

EVOLUTION IN THE LAB

A study which appeared in Science (1) explores accelerating the evolution in the lab using an advanced system called OrthoRep, which enables continuous mutations of a selected gene, at a rate 1 million times higher than in nature, compressing millions of years of evolution into laboratory experiments.

The system can produce rapid and extensive genetic diversity, allowing the exploration of new biological functions and the study of the evolutionary mechanisms and forces that shape the structure and function of genes.

This paper brings to mind Richard Lenski and his long-term evolution experiment “in the bottle”. The experiment began in 1988 with 12 identical populations of *E. coli*, which were cultured over thousands of generations in a controlled environment and freezing samples every 500 generations (two weeks). With the advent of high-throughput sequencing, Lenski was able to go back and trace the various mutations that had accumulated. A large number of studies have emerged from this experiment. One of the most famous outcomes of the experiment occurred in 2004, when one of the *E. coli* populations unexpectedly developed the ability to metabolize citrate. See the Science comment in 2013 (2)

1. <https://www.science.org/doi/10.1126/science.adm9073>
2. <https://www.science.org/doi/10.1126/science.342.6160.790>