

Bladder Cancer Treatment with Ultrasound and Nanobubbles

Track Code: 2017-IRUD-67917

Categories:

- Biomedical Engineering
- Medical/Health

Keywords:

- Biomedical Engineering
- Bladder Cancer
- Cancer
- Cancer Therapy
- Chemotherapy
- Hypoxia
- Medical/Health
- Ultrasound Imaging

Bladder cancer is the fourth most common cancer in men and the tenth most common in women. After initial surgical treatment, approximately 70 percent of patients with early stage non-muscle invasive bladder cancer (NMIBC) experience disease recurrence. The inability for oxygen to reach the tissues has been shown to contribute to chemoresistance, radioresistance, alteration of vasculature, chaotic blood flow, and genomic instability. There is a need for bladder cancer treatments with minimal side effects and with little to no tumor recurrence.

Researchers at Purdue University have developed a bladder cancer treatment which uses ultrasound-guided drug delivery. The use of oxygen-encapsulated cellulosic nanobubbles make it possible to reverse the hypoxia, decreasing the likelihood of tumor recurrence. Additionally, the use of an ultrasound beam for directing the oxygenated nanobubbles has shown to increase the efficiency of chemotherapy. This method has shown to decrease the amount of needed chemotherapeutic drug by 50 percent.

Advantages:

- Precise
- Multimodal
- Eliminating hypoxia
- Minimal side effects
- Less tumor recurrence

Potential Applications:

- Cancer treatment
- Oxygen delivery
- Eliminating hypoxia

People:

- Irudayaraj, Joseph (Project leader)
- Bhandari, Pushpak N

Intellectual Property:

Application Date: March 7, 2018

Type: CIP-Patent

Country of Filing: United States

Patent Number: 10,670,581

Issue Date: June 2, 2020

Contact OTC:

Purdue Office of Technology Commercialization
The Convergence Center
101 Foundry Drive, Suite 2500
West Lafayette, IN 47906

Phone: (765) 588-3475

Fax: (765) 463-3486

Email: otcip@prf.org