Free boundary problems arising in cancer models

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Tumor growth can be modeled by a system of PDEs in a the tumor region which is continuously changing in time. The ”free boundary ” of the tumor is held together by cell-to-cell adhesion, which is assumed to be proportional to the mean curvature. The dependent variables are tumor cells densities and nutrient concentration. In addition one needs to provide a constituent law for the tissue, e.g., assuming it to follow Darcy's law, Stokes equation, etc. In this talk I will describe such models,state existence theorems, show the existence of families of stationary spherical solutions, discuss their stability, and then proceed to describe the existence of non-radially symmetric family of solutions as bifurcation branches of the spherical ones. I will end by stating several open problems

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