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Benefits of mutation

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Natural pathogenic bacteria populations can harbour **mutator** alleles (with high mutation rates) that may offer a selection advantage. In the March 30 *Science*, Giraud *et al.* describe a model to investigate the role of mutator alleles in influencing adaptation to complex environments *in vivo* (*Science* 2001, **291**:2606-2608). They examined the colonization of the mouse gut by *Escherichia coli* strains with a high mutation rate due to a defective **MutS** protein. By examining bacteria in fecal samples they could follow total population sizes. Within the first two weeks of mouse infection, the mutator bacteria exhibit an advantage in gut colonization and adaptation. But at later stages the accumulation of deleterious mutations appears to affect bacterial competitiveness in secondary environments and transmission between hosts. Hence, high mutation rates may be beneficial for generating early adaptative mutations, but harmful once adaptation is achieved. These results provide a system to study the rapid evolution of bacterial mutations and provide insights into **mutator alleles** in human tumor cells.

References

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