Cellular automaton models for collective cell migration

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Abstract

Collective cell migration drives key processes for example in biological development, tumor invasion and wound healing. Lattice-gas cellular automata have proven successful to model and analyze collective behavior arising from interactions of migrating cells. We introduce cellular automaton models of collective cell migration, particularly cell clustering and invasion and demonstrate how analysis of the models allows for prediction of emerging properties at the individual cell and the cell population level. Finally, we discuss applications of the invasion models to glioma tumours.

Ref.: A. Deutsch, S. Dormann: Cellular Automaton Modeling of Biological Pattern Formation: Characterization, Applications, and Analysis Birkhauser, Boston, 2005 (2nd ed. 2015)