

## Biochemical Evaluation of Red Blood Cell Concentrates During a Long Time Storage with Vitamin E Emulsion.

Silva, C.A.L.<sup>1</sup>, Carvalho, V.C.O.<sup>2</sup>, Silva, Y. S.S.<sup>1</sup>; Araújo, H.D.A.<sup>2</sup>, Santos, B.S.<sup>1</sup>,  
Lima, V.L.M.<sup>2</sup>, Fontes, A.<sup>1</sup>.

<sup>1</sup>Departamento de Biofísica e Radiobiologia, <sup>2</sup>Departamento de Bioquímica, Centro de Ciências Biológicas, Universidade Federal de Pernambuco, Recife, PE. Brazil.

**INTRODUCTION:** During a long storage of red blood cell concentrates (RBCC), the erythrocytes undergo gradual damage due to biochemical and mechanical alterations, such as lipid peroxidation, which increase the hemolysis process. *In vivo*, the erythrocyte damage is reduced by antioxidants such as alpha tocopherol (vitamin E). **OBJECTIVE:** The study aimed to investigate whether vitamin E affects erythrocyte lipids, osmotic fragility and permeability after 42 days storage. **MATERIAL AND METHODS:** The RBCC were kept in a medium containing saline, adenine, glucose and mannitol (SAG-M) without alpha-tocopherol, as the control group, or with alpha-tocopherol nanoemulsion made with tensoactives tweens 20 and 80, as the test group. Each experimental group was done in quadruplicate and storage for 42 days at 4°C in the HEMOPE Blood Bank. The RBCC were washed with NaCl (0.9%p/v), centrifuged at 1,500 x g for 15min at 4°C. The physical properties of erythrocyte membranes were evaluated by osmotic fragility and permeability to glycerol tests. The erythrocyte membrane lipids were extracted for quantification of total phospholipids and cholesterol. **RESULTS AND DISCUSSION:** The results showed that after 42 days there was significant ( $p < 0.05$ ) decrease on total phospholipids and cholesterol levels when comparing the test group with the control group. Furthermore, the storage time also altered the erythrocyte osmotic fragility and its permeability to glycerol. Analysis of the osmotic fragility and the permeability showed that the percentage of hemolysis was reduced in the test group, in comparison with the control. **CONCLUSIONS:** The results suggest that during a long period of storage, the erythrocyte membrane decreased its resistance to disruption due to the addition of vitamin E *in vitro*.

**Keywords:** Erythrocytes, Vitamin E, Phospholipids, Cholesterol, Osmotic fragility, Permeability to glycerol.

**Supported by:** FACEPE, CNPq and CAPES.