

OXIDATIVE MODIFICATION OF PROTEINS AND METHEMOGLOBIN FORMATION IN ERYTHROCYTES UNDER OXIDATIVE STRESS IN VITRO

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It is known, that under different diseases the balance in prooxidative and antioxidative processes is destroyed and oxidative stress is realized. These processes are connected with productive of oxygen active forms, that leads to changed of molecular and cellular structures [1–3]. Today we have much dates about that under some diseases with oxidative stress erythrocytes are involved in pathological process as demonstrated by biochemical changes occurring in them [4–6]. In this regard, it is interest to examine the state of the processes of proteins oxidative modification and methemoglobin formation in erythrocytes under oxidative stress in vitro.

The materials for the study were the erythrocytes of healthy subjects. Erythrocytes were incubated in the Fenton system [7] (10mM FeSO₄ · 7H₂O and 3,0 mM H₂O) during 4 hours at 4°C. The control were erythrocytes didn't incubated in Fenton system. The erythrocytes were hemolysated by distilled water. Membranes of erythrocytes were separated from hemolysate by method of centrifugation. In membranes and hemolysates of erythrocytes the contents of proteins oxidative modification products [8] and oligopeptides [9] were determined. All indexes were studied by spectrophotometric methods of biochemical analyses.

It has been shown, that under oxidative stress in vitro in membranes and hemolysate of erythrocytes the content of proteins oxidative modification products is changed. So, the content of basic aldehyde productes in membranes was rised at 26,9 % as compared with control. The contents of neutral aldehyde products and basic aldehyde and cetons products in hemolysates were rised at 19,0 % and 16,0 %, and at 1,8 times , accordingly as compared with control. In total, under oxidative stress in vitro the formation of basic proteins oxidative modification products in erythrocytes is more prevailed.

At the same time, the content of oligopeptides in membranes and hemolysates of erythrocytes was lowed: in middle, at 1,7% times in membranes and at 3,0 times in hemolysates. These dates maybe connected with considerable destructive processes, formation of a agrigative complexes of structure-changed protein molecules and their removing by centrifugation.

Also, it has been shown, that under oxidative stress the content of methemoglobin in hemolysates of erythrocytes was rised (at 34 % as compared with control).

The obtained dates evidence about intensification of destructive processes in erythrocytes under oxidative stress in vitro that connected with oxidative modification of proteins by oxygen active forms and with activization of methemoglobin formation.

Keywords: erythrocytes, oxidative stress, Fenton system, proteins oxidative modification, oligopeptides, methemoglobin.

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