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Spatial avascular growth of tumor in a homogeneous environment

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Abstract

Describing tumor growth is a key issue in oncology for correctly understanding the underlying mechanisms leading to deleterious cancers. In order to take into account the micro-environment in tumor growth, we used a model describing — at the tissue level — the interactions between host (non malignant), effector immune and tumor cells to simulate the evolution of cancer. The spatial growth is described by a Laplacian operator for the diffusion of tumor cells. We investigated how the evolution of the tumor diameter is related to the dynamics (periodic or chaotic oscillations, stable singular points) underlying the interactions between the different populations of cells in proliferation sites. The sensitivity of this evolution to the key parameter responsible for the immuno-evasion, namely the growth rate of effector immune cells and their inhibition rate by tumor cells, is also investigated.

Keywords: Tumor growth, Cellular interactions, Immuno-evasion, Chaos

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