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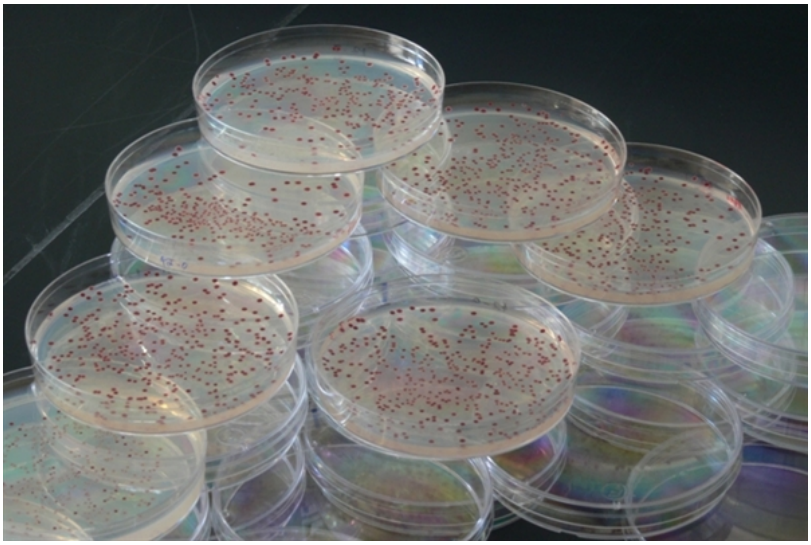
In evolution, slow and steady wins



Brian Baer

Petri dishes containing colonies of two strains of E. coli bacteria that can be tracked by their different colors. By watching the change over time in the relative abundance of the two types, researchers were able to track new beneficial mutations as they arose.

By John Roach

A slow and steady approach to evolution appears to give the winning edge, at least in a petri dish, according to a new study.

The finding stems from the long-term evolution project in Richard Lenski's lab at Michigan State University with the bacteria Escherichia coli. Lenski studies evolution through experiments on these bacteria, which have now grown for more than 50,000 generations.

In this experiment, Lenski and colleagues pitted four genetically distinct sub colonies of the E. coli against each other to find out which one would eventually take over a petri dish.

It turns out that the sub colonies of E. coli that acquired mutations more slowly — and at first appeared less fit — beat out their more rapidly evolving counterparts and eventually won the race

The reason for the plodders' success comes down to what's called a higher evolvability — the potential to continue to adapt to the environment in which they live — than their speedier counterparts, according to the researchers, whose results were published in the March 18 issue of Science.

According to the analyses, after 500 generations, all the lineages had beneficial mutations to a gene called topA, which involves winding DNA into a tight coil to make it easier for turning genes on and off. But these mutations were slightly different in the slow and fast evolving colonies, a difference that would be the eventual downfall of the fast-evolving E. coli.

The sub colonies were allowed to evolve for a further 883 generations, and then the team looked to see which mutations had accumulated. This time they found a mutation in a gene called spoT, conferring an advantage to the slow-evolving bacteria that was absent in the speedsters, Nature News explains.

It turns out that the previous topA mutation in the speedsters rendered the potentially beneficial spoT mutation useless. Since only the plodders had this beneficial mutation, they went on to win.

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John Roach is a contributing writer for msnbc.com. Connect with the Cosmic Log community by hitting the "like" button on the Cosmic Log Facebook page or following msnbc.com's science editor, Alan Boyle, on Twitter (@boyle).

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Aesop was correct!

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