Mammary gland is one of the most important accessory glands of the skin. This gland has the distinguished feature of synthesis and secretion of the 'renowned' fluid called milk, produced due to the prodigious synthetic activities of the mammary gland.

Milk is known to contain different types of proteins of which casein, the principal protein, is of extreme importance because of its high biological value. Vegetable proteins though available in abundance, yet they loose their importance due to lack of certain essential amino acids. For many years the origin and the site of synthesis of milk proteins was debated. During last two decades the intensive studies, using arteriovenous difference technique and radiotracer technique, have clearly shown that the major milk proteins are exclusively synthesized in the secretory cells of the mammary gland.

Intricate studies by using labeled amino acids have well established that casein, -lactalbumin and -lactoglobulin are not the same as the blood proteins, but must be synthesized in mammary gland from a free amino acid pool of the blood stream. In other words mammary gland is 'self-sufficient' in carrying out the synthesis of milk proteins. A multitude of enzymic proteins is
also synthesized in the mammary cells concomittant with the synthesis of milk and appear in minor quantities in the milk.

There are some milk proteins which do not have their origin in mammary gland. They comprise only 5-10% of the total milk proteins and include serum albumin and immune globulins. Tracer studies have indicated that the origin of these proteins is from the bloodstream only and they lend the immunological properties to the milk.

Apart from the nutritional and immunological importance of the milk proteins, the recent demonstration that one of them (α-lactalbumin) plays a pivotal role in the regulation of milk synthesis, further give the scope to elucidate the mechanism of their synthesis and secretion.

Enzymatic steps involved in the synthesis of milk proteins are well established, however, similar studies on the mechanisms involved in the synthesis of casein and its fractions appear to be limited. The elucidation of the discrete mechanisms involved in the milk protein synthesis is at present one of the most intensive area of scientific endeavour and has provided a fascinating chronology of brilliant research efforts.

Significant metabolic changes occur in mammary gland during pregnancy, parturition and lactation. Remarkable feature of the lactating mammary gland is that mitochondrial fraction is most active as regards protein synthesis unlike most of the other tissues. However, very little is known regarding the protein synthesizing activity of a normal mammary gland. Other interesting aspect of the
milk protein synthesis by the mammary gland is in its regulatory and control mechanisms through the agency of hormones. During the past decades the area of rapid development has been to define the requirements of the hormones inducing mammary cellular developments, induction and maintenance of lactation. It is well evidenced that the process of initiation and secretion of milk is controlled by certain specific hormones. Many a reports have appeared to disclose the existence of synergistic relationship between the hormones. The growth of mammary gland during pregnancy and transition to lactational state at parturition are processes dependent on a complex and sequential array of hormones like estrogens, progestins, adrenal corticoids, prolactin and insulin.

For such studies goat and rabbit earn preference over the other mammals because of comparatively small size, easy availability and economy, and furthermore these species well represent the ruminants and the non-ruminants, respectively.

Recent studies carried out in this laboratory have shown that liver, a non-target tissue, affects the protein synthesising activity of the mammary gland in vitro. It has been observed that the boiled extract of liver homogenate from lactating animal stimulates the amino acid incorporation in the mammary proteins while a similar extract of liver homogenate of a non-lactating animal has been reported to be inhibitory to such incorporation. The present studies were planned to investigate the stimulatory or inhibitory effects at the subcellular level of the mammary tissue. However, such type of interaction has also been studied with the boiled extracts of the different subcellular fractions of liver. The nature of action of
different hormones in relation to the protein synthesis has been tested in *in vivo* and *in vitro* system of virgin rabbit.

Numerous studies have emphasized the central importance of 3', 5'-cyclic AMP as a second messenger of hormonal stimulation which propagates within the cell the stimulatory signal from the hormones interacting primarily at the cell surface. Also the growth and activity of mammary gland is related to the 3', 5'-cyclic AMP content of the tissue. The present study also encompasses the investigation on the level of cyclic AMP and adenyl cyclase in the mammary tissue during lactation cycle of the rabbit.