



## Boosting medicine with nanotechnology to destroy cancers

April 18 | Posted by berser | News Tags: Biology

In the cover article of the May issue of Nature Materials, available online April 17 , the researchers describe silica nanoparticles about 150 nanometers in diameter as honeycombed with cavities that can store large amounts and varieties of drugs.

"The enormous capacity of the nanoporous core, with its high surface area, combined with the improved targeting of an encapsulating lipid bilayer [called a liposome], permit a single 'protocell' loaded with a drug cocktail to kill a drug-resistant cancer cell," says Sandia researcher and UNM professor Jeff Brinker, the principal investigator. "That's a millionfold increase in efficiency over comparable methods employing liposomes alone — without nanoparticles — as drug carriers."

The nanoparticles and the surrounding cell-like membranes formed from liposomes together become the combination referred to as a protocell: the membrane seals in the deadly cargo and is modified with molecules (peptides) that bind specifically to receptors overexpressed on the cancer cell's surface. (Too many receptors is one signal the cell is cancerous.) The nanoparticles provide stability to the supported membrane and contain and release the therapeutic cargo within the cell.

A current Food and Drug Administration-approved nanoparticle delivery strategy is to use liposomes themselves to contain and deliver the cargo. In a head-to-head comparison of targeted liposomes and protocells with identical membrane and peptide compositions, Brinker and colleagues report that the greater cargo capacity, stability and targeting efficacy of protocells leads to many times greater cytotoxicity [destruction] directed specifically toward human liver cancer cells.

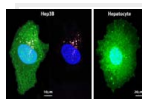
Another advantage to protocells over liposomes alone, says lead author Carlee Ashley, a Harry S. Truman post-doctoral fellow at Sandia's California site in Livermore, is that liposomes used as carriers need specialized loading strategies that make the process more difficult. "We've demonstrated we can just soak nanoparticles to load them with unique drug combinations needed for personalized medicine. They effectively encapsulate toxins as well as siRNA [ribonucleic acid] that silence expressions of proteins.

via: PhysOrg



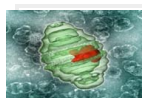
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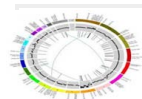
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