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Cancer therapies right on target

Targeted delivery of chemotherapeutic agents has the potential to make cancer treatment safer, more tolerable and more effective. But existing drug ferrying strategies don't typically get enough drug into tumor tissues and can lead to adverse effects. Now, a group of scientists from the University of New Mexico in Albuquerque hope to overcome these problems by introducing a new delivery vehicle.

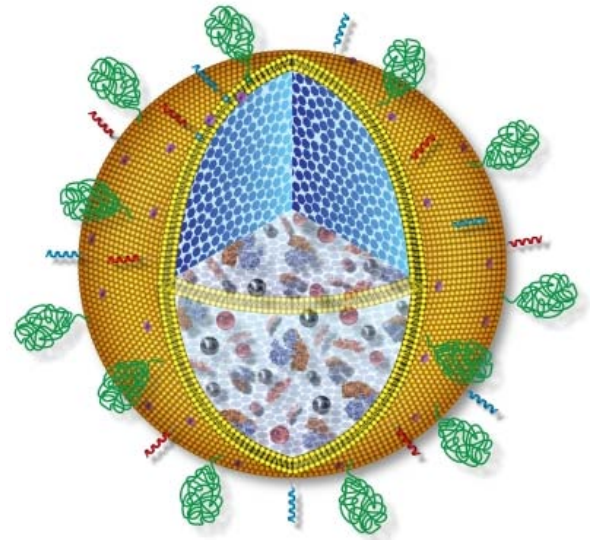
Called a protocell, the new lipid-covered drug-filled carrier is coated with peptides that target the chemical cocktail to the cancerous tissue and stimulate the drug to be expelled into tumors. And unlike conventional lipid-encapsulated drug delivery technologies, which simply hold drugs in fluid-filled cavities, this new carrier has added drug storage capacity thanks to a silica-based core with a greater surface area for attachment.

In a head-to-head comparison of protocells and liposome-based drug delivery approaches, the New Mexico team, led by material scientist [Jeffrey Brinker](#), found that protocells had 1,000 times greater capacity for holding cancer-killing chemicals and delivered 500 times more of the drug doxorubicin to liver cancer cells than the older technology. Reporting online yesterday in [Nature Materials](#), the researchers showed that protocell-delivered doxorubicin killed more than 95% of cancer cells compared to only about 70% with conventional drug carriers.

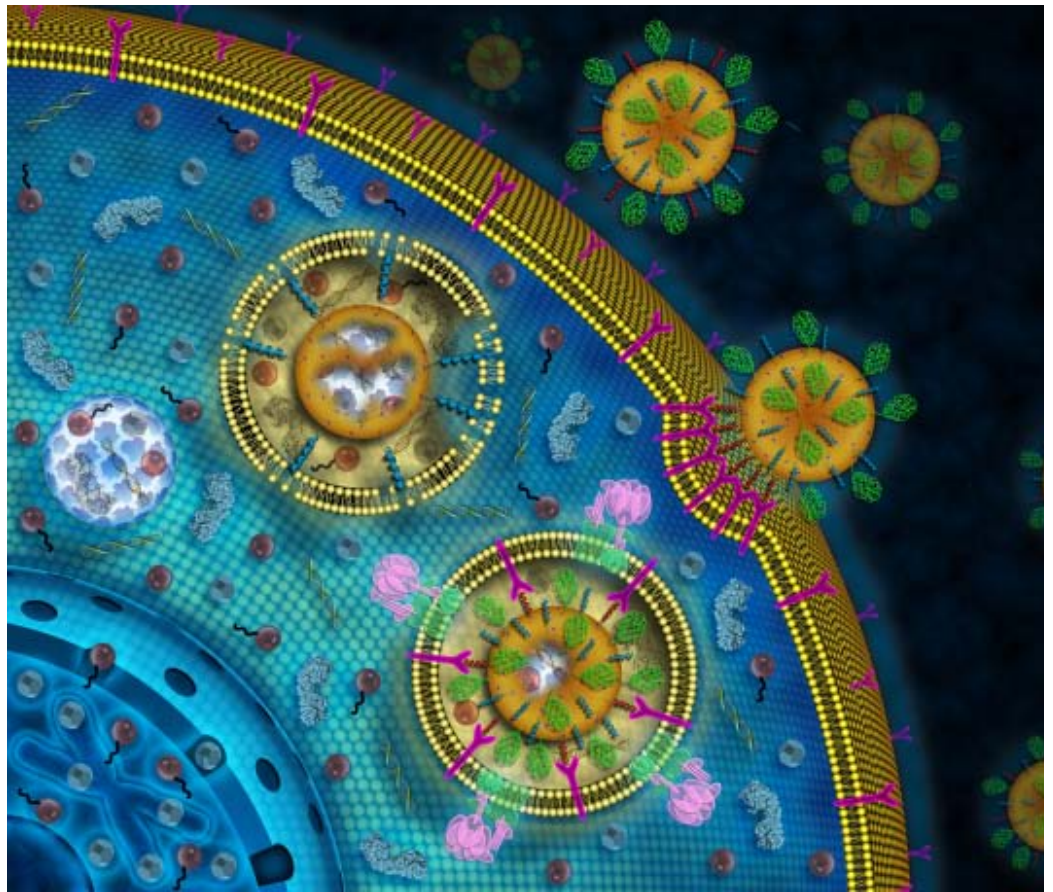
"The nanocarriers are so potent that on average a single particle is sufficient to kill a [liver cancer] cell," [Darrell Irvine](#), a material scientist at the Massachusetts Institute of Technology in Cambridge, wrote in an accompanying [perspective article](#).

The New Mexico team also showed that these new drug carriers are less likely to result in adverse side effects. When applied to normal cultured liver cells, the protocells killed less than 10% of healthy cells compared to nearly 30% percent with liposome-based delivery vehicles.

"We have demonstrated that targeted protocells possess the high specificity, enhanced cargo capacity, and long-term stability necessary to deliver a variety of chemically disparate therapeutic and diagnostic agents to cancer cells with minimal nonspecific binding and toxicity," the authors wrote.



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Images of protocells from Mona Aragon (top) and Carlee Ashley (bottom), University of New Mexico

Posted by Michelle Pflumm on April 18, 2011 01:50 PM | [Permalink](#)

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