

Review of: "Quantum Evolution and Genetic Mutations"

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The article does not clearly state its scientific goal, its subject, or its object. It does not position itself explicitly in the Review/Research Article categorization. Most of the article looks like a review; however, it follows from the abstract and parts of the introduction that it is a research article with the goal to investigate the origin of genetic mutations and their connection to Quantum Mechanics. In my view, the scientific content of the article qualifies for neither a review nor a research article.

Taken as a review, the article lacks completeness and appears to be rather shallow. In what is actually reviewed, the main stated contradiction is the one between preformationism and epigenesis (although it is not called like this), exemplified in the article, however, only by the views of Hippocrates and Aristotle, and of Lamarck, Darwin, Mendel, and de Vries. The history of evolutionary thought in general and the views on heredity of organismic traits in particular is significantly richer than that. Worth mentioning are the views of mutationists other than de Vries (new traits and species arise as simple genetic mutations), systemic mutations of Goldschmidt (hopeful monsters as a result of single, but very specific genetic mutations, the response is systemic), orthogenetic views (evolution by law, possible traits are strongly restricted: the main part of Lamarckism, L. Berg, S. Meyen, Lima-de-Faria), modern evo-devo (possible traits are restricted by the modularity of the developmental system), systemic evolutionary views (phenotypic heredity is created by selection, Schmalhausen, Waddington, epigenetic theory of evolution by M. Shishkin), molecular epigenetics, modern Extended Evolutionary Synthesis (eclectics of all above and niche construction: inheritance via external environment), etc.

Without further arguments, the author chooses the (neo-)preformationist view and reduces trait inheritance exclusively to the nucleotide sequence inheritance, and thus evolution to the origin of mutations, because mutations are seen as the sole creative factor of the process and their effect is immediately translated to the phenotype (due to the genetic preformationist assumption). In fact, the author claims (both in the abstract and on page 5) that the origin of genetic mutations is the main question (of evolutionary biology) in the last century. This is far from the truth. Although the question itself is legitimate and indeed important, the evolutionary theory (in any of its variants) does not depend on the nature of the genetic mutations as long as the dependence of their rate on conditions is defined.

The choice of the term 'Quantum Evolution' is very unfortunate. This term is historically associated with a completely different scenario by the paleontologist G.G. Simpson. Besides, no evolution is considered in the article, but only (a subset of) genetic mutations. Equating genetic mutations with evolution, suggested by the term, is a reduction to the mutationist views on evolution of early geneticists (such as that of de Vries, mentioned in the article).

Then the author continues to the molecular biological basis of the genetic apparatus. This part is at best sketchy, and as such is too long. It belongs more to an elementary introductory textbook rather than to a scientific article.

The only new idea in the whole article seems to be the idea of an automatic (independent of an external agent or environmental conditions) propensity for mutations due to quantum switches in the tautomerization of the nucleotide bases. This idea, however, is not supported by any kind of evidence or computations (nor even by estimates of the order of magnitude for the feasibility of the idea).

All this makes the article inappropriate for publication as a scientific work. A possible constructive suggestion could be 1) a more clear introduction and problem statement and the scope (the origin of genetic mutations, not solving grand problems of evolutionary biology, because those problems are not in genetic mutations), and 2) providing some evidence for the stated hypothesis as well as some, at least basic, estimates for the probabilities of the suggested proton tunneling events (in some rough approximate potentials mimicking the H-bonds); after all, the author is affiliated with a Department of Physics. These two points, however, constitute almost the whole work (that is yet to be done) for the claim of the article to gain scientific weight.