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### RESEARCH ARTICLE

## THE DEPENDENCE OF THE FULL CYCLE OF PROTON AND ELECTRON CONDUCTANCE INSIDE THE HUMAN BODY, CONSISTING OF 9 LINKED STAGES FROM PRESENCE OF OXYGEN.

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### Manuscript Info

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#### Key words:-

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### Abstract

Planet Earth is approximately 4,5 billion years old which is roughly one-third of the age of the universe during which after oxygen – producing organisms first evolved ,other organisms that use oxygen followed, and they then prospered,multiplied ,and evolved in to yet other oxygen-utilizing life forms.They gain their energy from promoting the reaction between inorganic substances in so called oxidation-reduction reactions , where electrons are transferred during the reaction.

A basic necessity for life is energy , which is supplied either from light,or from myriad of different oxidation-reduction reactions .

Energy in the form as ATP is critical in the biosynthesis of basic cellular components as cell membrane, genetic materials, including DNA and RNA , and all of the proteins and other molecules used in functioning of the cell machinery within the fourth compartment of body as the place of living cells, where occurred 5 main functions in the 5 main membrane structure complex of living cells by using the ATP ,NADPH, heat energy, metabolites ,H<sub>2</sub>O , CO<sub>2</sub> formed in the first compartment , as information - response functions, depolarization - repolarization processes in the plasmic membrane complex , genetic - cell division processes in the nucleus membrane complex, the synthesis, resynthesis of proteins, lipoproteins in the ribosomes and microsomal membrane complex , the bioenergetical processes in the mitochondrial membrane complex, the bioconverting, biotransforming processes in the microsomal membrane complex, synthesis, resynthesis and activated oxygen dependent processes in peroxisome-lysosome membrane complex (Ambaga M).

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### Introduction:-

Planet earth is approximately 4,5 billion years old, which is roughly one-third of the age of the the universe during which after oxygen –producing organisms first evolved ,other organisms that use oxygen followed(Canfield DE), and they then prospered,multiplied ,and evolved in to yet other oxygen-utilizing life forms(Park MA).

They gain their energy from promoting the reaction between inorganic substances in so called oxidation-reduction reactions , where electrons are transferred during the reaction.

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A basic necessity for life is energy, which is supplied either from light, or from myriad of different oxidation-reduction reactions (Canfield DE).

It should be said that the membrane-related mechanism for generating ATP were formed early in life process and existed in strong dependent from presence of oxygen, which needed the evolution mechanism of formation of the membrane - redox potential three state (alpha state with high oxidation potential, beta state with high reduction potential, gamma state with low redox potential) line system as very important member of reaction "Donators + membrane-redox potentials three-state line system +  $O_2$  + ADP +  $P_i$  + H + + nH + memb. space = (ATP + heat energy) +  $H_2O$  + nH + matrix +  $CO_2$ " existed in 14 trillion cells of human body (Ambaga and Tumen-Ulzii, 2015).

The membrane - redox potential three state line system existed between donators of proton and electrons as food substrates and acceptors of the proton and electrons as oxygen in all cells.

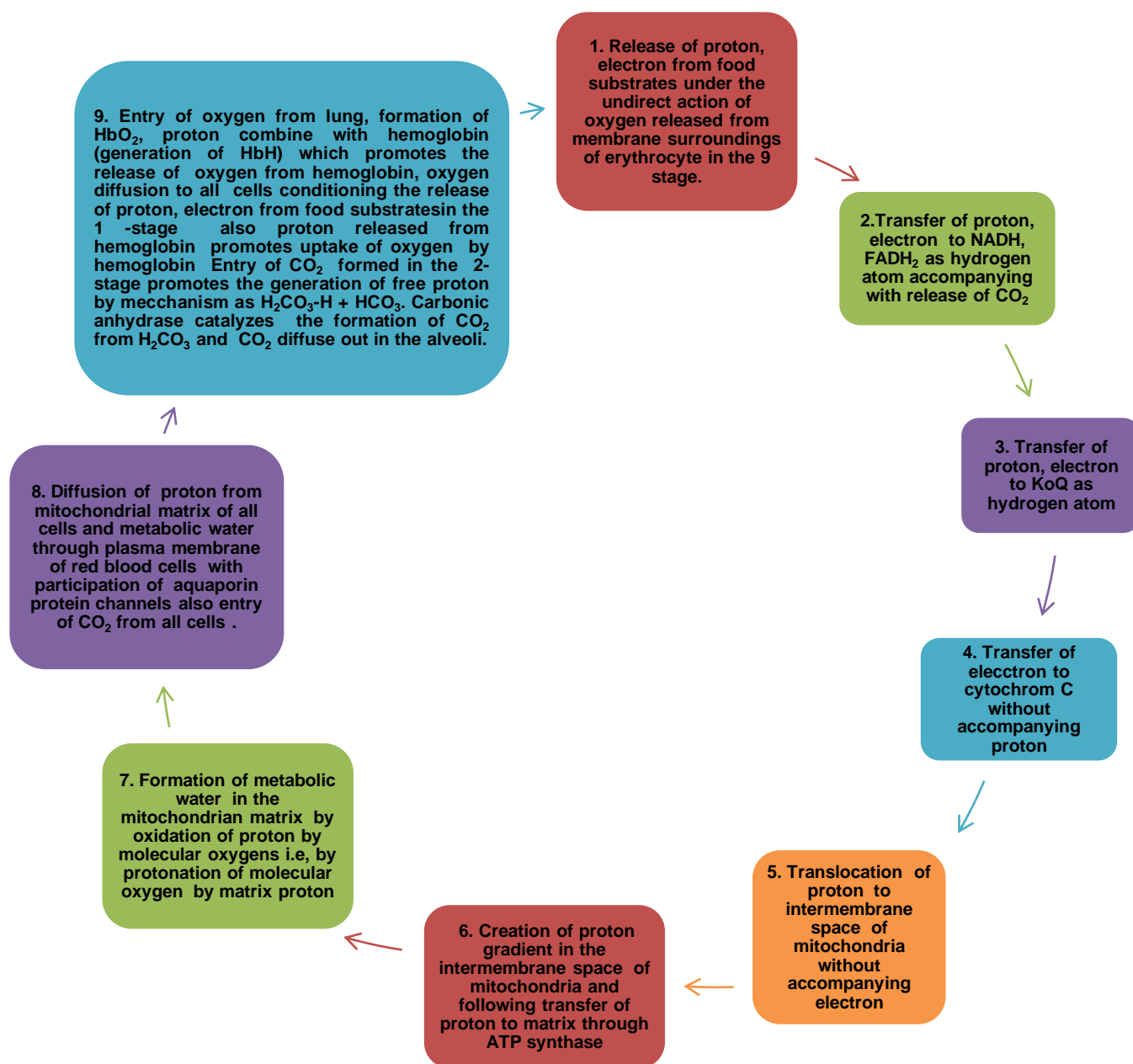


Figure 1:- Full 9 stepped cycle of proton conductance inside human body.

## Results and Discussion:-

**The full 9 stepped cycle of proton conductance inside human body proposed by Ambaga and Tumen-Ulzii (2015, 2016)**

The following are processes, of the full 9 stepped cycle of electron and proton conductance inside the human body which includes well known metabolic pathways such as glycolysis, Krebs cycle, beta oxidation of fatty acids, amino acid oxidation:

1. Release of proton, electron from food substrates(carbohydrate, amino acids, fatty acids), under the indirect action of oxygen released from membrane surroundings of erythrocyte in the 9 stage.
2. Transfer of proton, electron to NADH, FADH<sub>2</sub> as hydrogen atom accompanying with release of CO<sub>2</sub>
3. Transfer of proton, electron to KoQ as hydrogen atom
4. Transfer of electron to cytochrome C without accompanying proton
5. Translocation of proton to intermembrane space of mitochondria without accompanying electron
6. Creation of proton gradient in the intermembrane space of mitochondria and following transfer of proton to matrix through ATP synthase (**Alberts B**)
7. Formation of metabolic water in the mitochondrial matrix by oxidation of proton by molecular oxygens i.e., by protonation of molecular oxygen by matrix proton.
8. Diffusion of proton from mitochondrial matrix of all cells and metabolic water through plasma membrane of red blood cells with participation of aquaporin protein channels also entry of CO<sub>2</sub> from all cells.
9. Entry of oxygen from lung, formation of HbO<sub>2</sub>, proton combine with hemoglobin (generation of HbH) which promotes the release of oxygen from hemoglobin, oxygen diffusion to all cells conditioning the release of proton, electron from food substrates.

## **The evolutionary and biological significance of the oxygen dependent - full 9 stepped cycle of proton conductance inside the human body:-**

The evolutionary and biological significance of the full 9 stepped cycle of proton conductance inside the human body is explained by the following facts:

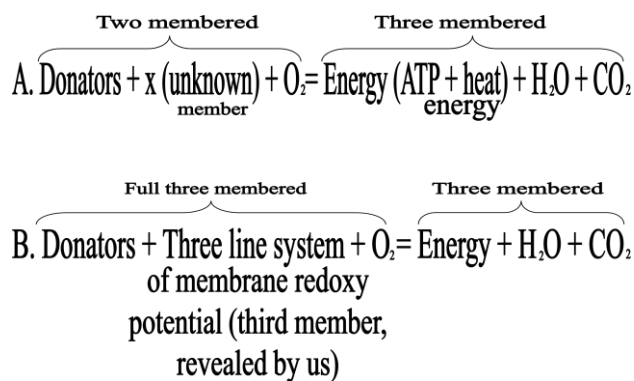
1. All these processes conducted in the oxygen dependent - full 9 stepped cycle of proton conductance inside the human body is regulated by the membrane - redox potentials three-state line system of "Donators + membrane - redox potentials three - state line system + O<sub>2</sub> + ADP + Pi + H<sup>+</sup> + nH + membrane space = (ATP + heat energy) + H<sub>2</sub>O + nH + matrix + CO<sub>2</sub>" reaction medium located in 14 trillion cells of human body.
2. All these processes conducted in the oxygen dependent - full 9 stepped cycle of proton conductance inside the human body under regulation of the membrane - redox potentials three-state line system of "Donators + membrane-redox potentials three-state line system + O<sub>2</sub> + ADP + Pi + H<sup>+</sup> + nH + membrane space = (ATP + heat energy) + H<sub>2</sub>O + nH + matrix + CO<sub>2</sub>" reaction medium are located in 14 trillion cells of the human body.
3. Free protons and ATP, NADPH, oxygen, carbon dioxide, water molecules and heat energy formed during functioning of this oxygen dependent - full 9 stepped cycle of proton conductance inside the human body served the role of normal maintaining of all kinds of life process of every cells. Without these regulations it is absolutely impossible to maintain any form of life process.

## **The participation of oxygen in functioning of membrane -redox potential three state line system between donators and acceptors inside the living cells:-**

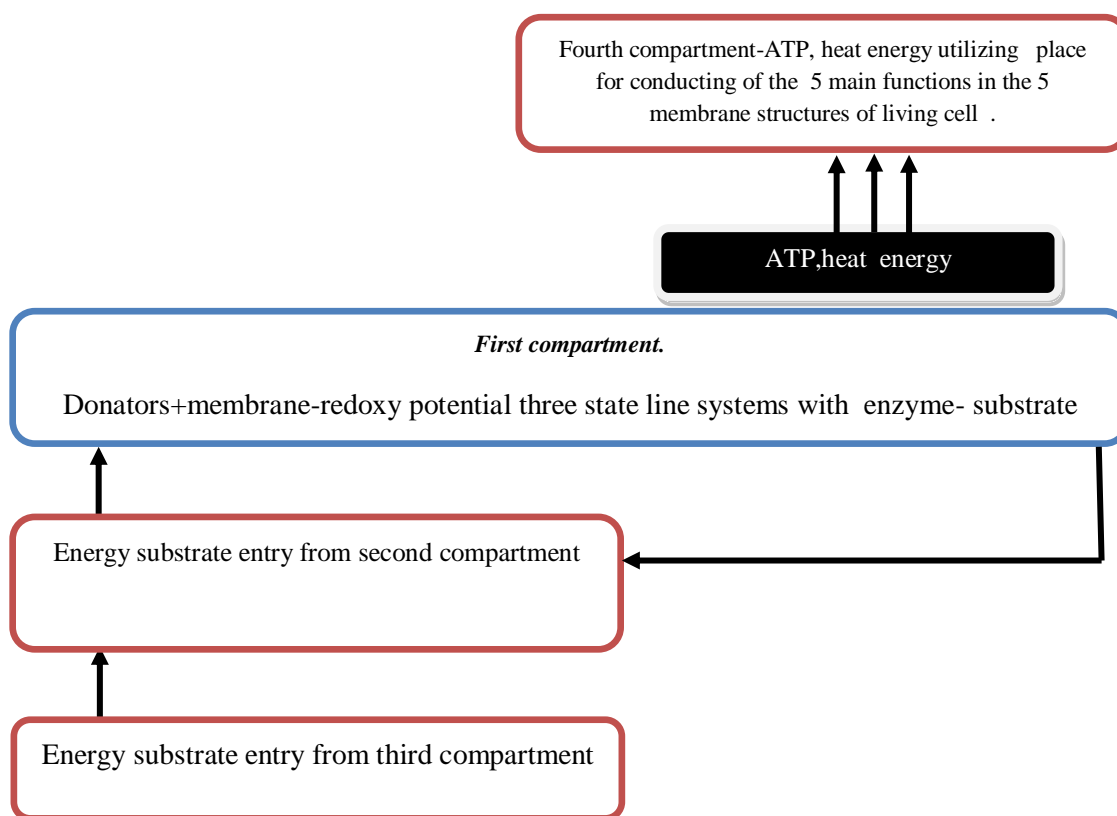
The main role of protons and electrons in the normal functioning of living cells is connected with the oxygen dependent - membrane -redox potential three state line system between donators and acceptors of electrons, protons inside the living cells.

We reveal that recently common used metabolic reaction formula of living cell as  $C_6H_{12}O_6 + 6O_2 = \text{energy} + 6H_2O + 6CO_2$  have been described with missing of one principally important, inseparable member of this reaction, paralleled with three variants of intensity of flow of protons and electrons.

It should be said that the right variant of three membered chemical balance equation formula for the metabolism is created by putting the oxygen dependent -membrane - redox potentials 3 state line systems of donators and acceptors between C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> molecule and 6O<sub>2</sub> molecule in the left side of reaction as "Donators + membrane-redox potentials three-state line system + O<sub>2</sub> + ADP + Pi + H<sup>+</sup> + nH + memb. space = (ATP + heat energy) + H<sub>2</sub>O + nH + matrix + CO<sub>2</sub>".



**Figure 2:-** The oxygen dependent membrane -redox potential three state line system between donors and acceptors inside the living cells.



**Figure 3:-**The basic 4 compartments of human body.

Three state new system discovered by such a way was named by us as “oxygen dependent - 3 state line system of membrane - redox potential”.

When newly discovered “oxygen dependent - 3 state line system of membrane - redox potential” named system is positioned in the middle of two members, called “carbohydrate, aminoacids, fatty acids + O<sub>2</sub>”, on the left hand side of the equation, it is making full-three membered.

In this case, this equation becomes into the previously non - existent form of “carbohydrate, aminoacids, fatty acids + 3 state line system of membrane - redox potential as very important place of conducting of protons, electrons, starting from cyanobacteria formed during last 3,8 billion years + O<sub>2</sub> = energy (ATP + heat) + H<sub>2</sub>O + CO<sub>2</sub>”.

**What is specificity of oxygen dependent - membrane - redox potentials three state line systems of donors and acceptors, which at first described by us:-**

1. Consisted of H,e donors as foods and H,e acceptors as oxygens, paralleled with three variants of intensity of flow of protons and electrons.
2. Ensured normal flow of protons and electrons from donors to acceptors with generation of high energy phosphate-ATP and heat energy paralleled with flow of protons and electrons.
3. Functioned with using a glycolysis reaction, Krebs cycle, oxidative deamination of aminoacids and beta oxidation of fatty acids, oxidation - phosphorylation process to ensure the energetic demand of organism, paralleled with three variants of intensity of flow of protons and electrons.
4. Provided the normal maintenance of living processes, paralleled with three variants of intensity of flow of protons and electrons.
5. Existed in three interconvertible states as follows:
  - ❖ Fluid alpha state of membrane structures (MS), consisting of mainly unsaturated fatty acids, conditioning a high levels of oxy potentials and with high intensity of proton, electrons conductance and high levels of heat energy release, middle degree of high energy phosphate – ATP with increased ratio of acceptors to donors, paralleled with three variants of intensity of flow of protons and electrons.
  - ❖ Solid beta state of MS, consisting of mainly saturated fatty acids, conditioning a high levels of red potentials and with slow intensity of proton, electrons conductance and low levels of heat energy release, high degree of high energy phosphate – ATP with increased ratio of donors to acceptors, paralleled with three variants of intensity of flow of protons and electrons.
  - ❖ Gamma state of MS, consisting of decreased contents of saturated and unsaturated fatty acids, conditioning a decreased levels of redox potentials with slow intensity of proton, electrons conductance, also with low levels of heat energy release and energy accumulation and low degree of high energy phosphate – ATP with decreased contents of donors and acceptors, increased loss-leakage of proton, electrons prior to generation of proton gradients, paralleled with three variants of intensity of flow of protons and electrons.

**The participation of oxygen in functioning of the buffering capacity of erythrocyte membrane surroundings in relation to free protons ,formed in the Full Cycle of Proton and Electron Conductance inside the Human Body:-**

By our suggestion, the buffering capacity of erythrocyte membrane surroundings in relation to free protons ,formed in oxygen dependent - the proton and electron conductance is the process implemented within the full 9 stepped cycle of proton conductance inside the Human Body proposed by Ambaga and Tumen-Ulzii (2015, 2016) leading to reutilization of diffused protons from mitochondrial matrix of all cells to plasma membrane of red blood cells with generation of HbH which promotes the release of oxygen from hemoglobin, oxygen diffusion to all cells conditioning the release of proton,electron from food substrates.

But participation of erythrocyte membrane surroundings in the regulation of free protons and oxygen, carbon dioxide, water molecules formed during functioning of the full 9 stepped cycle of electron and proton conductance inside the human body less elucidated in the scientific literature.

In this connection we are proposing the new suggestion about existing the oxygen dependent - regulations,named as the buffering capacity of erythrocyte membrane surroundings in relation to free protons ,formed in the Full Cycle of Proton and Electron Conductance inside the Human Body.

The buffering capacity of erythrocyte membrane surroundings in relation to free protons ,formed in the oxygen dependent - full cycle of proton and electron conductance inside the Human Body would be appeared in the 8-9 -th stages of the full cycle as the diffusion of proton from mitochondrial matrix of all cells and metabolic water through plasma membrane of red blood cells also entry of CO<sub>2</sub> from all cells and the entry of oxygen from lung, formation of HbO<sub>2</sub>, proton combine with hemoglobin (generation of HbH) which promotes the release of oxygen from hemoglobin, oxygen diffusion to all cells conditioning the release of proton,electron from food substratesin the 1-stage also proton released from hemoglobin promotes uptake of oxygen by hemoglobin .

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