfortunately, for many, these precious processes are subject to deterioration with increasing age - a pattern of progressive cognitive decline that becomes noticeable in middle age. Indeed, these symptoms are oftentimes dismissed as “getting old” and can be experienced by those as young as 50 years. Two syndromes – mild cognitive impairment and age related cognitive decline – have emerged to help describe the changes that occur as part of the continuum from normal to dementia. It has been estimated that the rate of mild cognitive impairment can be as high as 20% in those over 65 (3-3) and of that group, many ultimately convert to Alzheimer’s disease. According to the US Census, there were almost 100 million people over the age of 50 in 2010 and over 40 million persons over 65 [4]. This means that there are up to 8 million people with waning cognitive ability.

CAPTEX MEDIUM CHAIN TRIGLYCERIDES

Medium chain triglycerides (MCTs) are fats composed of fatty acids of 8-12 carbons - but mostly caprylic acid (8 carbons) and capric acid (10 carbons), which can be found in small amounts in coconut oil, palm kernel oil, and in milk - especially goat milk. The triglycerides are easily digested into fatty acids that are freely absorbed from the intestine into the portal vein for direct access to the liver. In the liver, MCTs are quickly oxidized into ketones that are able to enter the brain for use as an energy source. Contrast this pathway to those of long chain fatty acids (>12 carbons) which are absorbed from the intestine into the bloodstream and then require transport to the liver for oxidation.

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