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Biochemical effects of some antioxidants on induced liver toxicity

Thesis presented

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Summary

Biochemical effects of some antioxidants on induced liver toxicity

Our work has been designed in two experiments as follows:

The first experiment was conducted to estimate the hepatic oxidative stress induced by injection of Monocrotaline (10 mg/kg body weight in 0.5 mL PBS, IP) and to determine the protective effects of cerium oxide nanoparticles (CeO_2) (0.01µg/kg; 0.5 mL in PBS, IP) on days 1 and 3, a single dose of Mono on day 2 as described above, lipoic acid 30 mg/kg IP (days 1,3,5 and 7, 0.5 ml PBS) and a single dose of Mono on day 4 as described above, S- adenosyl methionine 20 mg/kg in four doses IP (days 1,2,4 and 5, 05 ml PBS) and a single dose of Mono day 3 as described above.

Our results show that, administration of these antioxidant substances (CeO_2), lipoic acid, SAM and vitamin E caused a significant increase of hepatic reduced glutathione level (GSH), glutathione reductase and glutathione peroxidase and glutathione S- transferase activities when compared with the rat group received moncrotaline only. In addition, these substances also caused a significant decrease in liver catalase and super oxide dismutase activities as compared with monocrotaline injected group.

That's to say; administration of cerium oxide anonoparticles, lipoic acid, SAM and vitamin E can induce a sufficient protection against monocrotaline induced hepatic oxidative damage.

The second experiment was designed to estimate hepatic toxic effects of parcetamol (APAP), (600 mg/kg body weight every 24 hours for two doses) and to evaluate the protective effects of selenium nanoparticles injection in two different sizes (3- 5 nm and 10- 20 nm) as follow 0.5 mg Kg^{-1} I.P. body weight in two doses every 24 hours before and after APAP administration. Rats were scarified 24 hours after the last dose.

Our results show that, Se nanoparticles administration caused a significant decrease of serum liver enzymes (ALT, AST and ALP) when compared to paracetamol group. Moreover, Se nanoparticles modulated the decrease in serum albumin and total protein caused by APAP injection. Added to that, Se nanoparticles injection caused a significant increase in hepatic GSH contents, glutathione reductase activity as compare to APAP group. These effects were accompanied by a marked reduction in DNA fragmentation, lipid peroxidation (MDA), catalase and super oxide dismutase activities when compared to APAP injected group.

Finally, our biochemical results and oxidative biomarkers were confirmed by histopathological examination and electron microscope scanning which came in agreement with our biochemical results and inveterate the intracellular even distribution of the nanoparticles.