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IPN Scientists Develop Nanocomposites to Optimize Cancer Treatments

- **Tests aim to ensure that medication targets only diseased cells without harming other organs, as explained by Dr. María Luz Carrera Jota, a researcher at ESIQIE.**
- **The project aims to advance medical strategies, enabling each patient to receive treatments tailored to their individual needs.**

Researchers at the Instituto Politécnico Nacional (IPN) are developing nanocomposites—tiny vehicles made of titanium and silicon dioxide—that enhance drug efficiency by directing active ingredients exclusively to diseased cells.

Dr. María Luz Carrera Jota, who holds a Ph.D. in Natural Sciences and Engineering and a Master's degree in Advanced Technology, explained that this methodology could revolutionize breast and ovarian cancer treatments through less aggressive therapies. Once consolidated, these advances could make it possible for patients to take medication that directly attacks cancer cells without harming other organs, instead of undergoing traditional chemotherapy sessions.

This effort is part of the educational and scientific initiatives promoted by President Claudia Sheinbaum Pardo and Secretary of Public Education Mario Delgado Carrillo.

Dr. Carrera Jota, a researcher at the Escuela Superior de Ingeniería Química e Industrias Extractivas (ESIQIE), leads the project "New Nanovehicles for Drug Encapsulation", supported by a multidisciplinary team of scientists. The goal is to establish the foundation for developing nanomaterial-based therapies that integrate cutting-edge medical strategies and enable personalized treatments for each patient.

"Our goal," she said, "is to make it possible for patients to take an accessible medication that reaches the cancer directly, destroying diseased cells without harming healthy organs or tissues."

The IPN researcher noted that countries such as Spain and China are global leaders in applying nanotechnology to medicine and are currently refining these methodologies to develop innovative alternatives for various diseases. "In China, they have already moved from laboratory testing to animal trials," she added.

Dr. Carrera Jota, a Level I member of the National System of Researchers, reported that her project has shown promising in vitro progress. The nanocomposites were tested on breast cancer cell cultures—the most common type of cancer among women worldwide.

"The goal was to determine whether the nanocomposites were toxic or could safely interact with the cells. The results were highly positive: the cells showed over 80 percent viability, confirming that the nanoparticles are non-toxic and can act as intelligent drug delivery systems capable of transporting and releasing the medication precisely where it is needed," she emphasized.

To validate these findings, photoluminescence studies were conducted using europium ions—chemical elements used in bioimaging applications—which made it possible to trace and monitor the nanocomposites within biological tissues without causing damage.

Dr. Carrera Jota highlighted that the results—whose methodology will be protected through intellectual property registration—open the door to the development of new personalized therapies based on nanomaterials, representing a major scientific and medical breakthrough for Mexico.

For more information, visit www.ipn.mx

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