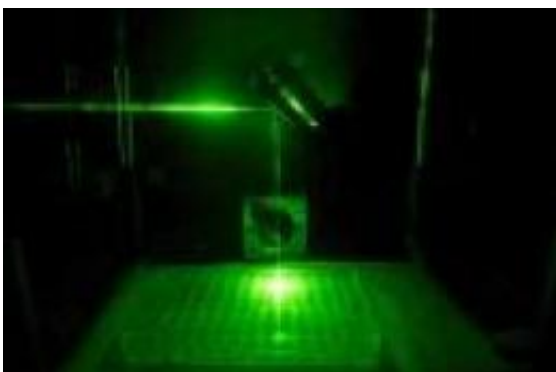


Researchers develop drug delivery system using nanoparticles and lasers

September 10 2009



The near-infrared laser pathway into the cell culture plate, traced by visible laser for photo. Credit: Rod Rolle

Researchers at UC Santa Barbara have developed a new way to deliver drugs into cancer cells by exposing them briefly to a non-harmful laser. Their results are published in a recent article in *ACS Nano*, a journal of the American Chemical Society.

"This entirely novel tool will allow biologists to investigate how genes function by providing them with temporal and spatial control over when a gene is turned on or off," explained Norbert Reich, senior author and a professor in the Department of Chemistry and Biochemistry at UCSB. "In a nutshell, what we describe is the ability to control genes in cells -- and we are working on doing this in animals -- simply by briefly exposing them to a non-harmful [laser](#)."

The scientists used cancer cells from mice, and grew them in culture. They then introduced gold nanoshells, with a peptide-lipid coating, that encapsulated "silencing ribonucleic acid" (siRNA), which was the drug that was taken up by the cells. Next, they exposed the cells to a non-harmful [infrared laser](#).

"A major technical hurdle is how to combine multiple biochemical components into a compact nanoparticle which may be taken up by cells and exist stably until the release is desired," said Gary Braun, first author and a graduate student in UCSB's Department of Chemistry and Biochemistry. "Laser-controlled release is a convenient and powerful tool, allowing precise dosing of particular cells within a group. The use of biologically friendly tissue penetration with near-infrared light is the ideal for extending this capability into larger biological systems such as tissues and animals."

The authors demonstrated, for the first time, the delivery of a potent siRNA cargo inside mammalian cancer cells, released by exposing the internalized [nanoparticles](#) for several seconds to a pulsed near-infrared laser tuned for peak absorption with a specific spatial pattern. The technique can be expanded to deliver numerous drug molecules against diverse biological targets.

Source: University of California - Santa Barbara ([news](#) : [web](#))

Citation: Researchers develop drug delivery system using nanoparticles and lasers (2009, September 10) retrieved 10 April 2024 from <https://phys.org/news/2009-09-drug-delivery-nanoparticles-lasers.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.
