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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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Abbreviations:

ATP: Adenosine triphosphate; REDOX: Reduction-oxidation; ADP: Adenosine diphosphate; 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 + $O_2 + ADP + Pi + H + nH + memb$. space = (ATP + heat energy) + $H_2O + nH + matrix + CO_2$ ".

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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:

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- 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, FADH₂ as hydrogen atom accompanying with release of CO₂
- Transfer of proton, electron to KoQ as hydrogen atom
- Transfer of elecctron 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 mitochondrian 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 CO₂ from all cells.
- Entry of oxygen from lung, formation of HbO₂, 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.

 $H_{12}O_{6}$, carbohydrate, aminoacids, fatty acids or donator of protons and electrons that gets into the body in a form of food.

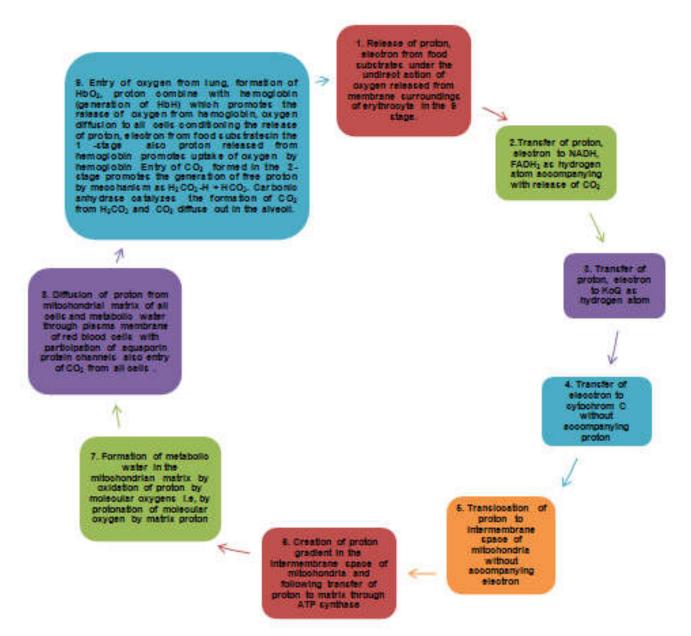


Figure 1. Full 9 stepped cycle of proton conductance inside human body proposed by Ambaga and Tumen-Ulzii (2015, 2016)

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.

More clearly, that regulatory system would facilitate explaining the

- Reaction medium between C₆H₁₂O₆ and 6O₂ members of reaction.
- Three distinct variations of formation of ATP in right hand of reaction.
- Three distinct variations of heat energy in right hand of reaction.
- Three distinct variations of formation of metabolic water molecules in right hand of reaction.
- Three distinct variations of formation of CO₂ molecules in right hand of reaction.

The world has an inadequate definition/explanation/ about the formula of equation that is being used in measuring of the metabolic reaction kinetics as flow of protons and electrons. It is known that an adequate amount of energy (ATP + heat) is not being created on the right side of the equation even if carbohydrate, aminoacids, fatty acids are of adequately high amount on the left side of the equation with direct participation of a donators of electrons, protons.

Why is that? There is no answer yet

It's known that under certain conditions, an adequate amount of energy (ATP + heat energy) is created on the right hand side with using a donators of electrons, protons, even if there is not adequately high amount of carbohydrate, aminoacids, fatty acids as donators of electrons, protons on the left hand side of the equation.

Why do such conditions form? There is no answer yet. Why was the idea of three state formed instead of one state on three state line of membrane-redoxy potential?

Under certain conditions, it is changed "ATP: heat energy" ratio with direct participation of a donators of electrons, protons:

- as ATP medium level + high heat energy = 100%- in case of autumn, middle of the day, high amount of unsaturated fatty acid is used and thyroxin, adrenaline content is increased.
- as ATP high level + low heat energy = 100%- in case of spring, middle of the night, high amount of saturated fatty acid is used and thyroxin, adrenaline content is lowered.
- as ATP low level + low heat energy = less than 100% in case of the old age, low amount of saturated, unsaturated fatty acid is used.

Based on all of these, it can be concluded that the functional system which is situated between the donator and acceptor on the left hand side exists in 3 states. However, it's not written in any book that above 3 state changes are being initiated due to "which structure unit of function".

Theoretically, it was first known that "oxidation: phosphorylation" ratio changes into 3 different states inside the equation environment. It became clear that "oxidation: phosphorylation" ratio is changing into 3 different states inside the equation environment meaning that proton, electron flows

were changing into 3 states. It became clear that proton, electron flow changed into 3 states inside the equation environment can be expressed as "3 states of ratio of redoxy potential". It became clear that ratio of redoxy potential is changing into 3 states inside the equation environment of metabolic reaction meaning that there are 3 states ratio of membrane structure saturated acid, unsaturated fatty acid:

- First occurrence: saturated acid low: unsaturated fatty acid low state,
- Second occurrence: saturated acid high: unsaturated fatty acid low state,
- Third occurrence: saturated acid low: unsaturated fatty acid high state.

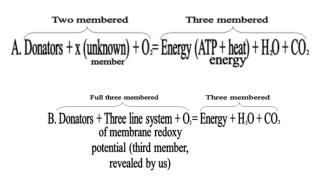


Figure 2. The membrane -redoxy potential three state line system between donators and acceptors inside the living cells

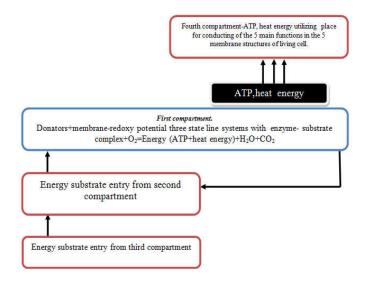


Figure 3. The basic 4 compartments of human body

Three state new system discovered by such a way was named by us as "3 state line system of membrane - redoxy potential". When newly discovered "3 state line system of membrane redoxy potential" named system is positioned in the middle of two members, called "carbohydrate, aminoacids, fatty acids + O_2 ", on the left hand side of the equation, it is making fullthree membered.

In this case, this equation becomes into the previously nonexistent form of "carbohydrate, aminoacids, fatty acids + 3 state line system of membrane - redoxy potential as very important place of conducting of protons, electrons, starting from cyanobacteria formed during last 3,8 billion years + O_2 = energy (ATP + heat) + H_2O + CO_2 ".

Almost all previously unsolved questions completely explained and fully clarified

What is the specificity of membrane - redoxy 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 betta 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 redoxy 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 redoxy 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 redoxy 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 - redoxy 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 redoxy potentials 3 state line systems + $6O_2$ = energy (AT Φ , 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 $C_6H_{12}O_6 + 6O_2 =$ energy $+ 6H_2O + 6CO_2$ have been described with missing of principally important, inseparable member of this one 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 H₂O, CO₂ 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 - 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.

What is specificity of membrane - redoxy 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 betta 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 betta 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 redoxy 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 donators 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) + H₂O + nH + matrix + CO₂" 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 donators 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 donators 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) + H₂O + nH + matrix + CO₂" 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, H₂O, CO₂ formed in the first compartment, as information - response functions. depolarization - repolarization processes in the plasmic membrane complex, genetic - cell divison 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 pereoxisome-lysosome membrane complex.

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