

Photovoltaic medicine: Miniature solar cells might make chemotherapy less toxic

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Micro-scaled photovoltaic devices may one day be used to deliver chemotherapeutic drugs directly to tumors, rendering chemotherapy less toxic to surrounding tissue.

"In the first step, we were able to prove the concept," says Tao Xu, Ph.D., an assistant professor at the University of Texas in El Paso. Xu and his colleagues will present their findings today at the AVS 57th International Symposium & Exhibition, which takes place this week at the Albuquerque Convention Center in New Mexico.

Currently, [chemotherapeutic drugs](#) are piped through an IV drip into the bloodstream, where they travel and come in contact with many organs on the way to their target. Patients are affected systemically, with toxic side effects that are well known. Ideally, clinicians would like to have a way to deliver these powerful drugs only where needed – to target them specifically to tumor tissue. Xu's device is designed to do just that - release drug only when stimulated by light, focusing it directly on a tumor during treatment. Near infrared or laser light is believed to penetrate tissues over 10 cm deep.

The novel device converts light into electric current. In an in vitro model system, positively or negatively charged "model" drugs were used to coat opposite sides of the miniature solar cell. Upon introduction of a light beam, one side of the device became positively charged, repelling the positive charged molecules the investigators had placed there, releasing them; the same thing happened with the negatively charged

side and negative model molecules.

It appears that "our hypothesis will work," says Xu, adding that the amount of drug released can also be controlled by varying the intensity of [light](#). The first phase employed an in vitro model; according to Xu, the next step for the work would be its application in small animal models.

More information: The presentation, "Release of Biomolecules from a Photovoltaic Device for Targeted Drug Delivery" is at 2:40 p.m. on Monday, October 18, 2010. ABSTRACT:

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