Mathematical Challenges Arising in Modeling of Tumor Growth.

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I will present several mathematical models of tumor growth by a system of PDEs in a domain with free boundary. For some of the simplest models, I will consider the existence of stationary solutions with many "fingers", representing a state of metastasis. Such solutions are obtained as bifurcation branches of spherical solutions. Asymptotic stability results will be stated for the spherical solution and for the first bifurcation branch. For more general models I shall state local existence and uniqueness theorems, but more detailed analysis regarding the existence of stationary spherical solutions and bifurcation branches remains to be developed.