

Modelling Cancer Cell Invasion

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The mathematical modelling of how cancer cells invade normal tissue gives rise to a number of mathematical challenges. Here, I will review work that we have been doing using coupled systems of nonlinear degenerate partial differential equations, building on the original model of Gatenby and Gawlinski (1996) [1]. We extend this model to investigate how different cancer cell phenotypes may co-operate with each other to enable invasion [2]. We carry out a travelling-wave analysis of a simplified version of this model with degenerate, cross-diffusion and propose a conjecture on how the minimal wave speed depends on various parameters [3]. Further work, on a model which includes volume-filling and environmentally dependent phenotypic switching, reveals how the make-up of the wave depends on different assumptions on how the environment affects phenotypic switching [4].

References

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