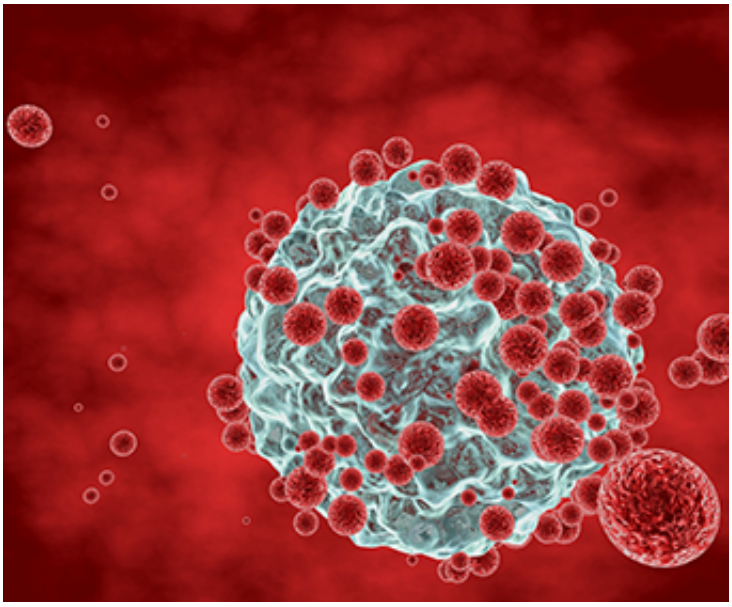
MedicalXpress

Study describes new way to predict tumor growth

April 18 2017, by Joanna Carver



Artist's illustration of cancer attacking a human cell. Credit: University of Texas at San Antonio

A new study by Yusheng Feng, professor of mechanical engineering at The University of Texas at San Antonio (UTSA), describes an algorithm that can predict the growth of cancerous tumors, which could help medical professionals judge the best treatment options for patients.

Feng first began researching cancer in 2002, predicting the outcomes of cancer treatments that utilize laser technology.

"In that project, we were using the heat of a laser to kill the cancer cells of the tumor," he said. "We had to use a computer simulation to show the amount of heat we were going to use and for how long, so we didn't damage any non-cancerous tissue."

In this project, Feng learned just how beneficial computer simulations can be when approaching treatments, especially cancer treatments, which regularly require surgery.

"One of the biggest advantages you can give a doctor and their patient is knowing how fast a tumor is growing," he said. "This helps you to make the decision of not just when to treat someone, how to treat them."

Feng collaborated with colleagues at The University of Texas at Austin and the MD Anderson Cancer Center to create the algorithm described in the study. It takes into account major biological events in the tissue and cells of the patient, as well as the patterns of growth of several different types of cells, among dozens of other factors. As a result, the algorithm is applicable to all types of cancers.

"Prediction is always good," he said. "But treatments also always benefit from patient-specific treatment and precision medicine."

Feng has plans to apply the algorithm to a computer program that can aid medical professionals in judging which treatments, if any, are appropriate for a patient's tumor based on how slowly or quickly it's growing.

"A tumor cell is nothing but a normal cell out of control in the wrong place," he said. "That's why cancer is so hard to treat: it's yourself."

More information: Mohammad Mamunur Rahman et al, A fully coupled space–time multiscale modeling framework for predicting

tumor growth, *Computer Methods in Applied Mechanics and Engineering* (2017). DOI: 10.1016/j.cma.2017.03.021