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Evaluation of the Potential of Marine Cyanobacteria Towards Alzheimer's disease

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Alzheimer's disease (AD) is one of the most prevalent neurodegenerative diseases (NDs) and the major cause of dementia. Despite the constant efforts to achieve cure, no treatment is currently effective and new approaches are urgently needed[1].

Marine biotechnology has been at the frontline for the bioprospection of natural sources to treat ND[2]. Several marine compounds have already provided evidence for anti-AD drugs by acting in mechanisms such as the inhibition of acetylcholinesterase (AChE). Among marine organisms, cyanobacteria have been recognized as a major source of bioactive compounds and the potential towards AD has been highlighted, namely AChE inhibitors[3].

This project is included in a screening program that aims to evaluate the potential of cyanobacteria from the Culture Collection of CIIMAR -LEGE-CC against AD. In this work, 80 fractions of marine cyanobacteria were screened for the potential to inhibit AChE since this is a proven enzyme target to ameliorate the loss of cholinergic signal and to induce cytotoxicity in the neuroblastoma cell line SHY5Y, in the normal fibroblasts cell line 3T3L1, and in the endothelial cells from central nervous system capillaries hCMEC/D3. Results considering the enzymatic assays and cytotoxic assays revealed that the fractions are not toxic or with low toxicity. The strains *Phormidium sp.*; an unidentified filamentous *Synechococcales* and *Nodosilinea nodulosa* revealed moderate toxicity towards AChE.

Keywords: Alzheimer disease; cyanobacteria; cytotoxicity; acetylcholinesterase

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