Unboxing mutations: Connecting mutation types with evolutionary consequences

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Abstract

A key step in understanding the genetic basis of different evolutionary outcomes (e.g., adaptation) is to determine the roles played by different mutation types. To do this we must simultaneously consider different mutation types in an evolutionary framework. Here we propose a research framework that directly utilizes the most important characteristics of mutations, their population genetic effects, to determine their relative evolutionary significance. We review known population genetic effects of different mutation types and show how these may be connected to different evolutionary outcomes. We provide examples of how to implement this framework and pinpoint areas where more data, theory and synthesis are needed. Linking experimental and theoretical approaches to examine different mutation types simultaneously is a critical step towards understanding their evolutionary significance.

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