

Relation of Hepatic Hydrogen Peroxide Level and Liver Super Oxide Dismutase Activity in Selenium-Deficient Rats

Matsumoto Ken-ichiro, Iori Ui¹ and Kazutoyo Endo¹

¹Department of Physical Chemistry, Showa Pharmaceutical University

The relationship of hydrogen peroxide (H₂O₂) levels in bile with liver SOD and GSH-Px activity in selenium (Se)-deficient rats was discussed. Normal rats and 7 groups of rats fed a Se-deficient diet with different feeding periods were examined. H₂O₂ levels in bile were measured with spin-trapping method using electron spin resonance (ESR) [1]. H₂O₂ was reacted with Fe²⁺ to obtain hydroxyl radical. The hydroxyl radical was trapped by DMPO. Then, the ESR signal intensity of DMPO-OH adduct was measured as the level of H₂O₂. The bile H₂O₂ levels in an initial stage (20-60 min from start of the operation) of the measurement were increased depending on the length of the feeding period with Se-deficient diet and absence of Se. Bile H₂O₂ levels in a later stage (60-120 min) of the measurement were once increased with feeding period of Se-deficient diet, then decreased with longer feeding period. Bile H₂O₂ levels immediately after the operation were relatively low in almost all cases. The operation may give an oxidative stress to generate H₂O₂. Liver GSH-Px activity decreased depending on the feeding period with Se-deficient diet and existence of Se. Liver SOD activity once increased with feeding period and then decreased with longer feeding period. It is suggested that the H₂O₂ levels in bile are related with decreased GSH-Px activity, SOD activity and also the oxidative stress caused by operation. Therefore, the H₂O₂ levels in bile are able to be used as an index of sensitivity to the oxidative stress. Although severe oxidative stress may decrease SOD activity, Se-deficiency is able to induce liver SOD activity.

[1] Ueda Yukiyo., Matsumoto Ken-ichiro, and Endo K.azutoyo, *Biochem. Biophys. Res. Commun.*, **271**, 699-702, 2000.