The reactivity of the lysosomal system, modified by reduced glutathione in subcellular fractions of the mouse kidney

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The kidney is composed of heterogeneous tissue which contains numerous cell populations, each possessing distinct morphological, physiological and biochemical properties. The distal tubular (DT) regions of the nephron are markedly more sensitive to oxidative injury from exogenous peroxides or thiol-alkylating agents than the proximal tubular regions are. The kidney has the several defense mechanisms to minimize this oxidative stress.

The regulation of the cellular GSH status in the kidney, as well as in other tissues, is compartmentalized, involving processes that occur in the cytosol, endoplasmic reticulum, nucleus and mitochondria.

In cells, there are two sites where oxidative-damaged molecules are degraded. They are mitochondria and lysosomes. Lysosomes are especially sensitive to oxidative stress.

This study aims to elaborate on the effect of reduced glutathione (GSH; 100 μg/g of body weight) on the reactivity of some lysosomal hydrolases (alanine aminopeptidase, leucine aminopeptidase, cathepsin D and cathepsin L, acid phosphatase and N-acetyl-β-D-glucosaminidase) in the lysosomal, microsomal and cytosol fractions of the mouse kidney.

All the biochemical assays were performeded spectrophotometrically, using a Lambda Bio 20 spectrophotometer (Perkin Elmer). The data were analyzed via a three-way analysis of variance using the Kramer’s test in the SAS software package.

The greatest number of changes in the activity of these enzymes was observed in the lysosomal fraction, and the least in a microsomal fraction. The activities of the assayed enzymes after GSH administration mainly increased in the lysosomal fraction.

We assume that the changes in this activity, dependent on the subcellular fraction, were a physiological response of the renal cells to this antioxidant.