Promising discovery from Puerto Rico: scientists “hitch a ride” on cancer medicines

[1]

Submitted on 17 December 2025 - 1:11pm

Calificación:

CienciaPR Contribution:

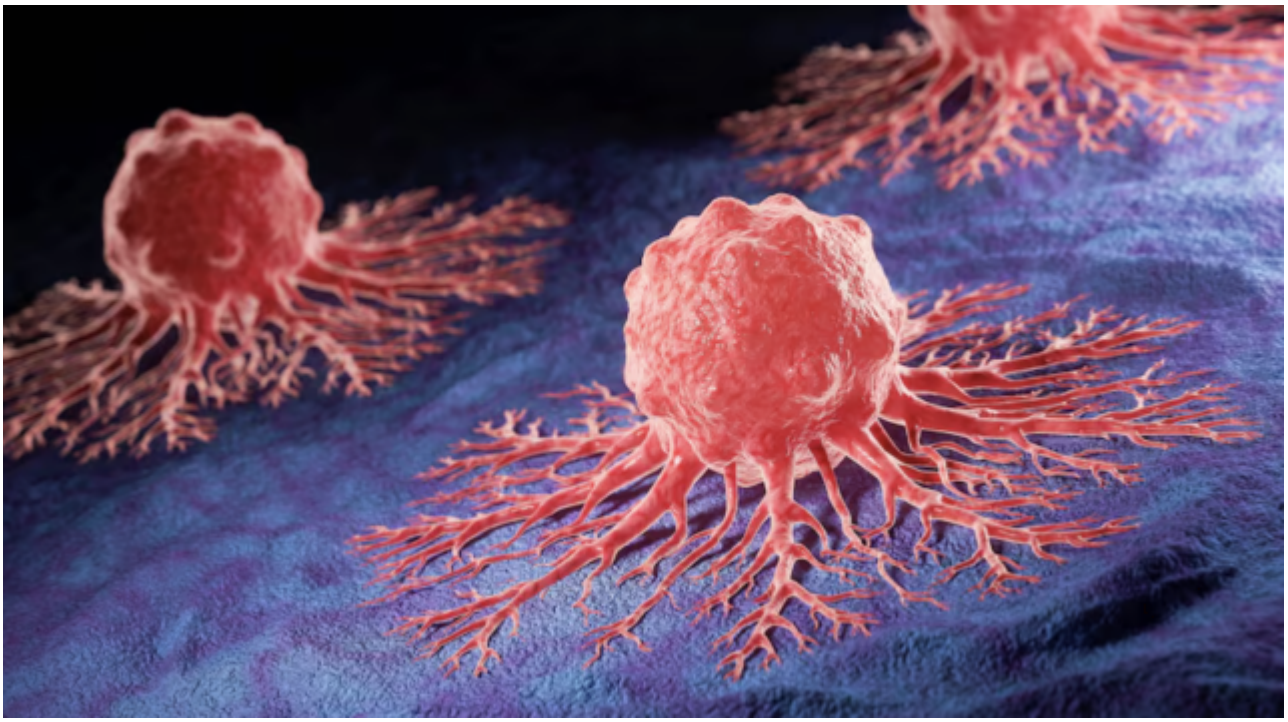
No

Original Source:

El Nuevo Día

By:

Wilson González-Espada



Today, traveling to a place you've never been to is easy, since many mobile phones have access to electronic maps and GPS ("Global Positioning System"). Medicines used to treat different conditions don't have that advantage; it's not possible to give them a little map so they can travel from the mouth to where the body needs them.

In addition, medications must survive corrosive stomach fluids and pass through different tissues and cellular membranes.

Consider, for example, cancer treatments. There is a type of small molecule called siRNA ("small interfering ribonucleic acid") whose role is to prevent a gene from expressing its function, such as producing a protein. In cancer, siRNA can be used to "silence" genes that cause diseased cells to grow; it's like a little message telling them, "stop growing!"

The challenge with siRNA is that, despite its anticancer properties, it is fragile and, once inside the body, can break down before reaching cancer cells. In other words, it doesn't reach its destination—even with GPS. Ensuring that siRNA reaches only the tumor and doesn't get lost elsewhere in the body can be a matter of life or death.

The solution is to load siRNA onto molecules that function like a GPS-equipped taxi, protecting them and delivering them directly to cancer cells without getting lost. Scientists are studying different types of nanoparticles or nanocarriers (thousands of times smaller than a red blood cell) for this purpose.

In Puerto Rico, a group of scientists recently published an article in the journal *Pharmaceuticals*, describing how they evaluated two types of nanoparticles as delivery vehicles: some made of metals—such as gold, selenium, and iron—and others called liposomes (which are like little fat-

wrapped packages), to see which ones best protected siRNA messages on their way to the tumor.

The collaboration included Drs. Betzaida Castillo Cruz and Gabriel Barletta, biochemists at the University of Puerto Rico (UPR) in Humacao; Pablo Vivas-Mejía from the UPR Comprehensive Cancer Center; and Sandra Chinapen Barletta from the San Juan Bautista School of Medicine in Caguas. Undergraduate students Bryan Ortiz Muñoz, Adriana Benítez Reyes, Omar Amalbert Pérez, and Alexander Cardona Amador, from UPR Humacao, were also co-authors of the publication.

The researchers identified that certain molecules called cyclodextrins—especially beta-cyclodextrin and methyl-beta-cyclodextrin treated with gold and selenium—did an excellent job protecting siRNA messages.

“We discovered some taxis that proved to be very efficient at protecting and transporting anticancer medicines inside the body. We’re still testing them in the laboratory; it remains to be seen how they would work in an animal model, such as laboratory mice,” explained Castillo Cruz.

A unique aspect of this collaboration is that it brings together three professional generations. Dr. Barletta was a mentor to Dr. Castillo Cruz, who in turn mentors some of the undergraduate students in the lab.

“By working on a real project, undergraduate students learn to use advanced biomedical technologies; they practice how to design experiments, analyze results, and solve real-world problems. They develop discipline, critical thinking, and teamwork. Publishing in a scientific journal opens doors to graduate school, scholarships, and competitive jobs,” Castillo Cruz noted.

Despite the promising results, there is still a long way to go. The ideal vehicle—one that meets all the necessary requirements to transport these fragments efficiently, precisely, and safely—has yet to be discovered. More research is needed to better understand how these siRNA taxis behave inside the body.

The author is a professor of Physics and Science Education at Morehead State University, Kentucky, and a member of Ciencia Puerto Rico (www.cienciapr.org [2]).

Links
[1] https://www.cienciapr.org/en/external-news/promising-discovery-puerto-rico-scientists-hitch-ride-cancer-medicines?language=es [2] http://www.cienciapr.org