

23. Long term evolution experiment

Since 1988 Prof Richard Lenski at Michigan State University has been growing in flasks 12 identical populations of *Escherichia coli* bacteria. (About a billion *E. coli* normally lives in human large intestine). Each population makes about 7 generations or doublings, each day. The total number of bacteria in one flask are in the hundred millions needed for significant statistical results. At regular intervals genes from these samples were sequenced. Up to 2016 about 65,000 generations were bred which is equivalent to over a million years in the history of large animals like humans.

The results of this experiment were widely publicized and Richard Dawkins called this experiment "The greatest show on Earth". Evolutionists believe that this is the first experimental proof of evolution.

Although the bacteria in each population are thought to have generated hundreds of millions of mutations over the first 20,000 generations, Lenski has estimated that within this time frame, only 10 to 20 beneficial mutations achieved fixation in each population,

The most important results are that all populations of bacteria showed rapid increase in relative fitness during early generations. After 2,000 generations the evolved bacteria were 37 percent greater than ancestors and replicated faster. By 20,000 generations the populations grew approximately 70% faster than the original bacteria. Populations in different flasks show similar increase of fitness.

Evolutionists presented results as a proof of beneficial changes occurring simultaneously in all 12 populations. It shows that improvements are gradual which is another corner stone of evolution. Dawkins writes: "we have seen so far a beautiful demonstration of evolution in action". This is an official story.

Now is the bad news.

Increase in fitness of population of bacteria was caused not by beneficial mutations but by deleterious mutations. As a result of this mutations several genes performing many functions were destroyed. Why this happened?

The tested bacteria lived in a very protective and constant environment. They lived in the same temperature, they were fed the same food – sugar, so they did not need many functions. Mutations destroyed many not used genes. But removing these genes saved the bacteria energy and bacteria could reproduce faster. For example, the evolved bacteria lost the ability to digest sugar called ribose. It was found that all bacteria suffered deletion of ribose gene.

It was identified that about 90 percent of the identified beneficial mutations worked by degrading or outright breaking the respective ancestor genes and this damage was fixed in the population by natural selection.

The simple explanation of this results is that there are many functions in the robust *E. coli* genome that wouldn't be needed in the laboratory environment. Bacteria could lose them without immediate consequence. In long term one inevitable consequence of losing genes is losing flexibility. If their environment shifted back to the more complex, more hostile, the mutated bacteria would no longer be able to survive.

Another bad news came out. Six of twelve bacteria populations developed loss of the DNA repair mechanism resulting in uncontrolled mutations which means their mutation rate was much higher, about 150 times greater than normal. This was due to just single extra nucleotide that had been inserted into gene that normally makes a DNA repair protein. This mutation effectively destroyed 6 populations of bacteria.

To summarize

The experiment showed that mutations very effectively damaged genes, but this damage in short term could be beneficial to bacteria.

This evolutionary mechanism works one way. Mutations can damage genes, but they are not able to repair them back.

The evolution experiment shows that over 65,000 generations no new genes were generated.

Evolution is not only about variability and adaptability. Evolution is mainly about generation of new life forms, new bodies and new functions. Evolution should tell us how this process could happen. This experiment is an equivalent of one million years of human evolution. In one million years human developed incredible brain and many functions as a result of development of many new genes. The experiment shows that billions of mutations did not produce any NEW genes. Yes, these mutations produced many beneficial functions and I do not reject this fact. But still the main question "How does evolution work?" remains unanswered. This is why this experiment showed that mutations on its own are not able to make completely new body parts, therefore we have to look for other explanations.