

Title: Computer predictions of cell movement

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Abstract: This work is focused on computer modelling of cells' behavior. Emphasis is laid on dynamics of cell structures creation. Our model is based on so called zygotic graph, which defines production of ligands by the cell in response to its chemical environment. This graph is widened with cell movement definition in direction of the highest concentration of the most seen substance. There are two topics modelled. Differentiation of homogenous tissues and angiogenesis. Part of the work is a simulation program. Experiences with performing of virtual experiments in it gives to the user a suitable frame of understanding of given topic. We show, that the number of isolated differentiated cells could be regulated by one quantitative parameter. Next, it seems, that a two – dimensional layout of a homogenous tissue could be in particular sense more suitable for differentiation, than in one – dimensional case. The work also allows us to see that consumption of environmental chemical substances by cells could have an important influence on correct micro – vessel network buildup.

Keywords: cell, simulation, virtual laboratory, zygotic graph