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RESEARCH ARTICLE

THE EIGTH AND NINTH STAGES OF THE MEMBRANE REDOXY POTENTIAL THREE STATE DEPENDENT CLOSED 9 STEPPED CYCLE OF PROTON CONDUCTANCE

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ABSTRACT

The Existence of life is strongly dependent on the presence of protons and electrons, which were formed during an event called the big bang, 15 billion years ago. That is, the protons and electrons, which were formed during this event, set the stage for the formation of life in the universe. The historical process of transition of life from the simple membrane - based mechanism for making ATP had converted to a more complex membrane - redox potential, a three state line system for making ATP during last 3,6 billion years. The membrane - redox potential three state line system existed between donators of proton and electrons as food substrates and acceptors of the protonand electrons as air, oxygen in all cells.

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INTRODUCTION

The membrane - based mechanism for making ATP were formed very early in life history (Park 2009), its essential features retained in the long evolutionary journey from the time of the early procaryotes to modern cells during last 3,6 billion years converted to 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 + Pi + H^+ + $nH^+_{memb.space}$ = (ATP + heat energy) + H_2O + nH^+_{matrix} + CO_2" existed in 87 trillion cells of human body (Ambaga and Tumen Ulzii, 2015). According to suggestion of professor M.Ambaga (2016) in relating to The membrane - based mechanism for making ATP consists of the full 9 stepped cycle of proton, electron conductance inside human body as electrons and protons derived from oxidation of food substrates are transferred along a electron carriers, protons (H^+) flows back down its electrochemical gradient through ATP synthase, which catalyses the energy requiring synthesis ATP from ADP and inorganic phosphate (Alberts B, et all) as:

- H atoms contained in food molecules through the 1-th stage of the full 9 stepped cycle of electron and proton conductance as release of proton, electrons together from food substrates under the undirect action of oxygen released from membrane surroundings of erythrocytes converted to NADH, FADH2.
- After these stages as conversion of H atoms contained in food molecules to NADH, $FADH_2$ have been started the next stages of conductance of free protons, including the 5-th stage of the full 9 stepped cycle of electron and proton conductance as translocation of proton to inter membrane space of mitochondria without accompanying electron, the 6-th stage as creation of proton gradient in the inter membrane space of mitochondria and following transfer of proton to matrix through ATP synthase, the 7-th stage as formation of metabolic water in the mitochondrian matrix by protonation of activated oxygen after obtaining electrons by matrix proton, the 8-th stage as diffusion of proton from mitochondrial matrix of all cells and metabolic water formed during protonation of molecular oxygen by matrix proton entered through plasma membrane of red blood cells by HCO_3/ CL - shift mechanism, also the 9-th stage as metabolic water entered to red blood cells reacts with CO_2 formed in the 2-stage by formation H_2CO_3, which is followed by reaction as H_2CO_3 = H + HCO_3 and released during this stage free proton promotes the release of oxygen from hemaglobin, i.e. occur the meeting of CO_2 formed in the 2-stage with metabolic water formed in the 7-th stage of the full 9 stepped cycle of electron and proton conductance inside red blood cells.

RESULTS AND DISCUSSION

The name as Membrane redoxy potential three state dependent closed 9 stepped cycle of proton conductance would be explained by this reason as final ninth stage of previous cycle have been conditioned

first stage of next cycle. Without full 9 stepped cycle of electron and proton conductance inside the human body it is absolutely impossible to maintain any form of life process. Now we know which stage of the full 9 stepped cycle of electron, proton conductance inside human body followed after Krebs cycle.

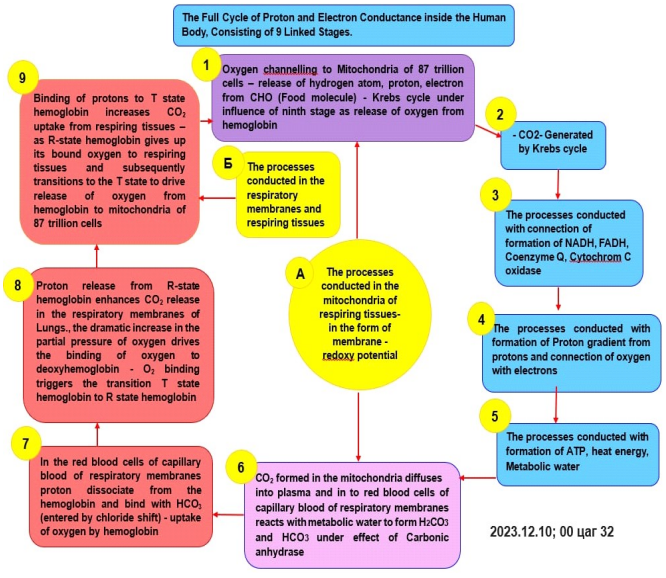
- We know where eaten food and air, taken through inhalation (oxygen) in the cycle of electron and proton conductance would meet inside the human body.
- We know which factors conditioned the release of electrons and protons are released from food substrates.
- We know which factors conditioned the release of oxygen from the hemaglobin
- We know which factors conditioned the release of carbon - dioxide from body.
- We know in which stage that started the cycle of electron and proton conductance inside human body.
- We know in which stage ended the cycle of electron and proton conductance inside human body.

According to full 9 stepped cycle of electron, proton conductance inside human body, proposed by us:

Some studies, during which have been revealed the transition of R-T, T-R state of hemoglobin gives us the possibilty to elucidate eigth and ninth stages of closed 9 staged cycle of proton conductance (Kennelly P, Botham K, McGuinness). In such way now we have the possibilty to give a answer to principally important quistions mentioned in some our previous publications (M.Ambaga, 2016). According to full 9 stepped cycle of electron, proton conductance inside human body, proposed by us:

First stage of proton conductance - Oxygen channelling to Mitochondria of of 87 trillion cells - Oxygen channelling - oxygen has been assumed to diffuse across cell bodies- Very low oxygen solubility in cytosol, reported High-solubility 'channels' likely formed by the endoplasmic reticulum, by haem - bearing cytochrome P450 molecules - Accelerated oxygen diffusion via lipid droplets - Lateral diffusion within mitochondrial membranes - Mitochondria - release of hydrogen atom, proton, electron from CHO (Food molecule) - Krebs cycle under influence of ninth stage as release of oxygen from hemoglobin.

Second stage of proton conductance - Carbon dioxide, generated by Krebs cycle in the in the mitochondria of 87 trillion cells.



Third stage - The processes conducted with connection of formation of NADH, FADH, Coenzyme Q, Cytochrom C oxidase

Fourth stage: The processes conducted with formation of Proton gradient from protons and connection of oxygen with electrons.

Fifth stage: The processes conducted with formation of ATP, heat energy and Metabolic water

Sixth stage: CO_2 formed in the mitochondria diffuses into plasma and in to red blood cells of capillary blood of respiratory membranes reacts with metabolic water to form H_2CO_3 and HCO_3, from the mitochondria carbon dioxide diffuses in to the plasma and in to red blood cells.

Seventh stage In the red blood cells of capillary blood of respiratory membranes proton dissociate from the hemoglobin and bind with HCO_3 (entered by chloride shift) -uptake of oxygen by hemoglobin
In the red blood cells of capillary blood HCO_3/ CL - shift - occurred between Mitochondria - Plasma - Hemoglobin.

Eigth stage of proton conductance - Proton release from R-state hemoglobin enhances CO_2 release in the respiratory membranes of Lungs, the dramatic increase in the partial pressure of oxygen drives the binding of oxygen to deoxyhemoglobin - O_2 binding triggers the transition T state hemoglobin to R state hemoglobin. Oxygen diffuses in to the plasma and in to red blood cells from Alveolus. Oxygen binds to Hemoglobin - in the chloride shift as HCO_3 diffuses in to red blood cells, bicarbonate ions and proton combine to replace H_2CO_3, Carbon dioxide is released from hemoglobin,and Hydrogen ions are released from Hemoglobin.

Ningh stage of proton conductance - Binding of protons to T state hemoglobin increases CO_2 uptake from respiring tissues - as R-state hemoglobin gives up its bound oxygen to respiring tissues and subsequently transitions to the T state s to drive release of oxygen from hemoglobin to mitochondria of 87 trillion cells. Carbon dioxide and Hydrogen ions combines with Hemoglobin that has released oxygen, promotes the release of oxygen from hemoglobin, Oxygen is released from hemoglobin - diffuses out of red blood cells and plasma in to tissues (mitochondria)

DISCUSSION

According to the full 9 stepped cycle of proton conductance proposed by professor M.Ambaga (2016) - 7-th stage conducted as formation of metabolic water in the mitochondrian matrix by protonation of activated oxygen after obtaining electrons by matrix proton, the 8-th stage conducted as diffusion of proton from mitochondrial matrix of all cells and metabolic water formed during protonation of molecular oxygen by matrix proton entered through plasma membrane of red blood cells by HCO_3/ CL –shift mechanism, the 9-th stage is distinguished by this as metabolic water entered to red blood cells reacts with CO_2 formed in the 2-stage by formation H_2CO_3, which is followed by reaction as $H_2CO_3 = H + HCO_3$ and released during this stage free proton promotes the release of oxygen from hemaglobin, i.e. occurred the combination of CO_2 formed in the 2-stage with metabolic water formed in the 7-th stage of the full 9 stepped cycle of electron and proton conductance inside red blood cells.

But now we made some elucidation in relating to Eigth stage of proton conductance - Proton release from R-state hemoglobin enhances CO_2 release in the Respiratory membranes. The increase in the partial pressure of oxygen drives the binding of oxygen to deoxyhemoglobin, O_2 binding accompanied by the transition T state hemoglobin to R state hemoglobin, the protons combine with bicarbonate to increase the concentration of carbonic acid which in turns favors the carbonic anhydrase catalyzed dehydration of H_2CO_3 to form CO_2 which can then disposed by exhalation - proton mediated coupling of the transition of hemoglobin between T and R states (Kennelly P, Botham K, McGuinness). Carbon dioxide generated in peripheral tissues combines with water to form carbonic acid, which dissociates in to protons and bicarbonate ions. Deoxyhemoglobin acts as a buffer by binding protons delivering them to the lungs. In the lungs the uptake oxygen by hemoglobin releases protons that combine

with bicarbonate ion formig carbonic acid, which when dehydrated by carbonic unhydrase becomes carbon dioxide, which then is enhaled (Kennelly P, Botham K, McGuinness). Ningh stage of proton conductance - Binding of protons to T state hemoglobin increasea CO_2 uptake from respiring tissues - as R-state hemoglobin formed in this stage gives up its bound oxygen to mitochondria of 87 trillion cells and subsequently transitions to the T state the absorbtion of protons both buffers the pH of the acidifying red blood cells. The greater availability of H+ in this stage of proton conductance favors the formation of T state therby enhancing the release of oxygen. Proton binding by T state hemoglobin enables the high levels of CO_2 in respiring tissues consisting of 87 trillion cells would release of oxygen from hemoglobin to 87 trillion cells, decrease in the pH of red blood cells in venous blood. All these processes conducted in the 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_2 + ADP + Pi + H^+ + $nH^+_{membrane\ space}$ = (ATP + heat energy) + H_2O + nH^+_{matrix} + CO_2" reaction medium located in 14 trillion cells of human body. Free protons and ATP, NADPH, oxygen, carbon dioxide, water molecules and heat energy formed during functioning of this 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. The full 9 stepped cycle of electron and proton conductance inside the human body and lung functioned with participation of CO_2, H_2O, H_2CO_3 and HCO_3 and in connection with oxygen/ carbon dioxide exchange mechanism.

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