A comparative study of the redox status in rat blood in different pathologies of the liver by EPR method

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Hepatocyte growth factor (HGF) has a leading role in liver regeneration, which cause initiation of cell proliferation by the activation of protein kinases, including MAP-kinase (MAPK). In different liver pathologies protein kinase cascade activation changes are occured. In particular, the reduction of glucocorticoids in the conditions of hormonal disbalance contributes to the activation of MAPK by the inactivation of its negative regulator. MAPK-activation is achieved by increasing the concentration of hepatocyte growth factor in cholestatic liver. At the same time, has not been studied mentioned protein kinases cascade changes in combined pathologies, when early mitotic activity occures in the destructive liver. MAPK signaling pathway is also greatly influenced by the various stress factors, such as oxidative stress. Particularly, it's established that MAPK signaling pathway activation by means of reactive oxygen species. The development of oxidative stress was shown in conditions of hormonal disbalance and cholestasis which has systematic nature. Hence, the acceleration of mitotic activity in combined pathology it's possible to be caused by the intensification of oxidative stress in the body,

The aim of the work was the comparative study of redox status in the blood in condition of different and combined liver pathologies by EPR method.

Research materials and methods: Investigations were carried out on 50 adult white rats (130-140 g). Experimental animals were divided by four groups: I group – control group animals; II group - cholestasis; III group – adrenalectomy; IV group – adrenalectomy 4 days + cholestasis. The cholestasis was induced by the ligation of common bile duct in condition of ether narcosis. Experimental model of hormonal disbalance was obtained by extirpation of both adrenal glands.

Results: It was established that, EPR signals of prooxidative (MetHb) and antioxidative (Ceruloplasmin, Fe^{3+} - transferrin) systems in blood are changed in all three experimental groups. Particularly, ceruloplasmin is increased (I group 27,3 ±0,3; II group 34,7±0,8; III group 29,7±0,3; IV group 36,0±0,6) and Fe^{3+}-transferrin is decreased (I group 29,7±0,9; II group 26,3±0,9; III group 27,3±0,3; IV group 25,3±0,3). The changes of MetHb was revealed as in case of cholestatic liver (cont.0,00, exp. 2±0,6), also in combined pathologies.

Conclusion: Based on our results, we can conclude that production intensification of reactive oxygen species generators in condition of combined pathologies in liver, as well as in blood. Consequently the intensification of oxigen and nitrogen stress takes place. According to the obtained dates, we can assume, that intesification of oxidative stress causes activation of MAPK and the acceleration of mitotic figures in destructive liver parenchyma.