Cologne Evolution Colloquium

CRC 1310 Predictability in Evolution

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Mutating mutators and how they change evolution

Adaptation is driven by beneficial mutations, whose supply determines the pace and dynamics of evolution. Increasing the mutation rate increases the supply of beneficial mutations, giving mutators an evolutionary advantage. However, genetic changes that increase mutation rate typically also change mutation bias, which can in turn influence access to beneficial mutations. Specifically, we recently showed that reversing the ancestral mutation bias in Escherichia coli from transitions (Ts) to transversions (Tv) unlocks access to under-sampled types of mutations, expanding the supply of beneficial mutations. To disentangle the effects of mutation rate and bias, we experimentally evolved E coli mutators in different environments. Both mutation rate and bias facilitated early adaptation, with bias shifts additionally influencing the underlying mutational mechanisms and parallelism. Thus, the evolutionary advantage of mutator strains also derives from mutation bias, which can significantly shape the dynamics and outcome of adaptation.

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Institute for Biological Physics, Zülpicher Str. 77a
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Hosted by Joachim Krug