

# Review of: "The evolution of E. coli is NOT driven by genetic variance but by thermodynamics."

Devapriya Choudhury<sup>1</sup>

<sup>1</sup> Jawaharlal Nehru University

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The authors seem to be adding their own interpretations to the evidence they cite from the work of others. For example, they seem to suggest that according to conventional genetics, the rate of fitness increase should match the rate of accrual of mutations. This is not true. The rate of fitness increase (as measured in a population of individuals) is more likely to match the rate of fixation of new mutations in the population. The rate of fixation may or may not match the rate of accrual of mutations, most likely the two will not match.

I do not agree with their conclusion 1, simply because identical fitness trajectories are not only not improbable, but in fact highly likely to occur, because of the identical selection pressures that have been applied in the Lenski experiment. In the wild, fitness trajectories are wildly different because every population is subjected to wildly varying selection pressures, varying both at different ecological niches and at different times in the same niche. But the Lenski experiment is being carried out under highly controlled conditions which are nearly static over time. Hence, it is no surprise that the fitness trajectories of different replicates are very similar. That the mutation spectrum is very different in the replicate cultures, once again validates the fundamental assumption of classical evolutionary theory that all genetic variations are essentially random and not dependent on the nature and strength of applied selection pressures.

Conclusion 2 drawn by the authors might as well be true, but I fail to see how it invalidates the role of genetic variation.

Conclusion 3 from the authors unfortunately betrays a lack of basic knowledge of Biology. Terms like gametes, zygote etc are only applicable for diploid organisms that exclusively reproduce by sexual means. None of these apply to E. coli. Honestly I am unable to understand what is being meant here. Perhaps the authors would like to clarify this part after removing the glaring errors.

In my view, what is being passed off as "Discussion" is just rambling based largely on incorrect understanding of basic Biology. For example, Mendelian inheritance is applicable to diploid organisms undergoing sexual reproduction by means of haploid gametes. E. coli does not reproduce this way. Finally, no one really suggests that classical Darwinian evolution operates in the case of bacteria like E. coli. It simply cannot be, because of the horizontal transmission of genetic information that takes place among bacteria. But this does not mean that genes hold no importance for the evolution of E. coli and organisms like it.

