

A stochastic model for immune response with mutations and evolution

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We propose a simple stochastic model for pathogens in the presence of immune response. In our model, pathogens reproduce but mutations introducing new pathogen types may occur. Mutations lead to pathogen types that have higher fitness than their ancestor types and the immune system only can eliminate a certain pathogen type after it has already managed to eliminate its ancestor types with lower fitnesses. This model reproduces results observed in more complex deterministic and stochastic models. Our model is based on an extension of the birth and assassination process introduced by Aldous and Krebs, which is also interesting by itself.