

Mestrado em Biologia Humana e Ambiente. Departamento de Biologia Animal

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## Tailor-made structured lipids for the prevention of Alzheimer's disease

Alzheimer's disease (AD), the leading cause of dementia worldwide, is a neurological multifactorial and multigenetic disease characterized by beta-amyloid plaques deposition, neurofibrillary tangles, synaptic damage, and massive neuronal loss. These AD hallmarks impact severely on gradual and progressive memory impairment, deterioration of cognitive capacities, and inability to carry out daily routine activities in AD patients. As a growing pandemic, AD profound challenges to healthcare systems, families and societies throughout the world. Given that the incidence of AD is expected to triple in the next decades, there is an urgent need for preventive measures and effective therapeutic options. Docosahexaenoic acid (DHA) is the most abundant long-chain polyunsaturated fatty acid from the n-3 family (n-3 LCPUFA) in the brain. Animal trials demonstrate that DHA dietary intake reduces Alzheimer's-like brain pathology. In this pilot study, our ultimate goal is to demonstrate a target enrichment of brain DHA leading to a functional improvement in learning, memory and brain function which are impaired in AD by means of providing a novel developed formulation of structured triacylglycerols (ST-TAG) with DHA esterified at the sn-2 position derived from a sustainable enriched natural source which are the underexploited microalgae. This aspect aligns well with specific sustainable development goals promoted by the United Nations (<https://www.un.org/sustainabledevelopment/sustainable-development-goals/>) for 2030, in particular to ensure healthy lives and promote well-being for all at all ages (goal 3), and to promote the sustainable use (goal 12) of the oceans, seas and marine resources (goal 14).