

The enzymatic regulation of production of oxidative phospholipids in biomembrane suffered with oxidative stress

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Phospholipid hydroperoxide glutathione peroxidase (PHGPx) is the unique antioxidant which is able to reduce the phospholipid hydroperoxides produced in biomembrane. PHGPx is preferentially localized in mitochondria as compared with another type of glutathione peroxidase such as classical GPx (cGPx). The cDNA for PHGPx included two sites for initiation of translation. One deduced product was 20 kDa PHGPx (non-mitochondrial type) and another was 23 kDa PHGPx (mitochondrial type) which possessed a signal peptide for the targeting to mitochondria. Cells that overexpressed the 23 kDa PHGPx were more resistant than control cells to the oxidative damage of mitochondria caused by the treatment with KCN, while the protective effect for the mitochondrial damage was not observed in the 20 kDa PHGPx-overexpressed cells. The 23 kDa PHGPx could prevent cell death due to the damage of mitochondria with oxidative stress and would be a key antioxidant enzyme to protect a damage of the skin which is exposed to oxidative damage.