CORRECTING DYSLIPIDEMIA MAY BE A VALUABLE APPROACH TO PREVENT COGNITIVE DECLINE AND ALZHEIMER'S DISEASE

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Introduction: Dyslipidemia, as defined by hypercholesterolemia and hypertriglyceridermia, represents a common risk factor for several age-related pathologies, most particularly, metabolic, cardiovascular and neurodegenerative diseases. It is often responsible for obesity, which has been reported to be associated to cognitive deficits. Indeed, along with extended lifespan, dyslipidemia is increasingly considered to play a pivotal role in Alzheimer's disease.

Aims: To investigate whether treating dyslipidemia could have a protective effect on cognitive decline and amyloid stress.

Methods: One-hundred-and-fifty male C57BL/6J mice aged 6 months at baseline were fed for 6 months with distinct diets regarding caloric intake (high-fat) and supplementation in long-chain n-3 polyunsaturated fatty acids (LC3PUFA). Biological follow-up included evaluation of various blood parameters and cognitive capacities. Next, these mice were submitted to brain injection of either soluble amyloid-β oligomers or saline solution. Their learning and memory performances were studied for 15 days, prior to sacrifice and biochemical analyses focusing on synaptic proteins and fatty acid composition in selected brain structures.

Results: As compared to control diet, high-fat diet led to moderate obesity and dyslipidemia, which was associated with lower cognitive performances and higher susceptibility to amyloid insult. In contrast, supplementation of high-fat diet with LC3PUFA led to delayed dyslipidemia, which was associated with higher learning capacities and better synaptic integrity both under physiological conditions and upon amyloid stress.

Conclusions: These results should encourage normalizing lipid risk factors by nutritional intervention as a promising preventive approach protecting neuronal function and thereby delaying age-related cognitive decline and onset of Alzheimer's disease.