1. What are the main areas of cell- and rule-based applications?

Cell-based and rule-based modeling approaches are commonly used to study multi-cellular biological systems (MCBS). These models simulate the behavior of individual cells, their functions within MCBS, and their interactions with other cells and the environment. Rule-based approaches are often employed in agent-based modeling (ABM), where each cell acts as an independent agent governed by specific rules. Cell-based approaches can also include grid-based methods like cellular automata. Both modeling techniques are used to investigate processes such as cell division, migration, apoptosis, differentiation, proliferation, and tissue organization. Applications include studying angiogenesis, tumor growth, and epithelial morphogenesis.

1. What is the phenomenon of self-metastases shown in Module 4 and its role in tumor migrations?

Self-metastasis refers to the process of self-seeding, in which cancer stem cells migrate away from the primary tumor, seed independent clusters elsewhere, and reappear at the periphery of the primary site. Cells in the tumor core are mostly quiescent, while those at the periphery are more proliferative, contributing to tumor expansion.

1. What is the meaning of quorum sensing in the tumor?

Quorum sensing within tumors serves as a control mechanism that aids a cell in determining whether to differentiate or proliferate based on feedback received from neighboring cells. The distance at which a cell can gather feedback from its neighbors has been identified as the most critical factor influencing the transition from tissue homeostasis to uncontrolled malignant growth (Agur et al 2010).

4. What are the major features of the cell- and rule-based methods?

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| Focus on cell | Model |

1. What is the novel treatment discussed in Modules 2 & 3?

Inducing differentiation of cancer cell stem cells (CSCs) must be combined with antiproliferative agents to be successful in curing cancer.

1. What are the groups of cells involved in tumor evolution (Module 2 & 3)?

The cancer cells involved in tumor evolution are cancer stem cells (CSCs).