

## **A multiscale model for pH-tactic invasion with time-varying carrying capacities**

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We propose a model for acid-mediated tumor invasion involving two different scales: the microscopic one, for the dynamics of intracellular protons and their exchange with their extracellular counterparts, and the macroscopic scale of interactions between tumor cell and normal cell populations, along with the evolution of extracellular protons. We also account for the tactic behavior of cancer cells, the latter being assumed to bias their motion according to a gradient of extracellular protons. A time dependent carrying capacity for the tumor cells in response to the effects of acidity is considered as well. We prove the global well-posedness of the resulting multiscale model and present numerical simulations in order to illustrate the behavior of the model.