

The invasion speed of cell migration models with realistic cell cycle time distributions

Abstract:

Cell proliferation is typically incorporated into stochastic mathematical models of cell migration by assuming that cell divisions occur after an exponentially distributed waiting time. Experimental observations, however, show that this assumption is often far from the real cell cycle time distribution (CCTD). In this talk I will investigate the connection between the CCTD and the speed of the collective cell invasion. I will present a series of stochastic and deterministic age-structured models which can be used to explore this connection from an analytical prospective. The results allow us to determine the range of possible invasion speeds in terms of the average cell proliferation time. Finally, I will discuss potential medical applications of these models to melanoma drug treatment optimisation and other extensions.