Review of: "Forecasting of the influence of physical fields on the metabolic nanocurrent in proteins"

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In the paper, authors present " Forecasting of the influence of physical fields on the metabolic nanocurrent in proteins

Abstract :

It is known that in order to complete the process of ATP synthesis in mitochondria, it is necessary to transfer in it electrons from places where electrons arise as a result of oxidative processes. Therefore, the study of the mechanisms of such a transfer is important, in particular, from the point of view of the regulatory effect on it for therapeutic purposes. The question of the possibility of considering the primary structure of proteins as an active nanowire of a semiconductor nature is analyzed. It has been shown that a non-uniform amino acid composition forms a residual electrostatic field, which is the cause of directional electron transfer. In particular, studies have been conducted on the effect of temperature on electron transfer processes along cellular organelles, which are polypeptide fragments of protein molecules. The calculations show that the electron, which is transferred by the residual field, creates micro currents in the range from 23 to 205 pA depending on the length of the protein-like nanowire (respectively, from 300 to 100 amino acid residues) and temperature in the physiologically relevant range: 33-41ºC. The possibility of controlling electron transfers along a protein-like nanowire using a magnetic field is investigated. The found threshold value of the magnetic field at which ATP synthesis can be blocked is consistent with observations. For magnetic field strength it will be: $H=8 \cdot 10^4 A/m$

The current work has some weakness and vague grammatical mistakes and lack of enough literature support are significant concerns. Detailed comments and questions are provided below: English of the entire manuscript needs to be improved for clarity and cohesiveness. Various examples are given. However, in my opinion this paper needs minor revision.

Paper is well written and can be accepted after proper revision.

Issue 1

Introduction portion is very small. Please add some references.

Issue 2:

Novelty is not complete?

Issue 3:

Please add reference in below portion

Nitrogen Model of the Atomic Subsystem

Issue 4:

Please add reference

For a single radical, one can set the ratio:

Ne/Na=8+Δ(Ne/Na)

Why do you only provide analysis for measuring cell viability? I guess, it is probably because of the limitation of your modeling. If not, I recommend developing it also for the other boundary conditions.

Issue 3:

Issue5:

The language, sentence formation and grammar of the entire manuscript need to be improved for clarity and cohesiveness. It is better to check the English by a native speaker.

Issue 6:

Please compare the results with above said references for the validation of paper.

Issue 7.

Some new references about research subject should be added entirely in the reference list and cited adequately in the text such as following.

As it stands, the goal of this review is not evident, and I suggest that it is better organized.

1. Effects of elastic medium on buckling of microtubules due to bending and torsion. Advances in Concrete Construction, An International Journal.
2. The effects of the surrounding viscoelastic media on the buckling behavior of single microfilament within the cell: A mechanical model. Advances in Concrete Construction, An International Journal

3. Analysis of nonlocal Kelvin's model for embedded microtubules: Via viscoelastic medium Smart Structures and System.*,*

4. Discretization and bifurcation analysis of tumor immune interaction in fractional form.

5. Instability analysis of microfilaments with and without surface effects using Euler theory

6. Effects of elastic medium on the electric potential of neural tissue by using spherical bidomain

7. Mechanics of anisotropic muscles embedded in viscoelastic medium"