Original article:
https://aun.webhostusp.sti.usp.br/index.php/2025/12/09/rede-prospecmar-nova-aposta-cientifica-no-combate-ao-cancer/

Rede ProspecMar: new scientific bet in the fight against cancer

A group of Brazilian researchers proposes new studies on marine microorganisms for antitumor drugs

By Regina Lemmi

The ProspecMar Network is a research core that organizes more than 33 faculty members to analyze marine biological resources in order to produce drugs. Coordinated by Letícia Lotufo, from the Institute of Biomedical Sciences (ICB) at USP, the multidisciplinarity of the professionals intends to develop molecules from bacteria that have antitumor character.

In 2025, the team gathers Brazilian researchers from three São Paulo institutions (USP, Unifesp, Unesp) and 10 national collaborating institutions (UFU, UFRJ, UFF, UFSC, UFC, UFPI, UFS, UFDPar, UFRN and IFPA).

To learn more about the various collaborations of the researchers, the **University News Agency** (AUN) interviewed the professor from the Department of Microbiology of the ICB, Gabriel Padilla Maldonado. “The project, in fact, is the continuation of other projects that started already for 20 years, maybe more. The idea is to research the biological diversity of microorganisms on the Brazilian coast,” he says.

Gabriel Padilla works primarily in the analysis of Actinobacteria, one of the main genera of bacteria, to evaluate their metabolites, that is, substances originating from bacterial cellular activities. His research constitutes a new branch of cancer treatment, immunotherapy. Once purified, the studies focus on biological activity and its genome, the DNA.

The antitumor effect

The senior full professor of the Department of Cellular Biology and Development, Gláucia Maria Machado Santelli, contributes to the research line on the biology of tumor cells. For the network, Gláucia will compare the classic chemotherapeutics with new marine compounds developed by other researchers.

To do this, the group reproduces the structure of tumor cells in the laboratory, using a technique called three-dimensional cell cultures. The reproduction of these cells in the laboratory is successful based on the analysis of four parameters: cell death viability, capacity of migration to other body tissues, proliferation and its morphology.

With the use of this technology, Gláucia explains that her research can track the effects on the tumor, created in the laboratory. “We admit a process called chromosomal or genomic instability. In this process, it loses control of cell proliferation. And, with that, it generates cells with an abnormal number of chromosomes,” she says.

The antitumor effect that the substances, derived from bacteria and researched by Padilla, can play multiple consequences on the tumor. Among some other changes generated by the compound, the tumor cell can be inhibited from multiplying, from differentiating and stop interacting with other cells.

Based on the analysis of these human cells, the researcher says that “now *our objectives are to detail each type of alteration that exists in the development of cancer*.” The intention is that, in in-vitro systems of three-dimensional cell cultures, the researchers manage to establish where these new compounds act.

According to Padilla, “cancer is not a single disease. Actually, there are more than 100 different types of cancer described in the medical literature. That is what is called a syndrome, when there are many variations.” He says that treatment is multifaceted, but that with the variety of research on the subject, the treatment can be possible for more people.

Gláucia, in turn, explains that her research *aims to identify effects sufficiently strong of these compounds in 3D tumor cell culture systems that justify evaluation in pre-clinical tests*. For this, the researchers must have very well characterized cellular systems, to identify where these new compounds act.

However, both researchers demonstrate concern with the progress of the research. After all, “of 10,000 molecules used for drug studies, only 5 are directed to the pre-clinical stage and maybe one to the clinics,” Padilla explains.