

New compounds from starfish of Kuril basin show efficacy against cancer cells.

June 26 2020



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Russian scientists from Far Eastern Federal University (FEFU), G. B. Elyakov Pacific Institute of Bioorganic Chemistry (PIBOC FEB RAS), and A.V. Zhirmunsky National Scientific Center for Marine Biology (NSCMB FEB RAS) have discovered four new steroid substances which target cells of human breast cancer, and colorectal carcinoma. They were extracted from the starfish *Ceramaster patagonicus*, a Kuril basin seabed dweller. A related article appears in *Marine Drugs*.

The discovery was made due to the joint expedition of scientists of FEFU and Far Eastern Branch of Russian Science Academy (FEB RAS) to the Kuril Islands on the "Academic Oparin" research vessel.

Four new [compounds](#) belong to non-typical derivatives of polar steroids with residual tails of fatty acids in the molecular structure. According to scientists, these compounds may be responsible in the body of [starfish](#) for the delivery of nutrients from the [digestive tract](#) to peripheral cells, acting alike bile acids in the human stomach. Previously, only one such compound was isolated from starfish.

In the study, scientists point out a pronounced anticancer effect of the unusual molecules. At the same time, researchers suggest that, due to their steroid nature, one can potentially consider such substances from starfish as blockers of neurodegenerative diseases (Alzheimer's disease, etc.), since they help nerve cells survive distress like, for example, low levels of oxygen and glucose.

"Importantly, the new steroid compounds from starfish curb the reproduction of cancer cells in non-toxic concentrations. That gives hope that new substances will not kill healthy body cells, and makes a promise

for further study and testing," says Timofey Malyarenko, Ph.D., associate professor of the Department of Bioorganic Chemistry and Biotechnology, FEFU School of Natural Sciences, Deputy Director for Science and Senior Researcher at Laboratory of Chemistry of Marine Natural Compounds in PIBOC FEB RAS. "It is interesting that these compounds had been found almost by accident when I was looking for new lipid molecules or fats of marine origin in the starfish extract. During the separation of substances on chromatographic plates (TLC), curious spots were detected. Having studied them, we established the structures of four new derivatives of polar steroids with fatty acids. There are five of them in the world now."

According to the scientist, the next step of the study could be the production of molecules with increased therapeutic properties based on steroid compounds. In addition, it is probable to scrutinize the new compounds to reveal the most active molecules responsible for the drug effect. It would give the opportunity to look for similar compounds in other types of starfishes. Potentially, these future substances will be even more effective.

FEFU University runs a priority project for a comprehensive study of the biological resources of the World Ocean. Among the aims of the project is to pick new biologically active marine [substances](#) and cast them for the roles of drugs of the future.

More information: Timofey V. Malyarenko et al, New Conjugates of Polyhydroxysteroids with Long-Chain Fatty Acids from the Deep-Water Far Eastern Starfish *Ceramaster patagonicus* and Their Anticancer Activity, *Marine Drugs* (2020). [DOI: 10.3390/md18050260](https://doi.org/10.3390/md18050260)

Provided by Far Eastern Federal University

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