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Researchers create cellular automation model to study complex tumor-host role in cancer

March 27 2012

Cancer remains a medical mystery – despite all of the research efforts devoted to understanding and controlling it. The most sought-after tumor model is one that would be able to formulate theoretical and computational tools to predict cancer progression and propose individual treatment strategies.

To better understand the role complex tumor-host interactions play in tumor growth, Princeton University researchers developed a cellular automation model for tumor growth in heterogeneous microenvironments. They then used this same model to investigate the effects of pressure on the growth of a solid tumor in a confined heterogeneous environment, such as a brain cancer growing in the cranium, and discovered that pressure accumulated during tumor growth can lead to a wide spectrum of growth dynamics and morphologies for both noninvasive and invasive tumors.

Depending on the magnitude of the pressure and the physical properties of the host environment, the types of tumor patterns that emerge range from strongly malignant tumors characterized by finger-like protrusions at the tumor surface to those in which fingering growth is diminished. These results should have important applications for cancer diagnosis, prognosis, and therapy.

More information: "Diversity of dynamics and morphologies of invasive solid tumors" is published in *AIP Advances.*

Provided by American Institute of Physics