THE ROLE OF NEUROGLOBINS IN GLOBIN REDOX REACTIONS

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Neuroglobin (Ngb) is a recently identified member of the globins family. In the absence of external ligands, it is hexa-coordinated, with a bis-hystidil heme at physiological conditions. The function of this new protein has not been elucidated yet, but some studies suggest that it may protect the cell from hypoxia, since the protein is expressed whereas there is a raise of ROS (reactive oxygen species), typical of this condition. We have studied the redox interactions between human hemoglobin (Hb) and methemoglobin (met-Hb) with hydrogen peroxyde (H_2O_2), a former of ROS, in the presence and in the absence of mouse ferric Ngb through UV-VIS spectra. Our results show that the transictions of Hb and met-Hb to ferryl and oxoferryl species, (the oxidated state of the proteins respectively) are affected by the presence of Ngb: we have detailed these interactions, comparing these transictions in the presence and in the absence of Ngb and also of ROS scavengers, such as superoxide-dismutase and catalase. In the presence of Ngb, the formation of ferryl and oxoferryl species requires more amounts of H_2O_2 and the degradation of heme is decreased. Once the results of H_2O_2 and ferric Ngb direct interaction showed no changes in the protein spectrum, indicating that in this state there is no reaction between Ngbs and ROS, we suggest that neuroglobin can participate in the redox equilibirum, acting as a protector of globins from ROS.

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Key words: globins, oxidative stress, redox reactions