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# BIOACTIVE COMPOUNDS OF SPONGES AS A DRUG FOR THE TREATMENT OF NEURODEGENERATIVE DISEASES

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## Abstract

Neurodegeneration is the gradual deterioration of cognitive abilities such as memory and decision making. It is the key aspect of a large number of diseases that come under the umbrella of “Neurodegenerative Diseases”, most notable being Parkinson’s disease, Huntington’s disease and Alzheimer’s disease. Only an extremely small portion of these diseases are caused by mutation, remainder due to build up of toxic proteins and loss of mitochondrial function leading to creation of neurotoxic molecules. Currently, there are no therapies to cure neurodegeneration, but medications exist to alleviate the symptoms and help improve patients quality of life. A recent study reveals that marine sponges are a huge source of potent compounds that are possible candidates for drug development. They have been described as neuroprotectors due to their ability to up regulate antioxidant enzymes that lead to a decrease in the generation and accumulation of reactive oxidative species. In addition, the modulation of intracellular signal transduction molecules reduces oxidative stress and inflammation and consequently restores the mitochondrial function. A study of the genome of sponges revealed that although they lack a nervous system, sponges have many of the genes that are used in the synapse of modern humans. The proteins made by the sponges gene interacts with one another in ways similar to proteins in human synapse. . *Hyrtioserecta* ,a source of sesterterpene is found to have neurological effects on humans. Culturing of sponges in large scale is a cumbersome process and hence the gene encoding proteins that show similarities with the human synapse can be incorporated into a bacterial host cell via a virus vector. The protein thus produced can be used to treat the neurodegenerative disorders.

**Keywords:** Neurodegenerative diseases; Sponges; Sesterterpene; Synapse