SUMMARY

In the present study it was observed that:

1) On administration of hepatotoxins (CCl₄, TAA and ethionine) the activities of aspartate and alanine transaminases in plasma increased significantly showing that the liver was damaged.

2) NADH oxidase which gives information on the ability of transfer of electrons through all three sites was decreased significantly in rats treated with CCl₄, TAA, galactosamine and ethionine.

3) Succinate oxidase which gives information on the electron transfer through site II and III was also decreased significantly on administration of CCl₄, TAA, galactosamine and ethionine.

4) RCR which is an index of membrane integrity was decreased by more than 50% on administration of these hepatotoxins (CCl₄, TAA, galactosamine and ethionine) showing that the integrity of mitochondria was damaged. P/O ratio, an index of the efficiency of the system to conserve energy in the form of ATP, was decreased significantly with all the hepatotoxins studied.

5) NADH dehydrogenase which feeds electrons to the respiratory chain at site I was decreased significantly in CCl₄, TAA, galactosamine and ethionine treated rats.

6) Succinate dehydrogenase, which feeds electrons to the respiratory chain at site II was decreased significantly in CCl₄ and galactosamine treated rats.

7) Cytochrome oxidase which gives information about electron carriers at site III of the respiratory chain was decreased significantly in CCl₄, TAA, galactosamine and ethionine treated rats.

8) Studies on succinate cytochrome C reductase which gives information about site II of the electron transport chain was decreased significantly in CCl₄, TAA, galactosamine and ethionine treated rats.

9) The ATPase activity which is generally very low in tightly coupled mitochondria, was found to be very high in CCl₄ and TAA treated mitochondria showing that the mitochondria were uncoupled.
10) Lipid peroxide level (index of membrane damage) was increased significantly in liver homogenate and mitochondria of CCl₄, TAA, galactosamine and ethionine treated rats.

11) Reverse electron transport which gives information about site I of electron transport chain was decreased significantly on administration of CCl₄, TAA and galactosamine treated rats.

12) The concentrations of cytochromes (aa₃, b and c) which serve as electron carriers were decreased significantly on administration of CCl₄, TAA, galactosamine and ethionine treated rats.

13) The concentrations of phospholipids phosphatidyl choline, phosphatidylethanol amine and cardiolipin were also decreased significantly on administration of CCl₄, TAA, galactosamine and ethionine treated rats.

14) Studies on purified cytochrome oxidase from CCl₄ treated rats showed that four subunits of the enzyme were decreased significantly. Kinetic studies of the purified enzyme showed that the $K_m$ had increased significantly while $V_{max}$ showed a significant decrease.

15) There was a significant decrease in the energy charge of the cell due to the administration of CCl₄, TAA and ethionine.

16) Among the four hepatotoxins studied only CCl₄ showed a significant effect on kidney mitochondria.

Administration of the protective agents like vitamin E (biological antioxidant) or P.fraternus or colchicine prior to the hepatotoxin reversed most of the effects induced by these hepatotoxins. It can be concluded that the administration of the hepatotoxins damage the membrane integrity, decrease the rate of electron transport through various segments of the electron transport chain and decrease ATP synthesis. These effects are due to the production of free radical which will lead to lipid peroxidation and membrane damage. All most all these damages can be reversed by prior administration of vitamin E or P.fraternus or colchicine.