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Abstract

In this paper, two types of cellular automata are studied in order to describe the 2-dimensional free growth of an avascular tumor under the effect of a limited nutrient source. On one hand a deterministic cellular automata approach is used. On the other hand a stochastic one is presented. An existing reaction-diffusion model including cell proliferation, motility and death is used. Finally, numerical simulations that show the difference between these approaches are discussed.

References

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- J. A. Adam and N. Bellomo. A survey of models for tumor-immune system dynamics. Birkhauser, 1997.
- T. Alarcon, H. M. Byrne, and P. K. Maini. A cellular automaton model for tumour growth in inhomogeneous environment. J. Theor. Biol. , 225, 257-274, 2003.
- D. G. Mallet and L. G. de Pillis. A cellular automata model of tumor-immune system

interactions

- S. C. Ferreira Junior, M. L. Martins and M. J. Vilela. A reaction-diffusion model for the growth of avascular tumor
- V. A. Kuznetsov. Basic models of tumor-immune system interactions - Identification, analysis and predictions. In J. A. Adam and N. Bellomo (eds), A survey of models for tumor-immune system dynamics. Birkhauser, 1997.
- L. G. de Pillis, W. Gu, A. E. Radunskaya (2005). Mixed Immunotherapy and chemotherapy of tumors: modeling, applications and biological interpretations
- L. G. de Pillis, W. Gu, A. E. Radunskaya (2005). Mixed Immunotherapy and chemotherapy of tumors: modeling, applications and biological interpretations
- H. M. Byrne. Using mathematics to study solid tumor growth. In Proceedings of the 9th General Meetings of European Women in Mathematics, 81-107.
- W. H. Clark, J. Cancer 64, 631 (1991)
- S. EL Yacoubi. A mathematical method for control problems on cellular automata models.
- M. Turhan Coban. Numerical analysis with java examples.
- Helen M. Byrne. Mathematical Biomedicine and modeling avascular tumor growth.
- M. A. J. Chaplain. Avascular Growth, Angiogenesis and vascular growth in solid Tumours: the mathematical modelling of the stages of tumour development.
- J. Folkman and M. Hochberg. Self-regulation of growth in three dimensions.

Index Terms

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Keywords

Cellular automata (CA) avascular tumor immune reaction-diffusion model
stochastic CA

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