

Webinar

Altered mutation spectra open new paths to adaptation

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Biased mutation spectra are pervasive, with widely varying direction and magnitude of mutational biases that influence genome evolution and adaptation. Why are unbiased spectra rare, and how do such diverse biases evolve? We show experimentally that changing the mutation spectrum increases the beneficial mutation supply, because populations can now sample mutational classes that were poorly explored by the ancestor. More broadly, adaptive walk simulations indicate that selection should not oppose the evolution of a mutational bias in an unbiased ancestor; but it generally favours a change in the direction of a long-term bias. Indeed, spectrum changes in the bacterial phylogeny occur frequently, typically involving reversals of ancestral bias. Thus, shifts in mutation spectra evolve under selection, and can directly alter outcomes of adaptive evolution by facilitating access to beneficial mutations.

Wednesday, Dec 16th 2020

2:00 PM