

MITOCHONDRIAL KINASES AND ANTIOXIDANT ENZYME ACTIVITY LEVELS IN MICE BRAIN POSTNATAL DEVELOPMENT.

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Electron leakage from electron transport chain in mitochondria is the major source of cellular reactive oxygen species (ROS), providing a continuous generation of these toxic byproducts. It has been well established that 1-2% of the consumed O₂ by the respiratory chain is diverted to generate ROS. The rate of ROS production is dependent on mitochondrial membrane potential ($\Delta\Psi_m$) and inversely proportional to the availability of ADP. Mitochondrial ADP re-cycling kinases, hexokinase (mt-HK) and creatine kinase (mt-CK) play a role on preventing ROS generation in rat brain. In this study we investigate if there is any correlation between classical antioxidant defenses and these ADP generating kinases in brain mitochondria of mice at different ages. Our results indicate an inverse correlation between the activity levels of the antioxidant enzymes and the kinases. Mt-HK and mt-CK activities significantly increase with aging, whereas catalase (CAT), glutathione reductase (GR), glutathione peroxidase (GPx) and superoxide dismutase (SOD) display an age-dependent decline. In addition, we observed that mitochondrial ROS production, induced by succinate, also increase with age, becoming more susceptible to the ADP-generating kinases activities. On $\Delta\Psi_m$ the result of the activation of the ADP recycling kinases was the same in all ages tested.