

# **Mechanisms of Hepatocellular Dysfunction and Regeneration: Enzyme Inhibition by Nitroimidazole and Human Liver Regeneration**

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**Mechanisms of Hepatocellular Dysfunction and Regeneration: Enzyme Inhibition by Nitroimidazole and Human Liver Regeneration**

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## **Introduction**

Enzymes so called (Enz'-a-ai-am) are biologically active protein molecules responsible of biochemical reactions in the bacteria, cells and organs. Enzymes regulate the rates of biochemical reactions to maintain the metabolism to keep active physiological actions in the body. High enzyme activities or high rates of reactions cause higher product formation or deposits to initiate disease. Drugs are used as enzyme competitors to normalize the reactions to correct disease. Most of diseases are cured by 'enzyme inhibition'. Enzyme inhibition can be three types: competitive, non-competitive, and uncompetitive. Enzyme inhibition also provides a kind of defense in cells by regulation of metabolism to inhibit or stimulate the biochemical processes. Most of the drugs undergo detoxification and biotransformation in liver to regenerate or formation of new hepatocytes and Kupffer cells. Major biochemical events in liver regeneration are regulated by enzymes in energy metabolism, growth factors and cytokine molecules.

Present chapter describes an example of liver cell enzyme battery to regulate the carbohydrate, lipid and protein metabolism in liver cells, mainly hepatocytes and Kupffer cells in the light of liver damage due to amoebic liver abscess and role of enzyme inhibition in liver regeneration by 2'-nitroimidazole. Liver damage by amoeba is manifested by elevated enzymes in cells. As a result, two major clinical manifestations of *Entamoeba histolytica* infection are amoebic colitis and amoebic liver abscesses. To cure amoebic liver abscess, liver regeneration and amoebic killing by 2'-nitroimidazole therapy is routine in clinical practice. 2'-nitroimidazole acts in liver to perform enzyme inhibition at the level of carbohydrate, lipid, and protein metabolic

regulatory steps. Earlier, nitroimidazole derivatives were considered drug of choice in treatment of hepatic hypoxia (low oxygen) conditions in parasitic infections, cancer and recently nitroimidazole derivatives are emerging as hypoxia markers and radiosensitizers in tumor treatment

### **Reference**

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