Researchers develop new drug release mechanism utilizing 3-D superhydrophobic materials

January 27 2012

According to a recent study, there is a new mechanism of drug release using 3D superhydrophobic materials that utilizes air as a removable barrier to control the rate at which drug is released.

The study was electronically published on January 16, 2012 in the Journal of the American Chemical Society.

Boston University (BU) graduate student Stefan Yohe, under the mentorship of Mark Grinstaff , PhD, BU professor of biomedical engineering and chemistry, and Yolonda Colson, MD, PhD, director of the Dana-Farber Cancer Institute/Brigham and Women's Hospital (BWH) Cancer Center, prepared drug-loaded superhydrophobic meshes from biocompatible polymers using an electrospinning fabrication method.

By monitoring drug release in aqueous solution and mesh performance in cytotoxicity assays, the team demonstrated that the rate of drug release correlates with the removal of the air pocket within the material, and that the rate of drug release can be maintained over an extended period.

"The ability to control drug release over a 2-3 month period is of significant clinical interest in thoracic surgery with applications in pain management and in the prevention of tumor recurrence after surgical resection," said Colson. Colson is also a thoracic surgeon at BWH with

an active practice focused on the treatment of lung cancer patients.

This approach along with the design requirements for creating 3D superhydrophobic drug-loaded materials, the authors write, should facilitate further exploration and evaluation of these drug delivery materials in a variety of cancer and non-cancer applications.

Provided by Brigham and Women's Hospital