Regulation of Free Radical Processes by Delta-Sleep Inducing Peptide in Rat Tissues under Cold Stress

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Abstract—An intraperitoneal injection of an exogenous delta-sleep inducing peptide (DSIP) at a dose of 12 μg/100 g body weight shifted the prooxidant–antioxidant balance of free radical process (FRP) in tissues and erythrocytes of rats: the activities of antioxidant enzymes (superoxide dismutase, catalase, glutathione peroxidase, and glutathione reductase) and the concentrations of antioxidants (reduced glutathione in particular) increased. The DSIP stimulated the myeloperoxidase activity in blood neutrophils and had no effect on the activity of xanthine oxidase, a prooxidant enzyme, in the brain and liver. Cold stress displaced the prooxidant–antioxidant balance by increasing the xanthine oxidase activity in tissues and decreasing the myeloperoxidase activity in blood neutrophils; it also inhibited the enzyme antioxidant activities in tissues and erythrocytes that was neutralized by an increased ceruloplasmin activity in blood plasma and by an elevated level of antioxidants in rat blood and tissues. Preliminary administration of DSIP to animals exposed to cold stress restored the prooxidant–antioxidant balance: it normalized the myeloperoxidase activity in blood neutrophils, decreased the xanthine oxidase activity, and increased the activity of antioxidant enzymes in tissues and erythrocytes restoring the antioxidant level. The molecular regulation mechanism of free radical processes by DSIP in tissues under stressful conditions is discussed.