Oxidative state of the liver of rats with adjuvant-induced arthritis

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Introduction. Adjuvant-induced arthritis is an experimental immunopathology in rats, often used as a model for studying autoimmune chronic inflammation and inflammatory cachexia. The purpose of this study was to evaluate oxidative stress in the liver of arthritic rats where morphological and metabolic alterations have been reported to occur. Material and methods. Oxidative injury parameters, levels and production of reactive oxygen species (ROS; spectrofluorometrically with 2',7'-dichlorofluorescein-diacetate) and antioxidant parameters were measured in subcellular fractions, namely cytosol, mitochondria and peroxisomes. Results and Discussion. Arthritic rats presented higher levels of ROS when compared to healthy controls in all subcellular fractions (+51%, +38% and +55% in mitochondria, peroxisomes and cytosol, respectively). Arthritic rats also revealed higher levels of protein carbonyl groups in all subcellular fractions (+189%, +227% and +260%, respectively, in mitochondria, peroxisomes and cytosol). Furthermore, higher levels of NO markers were found in the peroxisomes (+112%) and in the cytosol (+35%) of the liver cells of arthritic rats. The disease also affected several enzymatic activities. The catalase activity of all cell compartments was strongly diminished by arthritis (between −77 and −87%) and the glutathione peroxidase activity was diminished in the mitochondria (−33.7%) and cytosol (−41%). The cytosolic glucose 6-phosphate dehydrogenase activity, on the other hand, was increased (+62.9%) by arthritis, the same happening with the inducible peroxisomal NO-synthase (+119.3%). The GSH content of all cellular compartments was diminished in the arthritic condition (−50 to −59%). Conclusion. The liver of rats with adjuvant-induced arthritis presents pronounced oxidative stress with significant injury to lipids and proteins. The higher hepatic ROS content of arthritic rats seems to be the consequence of both stimulated pro-oxidant system and deficient antioxidant defense with a predominance of the latter as indicated by the strongly diminished activities of catalase and glutathione peroxidase. The complete article can be found at: (http://dx.doi.org/10.1016/j.freeradbiomed.2012.12.003).

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