6 - Neurobiology

PO-092 - (24005) - LONG-TERM KETOGENIC DIET IMPAIRS COGNITION AND REDUCES HIPPOCAMPAL ASTROCYTE COMPLEXITY IN AGING WISTAR RATS

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The authors declare no conflict of interests.

Aging-related neurodegeneration and cognitive decline are closely linked to neuroinflammation, often resulting from immune imbalance. The Ketogenic Diet (KD) has been proposed as a potential neuroprotective intervention through modulation of inflammatory processes. This study evaluates the long-term effects of KD on cognitive aging using behavioral and histological assessments.

Male and female Wistar rats (n=16/sex) aged three months were assigned to a KD or standard diet (SD) group (n=8/group), maintained for 21 months. Behavioral testing—including assessments of memory, anxiety, locomotion, and spatial learning—was performed at 16 and 20 months on diet. Body weight was also monitored. Additionally, immunohistochemistry for GFAP was performed to assess astrocytic morphology in the hippocampus.

Male KD rats exhibited significant weight gain, reduced locomotion in the open field test, and impaired spatial memory in the Morris Water Maze. Females also showed reduced locomotion. Despite sexual dimorphism in metabolic response to KD, reduced activity was observed in both sexes, suggesting effects beyond weight gain. GFAP immunohistochemistry revealed a marked reduction in astrocytic complexity in the hilus of the dentate gyrus in KD rats, indicating potential astrocytic dysfunction contributing to the observed behavioral deficits.

Prolonged exposure to a KD may negatively affect cognitive and behavioral functions, particularly in males, and is associated with reduced astrocyte complexity in the hippocampus. These findings suggest that KD is not suitable as a preventive strategy for cognitive decline and emphasize the need for further investigation into its long-term neurobiological effects.

Palavras-chave : Ketogenic diet, Behavior, Astrocytes