DETOXICANT AND HEPATOPROTECTIVE EFFECT OF CYSTAMINE DIHYDROCHLORIDE IN ACUTE INTOXICATION BY CARBONE TETRACHLORIDE

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It is known, that level of sulfhydryl groups (SH-groups) is one of the important factors determining the liver sensitivity to damaging effect of halogenated hydrocarbons, alkylating, and other hepatotropic compounds.

It is due to the fact that functional groups are essential component in maintaining of macromolecular structure of many proteins, biological activity of enzymes and non-enzymatic protein molecules, functioning of low molecular weight thiols which performing the role of cofactors or prosthetic groups of coenzymes (such as glutathione, lipoic acid, and coenzyme A). Moreover, it was found that SH-groups are among the first groups which attacked by xenobiotics in process of cellular response to toxic influence. Due to this process, the oxidation or alkylation of sulfhydryl groups is occured.

Proceeding from this, the aim of our research was the investigation of preventive and therapeutic influence of cystamine dihydrochloride upon the level of SH-groups in blood and liver, processes of detoxication in organism, and cytolysis of hepatocytes in acute intoxication by carbone tetrachloride.

Experiments were performed on white male Wistar rats with weight 160-200 g. It was shown, that a single intraperitoneal injection of carbon tetrachloride (3.5 mmol/kg) after prior administration of phenobarbital (70 mg/kg/day during 4 days) resulted to significant change in concentration of general and non-protein SH-groups. In two hours after intoxication, their blood and hepatic concentration decreased by 30, 45, and 38, 72% respectively that was accompanied by significant increase of AlAT, AsAT, and gamma-glutamyl transferase activity in blood serum.

Preliminary intraperitoneal injection of cystamine dihydrochloride in dose 30 mg/kg in 1 hour prior intoxication caused the insignificant change of sulfhydryl compounds level. A slight increase of mainly non-protein SH-groups was observed. More pronounced hepatoprotective effect was observed with the introduction of the drug in dose 80 mg/kg. In this case, the concentration of both general and non-protein SH-groups authentically increased in liver. In blood serum, this dose of cystamine dihydrochloride also caused reduction of aminotransferase and gamma-glutamyl transferase activity. In case of pre-existing hepatic pathology, usage of cystamine dihydrochloride practically had no therapeutic effect.

Therefore, cystamine dihydrochloride efficacy in toxic damage by carbon tetrachloride was shown only in case of its preventive administration. Obviously, this is due to the increase of SH-groups which included predominantly in low molecular weight compounds.

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