

MODELS OF TUMOR GROWTH AND THERAPY

Benoit Perthame

Laboratoire J.-L. Lions, Université Pierre et Marie Curie (Paris 6), France

benoit.perthame@upmc.fr

Models of tumor growth are now commonly used to predict the evolution of cancers, based on images for instance. These models serve to predict the evolution of the disease in medical treatments, to understand the biological effects that permit tumor growth and decide of the optimal therapy. A more recent subject is to explain emergence of resistance to drug and its implication in therapeutic failures.

These models contain several levels of complexity, both in terms of the biological and mechanical effects, and therefore in their mathematical description. The number of scales, from molecules to the organ and entire body, explains partly the complexity of the problem.

In this talk I shall give a general presentation of the field and focus on two aspects. I shall firstly present a multiscale approach to mechanical models of tumor growth and secondly, models of resistance to therapy and treatment optimization.

The part on Hele-Shaw is a collaboration with F.Quiros and J.-L.Vazquez (Universidad Autonoma Madrid), M.Tang (SJTU) and N.Vauchelet (LJLL). The part on adaptation and resistance is a collaboration with O.Diekmann, P.-E.Jabin, S.Mischler, A.Escargueil, J.Clairambault, T.Lorenzi, A.Lorz, G.Barles, S.Mirrahimi, P.E.Souganidis, V.Calvez.