5. SUMMARY

Gentamicin, an aminoglycoside antibiotic was administered to induce nephrotoxicity in male albino rats. The effect of α-lipoic acid was studied on some of the carbohydrate metabolising enzymes in both liver and kidney tissues.

The activities of the glycolytic enzymes hexokinase, phosphoglucomutase and aldolase were significantly affected in the liver and kidney tissues of gentamicin administered rats. This is likely to be due to inhibition in the transport of glucose across the brush border membrane in the kidney. Lipoic acid administration at a lower (2 mg) and higher dosage (5 mg) brought about significant elevation in the enzyme activities in both liver and kidney tissues in normal and gentamicin injected rats.

The LDH activity was decreased in the liver in gentamicin treated animals and increased when lipoic acid (5 mg) was given. The increase was seen in both the kidney and liver tissues.

The two major gluconeogenic enzymes, Glucose-6 phosphatase and Fructose 1,6-diphosphatase were significantly inhibited in the gentamicin group in both the liver and kidney tissues. Lipoic acid also further reduced their activities in both normal and gentamicin administered rats.

The effect is likely to be due to lowering in the levels of acetyl CoA, an essential factor for active gluconeogenesis.
The activities of ICDH, SDH and MDH were significantly decreased in the kidney in gentamicin group. This may be due to the untoward effect of gentamicin on mitochondrial inner membrane. Lipoic acid at a concentration of 5 mg brought about a significant increase in the activities of all these three enzymes in the kidney tissue.

Na⁺, K⁺-ATPase, Mg⁺⁺-ATPase and Ca⁺⁺-ATPase levels were decreased in gentamicin group in both the tissues and returned to near control levels when lipoic acid at a higher dosage was given.

Alkaline phosphatase level was decreased in the kidney during gentamicin administration and significant increase could be seen in the lipoic acid treated group in both the liver and kidney tissue. The decrease in the enzyme activity in the kidney may be due to the binding of gentamicin to phosphotidylinositol resulting in the inhibition of alkaline phosphatase activity.

Histopathological studies also reveal changes in the proximal convoluted tubule in the gentamicin injected group and in the case of lipoic acid (2 mg and 5 mg) treated group shows normal architecture.