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Mathematical models of cancer evolution through Moran processes with migration.

In this talk, we investigate mathematical models regarding the evolutionary dynamics of cancer cells. These models are based on the Moran process, which is a simple birth-death stochastic process used in biology to describe constant populations with competing healthy and mutant cell types. We consider models with variations on the basic Moran process. These variations include migration and exchange between many connected regions, which represent different locations and tissues in the body. In the context of multiple related models, we implement analytical methods and stochastic simulations in order to assess the probability of cancerous mutant fixation as well as the mean conditional time until such fixation occurs. These results can improve understanding of cancer-specific evolutionary dynamics and can help predict the progression of cancer through the body. (Received September 19, 2018)