Mathematical Methods and Models in Biosciences
June 18-23, 2023, Pomorie, Bulgaria
https://biomath.math.bas.bg/biomath/index.php/bmcs

Mechanisms of cancer invasion and progression: insights from cellular automaton models

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Tumour invasion and progression may be viewed as collective phenomena emerging from the interplay of biological cells with their environment. Cell-based mathematical models in which cells are regarded as separate discrete entities can be used to decipher the rules of interaction. Here, we focus on the dynamics of glioma and breast cancer.

We introduce lattice-gas cellular automaton models [1, 2] to analyse the role of phenotypic plasticity in cancer invasion, define spatial and non-spatial Moran processes to shed light on the size of the tumour originating niche, and adopt Markov chain models to investigate the origin of genetic heterogeneity in glioblastoma [3, 4, 5].

References

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