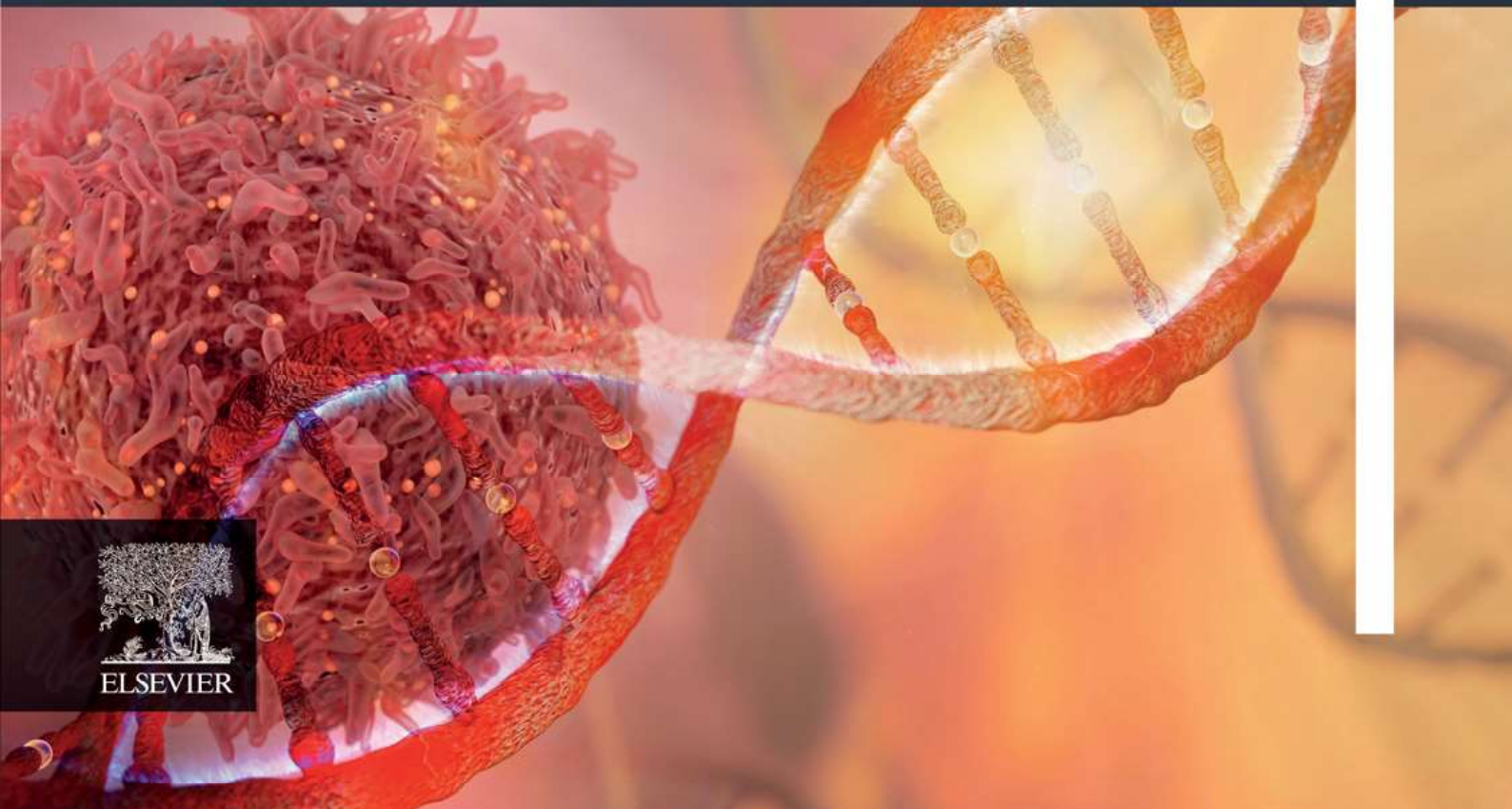


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Biomaterials for 3D Tumor Modeling

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A predictive oncology framework— modeling tumor proliferation using a FEM platform

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Chapter points

- In order to apply the virtualization of tumor proliferation, the available procedures for transforming the region of interest of a given patient in a virtual volume are discussed.
- The set of governing equations, forming the analytical model for tumor proliferation, is then solved by the finite element method, with the calculations carried out by using a commercial platform.
- After a validation study with literature data on a hepatocellular carcinoma, a sensitivity analysis is conducted on 12 computational cases to demonstrate the flexibility of the proposed model.
- The values for hallmark properties and source terms (diffusivities and growth rates, as well as drug efficiency and local therapy delivery/availability) are assessed and form the knowledge basis for preliminary studies on computational tumor proliferation and oncological biomaterials behavior.

18.1 Introduction

18.1.1 A vision of feasible virtualized oncological prognoses

Oncology is the branch of medicine dealing with prevention, diagnosis, treatment, and prognosis of cancer. Cancer deeply involves with the physical, social, psychological, emotional, and financial status of patients and our society as a whole. Cancer treatments may