P R E F A C E

This thesis incorporates the results of investigation on the role of taurine in metabolism.

Taurine is widely distributed in animal kingdom, high concentrations being seen in mammalian tissues, especially in heart. It has been suggested that taurine plays an important role in stabilization of membranes. Cholesterol, phospholipids, free fatty acids, glycosaminoglycans and glycoproteins form important components of cell membranes and subcellular particles. Very little is known about the role of taurine in the metabolism of these substances. The difficulty in producing taurine deficiency was the major handicap in the study of the metabolic role of taurine. Recently, β-alanine - structural analog of taurine, has been found to produce taurine deficiency in rats. The following investigations have been carried out in this respect in rats:

1. Effect of administration of β-alanine and taurine on the concentration of taurine in serum and tissues.

2. Effect of administration of β-alanine and taurine on
   a) Concentration of cholesterol, phospholipids and triglycerides in serum and tissues.
   b) Activity of HMG-CoA reductase and incorporation of $^{14}$C-acetate into liver cholesterol.
   c) Concentration of hepatic biliary bile acids and biliary cholesterol.
   d) Activity of lipoprotein lipase of the extra hepatic tissues and that of plasma LCAT.
   e) Release of lipoproteins into the circulation.
3. Effect of administration of taurine on the metabolism of glycosaminoglycans (GAG).
   a) Concentration of total and different GAG in the tissues.
   b) Activity of some enzymes involved in the biosynthesis of precursors of GAG.
   c) Activity of some enzymes involved in the degradation of GAG.
   d) Concentration of PAPS, activity of sulfate activating system and activity of sulfotransferase in liver.

4. Effect of administration of taurine on the metabolism of glycoproteins (GP)
   a) Changes in the concentration of total hexose, fucose and sialic acid in the tissue GP.
   b) Activity of glycohydrolases.

There are reports that taurine has magnesium sparing action. Work in our laboratory has shown that magnesium deficiency has significant effect on the metabolism of cholesterol, GAG and GP. In view of these, the following investigations have also been carried out:

1. Effect of administration of taurine to magnesium deficient rats on
   a) Concentration of cholesterol, phospholipids, triglycerides magnesium levels in serum and tissues.
   b) Activity of HMG-CoA reductase and incorporation of labelled acetate into different lipids in liver.
c) Concentration of hepatic acids and fecal excretion of neutral sterols and bile acids.

d) Release of lipoproteins into the circulation.

e) Activity of lipoprotein lipase of the extra hepatic tissues and that of plasma LCAT.

2. Effect of the metabolism of GAG

a) Concentration of total and different GAG in the tissues.

b) Activity of enzymes involved in the biosynthesis of precursors of GAG.

c) Activity of enzymes involved in the degradation of GAG.

d) Concentration of PAPS, activity of sulfate activating system and that sulfotransferase in the liver.

3. Effect on the metabolism of GP.

a) Concentration of total hexose, fucose and sialic acid in the tissue GP.

b) Activity of glycohydrolases.

Since taurine has been reported to be depleted in the cardiac muscle in isoproterenol induced myocardial infarction in rats, the effect of administration of taurine on the severity of myocardial infarction induced by isoproterenol has also been studied. Investigations carried out in this respect include:

a) Activity of serum CPK, LDH, GOT and GPT

b) Concentration of malondialdehyde, hydroperoxides and conjugated dienes in the heart.

c) Concentration of total GAG in serum, heart and aorta.

d) Concentration of total hexose, fucose and sialic acid in serum and heart.

The results of these investigations are discussed in this thesis.