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Research Article

HALDEN, BOHR EFFECTS AND THE MEMBRANE REDOXY POTENTIAL THREE STATE DEPENDENT 9 STEPPED FULL CYCLE OF PROTON CONDUCTANCE IN THE HUMAN BODY

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Abstract

According to the Bohr effect, hemoglobin's oxygen binding affinity is inversely related both to acidity and to the concentration of carbon dioxide, carbon dioxide reacts with water to form carbonic acid, an increase in CO_2 results in a decrease in blood pH, resulting in hemoglobin proteins releasing their load of oxygen, conversely, a decrease in carbon dioxide provokes an increase in pH, which results in hemoglobin picking up more oxygen, all these processes have been conducted under influence of increase of unsaturated fatty acids – alpha state as first variant of basic three membrane states of **a** membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance.

Keywords:

INTRODUCTION

Deoxygenated hemoglobin is a better proton acceptor than the oxygenated form, in red blood cells, the enzyme carbonic anhydrase catalyzes the conversion of dissolved carbon dioxide to carbonic acid, which rapidly dissociates to bicarbonate and a free proton, all these processes have been conducted under influence of increase of unsaturated fatty acids – alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within amembrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance. The enhanced affinity of deoxyhemoglobin for protons enhances synthesis of bicarbonate and accordingly increases capacity of deoxygenated blood for carbon dioxide, the majority of carbon dioxide in the blood is in the form of bicarbonate, only a very small amount is actually dissolved as carbon dioxide, and the remaining amount of carbon dioxide is bound to hemoglobin, all these processes have been conducted under influence of increase of unsaturated fatty acids – alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within **a**membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance. The original dissociation curves from Bohr's experiments in the first description of the Bohr effect, showing a decrease in oxygen affinity as the partial pressure of carbon dioxide increases, all these processes have been conducted under influence of increase of unsaturated fatty acids – alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9

According to the Haldane effect , oxygenation of blood in the lungs displaces carbon dioxide from hemoglobin which increases the removal of carbon dioxide, oxygenated blood has a reduced affinity for carbon dioxide, this effect describes the ability of hemoglobin to carry increased amounts of carbon dioxide (CO_2) in the deoxygenated state as opposed to the oxygenated state, a high concentration of CO_2 facilitates dissociation of oxyhemoglobin, all these processes have been conducted under influence of increase of unsaturated fatty acids – alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance.

RESULTS AND DISCUSSION

At first time, we revealed that the full 9 stepped cycle of proton conductance inside human body, which starts as release of proton, electron from food substrates under the undirect action of oxygen released from membrane surroundings of erythrocyte in the 9 stage by a closed loop figure.

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Figure1. The final variant of closed cycle of proton conductance inside human body

In the framework of biological events as "the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance" would be conducted a following processes as:

1. First stage - Release of proton, electron from food substrates under the undirect action of oxygen released from membrane surroundings of erythrocyte in the 9 stage
2. Second stage - Transfer of proton, electron to NADH, $FADH_2$ with release of CO_2 in Krebs cycle
3. Third stage - Transfer of electron to KoQ with the transfer of protons across a membrane to intermembrane space
4. Fourth stage - Transfer of electron from reduced KoQ to cytochrom C with the transfer of protons across a membrane to intermembrane space
5. 5. Fifth stage - 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 with participation cytochrome C oxidase within complex IV
6. Sixth stage - Final creation of proton gradient in the mitochondrial intermembrane space with participation of complex I, III, IV
7. Seventh stage - Transfer of proton to mtochondrial matrix through ATP synthase with synthesis of ATP and generation of heat energy
8. Eighth stage - Entry of three important factors to erythrocytes as protons are exited in the form of metabolic water from mitochondrial matrix of all cells and entered in the form of HCO_3 through plasma membrane of red blood cells, also entry of CO_2 formed in the 2-stage of closed cycle and entry of oxygen from lung
9. Ninth stage - 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, CO_2 promotes the generation of free proton by mecchanism as $H_2CO_{3-} = H + HCO_3$, carbonic anhydrase catalyzes the formation of CO_2 from H_2CO_3 and CO_2 diffuse out in the alveoli.

According to the Bohr effect, hemoglobin's oxygen binding affinity is inversely related both to acidity and to the concentration of carbon dioxide, carbon dioxide reacts with water to form carbonic acid, an increase in CO2 results in a

decrease in blood pH, resulting in hemoglobin proteins releasing their load of oxygen, conversely, a decrease in carbon dioxide provokes an increase in pH, which results in hemoglobin picking up more oxygen, all these processes have been conducted under influence of increase of unsaturated fatty acids – alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance. Deoxygenated hemoglobin is a better proton acceptor than the oxygenated form, in red blood cells, the enzyme carbonic anhydrase catalyzes the conversion of dissolved carbon dioxide to carbonic acid, which rapidly dissociates to bicarbonate and a free proton, all these processes have been conducted under influence of increase of unsaturated fatty acids – alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance.

The enhanced affinity of deoxyhemoglobin for protons enhances synthesis of bicarbonate and accordingly increases capacity of deoxygenated blood for carbon dioxide, the majority of carbon dioxide in the blood is in the form of bicarbonate, only a very small amount is actually dissolved as carbon dioxide, and the remaining amount of carbon dioxide is bound to hemoglobin, all these processes have been conducted under influence of increase of unsaturated fatty acids –alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance. The original dissociation curves from Bohr's experiments in the first description of the Bohr effect, showing a decrease in oxygen affinity as the partial pressure of carbon dioxide increases, all these processes have been conducted under influence of increase of unsaturated fatty acids – alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance.

The Bohr effect facilitates oxygen release in the tissues, particularly those tissues in most need of oxygen, when a tissue's metabolic rate increases, so does its carbon dioxide waste production, when released into the bloodstream, carbon dioxide forms bicarbonate and protons, all these processes have been conducted under influence of increase of unsaturated fatty acids – alpha state as first variant of basic three membrane states of **a** membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance. The enzyme carbonic anhydrase, which is present in red blood cells drastically speeds up the conversion to bicarbonate and protons, this causes the pH of the blood to decrease, which promotes the dissociation of oxygen from haemoglobin, and allows the surrounding tissues to obtain enough oxygen to meet their demands, in areas where oxygen concentration is high, such as the lungs, binding of oxygen causes haemoglobin to release protons, which recombine with bicarbonate to eliminate carbon dioxide during exhalation, these opposing protonation and deprotonation reactions occur in equilibrium resulting in little overall change in blood pH, all these processes have been conducted under influence of increase of unsaturated fatty acids – alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance.

The Bohr effect enables the body to adapt to changing conditions and makes it possible to supply extra oxygen to tissues that need it the most, such as when muscles are undergoing strenuous activity, they require large amounts of oxygen to conduct cellular respiration, which generates CO2 (and therefore HCO3− and H+) as byproducts, these waste products lower the pH of the blood, which increases oxygen delivery to the active muscles, if muscle cells aren't receiving enough oxygen for cellular respiration, they resort to lactic acid fermentation, which releases lactic acid as a byproduct, this increases the acidity of the blood far more than CO2 alone, which reflects the cells' even greater need for oxygen,in fact, under anaerobic conditions, muscles generate lactic acid so quickly that pH of the blood passing through the muscles will drop to around 7.2, which causes haemoglobin to begin releasing roughly 10% more oxygen, all these processes have been conducted under influence of increase of unsaturated fatty acids –alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance.

In addition to enhancing removal of carbon dioxide from oxygen-consuming tissues, the Haldane effect promotes dissociation of carbon dioxide from hemoglobin in the presence of oxygen, in the oxygen-rich capillaries of the lung, this property causes the displacement of carbon dioxide to plasma as low - oxygen blood enters the alveolus and is vital for alveolar gas exchange, oxygenation of Hb promotes dissociation of H^+ from Hb, which shifts the bicarbonate buffer equilibrium towards CO_2 formation, therefore, CO_2 is released from RBCs, all these processes have been conducted under influence of increase of unsaturated fatty acids –alpha state as first variant of basic three membrane states of a membrane - redox potentials three - state (MRPTS) within a membrane - redox potentials three - state line system reaction medium firstly described by us, which have been functioned in the framework 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" which is belong to the the membrane redoxy potential three state dependent 9 stepped full cycle of proton conductance.

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