

Editorial

A Conversation on Definition of Life

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In his letter of submission of the Definition of Life paper (1), Edward Trifonov indicated

“The subject is very much debatable, the analysis may appear to some controversial, and the claim – outrageous. That also means, that the paper could be suggested for open discussion. I am ready to confront any challenges.”

Well, I thought, let me see what the referees have to say. One referee in part said:

“I happen to disagree with Edward Trifonov, and yet I strongly recommend the publication of his paper. The reason is that the definition of life is an extremely important issue but also one where there is virtually no objective approach. Trifonov’s paper is probably the first of this kind, and it is for that reason that it should be circulated. When it is published, it shall be possible to discuss it and eventually propose something better, but there must be a starting point.”

Interesting, this referee disagrees with the author, but wants me to publish the paper to start a Conversation among his peers. Wow! What a magnanimous gesture! And a second referee in part said:

“And indeed, the resulting definition thus laboriously “refined” from all the previous ones strikes the reader as very concise and straightforward. I must confess that my first reaction to this move by the author was “how come nobody thought about it so far?”

All in all, this paper combines a brilliant and rigorous analysis with a profound scientific and philosophical result. It certainly deserves being published “as is” in any leading scientific journal.”

Then we heard from referees about the absence of reproducibility, controls, and the utter lack of the consideration of central elements in life such as “beauty”, “truth” and “love”, a definition of life devoid of life and soul, manufactured from linguistics.

I thought that the effort by Trifonov was an interesting intellectual adventure that warranted open comments and discussion by scientists and philosophers researching in life, its origins (2-6) and evolution (7-11). So I extended them an invitation and most of them agreed to provide the comments. Prof. Pier Luigi Luisi did not write a formal response to Trifonov’s paper, but wrote me the letter reproduced verbatim below:

“Dear Rama

I have been thinking about it, and definitely decided not to invest my time to write an article, as it would be to give relevance to what I consider a poor piece

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of science-and I do not want to do that. I would like however to briefly explain to you the reasons for my negative stand.

What Trifonov does, is to make a kind of average of all possible life definitions of life, giving to everyone the same statistical weight. A democratic decision. But science does not work this way. It comes to my mind the statistic that some politicians do: given a group of scientists who says: two and two makes four; and another group who say: two and two make six—the politicians say, well, let us not argue, let's make so that two and two makes five...

This kind of statistics is simply wrong, non-sense things should first be eliminated. Of course this necessitates an arbitrary act of courage-this is the responsibility of the scientist.

And then the basic result of our Author, that life is reproduction and variation-which means, change, evolution... my God, we have been debating for so many years that this is not simply so. The old grand mother of our author is not capable of reproduction, but is (I hope) still living, and so are all women of this planet over 60 years. Not able to reproduce...and then not living? And to decide whether an oak tree is living, you wait a few hundred years until it reproduces? Reproduction is important, but it is a consequence of life, it can be there or not, it depends...this is so obvious, and common sense is much more important than statistics.

And the confusion with variation-changes, evolution: a colony of bacteria which is not reproducing in a measurable time scale-is not living? and again, to decide whether something is living you wait until you measure changes? which kind of?

As I told you, Rama, these issues were already debated in my old paper (1998) on the definition of life and in my book on the emergence of life-long ago. Trifonov does not mention all this, and he is right, in the sense that I am now completely on another place; let me only add that, when I read a paper, I always ask myself whether this is something I would suggest to my students. In this case, my answer is definitely negative, as they would not learn anything-they would probably get more confused.

Dear Rama, although my decision is definitive, if you want/need to use some of the material in this letter, you can do it, thanks for the trust.

Luigi

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In my letter of invitation, I made it explicitly clear that their comments would not be subject to the normal peer review so that they could express their personal points, views, and evaluation of Trifonov's paper without interference from the referees. This is perfectly fine because the comments themselves are not research articles which require mandatory peer evaluations, but just pure comments, and referees inserting moderation and balance into the comments is not right. These comments are brief items with a short list of references, and do not contain original research data. They are essentially open referee reports. The comments are published without dates received and without the name of the Communicating Editor because they are not regular research articles. Finally this *Journal* is publishing the section consisting of this editorial, the 19 comments and the author response as *Open Access*. This is because this *Journal* strongly believes that doctoral students in biochemistry and molecular biology will benefit a great deal from a study of these comments; and *Open Access* publication enables this.

I have received comments from 19 laboratories across the globe. I thank all of them for reading Trifonov's paper and expressing their opinion. I am particularly grateful to Nobel Laureate Jack Szostak for visiting Albany, delivering the Keynote address at the 17th Conversation, and chairing the session on origin of life there and for participating in this Conversation.

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