

The sea cucumber is a marine invertebrate that lives on the ocean floor and can be spotted around the globe. This marine animal is an echinoderm and is harvested primarily for cuisine, nutrition, and its medicinal properties. It has also been used for many years for its therapeutic potential in Chinese and traditional medicine. Sea cucumber has become a topic of interest as of late as the metabolites and nutrients within the organism have been hypothesized to possess anticancer properties in numerous academic studies. A novel sea cucumber extract has even undergone Phase II trials to date evaluating its use in a patient population with untreated asymptomatic myeloma. It is important to understand the available scientific data related to the biological activities of the compounds found within the sea cucumber and how they may possess therapeutic benefit at the molecular level. Understanding what these bioactive compounds can achieve at the cellular level will help bring together the proposed medicinal benefits at the personal level.

So how can such biologically active compounds found deep within different species of sea cucumber have proposed anticancer properties? Wargasetia and Widodo discuss in *Invest New Drugs* (2017) an extensive list of active compounds, the malignant cell lines these metabolites were tested on in vitro or in animal models, and the resulting cellular effect. Some metabolites possess cytotoxic activity, which result in inhibition of growth and cell division of cancer cells. Other metabolites cause apoptosis of malignant cells, resulting in inhibition of the disease's progression. Apoptosis, in simplified terms, is programmed cell death. This process is important in regards to suppressing a tumor's growth. An important metabolite, Frondoside A, has shown to inhibit tumor growth, metastasis (spread of malignant cells to other sites), and angiogenesis (formation of blood vessels to support tumor growth). They conclude that the bioactive compounds isolated from the sea cucumber have potential anti-cancer activities and “give a promising hope for the treatment and prevention of human cancers.”

Chari et al. discuss in the *British Journal of Haematology* (2016) the findings of a Phase II trial of a novel sea cucumber extract and its effects on untreated asymptomatic myeloma patients. This study was open label (meaning patients were aware of their treatment) with a relatively small sample size of 20 subjects. Treatment was continued until disease progression, with the primary endpoint being progression-free survival (PFS). The median progression-free survival for all subjects was around 33 months. The authors of the study conclude that the tested extract was well tolerated and the results were favorable when compared to the expected outcome of a high risk patient with myeloma. They note that four patients who were defined to have active myeloma according to International Myeloma Working Group (IMWG) criteria remained asymptomatic for approximately 6 years after enrollment in this study.

Sea cucumber extract is the main ingredient of the natural dietary supplement SeaCare. This supplement also includes a small portion of sea urchin and marine grasses. This supplement is formulated as an extract from such bioactive components mentioned above. In comparison, other products may be comprised of dehydrated sea cucumber in a powdered form, which has negligible potency compared to bioactive rich extract formulations. The sea cucumbers harvested for SeaCare are from the natural waters of Vanuata, which is located west of Fiji. The sea cucumber used are of the *Holothuria Nobolis* and *Holothuria Scabra* species. The scientific data above suggests beneficial results in regards to anticancer properties, thus showing that sea cucumber extract has a meaning use both in vivo and in vitro. Other studies have shown that such bioactive compounds also have anti-inflammatory and immunomodulatory benefits (improved immune response). Boosting the immune system is highly beneficial, especially when the body is combating an acute illness or when dealing with a chronic condition. With that being said, such supplement with the suggested benefits mentioned above has the potential to provide benefit by itself or in conjunction with other treatments.

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Chari A, Mazumder A, Lau K, Catamero D, Galitzeck Z, Jagannath S. A phase II trial of TBL-12 sea cucumber extract in patients with untreated asymptomatic myeloma. *Br J Haematol*. 2018;180(2):296-298. doi:10.1111/bjh.14314