

# Review of: "Kirchhoff Coupling Generates ATP, the Chemical Energy of Life"

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**Potential competing interests:** No potential competing interests to declare.

The current manuscript investigates how electrons flow can generate energy that is converted by mitochondria in a form of usable chemical energy by the oxidative phosphorylation process. The Manuscript is very informative and interesting but needs some revisions to improve the quality.

Here are some suggestions and comments that will be helpful:

1) The abstract of this paper is just a statement. There is no idea how the author going to investigate the problem. There is not a clear result. The abstract must clearly show the method used for the investigation and includes one or two most important results of the entire paper. Moreover the abstract must not tell a reader to go check another paper to get an idea before coming back to the current paper. That's why some results must be included here. The abstract is about the current manuscript, not the Refs the author refers to.

2) The first sentence of the Background is not well written, "these" used in "these protein devices" must be taken off in the sentence. What protein device the author is talking about? This sentence needs to be improved, the author wrote this sentence as he already mentioned to the lecturer but it is not the case.

The sentence makes more sense if it is written as follows: Atomic details control function/functioning in protein devices. The first sentence and the second one can be written as one, which will make the reading more digest: Atomic details control functioning/function in protein devices and, must be included if models of proteins are to be useful in immensely important medical applications.

3) In The second paragraph of the background, the author compares the speed of biological systems to biology. what does he means? I suggest the author review what he wants to compare. Is there any difference between biology and biological systems?

4) The background of this manuscript starts with a good statement but it is not given enough information about Kirchhoff's law (Fig 1) and oxidative phosphorylation (Fig 2), there is no flow in the manuscript from the background to the results. The last sentence in the background doesn't give the reader an idea about what he will read in the next session, it is a little bit disconnected. The author must include some statement about Kirchhoff's law and oxidative process (relation

between current and oxidative process in mitochondria) before moving to results, which will make the manuscript flow well.

5) The title of this manuscript includes ATP, but I noticed that ATP is mentioned at the end of the results session. Nowhere in the background. The author must make a brief overview of how the Kirchhoff law can be linked to ATP.

6) The Maxwell Ampere formula doesn't include any explanation of each symbol used. The author should give details about each element used in the formula. And most important, connect this formula to how the ATP is generated.

7) The discussion session of this manuscript is not one. It is just a statement as the manuscript itself. The author should discuss and show the reader how the Kirchhoff law is connected to ATP production. Also, at the end of the manuscript there are a bunch of figures that the author doesn't comment on for the reader, why are they included in the manuscript if there is no comment and discussion on them?

All the figures have to be commented on and explain in such a way the reader could get a general idea without checking the references the first time.

8) I suggest the author comment on Fig 1 in the results session (as he got permission to use the figure), then connect the figure to the equation he wrote. That will make more sense to a reader.

9) Fig 2 doesn't have a connection with the rest of the paper. How does the different oxygen concentration come in? The author must make the connection between all the information he is bringing. Why do these figures important for the idea the author is investigating? The author must state and comment that clearly because those figures are related to the law and equation he wrote.

10) The author must refer to other previously published articles to support the statements he has made throughout this manuscript.