Effects of 47C Allele (rs4880) of the SOD2 Gene in the Production of Intracellular Reactive Species in Peripheral Blood Mononuclear Cells

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INTRODUCTION. The outcome of sepsis occurs due to influence of environmental and genetic factors besides genes variants whose expression support or not its outcome. Oxidative stress is related to the pathogenicity of sepsis, occurring when there is overproduction of reactive oxygen species associated with inflammation.

OBJECTIVE. Investigate the production of intracellular oxidants as well as the DNA damage between peripheral blood mononuclear cells (PBMCs) Ala-9Val polymorphism carriers of the SOD2 gene before and after they were challenged with lipopolysaccharides (LPS).

MATERIAL AND METHODS. The PBMCs were isolated from the blood of 30 healthy human volunteers by gradient centrifugation (15 volunteer for each allele) and the following assays were performed: Nitrite assay; ELISA Analyses for TNF-α, carboxymethyl lysine, and Nitrotyrosine; determination of intracellular reactive species by 2',7'-dichlorodihydrofluorescein diacetate (DCFH-DA); comet assay; the statistical analysis utilized was t Student Test, significance p<0.05.

RESULTS. In the DCFH-DA the cell with LPS there is an increase in the fluorescence percentage in both alleles. When adding H2O2, the readiness of RS in the cell with 47C allele without LPS it falls (60 min) for the levels of the same cells however with LPS and that doesn't happen in the cell with 47T allele that present higher levels. When it analyzed the fluorescence percentage, it observed that the production of RS in the 47CC cells without LPS is larger than in the 47TT cells without LPS. Nitrite was available finding difference just in the cells challenged with LPS compared with the control in both alleles, this result was also seen for TNF-α, for carboxymethyl lysine, but for 3-nitrotyrosine there is difference among the alleles in the control group, there was difference in the 47TT cells among the groups with and without LPS. In the comet assay it was not found difference among the alleles, only among the groups with and without LPS.

CONCLUSIONS. The 47C allele in the cells in the basal state allows the cells to adapt to a more intense metabolism quickly leaving the capable cells detoxify self with more efficiency. However when are stressed by a long period, they enlarge the products of toxification of the metabolism.