

The role of stress-induced mutation in the emergence of complex adaptations

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Stress-induced mutation, the phenomenon in which cells increase their mutation rate in response to stress and maladaptation, has been observed in bacteria, yeast and cancer cells. However, it is not yet understood why this phenomenon evolved and how it influences evolution and adaptation. While some suggest that increased mutation rates are simply a by-product of stress, others argue that stress-induced mutation evolved because it increases the ability of populations to adapt to environmental challenges. I will present our theoretical models which show for the first time that stress-induced mutation can evolve due to its effect on evolvability, and discuss some consequences of a regulated mutation rate for the evolution of complex traits and designs.