RATIONALE OF THE PRESENT STUDY

Human placenta and fetal liver show a close functional interdependency to each other. Placenta plays the role of a liver for the developing embryo until about 10-12 weeks of gestation, secreting glucose or otherwise controlling the concentration of glucose in the embryonic blood stream (10). It also serves early in gestation as an important organ for lipid and protein metabolism for the fetus until the fetal liver becomes more competent. On the other hand, fetal liver helps the placenta during its estrogen synthesis (53). Placenta can not mediate the conversion of estrone and estradiol-17β into corresponding 16α--hydroxy estrone and estradiol, the end products of estrogen biosynthesis, due to lack of the enzyme 16α-hydroxylase. By contrast, this enzyme is present with high activity in fetal liver. So, with the help of this organ, placenta completes the estrogen formation. Thus, human placenta and fetal liver supplement each other during embryogenesis. The present work has been planned to study some biochemical parameters of these two closely related organs.

During embryogenesis, rapid cell differentiation and organelle formation take place both of which require more lipids. But lipids cross the placental barrier very slowly or not at all. Thus, fetus imports fatty acids from the maternal source through placenta and synthesizes its own lipids. During such passage through placental and fetal tissues, these hydrophobic fatty acids have to cross the aqueous cytosol. Thus some carrier molecule must be involved in this transport process. It is now well established that FABP helps in the intracellular transport of fatty acids and fatty acyl-CoA thioesters in many tissues e.g. rat liver, intestine and myocardium (244), brain (247), mouse preputial gland (272), bovine heart (273), bovine liver (274), human liver (275, 276) etc. But there is hardly any report regarding its presence, function and involvement in fatty acid transport and metabolism during human embryogenesis. Moreover, this protein plays a regulatory role in many enzyme systems which are affected by fatty acids and their CoA thioesters (250, 257-261). Glucose-6-phosphate dehydrogenase (G6PD, EC.1.1.1.49) is an enzyme which furnishes coenzyme, i.e. NADPH for reductive biosynthesis of lipids, steroids etc. and gets inhibited by fatty acids and fatty acyl-CoA thioesters (277, 278). However,

the role of FABP in regulating G6PD activity during human embryogenesis is not properly investigated.

The present study has thus been aimed to fulfil some of these lacunae. The immediate objectives are to isolate, purify and characterize FABP from developing human placenta and fetal liver as well as to study its role in regulating G6PD activity during human embryogenesis.

The following investigations have, therefore, been made in human placenta and fetal liver.

1] Isolation, purification and characterization of fatty acid binding proteins.

2] Role of fatty acid binding proteins in regulating glucose-6-phosphate dehydrogenase activity.

Lastly, the results obtained have been discussed in the light of available literature in the field.