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RESEARCH ARTICLE

A NEW SUGGESTION ABOUT EXISTING OF MEMBRANE -REDOXY POTENTIAL THREE STATE LINE SYSTEM BETWEEN DONATORS AND ACCEPTORS INSIDE THE LIVING CELLS

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ATP: Adenosine triphosphate;
REDOX: Reduction-oxidation;
ADP: Adenosine diphosphate;

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ABSTRACT

The main role of protons and electrons in the normal functioning of living cells is connected with the membrane -redo xy potential three state line system between donators and acceptors of electrons, protons inside the living cells. During 3,8 billion years lasted formation of the life in the universe have been created the law full process of dependence of any form of life process from protons and electrons, which had formed and joined to make atomic nuclei 15 billion - bya years ago. 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 say that the right variant of three membered chemical balance equation formula for the metabolism is created by putting the membrane - redoxy potentials 3 state line systems of donators and acceptors between $C_6H_{12}O_6$ molecule and $6O_2$ molecule in the left side of reaction as "Donators + membrane-redox potentials three-state line system + $O_2 + ADP + Pi + H + + nH + \text{memb. space} = (\text{ATP} + \text{heat energy}) + H_2O + nH + \text{matrix} + CO_2$ ".

INTRODUCTION

The main role of protons and electrons in the normal functioning of living cells is connected with the membrane - redoxy potential three state line system between donators and acceptors of electrons, protons inside the living cells. During 3,8 billion years lasted formation of the life in the universe have been created the lawfull process of dependence of any form of life process from protons and electrons, which had formed and joined to make atomic nuclei 15 billion - bya years ago (Park, 2009).

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, betta oxidation of fatty acids, amino acid oxidation:

- Release of proton, electron from food substrates (carbohydrate, amino acids, fatty acids), under the undirect action of oxygen released from membrane surroundings of erythrocyte in the 9 stage.
- Transfer of proton, electron to NADH, $FADH_2$ as hydrogen atom accompanying with release of CO_2
- Transfer of proton, electron to KoQ as hydrogen atom
- Transfer of electron to cytochrom C without accompanying proton
- Translocation of proton to intermembrane space of mitochondria without accompanying electron
- Creation of proton gradient in the intermembrane space of mitochondria and following transfer of proton to matrix through ATP synthase
- 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.
- 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_2 from all cells.
- Entry of oxygen from lung, formation of HbO_2 , proton combine with hemoglobin (generation of HbH) which promotes the release of oxygen from hemoglobin,

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oxygen diffusion to all cells conditioning the release of proton, electron from food substrates.

H_2O_6 , carbohydrate, aminoacids, fatty acids or donator of protons and electrons that gets into the body in a form of food.

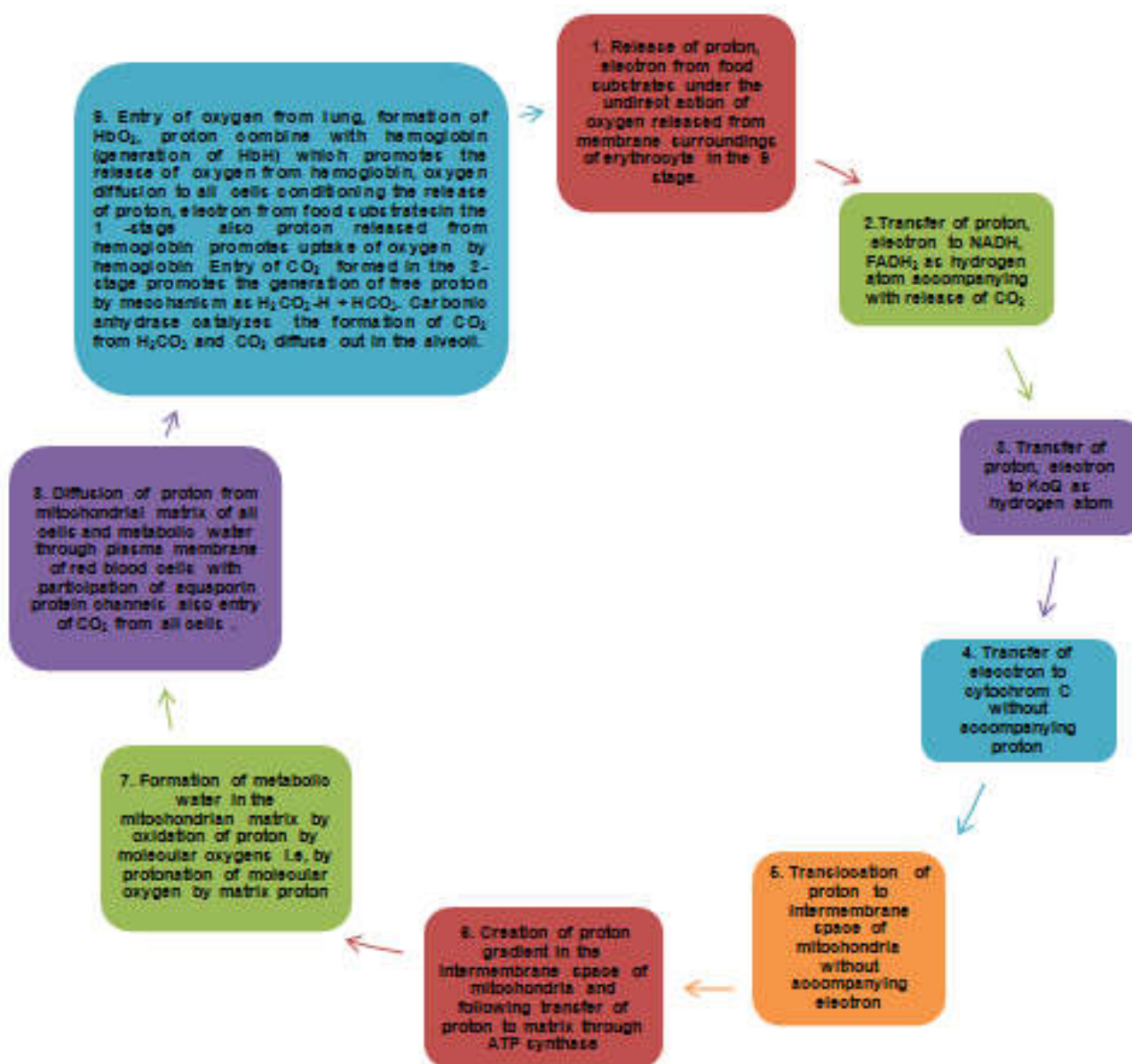


Figure 1. Full 9 stepped cycle of proton conductance inside human body proposed by Ambaga and Tumen-Ulzii (2015, 2016)

But the globally used equation of living cell metabolic reaction did not reflect this events, which appeared with participation of protons and electrons

In such way, recently, a new knowledge based explanation on the globally used equation of metabolic reaction is required.

RESULTS AND DISCUSSION

Donators (glucose - source of protons and electrons) + O_2 (acceptor of protons) = Energy (ATP + heat energy) + H_2O + CO_2 is the globally used equation of metabolic reaction. But here we could not see the such morpho - functional unit, through which have been conducted a normal flow of protons and electrons from donators to acceptors-oxygen with generation of high phosphate compound as ATP. The left hand side of the equation is an acceptor of protons and electrons or oxygen (O_2) which gets through respiration and C_6

Meanwhile the right hand side of the equation shows "energy - ATP, water molecule and carbon dioxide which are formed inside the human body because of a normal flow of protons and electrons. The left hand side of the equation has two members while the right hand side has three members as if the balance has been shifted heavily to the right side and the left side is being light-weighted or missing something. It's curious, why the human body or living cell representation participation is omitted in the left hand side of this equation.

The world is expecting of meaning full explanation of the above equation which is missing a very important element. Logically, therefore there would be "main regulatory system with many stations of reaction on the left hand side of the equation, through which constantly conducted the normal flow of protons and electrons with formation of ATP and heat energy.

Almost all previously unsolved questions completely explained and fully clarified

What is the specificity of membrane - redox potential three state line systems of donators and acceptors, which at first described by us:

- Consisted of H^+ , e^- donators as food substrates and H^+ , e^- acceptors as oxygens with direct participation of a donators of electrons, protons.
- Ensured normal flow of protons and electrons from donators to acceptors with generation of high energy phosphate-ATP (Alberts *et al*, 2009), high energy electrons NADPH and heat energy
- 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 with direct participation of a donators of electrons, protons.
- Provided the normal maintainance of living processes.
- Existed in three interconvertible states following as:

Liquid alpha state having a high value of oxy potential and consisting mainly of unsaturated fatty acids, that creates medium level of ATP and high level of heat energy with direct participation of a donators of electrons, protons. Solid, beta state having a high value of red potential, consisting mainly of saturated fatty acids, that creates high level of ATP and medium level of heat energy with direct participation of a donators of electrons, protons. Gamma state having a low value of redox potential, consisting of low content of saturated and unsaturated fatty acids, that creates low level of ATP and low level of heat energy with direct participation of a donators of electrons, protons.

New postulate, appeared in connection with three state line of membrane redox potential existed between donators and acceptors inside of living cells has been giving a possibility to radically change following basic aspects as:

- Organ formation evolution of morphogenesis with direct participation of a donators of electrons, protons
- Refined definition of living processes with direct participation of a donators of electrons, protons
- Refined definition of diabetes and obesity with direct participation of a donators of electrons, protons
- Refined definition of security of living body system with direct participation of a donators of electrons, protons.

This above mentioned new theory of existence of three state line of membrane redox potential between donators and acceptors inside of living cells will open up a broad avenue in modern medical and biological science both in terms of theoretical innovation as well as applying it in teaching and education practices. In such way if in the membrane - redox potential three state line systems enzyme substrate positioned between donators and acceptors in the left side of the full three membered equation of metabolic reaction as "Carbohydrate, aminoacids, fatty acids + the membrane - redox potentials 3 state line systems + $6O_2 = \text{energy (ATP, heat energy)} + 6H_2O + 6CO_2$ " has been prevailed alpha state

with high oxygen potentials has been created a preconditions to generate the oxidized form of metabolites and drugs.

In case of lacking of this new knowledge we could not develop the new model of functioning of living cells, relating to harvesting energy from various H,e donators and acceptors as oxygen. In such way, 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. In the case of reaction, expressed as $C_6H_{12}O_6 + 6O_2$ with two member, the formation of such energy as ATP, heat energy, also end products as H_2O , CO_2 in the right side of reaction would not be happened, instead of them glucuronic acid and other products would be formed as a result of oxidation of glucose molecule, paralleled with three variants of intensity of of protons and electrons.

It should be say that the right variant of three membered chemical balance equation formula for the metabolism is created by putting the membrane - redox potentials 3 state line systems of donators and acceptors between $C_6H_{12}O_6$ molecule and $6O_2$ molecule in the left side of reaction.

What is specificity of membrane - redox potentials three state line systems of donators and acceptors, which at first described by us

- Consisted of H,e donators as foods and H,e acceptors as oxygens, paralleled with three variants of intensity of flow of protons and electrons.
- Ensured normal flow of protons and electrons from donators to acceptors with generation of high energy phosphate-ATP and heat energy paralleled with flow of protons and electrons.
- 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.
- Provided the normal maintainance of living processes, paralleled with three variants of intensity of flow of protons and electrons.

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 donators, 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 donators 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.

What is the new knowledge about basic 4 compartments of human body

According to our suggestion, relating to basic 4 compartments of human body, the first compartment is the place of human body, where occurred the reaction “Donators + membraneredox potentials three-state line system + O_2 + ADP + Pi + 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).

Second compartment is the place of human body for delivering electron,proton acceptors as oxygen and electron,proton donors as food substrates together to “Donators + membrane-redox potentials three-state line system + O_2 + ADP + Pi + H + + nH + memb. space = (ATP + heat energy) + H_2O + nH + matrix + CO_2 ” existed in 14 trillion cells of human body.

Third compartment is is the place of human body for preserving of electron - proton donors food in the form of visceral and subcutaneous fatty acids to maintain the normal functioning of “Donators + membraneredox potentials three-state line system + O_2 + ADP + Pi + H + + nH + memb. space = (ATP + heat energy) + H_2O + nH + matrix + CO_2 ” existed in 14 trillion cells of human body.

Fourth compartment is 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_2O , CO_2 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.

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