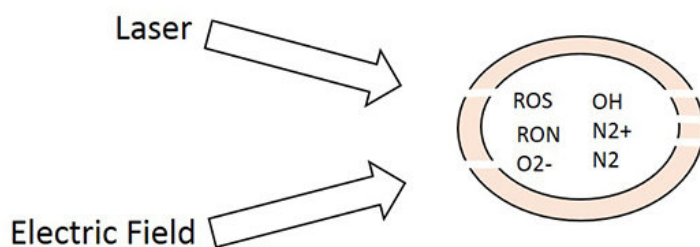


Minimally invasive, cost-effective method shows promise in treating cancer without harming healthy cells

May 23 2018



A Purdue innovation, called PLASMAT, combines three emerging techniques that appear promising in the fight against most types of cancer. Credit: Purdue University

Purdue University researchers have developed a minimally invasive technique that may help doctors better explore and treat cancerous cells, tissues and tumors without affecting nearby healthy cells.

The method, called PLASMAT—Plasma Technologies for a Healthier Tomorrow—combines three emerging techniques that appear promising in the fight against most types of [cancer](#). PLASMAT combines cold atmospheric plasma (CAP) with electroporation and/or photoporation to kill [cancerous cells](#) without harming nearby healthy ones. The method

has proven effective in the laboratory against several types of cancerous [cells](#) and cancer lines, including types of breast cancer, mouth/cervical cancer and prostate cancer.

CAP, a near room temperature ionized gas, is used to introduce active oxygen or nitrogen species into the cancerous cells, tissues or tumors. An electric field or a laser is used to open the membranes of the cells for introduction of the species. This introduction leads to apoptosis, or killing, of [cancer cells](#) once a critical level of reactive species is reached. Nearby healthy cells are either unaffected or minimally affected to a point they are able to easily restore themselves to a normal level.

"Using these three techniques in a combined method has been shown to be 70 to 90 percent more effective in killing cancerous cells than other treatments," said Prasoon Diwakar, a postdoctoral research associate in the Purdue School of Nuclear Engineering, who developed PLASMAT along with Ahmed Hassanein, the Paul L. Wattelet Distinguished Professor of Nuclear Engineering. "We are using the synergy of these three treatments to provide an efficient, non-toxic and cost-effective approach to fight cancer with minimal chemical and toxic effects."

The National Cancer Institute reports that more than 1,600 people die each day in the United States from cancer, along with about 5,000 new cases diagnosed each day. Although current treatments of chemotherapy, radiation and surgery have proven effective, they can also be expensive, weaken the immune system and not work well for all patients.

Diwakar said PLASMAT does not introduce chemicals into the body during [treatment](#) and is significantly less expensive than chemotherapy or radiation. The technique is also more mobile than traditional cancer treatments because the required equipment is small and easily accessible in most medical settings.

"Our method is easy to integrate with existing method technologies," Diwakar said. "PLASMAT can be combined with nanomedicines for further effective cancer treatment."

Provided by Purdue University

Citation: Minimally invasive, cost-effective method shows promise in treating cancer without harming healthy cells (2018, May 23) retrieved 24 April 2024 from <https://medicalxpress.com/news/2018-05-minimally-invasive-cost-effective-method-cancer.html>

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