This thesis incorporates the results of detailed investigations on the effect of glucagon on the metabolism of cholesterol, glycosaminoglycans and glycoproteins in rats. There are a few reports indicating that this hormone lowers serum cholesterol and triglycerides in man and experimental animals, suggesting an antiatherogenic action. But no definite information is available on the mechanism of this hypocholesterolemic effect. It is known that in atherosclerosis the metabolism of glycosaminoglycans and glycoproteins is altered in addition to that of lipids. In view of these detailed investigations have been carried out on the effect of acute and chronic administration of glucagon on the metabolism of cholesterol, glycosaminoglycans and glycoproteins using rats as experimental animals. The following aspects have been studied.

1. Metabolism of lipids.

a) Concentration of cholesterol, triglycerides and phospholipids in the serum, liver and aorta.

b) Concentration of cholesterol in the serum lipoprotein fractions.

c) Activity of HMG-CoA reductase in the liver and incorporation of labelled acetate into liver cholesterol.

d) Activity of lipoprotein lipase in the extrahepatic tissues.

e) Activity of plasma lecithin: cholesterol acyl transferase.

f) Release of lipoproteins into the circulation.

g) Concentration of bile acids in the liver and fecal excretion of bile acids and neutral sterols.
II. Metabolism of glycosaminoglycans in the liver
   a) Concentration of total and different glycosaminoglycans - hyaluronic acid, heparan sulphate, chondroitin-4-sulphate, chondroitin-6-sulphate, dermatan sulphate and heparin.
   b) Activity of enzymes involved in the biosynthesis of precursors of glycosaminoglycans - D-glucosamine-6-phosphate isomerase (glutamine forming) and UDPG dehydrogenase.
   c) Activity of enzymes involved in the degradation of glycosaminoglycans - β-glucuronidase, β-N-acetyl hexosaminidase, hyaluronidase, aryl sulphatase and cathepsin-D.
   d) Sulfate metabolism - Concentration of PAPS, activity of sulphate activating system (which includes sulphate adenyl transferase and adenyl sulphate kinase) and sulphotransferase in the liver.

III. Metabolism of glycoproteins in the liver.
   a) Concentration of carbohydrate components - total hexose, fucose and sialic acid in the liver glycoprotein.
   b) Activity of glycohydrolases - β-glucosidase, β-fucosidase, β-galactosidase and β-N-acetyl hexosaminidase.

IV. Concentration of collagen and elastin in the liver.

The results of these studies are discussed in this thesis.