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CANCER BIOPHYSICS AND MECHANOBIOLOGY *IN SILICO* MULTISCALE MODELLING

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ABSTRACT

To understand and, thus, treat cancer, experts in the field employ sophisticated *in vitro* and *in vivo* modelling approaches. Such systems have permitted investigators elucidate tumor pathophysiology, including genetic and biochemical mechanisms of cancer. Moreover, *in vitro* and *in vivo* models are extensively used for cancer-drug testing purposes. However, despite the progress made, it is becoming evident that targeted, reliable and successful treatment of cancer necessitates an integrative, multiscale, cancer-biology system approach. To address this, *in silico* models have emerged and have proven a very powerful tool to study and understand cancer development, the complexity and heterogeneity of its micro-environment, the transport of anti-cancer drugs and the effects of radiotherapy.

The purpose of this minisymposium is to act as a forum for presenting the *state of the art* mathematical and computational modelling approaches and techniques in the field of cancer biophysics, mechanobiology, and in cancer therapy modelling. Therefore, in this minisymposium, we aim to foster the exchange of knowledge and ideas in cancer research between engineers, physicists, mathematicians, tissue engineers, biologists and clinicians. We solicit contributions addressing challenges related to mathematical and computational modelling in cancer research, with particular emphasis in:

- multiscale modelling methods: from tissue to cell, to protein and molecular levels;
- challenges related to numerical methods for single-scale or/and multiscale cancer models;
- *in silico* simulations integrated with *in vitro* or/and *in vivo* laboratory experiments;
- coupled imaging and numerical modelling techniques;
- drug delivery, *in silico* drug testing, and nanomedicine modelling procedures;
- personalized models in cancer chemotherapy or/and radiotherapy.