

Natural product isolated from sea sponge tested against cancer cells

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Scientists from Far Eastern Federal University (FEFU) together with Russian and German colleagues, continue studying antitumor compounds synthesized based on bioactive molecules isolated from a sea sponge. One of them fights cancer cells resistant to standard chemotherapy, and at the same time has an interesting dual mechanism of action. A related article appears in *Marine Drugs*.

Scientists have tested the biological effect of the marine alkaloid 3,10-dibromofascaplysin on various prostate [cancer cells](#), including those resistant to standard docetaxel-based chemotherapy. The compound was first isolated from the sea sponge *Fascaplysinopsis reticulata* and subsequently chemically synthesized in FEFU. The substance forces [tumor cells](#) to die via a programmed cell death mechanism. This process is called "apoptosis" and is considered the most favorable mode of action of anticancer drugs.

"The examined compound, while killing cancer [cells](#), even ones resistant to standard chemotherapy, simultaneously activates an enzyme (so-called laquokinase") protecting these tumor cells. However, it can't be considered as a "good" or "bad" effect. This is just a mechanism of action, an understanding of which suggests us to apply 3,10-dibromofascaplysin together with inhibitors of these enzymes," says Dr. Sergey Dyshlovoy, from the Laboratory of biologically active substances of FEFU School of Natural Sciences, senior researcher in the laboratory of the pharmacology of National Scientific Centre of Marine Biology in Vladivostok, Russia.

According to the scientist, the synthesized compound in addition to its own activity, works well in combination with several already approved anticancer drugs, enhancing their antitumor effect.

Next, scientists are planning to examine how 3,10-dibromofascaplysin affects non-cancer cells. They already run a related project supported by the Russian Foundation for Basic Research, aiming to report the outcomes during 2021.

"Fascaplysin is rather toxic to non-cancer cells. In our laboratory, we are trying to modify the structure of these [compounds](#) in order to reduce their cytotoxic effect on normal cells, while maintaining the necessary antitumor effect. The goal is to create a substance for targeted therapy,

with a minimum of side effects for healthy cells of the body," says Dr. Maxim Zhidkov, Head of Department of Organic Chemistry, FEFU School of Natural Sciences.

Commented on the time needed for the development of the on-the-shelf drug, scientists speak about the horizon of 10-15 years, given the necessity for long preliminary and further clinical trials.

More information: Sergey A. Dyshlovoy et al, Efficacy and Mechanism of Action of Marine Alkaloid 3,10-Dibromofascaplysin in Drug-Resistant Prostate Cancer Cells, *Marine Drugs* (2020). [DOI: 10.3390/md18120609](https://doi.org/10.3390/md18120609)

Provided by Far Eastern Federal University

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