Antioxidantotherapy by the Sodium Thiosulfate on Phospholipid Metabolism Abnormalities in Different Diseased States

Ghazaryan A.V.

The Scientific Technological Centre of Organic and Pharmaceutical Chemistry of National Academy of Sciences, Yerevan, Republic of Armenia

According to modern images and results of our observations the oxidative stress (OS) is a non-specific though a certain component of pathogenesis at numerous diseased states of organism having in the basis the pathogenic disturbances of phospholipids (PL) metabolism and processes of their free radical oxidation (FRO), which takes place in the membrane formations of the whole cell, as well as the mitochondrial and microsomal fractions of the white rat brain, liver mitochondria, lung shadows, at the same time erythrocyte and lymphocyte shadows at brain acute edema, ischemia, reperfusion and desympathization, infarction of myocardium, tuberculosis of lungs, diabetes, Familial Mediterranean Fever (FMF). The regularities observed clarify the molecular mechanisms of initiation, development and generalization of factors for OS formation under pathologic conditions.

Our data obtained, we propose that disorders mentioned are conditioned by the conformation of cell membranes. In the base of these changes one can see the qualitative and quantitative abnormalities in the membrane bound phospholipid (PL) composition. In the base of PL-PL interrelation disorders the significant qualitative and quantitative abnormalities take place. They are conditioning mainly by increasing of phospholipase A2 activity, which catalyses the degradation of PL-glycerides, prodominantly phosphatidylcholines. This process is accompanied by formation of high concentration of lysophosphatidylcholines and free fatty acids, which involving into free radical processes.

Literary data testify exceptional efficiency of sodium thiosulfate ((STS – $Na_2S_2O_3$) as a powerful synergist for endogenous factors of antioxidant effect, particularly α-tocopherol (α-T), which is the main component for the system of cell antiradical defence. Comparative evaluation of molecular mechanisms of STS normalizing effect as a supplier for hydrogen and sulphur ions, as well as an effective synergist for α-T on the level of various formations of the live cell in compare with the effects of α-T and ubiquinone, allowed to make a special accent on the role of STS in interaction with energy-dependent enzymatic systems of cell antiradical defence, as well as accumulation and transformation of energy on the level of mitochondrial membranes. The results obtained by us confirm a number of clinical experimental observations, which demonstrate treatment and prophylactic role of STS at different pathologic states of the organism.

It was shown for the first time by us the most efficient antioxidant effect conditioning by STS both in-vivo and in-vitro observations in membranes, especially under the action of ultralow concentrations of it (10^{-6}M, 10^{-9}M,10^{-12}M).