
The Ecology and Evolution of Cancer

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Abstract

Our Session: "Complex diseases: evolutionary models, systems and explanations"
Robert Skipper, Anya Plutynski, Michel Morange, Marta Bertolaso.

My abstract:

There are a variety of ways in which cancer can be understood from an evolutionary perspective: as a kind of "regression" to "cellular autonomy", as a by-product of evolution, or cooption of traits otherwise advantageous to the organism as a whole, or, neoplastic progression may have an "evolutionary dynamics." In other words, cancer can be conceived of both a dysfunctional state, and an adaptive process, on a multi-level approach. As a corollary, the debate over whether medical explanations of dysfunctional states may be mechanistic in character is seen to lose its apparently problematic character. This paper will explore the character of evolutionary explanations of cancer; what purpose do such explanations serve, or how should an evolutionary perspective be interpreted. While an evolutionary perspective may add to our understanding of cancer, cancer may also serve as a case study for addressing a variety of questions of interest in evolutionary theory: about the possibility and character of multilevel selection, the evolution of intercellular signaling, the nature and evolution of evolvability, the role of ecology and niche construction in evolutionary processes, and the explanatory power of selection versus drift. In sum, cancer serves as a test case for exploring the character of evolutionary explanation: and in particular, the problem of explanatory integration of distinct accounts of the same phenomena, at different temporal and spatial scales.

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