Review of: "[Commentary] Evolution, Through the Lens of a Physicist"

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Potential competing interests: No potential competing interests to declare.

I choose to comment on the article sequentially as written. However, it is best that I first provide some overall comments. The article is well-written, and it reflects a thoughtful analysis that engages the reader and calls for the opposite of the dogmatism too often shown (in my opinion) by biologists writing about biological evolution.

My sequential assessment follows. In the introduction (a somewhat picky comment), evolution addresses more than “across all animal classes.”

The paragraph beginning “The Darwin year...” could be written more clearly regarding the comments about relationship to science and religion.

The author’s statement “In the present study... by focusing mainly on the concept of chance and the wholeness of biological systems” misses his opportunity to clearly address the focus of his paper. The next paragraph is well-written and helpful in directing the readers to what the author intends to discuss. I applaud the sentiment behind “Biology is not just applied chemistry...” The discussion about the “upper layer of physics...” is well written. The quote by De Broglie is skillfully used to draw the reader into the thought process of the author about “metaphysics, chance, and purpose," and the phrase “the whole is more than the sum of its parts” is skillfully and appropriately used.

Section 2 follows naturally and poses a relevant question about chance and purpose. The references are well chosen and introduced artfully. A citation for the statement by Galilei would be helpful. Consider if it would be helpful to expound a bit more about EPR (Fig. 3) and Einstein... and the use of ‘the magical force’. The conclusion “the intent, intentionality, and design are not in the domain of the natural sciences” is well-stated.

Your statement “The biologist lacks, equally to the physicist, a tool to decide whether a given step in evolution is chance or intentional” is expressed well and aptly placed in the text.

Section 3 fits well where it is placed in the text. I like the statements: “ It is a fact that biological tissue engineering, starting exclusively from chemical compounds, is currently not possible.” and also ... “In this view, biology becomes applied chemistry, which can be thought to be applied physics. [With coauthor Hullender, we have written about this in a recent paper in *Progress in Biophysics and Molecular Biology*]

If you are amenable to expanding (rewriting a few paragraphs of the article), I suggest (where you talk about the division of a stone) that you reflect on the recent and ongoing work by Michael Levine (Tufts University) using planaria, which have

remarkable regenerative powers.

Your return to the concept “The reductionist hypothesis does not by any means imply a constructionist one” and then appropriately state “without ruling out that the whole is subject to new laws that appear only at the higher level”. This idea of ‘emergence’ is a concept that David Hullender and I have shared recently in the Journal *Progress in Biophysics and Molecular Biology*.

The transition to part 4, is well-stated; however, the article ends somewhat abruptly and unexpectedly --- as if there is another ‘shoe to drop’. I also suggest that Fig.1 would benefit from more explanation and a conclusion which you apply to the article as a whole.

I enjoyed reading the article and learned from it while sharing similar thoughts which I have expressed in recent publications, as previously stated, that includes the ineffectiveness of biological selection (macroevolution) based on survival of the fittest using biology, philosophy, and mathematics (probability calculations).