

From cell to tumour: the case of invasive brain tumours

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We begin with a study of the migratory behaviour of cells stemming from a brain tumour. Based on experimental data we study the interaction of cells, its effect on migration with emphasis on the interaction inhibition. A cellular automaton model allows to describe the situation and quantify the interaction. In order to investigate possible clinical applications of inhibition, we introduce a diffusion-proliferation model that takes into account cell interaction and makes possible the description of solid tumours. We conclude that the effect of inhibition on the increase of patient life expectancy is marginal.

Next we address the question of tumour genesis (in particular for low grade tumours that exhibit a slow evolution). We show that we must take into account the “silent” phase of the tumour and analyse data on patients of the Cancerology service of Ste. Anne hospital. We also present some preliminary results on modelling the radiotherapy effects on patients suffering from low grade gliomas.

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