Nanotech could offer better delivery for cancer treatment

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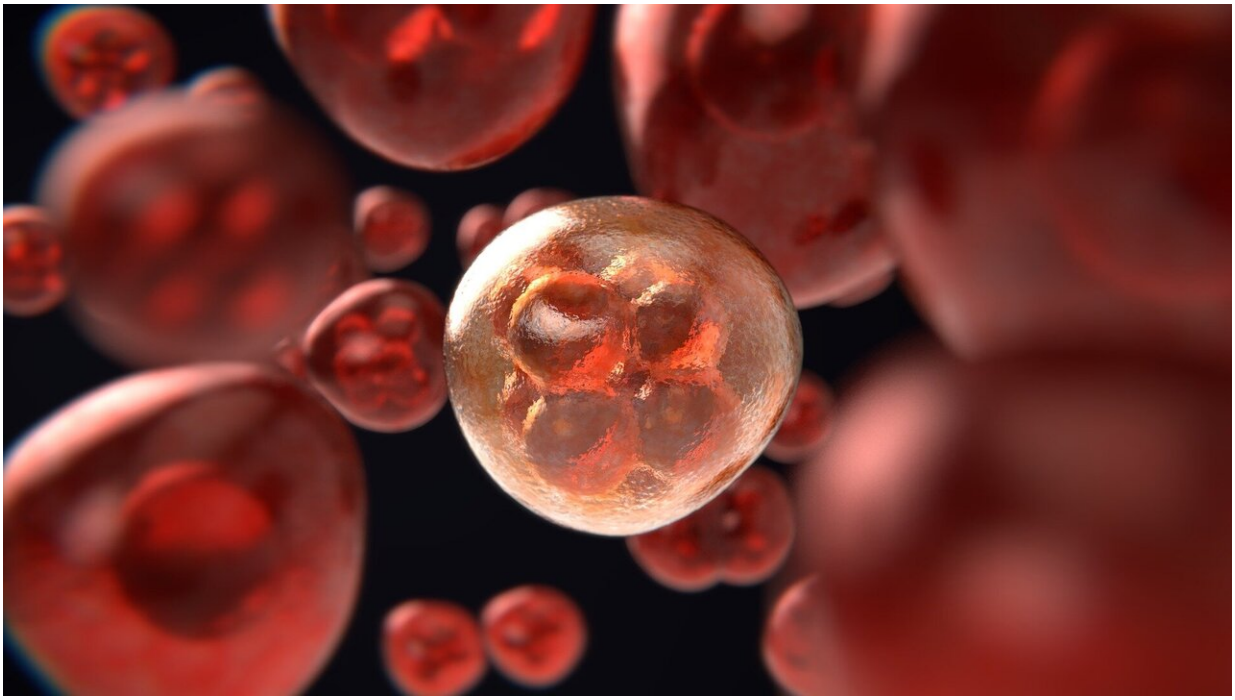

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Nanoparticles initially designed as biological markers are entering their first therapeutic trial as a treatment for patients with advanced, recurrent or refractory cancers.

From the beginning, these "Cornell dots"—silica-encased fluorescent nanoparticles, developed in the lab of Ulrich Wiesner, professor of

engineering—were seen as having great potential as biological markers.

The technology has been refined and improved since its unveiling in 2005. C'Dots have been used to create the world's smallest laser and have shown the diagnostic ability to find tumors; a new version was armed with nano-sized antibody fragments; and in separate studies actually induced, without attaching a drug, a form of cell death in tumors.

Now C'Dots, proven safe and effective in three previous diagnostic human clinical trials, have just begun their first therapeutic trial.

After being further developed by Elucida Oncology, Inc., a New Jersey-based biotechnology company co-founded by Wiesner, the newest iteration of C'Dots is referred to as CDCs—C'Dot drug conjgates—a nanoparticle with dozens of drug molecules attached.

One key to C'Dots is their ability to be efficiently cleared from the body via the kidneys with minimal off-target accumulation.

"We have this [trademarked] 'Target or Clear' paradigm," Wiesner said. "They either target the tumor, or they get out and do not accumulate at off-target sites in your body. Therefore, they are expected to substantially reduce side effects, relative to previous [therapeutic] platforms."

Elucida's technology features a 10-step process in which C'Dots either find their mark or are eliminated. After injection and circulation in the bloodstream, the CDCs find the tumor. CDCs then diffuse through the tumor microenvironment to specifically target tumor cells.

This is key: The better CDCs diffuse through the entirety of the tumor, the better they can target cells throughout the tumor, and not just those

on the surface layer.

"Target or Clear" leads to efficient biodistribution; accumulation in the tumor is maximized, while off-target accumulation (in the liver, for example) is minimized, reducing the potential for negative side effects such as those often suffered by chemotherapy patients.

Despite their ultra-small size, C'Dots can be armed with a payload of up to 80 molecules of synthetic drugs without compromising the desired targeting and pharmacokinetic properties.

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