

# A numerical simulation of avascular tumour growth

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In this paper, we develop and validate a mathematical model for avascular tumour growth. The model is formulated as a set of partial differential equations describing the spatio-temporal changes in cell concentrations based on reaction-diffusion dynamics and the law of mass conservation. Unlike existing models, the current model takes into account the dependence of the cell proliferation rate on the growth inhibiting factors secreted by necrotic cells, as well as incorporates an element of random variation to the mitotic rate and nutrient supply. The model is solved using standard finite difference techniques. Results obtained from the simulation are compared with published experimental data and these have shown to be in good agreement. The biological and clinical implications of these results are also discussed.