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RESEARCH ARTICLE

THE HISTORY OF THE DISCOVERY OF THE MEMBRANE REDOXY POTENTIAL: A THREE - STATE-DEPENDENCY CLOSED 9-STEP STEPPED CYCLE OF PROTON CONDUCTANCE

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Abstract

Introduction:-

The proper version System models of the human body that would allow for a deeper understanding of the body's hidden regulations - such as the proton dependent membrane redoxy potential, the nine-step, state-dependent proton conductance cycle, the proton dependent four compartments, and the proton dependent ten functional systems - have not yet surfaced (2, 3, 16).

Consequently, we have only used the Vesalius Anatomy Atlas in specific situations.

However, this can occasionally result in cognitive constraints while trying to achieve the desired outcome in many pathological cases (4, 6, 8).

In this regard, we have proposed a new theory regarding proton-dependent system models of the human body by demonstrating a close relationship between the two expressions: protons from peripheral tissues promote the formation of a salt bridge in the histidine residue of betta subunits, and life has become dependent on the presence of protons and electrons, which were formed during the events known as the Big Bang fifteen years ago (Harpers Biochemistry).

According to the full nine-step cycle of electron and proton conductance inside the human body, as proposed by us,

First stage of proton conductance: oxygenchanneling to mitochondria of 87 trillion cells; oxygen channeling: oxygen has been assumed to diffuse across cell bodies; very low oxygen solubility in the 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 atoms, protons, and electrons from food molecules; Krebs cycle under the influence of the ninth stage as release of oxygen from hemoglobin.

Now we have some elucidation in relation to the eighth 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 is accompanied by the transition of T-state hemoglobin to R-state hemoglobin. The protons combine with bicarbonate to increase the concentration of carbonic acid, which in turn favors the carbonic anhydrase-catalyzed dehydration of H_2CO_3 to form CO_2, which can then be disposed of by exhalation-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

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dissociates into protons and bicarbonate ions. Deoxyhemoglobin acts as a buffer by binding protons and delivering them to the lungs. In the lungs, the uptake of oxygen by hemoglobin releases protons that combine with the bicarbonate ion to form carbonic acid, which, when dehydrated by carbonic unhydrase, becomes carbon dioxide, which is then enhaled (Kennelly P, Botham K, McGuinness). Ningh stage of proton conductance: binding of protons to T-state hemoglobin increases CO_2 uptake from respiring tissues. As R-state hemoglobin forms in this stage, it gives up its bound oxygen to the 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 the T state by 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 to release oxygen from hemoglobin to 87 trillion cells, resulting in a decrease in the pH of red blood cells in venous blood. All these processes conducted in the full 9-step cycle of proton conductance inside the human body are regulated by the membrane-redox potentials three-state line system of " Donators (first stage of proton conductance) + membrane - redox potentials three state line system + O_2 (Hemoglobin of pulmonary capillary -8-th stage , Hemoglobin of tissue-87 trillion cell surrounded capillary-9-th stage,) + ADP + Pi + (H^+ + nH + memb.space – proton gradient-4-th stage) = (ATP + heat energy-5 -th stage) + H_2O (5-th stage) + (nH^+_{matrix}) + CO_2(second stage of proton conductance)"reaction medium located in 87 trillion cells of the human body. Free protons and ATP, NADPH, oxygen, carbon dioxide, water molecules, and heat energy formed during the functioning of this full nine-step cycle of proton conductance inside the human body served the role of normal maintenance of all kinds of life processes in every cell.

Methods:-

We are used for the first time the innovative methods, proposed by us as "Donators (first stage of proton conductance) + membrane - redox potentials three state line system + O_2 (Hemoglobin of pulmonary capillary -8-th stage, Hemoglobin of tissue-87 trillion cell surrounded capillary-9-th stage,) + ADP + Pi + (H^+ + nH + memb.space – proton gradient-4-th stage) = (ATP + heat energy-5 -th stage) + H_2O (5-th stage) + (nH + matrix) + CO_2(second stage of proton conductance)", including glycolysis, Krebs cycle, ATP + heat energy-5 -th stage, HCO_3 entry and CL ion exit (bicarbonate/chloride ion shift mechanism), oxygenchanneling to mitochondria of 87 trillion cells, oxygenchanneling to mitochondria of 87 trillion cells

Results:-

According to the full nine-step cycle of electron and proton conductance inside the human body, as proposed by us:

First stage of proton conductance: oxygenchanneling to mitochondria of 87 trillion cells; oxygen channeling: oxygen has been assumed to diffuse across cell bodies; very low oxygen solubility in the 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 atoms, protons, and electrons from food molecules; Krebs cycle under the influence of the ninth stage as release of oxygen from hemoglobin.

The second stage of proton conductance is carbon dioxide, generated by the Krebs cycle in the mitochondria of 87 trillion cells.

Third stage: the processes conducted with connection to the formation of NADH, FADH, Coenzyme Q, and Cytochrome C oxidase

Fourth stage: the processes conducted with the formation of a proton gradient from protons and the connection of oxygen with electrons.

Fifth stage: the processes conducted with the formation of ATP, heat energy, and metabolic water.

In the sixth stage, PO_2 formed in the mitochondria diffuses into plasma and into red blood cells. The capillary blood of respiratory membranes reacts with metabolic water to form H_2CO_3 and HCO_3. From the mitochondria, carbon dioxide diffuses into the plasma and into red blood cells.

Seventh stage: In the red blood cells of the capillary blood of the respiratory membranes, protons dissociate from hemoglobin and bind with HCO_3 (entered by chloride shift) - uptake of oxygen by hemoglobin.

In the red blood cells of capillary blood, CL shift occurred between mitochondria, plasma, and hemoglobin.

Eigth stage of proton conductance: proton release from R-state hemoglobin enhances CO_2 release in the respiratory membranes of the lungs; the dramatic increase in the partial pressure of oxygen drives the binding of oxygen to deoxyhemoglobin; O_2 binding triggers the transition of T-state hemoglobin to R-state hemoglobin. Oxygen diffuses into the plasma and into red blood cells from the alveolus. Oxygen binds to hemoglobin; in the chloride shift, as HCO_3 diffuses into red blood cells, bicarbonate ions and protons combine to replace H_2CO_3, carbon dioxide is released from hemoglobin, and hydrogen ions are released from hemoglobin.

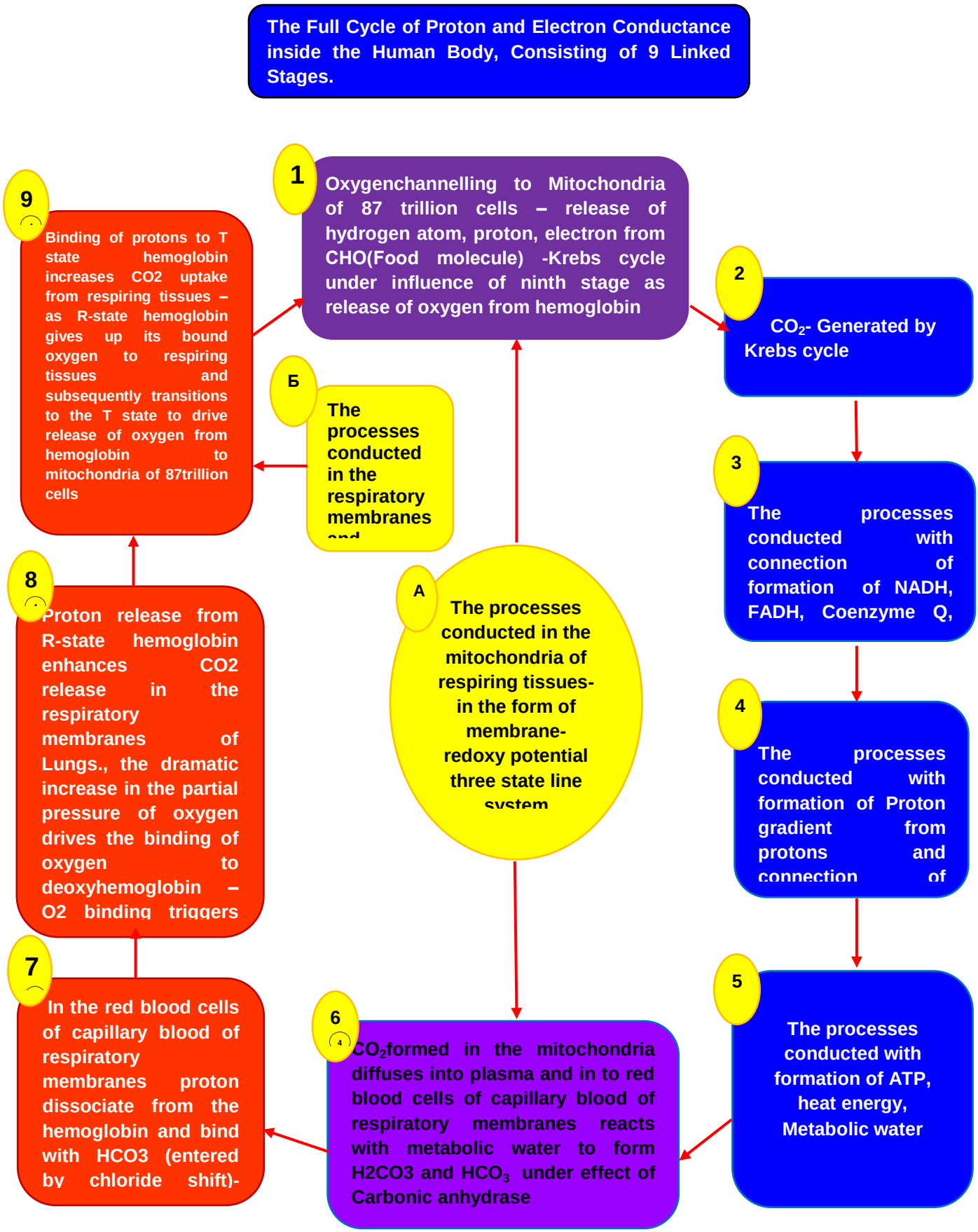
Ningh stage of proton conductance: binding of protons to T-state hemoglobin increases CO_2 uptake from respiring tissues. As R-state hemoglobin gives up its bound oxygen to respiring tissues and subsequently transitions to the T-state, it s to drive release of oxygen from hemoglobin to the mitochondria of 87 trillion cells. Carbon dioxide and hydrogen ions combine with hemoglobin, which has released oxygen, to promote the release of oxygen from hemoglobin. Oxygen is released from hemoglobin, which diffuses out of red blood cells and plasma into tissues (the mitochondria).

In such way all processes including from Sixth stage – to Ningh stage of proton conductance may be describe as carbon dioxide diffuses in to the plasma and red blood cells (in the tissue capillaries), carbon dioxide is released from red blood cells, proton is released from red blood cells (in the pulmonary capillaries), oxygen diffuses in to plasma from alveolus, oxygen binds to hemoglobin, in the chloride shift as HCO_3 diffuses in to red blood cells, proton and carbon dioxide are combined with hemoglobin, that has released oxygen, promotes the release of oxygen from hemoglobin – oxygen diffuses out of red blood cells and plasma in to tissues – mitochondria of 87 trillion cells through oxygen channeling lipid based pathways.

Discussion:-

The concept of the "closed nine-stage cycle of proton conductance" was developed by us. This cycle is a comprehensive model explaining how protons and electrons are utilized in the human body to produce ATP, the energy currency of cells. The model integrates various biological processes, including the electron transport chain and membrane-redox potentials, into a nine-step cycle. This cycle helps explain how the body maintains energy production and balance, which is crucial for understanding metabolic conditions like diabetes and hypercholesterolemia. Ambaga's research emphasizes the significance of the membrane-redox potential in driving the proton conductance cycle, which can be manipulated to improve metabolic reactions under pathological conditions. This involves adjusting the redox state of membranes to favor desirable metabolic outcomes, thus offering potential therapeutic strategies for managing diseases by targeting specific stages within this cycle. For more detailed information, you can refer to the original articles by us and our colleagues available in various academic journals such as the International Journal of Current Research [oai_citation:1,The eigth and ninth stages of the membrane redoxy potential three state dependent closed 9 stepped cycle of proton conductance | International Journal of Current Research](https://www.journalcra.com/article/eigth-and-ninth-stages-membrane-redoxy-potential-three-state-dependent-closed-9-stepped) [oai_citation:2,The possibility to drive the membrane - redox potential, a three state line system dependent - full 9 stepped cycle of proton conductance inside human body to favorable direction during pathological situations | International Journal of Current Research](https://www.journalcra.com/article/possibility-drive-membrane-redox-potential-three-state-line-system-dependent-full-9-stepped)

Also, "System Models of the Human Body" by us (M.Ambaga) and our collaborators is a detailed scientific work that establishes a comprehensive model of the human body's systems. "System Models of the Human Body" includes descriptions of the 10 main systems of the human body, which function as proton donors and electron acceptors, exploring concepts such as membrane redox potential and the nine-step full closed cycle of proton conductance. The models also delve into cellular differentiation based on proton conductance, and describe four types of cells distinguished by their proton conductance properties. The authors, including M. Ambaga, A. Tumen-Ulzii, and T. Buyantushig, focus on integrating these models to provide insights into the normal genetic-cell division, bioenergetic functions, and other essential physiological processes through the use of high-energy molecules like ATP and NADPH [oai_citation:1,System models and Integrated NCM medicine by Ambaga.M, Tumen-Ulzii.A, Buyantushig.T, Paperback | Barnes & Noble®](https://www.barnesandnoble.com/w/system-models-and-integrated-ncm-medicine-ambaga-m/1143059243) [oai_citation:2,System Models of the Human Body von Ambaga,M.; Tumen-Ulzii,A.; Buyantushig,T. - englisches Buch - bücher.de](https://www.buecher.de/artikel/buch/system-models-of-the-human-body/69946757/). For further reading, you can find the book on [Barnes &


The Full Cycle of Proton and Electron Conductance inside the Human Body, Consisting of 9 Linked Stages.
1
Oxygenchannelling to Mitochondria of 87 trillion cells – release of hydrogen atom, proton, electron from CHO(Food molecule) -Krebs cycle under influence of ninth stage as release of oxygen from hemoglobin
2
CO_2- Generated by Krebs cycle
3
The processes conducted with connection of formation of NADH, FADH, Coenzyme Q,
4
The processes conducted with formation of Proton gradient from protons and connection of
5
The processes conducted with formation of ATP, heat energy, Metabolic water
6
CO_2formed in the mitochondria diffuses into plasma and in to red blood cells of capillary blood of respiratory membranes reacts with metabolic water to form H2CO3 and HCO_3 under effect of Carbonic anhydrase
7
In the red blood cells of capillary blood of respiratory membranes proton dissociate from the hemoglobin and bind with HCO3 (entered by chloride shift)-
8
Proton release from R-state hemoglobin enhances CO2 release in the respiratory membranes of Lungs., the dramatic increase in the partial pressure of oxygen drives the binding of oxygen to deoxyhemoglobin – O2 binding triggers
9
Binding of protons to T state hemoglobin increases CO2 uptake from respiring tissues – as R-state hemoglobin gives up its bound oxygen to respiring tissues and subsequently transitions to the T state to drive release of oxygen from hemoglobin to mitochondria of 87trillion cells
Б
The processes conducted in the respiratory membranes
A
The processes conducted in the mitochondria of respiring tissues- in the form of membrane- redoxy potential three state line system

The mechanism (Essential Biology, p. 475, Figure 14-23) for H+ pumping by transmembrane protein is thought to be used by HADH dehydrogenase and Cytochrom oxidase and by many protein pumps is one of parts of "System Models of the Human Body is one of parts of "System Models of the Human Body"

In conformations A and B, the protein has high affinity for H+, causing it to pick up an H+ on the inside of the membrane; in conformation C, the proton has low affinity for H+, causing it to release an H+ on the outside of the membrane; the transition from conformation B to conformation C that releases the proton is energetically unfavorable is also, one of parts of "System Models of the Human Body".

At beginning of the discovery of System models of the Human body, proposed by us has been established the new variant of equation of metabolism as "Donators (first stage of proton conductance) + membrane - redox potentials three state line system + O_2 (Hemoglobin of pulmonary capillary -8-th stage, Hemoglobin of tissue-87 trillion cell surrounded capillary-9-th stage,) + ADP + Pi + (H^+ + nH + memb.space – proton gradient-4-th stage) = (ATP + heat energy-5 -th stage) + H_2O (5-th stage) + (nH + matrix) + CO_2(second stage of proton conductance)",which give to us the possility to speak about of existing of two forms of free protons as at first: left side of equation - H+ membrane space - formed by this reaction as - CHO- food molecules, separated from CHO - H- hydrogen atom, separated from hydrogen atom free proton, free electron –proton gradient – at second : right side of equation H^+_{matrix}, after this we was suggested the new thermin as "Repackaging of protons inside membrane surrrounding of Erythrocyte", after this we started use the expressions outlined in the book -Harper Biochemistry, 24 edition, p.51 - Hemoglobin of Vertebtrate erythrocyte - Transport of oxygen from peripheral organs to respiratory organs, Transport of CO_2, proton from respiratory organs to peripheral organs, and positioned the "H^+matrix and carbon dioxide "formed in the mitochondria in the sixth and seventh stages of the 9-staged closed cycle of proton conductance by relation ship as "mitochondrial matrix - cytosol - plasma - carbon anhydrase -H_2O+ CO_2= HCO_3 + H^+- Chloride shift - гемаглобин- HbH- $HbCO_2$. The discovery of the closed 9-step cycle by us has biological and medical significance, as did the DNA molecular structure revealed by Watson and Krick, because the 9-stage cycle of proton conductance resembled a big electric station, which provided all 87 trillion cells, including brain cells and myocardial cells, with ATP, NADPH, and ATP-based genetic materials such as DNA, RNA, heat energy, CO_2, oxygen, free protons, and electrons.

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