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Anuraag Muralidharan, J. Venkata Rao, H. Raghu Chandrashekhar

PII: S0024-3205(18)30413-2
DOI: doi:10.1016/j.lfs.2018.07.036
Reference: LFS 15823

To appear in: *Life Sciences*

Received date: 25 June 2018
Accepted date: 18 July 2018

Please cite this article as: Anuraag Muralidharan, J. Venkata Rao, H. Raghu Chandrashekhar , Exploring the potential of marine microbes in clinical management of Alzheimer's disease: A road map for bioprospecting and identifying promising isolates. Lfs (2018), doi:10.1016/j.lfs.2018.07.036

Exploring the Potential of Marine Microbes in Clinical Management of Alzheimer's Disease: A Road Map for Bioprospecting and Identifying Promising Isolates

Anuraag Muralidharan[a], J. Venkata Rao[b*], H. Raghu Chandrashekhar[c]

[a] Research Scholar, Department of Pharmaceutical Biotechnology, Manipal College of Pharmaceutical Sciences, Manipal Academy of Higher Education, Manipal-576104, Udupi, Karnataka, India

[b] Professor, Department of Pharmaceutical Biotechnology, Manipal College of Pharmaceutical Sciences, Manipal Academy of Higher Education, Manipal-576104, Udupi, Karnataka, India

[c] Associate professor, Department of Pharmaceutical Biotechnology, Manipal College of Pharmaceutical Sciences, Manipal Academy of Higher Education, Manipal-576104, Udupi, Karnataka, India

***Corresponding author:**
E-mail address: rao.jsyula@gmail.com (J. Venkata Rao[b])

'Declarations of interest: none'

Word count: 8200, No of Tables; 1, No of diagrams; 3

Keywords

Marine microbes, Bioprospecting, Alzheimer's disease, Amyloid beta plaques, Beta secretase enzyme, Bioactive metabolites

Abstract

Pervasiveness of Alzheimer's disease (AD) across the globe is on rise, devitalizing the essential brain functions of the afflicted individual. Multiple neurological pathways viz., cholinergic, amyloidogenic and tau protein pathways underlying the disease and interdependence make it more complex to develop effective treatment strategies. Existing drug treatments for Alzheimer's disease majorly belong to the class of cholinergic inhibitors which improve the behavioral symptoms. But there are no drugs that could arrest the disease progression. Inhibition of beta secretase enzyme could prevent the deposition of amyloid plaques in the neurons, thereby arresting the disease progression. Search for novel drugs to treat the underlying pathogenesis of the disease is pivotal in this day and age. The source of most active lead molecules discovered recently is from the nature. Marine ecosystem provides a plethora of pharmacologically lead molecules from various living organisms inhabiting the sea. Among all, marine microbes are the most under-explored and indispensable source of many bioactive metabolites. Studies have been reported on potent metabolites from marine microbes which could inhibit the key enzymes involved in the AD pathogenesis. The advancement in microbial bioprospecting and molecular biology techniques have eased the process of cultivation and identification of microbes, isolation of novel bioactive metabolites of clinical use. Exploring such marine natural resources for pharmacological lead