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Multistep Navigation of Leukocytes

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We present a model for the migratory behaviour of neutrophils responding to multiple chemotactic cues to simulate the evolution of the concentration of neutrophils in an "under agarose" migration assey.

The model consists of a system of stochastic differential equations. The long time behavior of the corresponding deterministic system is analysed and two approaches for the numerical solution of the full stochastic system are compared.

Experimental results were published in 1997 by E.F. Foxman, J.J. Campbell and E.C. Butcher. They investigated multistep navigation by memory effects in overlapping chemotactic fields. Our model incorporates these memory effects and simulations based on it are shown to quantitatively agree with the experimental results.