
Clonal pattern dynamics in tumor: the concept of cancer stem cells

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Résumé

In this talk, I will present a multiphase model for solid tumor initiation and progression focusing on the properties of cancer stem cells (CSC). CSCs are a small and singular cell sub-population having outstanding capacities: high proliferation rate, self-renewal and extreme therapy resistance. Our model takes all these factors into account under a recent perspective: the possibility of phenotype switching of differentiated cancer cells (DC) to the stem cell state, mediated by chemical activators. This plasticity of cancerous cells complicates the complete eradication of CSCs and the tumor suppression. The model in itself requires a sophisticated treatment of population dynamics driven by chemical factors. Three fixed points guide the dynamics, and two of them may lead to an optimistic issue, predicting either a control of the cancerous cell population or a complete eradication. The space environment, critical for the tumor outcome, is introduced via a density formalism. Patterns will be presented and discussed.

Reference: F. Olmeda and M. Ben Amar, "Clonal pattern dynamics in tumor: the concept of cancer stem cells", Nature: Scientific Reports, October 2019.

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