Insalate di Matematica

presents

On the incompressible limit for tumor growth models including nutrients and convective effects

Noemi David

Sorbonne Université

14:00 - 07/04/2022
U5 - Room 3014 and
Webex meeting
Università di Milano Bicocca

Abstract

Both compressible and incompressible porous medium models are used in the literature to describe the mechanical properties of living tissues. Relying on Darcy's law, these models describe the tendency of tumor cells to move down pressure gradients, away from highly congested regions. These two different representations can be related using a stiff pressure law. In the incompressible limit, the compressible model generates a free boundary problem of Hele-Shaw type where the cell density is saturated. In this talk, I will discuss the analysis of the incompressible limit of a model including the effect of a nutrient (or possibly an external drift). The main difficulty is to deduce the pressure equation in the limit. To this end, we prove the strong compactness of the pressure gradient, blending two techniques: an extension of the usual Aronson-Bénilan estimate in an L^2-setting, and a sharp L^4-uniform bound of the pressure gradient.

Keywords:

Porous medium equation · incompressible limit · free boundary · Hele-Shaw · tumor growth

"Obvious" is the most dangerous word in mathematics. - Eric Temple Bell

Register here to attend the event in presence