

## ERYTHROCYTE ENZYMES KINETICS DURING STORAGE

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The goal of this work is to study the evolution of 6 erythrocytes enzyme activity for during storage of red cell concentrates.

Enzymes: CAT, GPx, GRed, GST, G6PD and SOD have an important role in the antioxidant defense during storage. Decrease levels in these enzymes, together with changes that occur in membrane proteins and lipids, are processes that can lead to the destabilization of the skeletal membrane and thus compromise the erythrocytes survival.

**Material and Method:** The red cells samples were processed by freezing-thawing method, and then the hemolyzate obtained was evaluated for the enzymatic activity by spectrophotometrical method for enzymes: CAT, GPx, GRed, GST, G6PD and SOD.

**Results and Discussion:** Activities of enzymes were evaluated weekly: on samples obtained from 8 units of red blood cell concentrates on a period of 8 weeks of storage at a temperature of 2-8 ° C. We found that the enzymes activity studied have a growth trend in the first week in an attempt to counteract oxidative stress in the microenvironment of the bag storage, then a gradual decline in a time dependent manner since the enzymes face increasingly more difficult attack to oxidants.

Thus, decreases of enzymatic activities were observed during the study for all investigated enzymes, and finally were obtained the following results: a decrease by 38% for CAT, 48% GPx, 30% GRed, 85% for GST, 24% for G6PD, 40% for SOD.

Most antioxidant enzymes studied (except G6PD) are directly involved in maintaining a low redox status in erythrocytes cytosol, counteracting superoxide anion attack (a result of erythrocytes physiology) on the bivalent iron.

Enzymatic activity dynamics during storage explains the ability of erythrocytes resistance for 120 days "in vivo" and minimum 40 days "in vitro", the blood being the only tissue that can be kept a long time without special conditions of storage (temperature must be 2-8°C, and the presence of additive solutions to maintain anaerobic metabolism of the erythrocyte).

Initially there is a balance between oxidative stress and antioxidant defense of stored erythrocytes, and thus when it is exceeded, it may not prevent oxidative attack, start hemolysis. In the first week of storage enzymes: CAT, GPx, GRed, GST, SOD and G6PD are less affected by oxidants than other protein structures, and then during storage, the stress gradually increases and the enzymes face increasingly harder oxidative attacks.

This study emphasis the erythrocytes ability to survive longer than 42 days in appropriate additive solutions, which will allow in future new solutions to extend storage ( without freezing) of blood.