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Marine sponges and their therapeutic applications

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Substances derived from the marine sponges have remarkable chemical diversity that could potentially be very significant in medicine and pharmacology. As the pathogens are turning out to become more resistant to antimicrobials every passing day, marine sponges help generate new propositions against various bacterial, viral, parasitic or fungal diseases. Sponges are rich in compounds with antivirals; several antiviral substances with promising therapeutic leads have been isolated from sponges and other marine sources. Most of the antiviral substances are being used in the treatment of human immunodeficiency virus (HIV). Various types of screening techniques are being used for the identification of anti-HIV activity, and many HIV-inhibiting elements have been discovered as well. Avarol is also one of the compounds that helps inhibit HIV infection at some level. A low volume of avarol can inhibit HIV infection for up to 50 and 80%. Fungal infection is one of the vital causes of the deaths of patients suffering from malignant disease. Various marine sponges possessing a significant antifungal activity inhibit the fungal infection. Jaspamide, a cyclic peptide isolated from Jaspis sp. exhibits antifungal activity in vitro against Candida albicans, whereas in vivo against Candida species. Besides, others show a crucial antifungal activity against fungal infections. Since marine sponges are rich in secondary metabolites, various marine sponges exhibit fascinating tumour therapeutic activities.

A few years back, the Food and Drug Administration gave approval to the therapeutics obtained from marine sponges that exhibited inhibition of metastatic breast cancer. Sarcotragus sp. is a type of sponge species from which fucosyltransferase inhibitors have been isolated. They were found to have the ability to control the inflammation and resist the growth of the tumour. There are numerous types of compounds isolated from sponges with tumour-resisting potency. Some of the substances isolated from marine sponges are used in the production of drugs or therapeutics that help in the treatment of common disorders related to blood such as thrombosis, atherosclerosis or diabetes. In the treatment of thrombosis, a drug Cyclotheonamide A is used, which is isolated from the specific species of sponges named Theonella sp. Eryltus formosus is a species of sponge from which the Eryloside F is isolated, which is known to have a potency for thrombin receptivity. There are numerous other potential applications of the substances derived from marine sponges. Also, in all of these metabolites and bioactive compounds isolated from sponges, each one has a specific efficacy or inhibitory effect of its own such as antibacterial, antiviral, etc. Further studies in marine sponges would lead to the discovery of many more therapeutics or medicinal treatments manifesting their immense importance to mankind.

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