REGULATION OF PEROXIREDOXINS PRODUCTION PLAYS AN IMPORTANT ROLE IN THE SURVIVAL OF ERYTHROID CELLS IN BETA THALASSEMIA AND SICKLE CELL DISEASE PATIENTS.

Romanello KS¹, Lopes KK¹, Oliveira MA², Netto L.E.S³, Malavazi I¹, Cunha AF¹

¹Universidade Federal de São Carlos, São Paulo, Brazil; ² Universidade Estadual Paulista Julio Mesquita Filho - Campus Experimental do Litoral Paulista; São Paulo, Brazil ³USP-SP Laboratório de Biologia Molecular e Estrutural, São Paulo, Brazil;

Introduction: Peroxiredoxins (PRDXs), are a group of enzymes involved in the detoxification of Reactive Oxygen Species (ROS) in erythroid cells and are highlighted for their abundance and high reactivity. In erythrocytes, PRDXs, particularly PRDX2, is the third most abundant protein, indicating its possible role in the cell development and their maintenance. However, there are few studies connecting these proteins to hemolytic anemias, which have an increase in production of ROS. This study evaluated the expression and production of PRDXs in reticulocytes of sickle cell disease (SCD) and beta thalassemia (BT) patients compared to healthy blood donors. Material and Methods: Gene expression and protein production were evaluated using qPCR and Western blot respectively. Results and Discussion: Our results showed that the levels of transcript and PRDX1 protein were increased in BT patients and decreased in SCD. The PRDX2 transcript showed no differences in both diseases but in western blot analysis a decrease in PRDX2 protein was observed in SCD reticulocytes, indicating a possible post transcription regulation process for this gene in SCD. High levels of PRDX5 transcript were found in BT patients and no difference was observed for SCD. A reduction in mRNA and protein levels for PRDX6 was observed in BT and SCD patients. Besides its action in the detoxification of ROS, PRDX6 acts also as a phospholipase A2 regulating the phospholipid turnover at the cell membrane. The decrease of this enzyme found in both patients could indicate that the cell membrane of the erythroid cells were not renovated leading to hemolysis observed in these patients. Conclusions: This is the first study correlating gene expression of peroxiredoxins in these hemolytic anemias The results could contribute in better understand the role of these protein and in a identification of new targets that could help in the management of diseases and improve the survival of these patients.

Keywords: peroxiredoxins, sickle cell disease, thalassemia
Financial Support: FAPESP and Capes