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RESEARCH ARTICLE

THE FULL 9 STEPPED CYCLE OF PROTON CONDUCTANCE AND ANTIOBESITY MECHANISM OF PROTON LEAKAGE FROM ERYTHROCYTE MEMBRANE SURROUNDINGS

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ABSTRACT

The accumulative capacity of erythrocyte membrane surroundings in relation to free protons, formed in the full 9 stepped cycle of proton conductance is one of more powerful factors influencing the antiobesity mechanism. The accumulation of protons inside erythrocyte membrane surroundings are strongly connected with all previous stages of transferring of protons within the full cycle of proton conductance, which conducted as follows as the second stage of proton conductance, where formed CO_2 and the seventh stage of proton conductance, where formed metabolic water - H_2O in the result of oxidation of protons by activated oxygens, after this have been occurred the reaction between CO_2 and H_2O with formation of H_2CO_3 and dissociation reaction withformation of HCO_3. HCO_3 formed during this reaction have been entered to the erythrocyte membrane surroundings, bearing some parts of protons, released from food substrates. In such way, protons released from food molecules passing all previous 7 stages of the full cycle of proton conductance have been created the preconditon of biosynthesis of fatty acids with participation of HADH, FADH2 (HADH + ATP = NADPH) formed during second stage of full cycle and reached to final 9-th stage as erythrocyte membrane surroundings. This explanation gives the new idea, that if we can succeeded to cause the controlled proton leakage from erythrocyte membrane surroundings, which thereby would lead to diminish the proton gradient in the intermembrane space of mitochondria and also diminish the following transfer of proton to matrix through ATP synthase (sixth stage) and to decrease the fatty acid synthesis owing to relatively shortage of reducing agent as NADPH.

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INTRODUCTION

The ant-obesity mechanism of proton leakage from erythrocyte membrane surroundings less elucidated in the scientific literature.Change of quantity of free protons inside of erythrocyte membrane surroundings at last stage of proton conductance cycle and also change of accumulative capacity of erythrocyte membrane surroundings in relation to free protons, formed in the all stages of full cycle of proton and electron conductance would make the remarkable influence to diffusion speed of oxygen to 14 trillion cells, thereby influencing the oxygen delivery intensity to all cells and influencing the intensity of biosynthesis of fatty acids and the betta oxidation of fatty acids.The prevalence of fluid alpha state with high oxidation potentials in the membrane - redox potentials three - state line system, which included to full cycle of proton and electron conductance leads to increase of proton leakage from 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 andelectron from food substratesat first stage of this cycle and more conversion of proton gradients to heat energy at sixth stage of this cycle, thereby stimulating the betta oxidation of fatty acids, serving the role of antiobesity mechanism.The prevalence of solidbetta state with high reduction potentials in the membrane - redox potentials three - state line system, which included to full cycle of proton and electron conductance leads to decrease of proton leakage from erythrocyte membrane surroundings in relation to free protons, thereby decrease of intensity of release of proton and electron from food substrates at first stage of this cycle and less conversion of proton gradients to heat energy at sixth stage of this cycle and more the free protons in the erythrocyte membrane surroundings, thereby stimulating the biosynthesis of fatty acids, leading to fatty acid accumulation.The prevalence of gamma state with low redox potentials in the membrane-redox potentials three-state line system, which included to full cycle of proton and electron conductance leads to increase of proton leakage from erythrocyte membrane surroundings in relation to free protons owing to high permeability of plasmic membranes and relatively deficit of reducing agent as NADPH, leading to decrease of biosynthesis of fatty acids and also to decrease of betta oxidation of fatty acids.

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RESULTS AND DISCUSSION

The accumulative capacity of erythrocyte membrane surroundings in relation to free protons, formed in the full 9 stepped cycle of proton conductance is one of more powerful factors influencing the antiobesity mechanism. The accumulation of protons inside erythrocyte membrane surroundings are strongly connected with all previous stages of transferring of protons within the full cycle of proton conductance, which conducted as follows as the second stageof proton conductance, where formed CO_2 and the seventh stage of proton conductance, where formed metabolic water - H_2O in the result of oxidation of protons by activated oxygens, after this have been occurred the reaction between CO_2 and H_2O with formation of H_2CO_3 and dissociation reaction with formation of HCO_3. HCO_3 formed during this reaction have been entered to the erythrocyte membrane surroundings, bearing some parts of protons, released from food substrates.In such way, protons released from food molecules passing all previous 7 stages of the full cycle of proton conductance have been created the preconditon of biosynthesis of fatty acids with participation of HADH, $FADH_2$ (HADH + ATP = NADPH) formed during second stage of full cycle and reached to final 9-th stage as erythrocyte membrane surroundings.

This explanation gives the new idea, that if we can succeeded to cause the controlled proton leakage from erythrocyte membrane surroundings, which thereby would lead to diminish the proton gradient in the intermembrane space of mitochondria and also diminish the following transfer of proton to matrix through ATP synthase (sixth stage) and to decrease the fatty acid synthesis owing to relatively shortage of reducing agent as NADPH. The accumulative 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 of proton conductance as the diffusion of HCO_3 and protons, also metabolic water from mitochondrial matrix of all cells to erythrocyte. Quantity of hydrogen atom (proton, electron together) that existed in the donator (food substrates) in the first stage of the full 9 stepped cycle of proton conductance would make the remarkable influence on the accumulative capacity of erythrocyte membrane surroundings in relation to free protons, formed in the proton conductance cycle 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. This antiobesity mechanism of proton leakage from erythrocyte membrane surroundings may be

explained by following facts that less protons inside erythrocyte membrane surroundings lead to more diffused protons from mitochondrial matrix of all cells to plasma membrane of red blood cells with generation of HbH, which thereby promotes the release of oxygen from hemoglobin, oxygen diffusion to all cells conditioning the less accumulation of fatty acids in second and third compartments of human body.The another anti-obesity mechanism of proton leakage from erythrocyte membrane surroundings would be appeared as less protons inside erythrocyte membrane surroundings and less quantity of reduced agents as NADH and NADPH in human body and less intensity of fatty acid biosynthesis, which have been conducted as at first stage: acetyl-CoA + H-SACP = acetyl-ACP, at second stage: acetyl-ACP +malonyl-ACP= acetoacetyl-ACP, at third stage : acetoacetyl-ACP+H+NADPH = NADP + d-betta-hydroxybutyryl-ACP = H_2O + alpha, betta-trans-butenoyl - ACP, at fourth stage: alpha, betta - trans-butenoyl- ACP H+NADPH= butyryl-ACP (recycle reactions 2-6 six more times) = H_2O + palimitate + H-SACP.This anti-obesity mechanism of more proton leakage from erythrocyte membrane surroundings is connected with the Bohr effect, which can be described as a increase in pH, decrease in carbon dioxide, which would be lead to picking up more oxygen.Basing in this fact can be concluded that the decrease of pH erythrocyte membrane surroundings because of increased proton leakage would lead to more intensity of release of proton, electrons from food substrates under the undirect action of oxygen, which would be conditioned the more intensity of betta oxidation of fatty acids.

This antio-besity mechanism of proton leakage from erythrocyte membrane surroundings is also associated with Haldene effect, according to this effect deoxygenated hemoglobin is a better proton acceptor than the oxygenated form of hemoglobin, which would be appeared as less free protons inside erythrocyte membrane surroundings, more oxygenated hemoglobin, more intensity of release of proton, electrons from food substrates and more intensity of betta oxidation of fatty acids.Proton circulation through all previous stages of the full 9 stepped cycle of proton conductance with small leakage of protons, which have been includedthe first stage as release of proton, electron from food substrates, also the second stage of transfer of proton, electron to NADH, $FADH_2$ as hydrogen atom accompanying with release of CO_2 (second stage), the third stage of transferring of proton, electron to KoQ as hydrogen atom, the fourth stage of transferring of protons, electrons to KoQ as hydrogen atom (third stage), the fifth stage of translocation of proton to intermembrane space of mitochondria without accompanying electron, the sixth stage ofcreation of proton gradient in the intermembrane space of mitochondria and following transfer of proton to matrix through ATP synthase, the seventh stage formation of metabolic water in the mitochondrian matrix by oxidation of proton with participation of activated oxygens (protonation of molecular oxygen by matrix proton) would lead to more accumulation of free protons and HbH inside erythrocyte membrane surroundings conditioning the more intensification of biosynthesis of fatty acids.In such way, less proton leakage from erythrocyte membrane surroundings, more accumulation of free protons and HbH and also NADH formed by EmbdenMeierhoff way would give the precondition to intensification of the biosynthesis of fatty acids because this process have been intensified in case of sufficient quantity of NADPH, FADH, H_2O which have been conducted in following four stages as the first stage: acetyl-CoA + H-SACP = acetyl-ACP, the second stage: acetyl-ACP + malonyl-ACP = acetoacetyl-ACP, the third stage : acetoacetyl-ACP + H + NADPH = NADP+d-betta - hydroxybutyryl-ACP = H_2O + alpha, betta-trans-butenoyl- ACP, the fourth stage: alpha, betta-trans-butenoyl- ACP H + NADPH = butyryl-ACP (recycle reactions 2-6 six more times) = H_2O + palimitate + H-SACP.

The antiporter exchange chloride ion for HCO_3 ion, as HCO_3 ion diffuse out of erythrocyte membrane surroundings is one of forms of leakage of protons, which included in composition of bicarbonate ion.

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