



## **Full Length Research Article**

### **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**

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#### **ABSTRACT**

By our suggestion, the buffering capacity of erythrocyte membrane surroundings in relation to free protons, formed in 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 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 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 substrates in the 1-stage also proton released from hemoglobin promotes uptake of oxygen by hemoglobin.

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#### **INTRODUCTION**

By our suggestion, the buffering capacity of erythrocyte membrane surroundings in relation to free protons, formed in 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. During last 3,8 billion years in the universe have been created the lawfull process of dependence of any form of life process from protons and electrons, which had formed 15 billion - bya years ago (Park, 2009).

#### **The evolutionary and biological significance of the 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:

- All these processes conducted in the full 9 stepped cycle of proton conductance inside the human body is regulated by

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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.

- All these processes conducted in the 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 +  $O_2$  + ADP + Pi +  $H^+$  + nH + membrane space = (ATP + heat energy) +  $H_2O$  + nH + matrix +  $CO_2$ " reaction medium are located in 14 trillion cells of the 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. Without these regulations it is absolutely impossible to maintain any form of life process (Ambaga, 2015, 2016).

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 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.

## RESULTS AND DISCUSSION

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 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  $CO_2$  from all cells and the entry of oxygen from lung, formation of  $HbO_2$ , proton combine with hemoglobin (generation of HbH) which promotes the release of oxygen

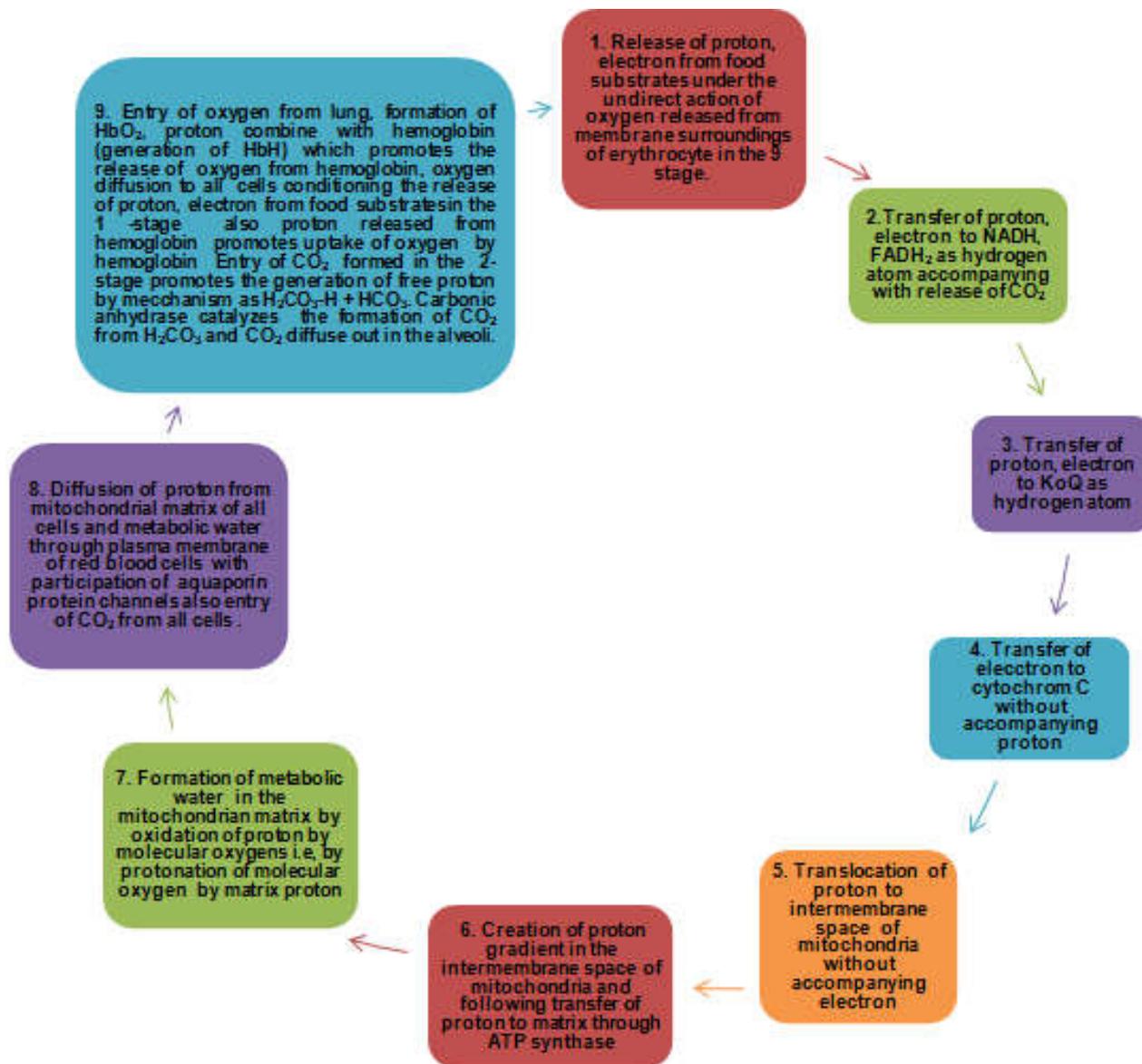


Figure 1. Full 9 stepped cycle of proton conductance inside human body proposed by Ambaga and Tumen-Ulzii (2015, 2016)

from hemoglobin, oxygen diffusion to all cells conditioning the release of proton, electron from food substrates in the 1-stage also proton released from hemoglobin promotes uptake of oxygen by hemoglobin.

### **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:

- 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.
- Transfer of proton, electron to NADH, FADH<sub>2</sub> as hydrogen atom accompanying with release of CO<sub>2</sub>
- 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<sub>2</sub> from all cells.
- 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.

### **Influencing some basic members of the full 9 stepped cycle of proton conductance to 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**

- Quantity of hydrogen atom (proton, electron together) that existed in the donator (food substrates) in the first stage of this cycle would make the remarkable influence to the buffering capacity of erythrocyte membrane surroundings in relation to free protons, formed in the full cycle of proton and electron conductance and to reaction intensity, because more hydrogen atoms, more proton gradients, ATP in the sixth stage of the cycle and more free proton inside the erythrocyte membrane surroundings.
- Quantity of free protons inside of erythrocyte membrane surroundings at 9 stage of cycle would make the remarkable influence to the buffering capacity of erythrocyte membrane surroundings in relation to free

protons, formed in the full cycle of proton and electron conductance and to diffusion speed of oxygen to 14 trillion cells that is, more free protons inside of erythrocyte membrane surroundings more oxygen delivery to body cells.

- Quantity of free protons inside the erythrocyte membrane surroundings would make the remarkable influence to the buffering capacity of erythrocyte membrane surroundings and in such way to the exhalation speed of carbon dioxide from the body that is, more free protons inside of erythrocyte membrane surroundings and more carbon dioxide from the human body.
- Intensity of diffusion of oxygen to 14 trillion cells would make the remarkable influence to 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 that is, more oxygen more release of hydrogen from donators (food substrates) more the free protons in the erythrocyte membrane surroundings
- Increase of intensity of the process at the last 9 step of this cycle in the form of rise of uptake oxygen by the human body are accompanied with remarkable change of the buffering capacity of erythrocyte membrane surroundings in relation to free protons and in such way may rise of intensity of release of proton and electron from donators at first 1 step of this cycle and more the free protons in the erythrocyte membrane surroundings
- The prevalence of fluid alpha state with high oxidation potentials in the membrane-redox potentials three-state line system leads to change of the buffering capacity of erythrocyte membrane surroundings in relation to free protons and in such way to the intensification of diffusion of oxygen to 14 trillion cells and to rise of intensity of release of proton and electron from donators at first 1 step of this cycle and more conversion of proton gradients to heat energy at 6 stage of this cycle and more the free protons in the erythrocyte membrane surroundings
- The prevalence of solid beta state with high reductive potentials in the membrane-redox potentials three-state line system leads to change of the buffering capacity of erythrocyte membrane surroundings in relation to free protons and in such way to the lowering of the diffusion of oxygen to 14 trillion cells and to lowering of the intensity of release of proton and electron from donators at first 1 step of this cycle and more conversion of proton gradients to ATP at the 6th stage of this cycle and the change of the free protons in the erythrocyte membrane surroundings
- The prevalence of gamma state with low redox potentials in the membrane-redox potentials three-state line system leads to change of the buffering capacity of erythrocyte membrane surroundings in relation to free protons and in such way to the less high protonized donators at the first stage of this cycle and to lowering of the diffusion of oxygen to 14 trillion cells and intensity of the release of proton and electron from donators at first 1 step of this cycle and less conversion of proton gradients to ATP and heat energy at the 6th stage of this cycle and less the free protons in the erythrocyte membrane surroundings.

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