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Liver as a Target Organ for Eco-Toxicological Studies

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Introduction

Liver is the primary target organs for many chemicals principally because of the role they serve within the body and serves as a suitable organ for the study of heavy metals effects due to its high metal accumulating capacity and susceptibility to histo-pathological damage by metals [1,2].

A range of contaminants including carcinogens, metals, bio-toxins, and persistent organic pollutants injure livers of fishes, and although some mechanisms of liver injury are unique to fish, most of the hepatic injury in these aquatic vertebrates arises from mechanisms similar to those observed in mammals [2]. An understanding of chemical hepato-toxicity requires an appreciation of anatomic and physiologic features of the liver. With respect to fish liver, although fish and mammalian liver are same in many features, there are some different futures between fish and mammals that may influence its interpretation [3].

Clearly, the liver is not an initial or primary organ expose to contaminant but it is a detoxifying organ which may accumulate various contaminants or their metabolites [3].

Gut is a important rout of contaminant uptake ones they are ingested by fish via this route the liver is a more direct target organ for uptake contaminants, however metabolism processes within the cell of intestine wall is prior to liver entry [4].

The three major functions of the liver essential for life of the organism are [3,4]:

Uptake, metabolism, storage, and redistribution of nutrients and other endogenous molecules

The synthetic and excretory functions of the liver maintain the homeostasis of the organism. To achieve this, specific molecules are synthesized in hepatocytes, packaged in the Golgi apparatus, transported in a specific direction for release into the intercellular spaces and to the bloodstream, where they are taken up by other organs and utilized.

Metabolism of lipophilic compounds, including xenobiotics

Biotransformation reactions catalyze the conversion of endogenous as well as exogenous compounds with poor water solubility to more hydrophilic metabolites that can be readily excreted. With respect to xenobiotics, the majority of hepatic biotransformation reactions may be considered as a detoxification process decreasing toxic body burden by enhancing excretion.

Formation and excretion of bile

Bile excretion is important for the elimination of degradation products of endogenous compounds such as heme or steroid hormones, as well as for the elimination of xenobiotics and their metabolites and some metals such as copper and mercury.

All of these hepatic functions have been shown to be involved not only in physiological states but also in processes leading to alterations in hepatic morphology and physiology. It is this great metabolic capacity of the liver that makes it both a target and an organ of defence. When toxic hits on the target occur, they may lead to alterations or injury in liver structure and function. Because of the multiple physiologic functions of the liver and its considerable plasticity, the liver responds to toxic insults in many different ways; thus, there appears to be no prototype single reaction classification of hepatotoxicity [5-8].

Conclusion

In Conclusion Liver is vital organ of fishes and due to various metabolism and different process. It is therefore a potential target for the toxic action of chemicals. It is important to differentiate between effects which are toxic for the liver cells and effects which do not harm the liver cells but disturb their support of peripheral tissues. We can chose liver as target organ of heavy metals and examined liver cell through histo-pathological analyses for possible effect of metals on liver tissue and also examined eventual role of xenobiotics on disturb liver support of peripheral tissues through enzymatic, hormonal and hematological analyses.

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