

COGNITIVE, BEHAVIORAL AND MITOCHONDRIAL EFFECTS OF MEDIUM CHAIN TRIGLYCERIDES (MCTS) IN A DOG MODEL OF HUMAN AGING AND DEMENTIA

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Decreased cerebral glucose metabolism is seen in both normal aging and Alzheimer's disease (AD) and may contribute to cognitive decline in both conditions. Medium chain triglycerides (MCTs), which are converted to ketone bodies by the liver, can provide an alternate energy source to glucose-deprived neurons, thereby improving several facets of impaired metabolism. The present study determined the efficacy of MCTs in aged dogs, a natural model of human aging and dementia. We examined cognitive and behavioral changes in aged dogs receiving MCT oil and, in a separate group of dogs, changes in mitochondrial function. Dogs receiving 2 g/kg of MCT oil showed improved visuospatial working memory function and long-term memory, which persisted for approximately 1 month after treatment cessation. These animals showed improvements in activity rhythms, exploratory and social behaviors, which are linked to the severity of dementia in dogs. Finally, aged dogs receiving 2 g/kg of MCT oil showed dramatically improved mitochondrial function, as evidenced by increased active respiration rates, compared to age-matched controls. The improved mitochondrial function may be due to decreased oxidative damage, which was limited to the mitochondrial fraction and not observed in the cytosolic or P1 fractions. Combined, these findings suggest that MCTs can (1) attenuate the behavioral and cognitive symptoms of dementia in a dog model of human aging and (2) decrease reactive oxygen species, a contributing factor in the progression of AD.