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Advances In Antarctic Research for Anticancer Discovery: A Comprehensive Narrative Review of Marine Animals From Antarctic Environments as Potential Sources Of Anticancer Compounds

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Structured Abstract

Background: In 2020, the World Health Organization (WHO) declared that cancer is one of the most dangerous diseases in the world, causing around 10 million fatalities and nearly one in every six deaths. The government's annual budget is gradually increasing to provide programs to prevent, identify, and treat cancer. In 2040, it is anticipated that there will be up to 29.5 million new cases of cancer. The usage of anticancer pharmaceuticals, sometimes referred to as chemotherapy drugs or antineoplastic treatments, has drastically expanded during the past 20 years following the increase in cancer incidence. Anticancer medications are designed to stop the DNA production and the growth of cancerous cells. They may have various impacts on some species, including cytotoxicity, carcinogenicity, genotoxicity, mutagenicity, and teratogenicity. Microorganisms such as various types of marine animals are essential and must dominate most Antarctic ecosystems. They have distinctive metabolic properties that can be adapted to the prospective use of biotechnology in a variety of disciplines, particularly in the production of anticancer therapy. This study aims to review the potential anticancer sources from Antarctic marine animals and their mechanism of action interaction with cancer.

Methods: New approaches to cancer prevention and management are emerging in the Antarctic because of ongoing research efforts. The continuous investigation and research conducted in this harsh environment have yielded important insights that scientists are currently using to create novel strategies in the fight against cancer. These developments point to a promising path forward for the development of cancer treatments and the application of preventative measures .

Results: There are only a few marine animals in the Antarctic that contain bioactive compounds to produce anticancers. These marine animals include Emerald Rockcods (*Trematomus bernacchii*), Sponges (*Kirkpatrickia varialosa*), Sponges (*Latrunculia apicalis*), Tunicates (*Aplidium falklandicum*), Bryozoans (Bryozoans bugula), Nudibranchs (*Bathydoris hodgsoni*) and Sea Anemones (*Telmatactis sp.*). In summary, the harsh environment of the Antarctic has led to the adaptation of peculiar metabolites, particularly in marine invertebrates, which has the potential to be an anticancer discovery.

Conclusion: In conclusion, the findings of this study indicated that there is considerable potential in extracting natural dyes from diverse plant sources, thereby offering long term environmental advantages. The utilization of leftover plant material; Tamarindus Indica seed in this study for natural dye extraction could potentially be used for dyeing textiles, to substitute synthetic dyes.

Keywords: Emerald rockcods, Sponges, Tunicates, Bryozoans, Nudibranchs

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