Oklahoma State University

Colloquium

Title

Tumor Grows to Lower Extracellular Matrix Conductivity Regions under Darcy's Law and Steady Morphology

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Abstract: We study a classic Darcy's law model for tumor cell motion with inhomogeneous and isotropic conductivity. The tumor cells are assumed to be a constant density fluid flowing through porous extracellular matrix (ECM). The ECM is assumed to be rigid and motionless with constant porosity. One and two dimensional simulations show that the tumor mass grows from high to low conductivity regions when the tumor morphology is steady. In the one-dimensional case, we proved that when the tumor size is steady, the tumor grows towards lower conductivity regions. We conclude that this phenomenon is produced by the coupling of a special inward flow pattern in the steady tumor and Darcy's law which gives faster flow speed in higher conductivity regions.