Joint Event

APPLIED MATHEMATICS COLLOQUIUM
And
NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS SEMINAR

Multi-scale Models of Solid Tumor Growth and Angiogenesis

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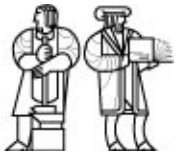
ABSTRACT:
We present and investigate models for solid tumor growth that incorporate features of the tumor microenvironment including tumor-induced angiogenesis. Using analysis and nonlinear numerical simulations, we explore the effects of the interaction between the genetic characteristics of the tumor and the tumor microenvironment on the resulting tumor progression and morphology. We account for variable cell-cell/cell-matrix adhesion in response to micro-environmental conditions (e.g. hypoxia) and to the presence of multiple tumor cell species. We focus on glioblastoma and quantify the interdependence of the tumor mass on the microenvironment and on the cellular phenotypes. The model provides resolution at various tissue physical scales, including the microvasculature, and quantifies functional links of molecular factors to phenotype that for the most part can only be tentatively established through laboratory or clinical observation. This allows observable properties of a tumor (e.g. morphology) to be used to both understand the underlying cellular physiology and to predict subsequent growth or treatment outcome, thereby providing a bridge between observable, morphologic properties of the tumor and its prognosis.

MONDAY APRIL 6TH 2009
4:30 PM
Building 4, Room 237
Refreshments at 4:00 PM in Building 2, Room 349
(Applied Math Common Room)

Applied Math Colloquium: http://www-math.mit.edu/amc/spring09
Math Department: http://www-math.mit.edu



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