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TOWARDS A CA MODEL OF EMT6/RO SPHEROID GROWTH UNDER IRRADIATION

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ABSTRACT

We present recent numerical results from a quasi-2D Cellular Automaton (CA) model describing the dynamics of the *in vitro* cultivated multicellular spheroid obtained from the EMT6/Ro (mammary carcinoma) cell line [1]. In this update, we report on the addition of a synthetic irradiation device and an irradiation-response module to our numerical model [2]. In contrast to several authors, we do not employ the Linear Quadratic model to build our response model, instead, we propose a simple two-parameter algorithmic module which captures the essential biological features of irradiation-induced cell death, repair and associated cell cycle delays. Our approach allows us to estimate directly the underlying irradiation-induced cell survival probability for the numerical model.

After calibrating our extended model under the application of single irradiation doses with the Kelley et al. (1981) data for EMT6/Ro spheroids, we run a number of experiments for different irradiation doses and compare the results with available experimental data. The extended numerical model shows a strong fit to post-irradiation cell count dynamics and the formation of a linear delay in % initial volume versus dose as observed by experimentalists. Comparison of the numerically estimated underlying cell survival probability function with the in vitro survival probability data for EMT6/Ro cell line confirms the expected differences in the measures.

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