Chapter - III

Problems and Hypotheses

The organism's reaction to a stressor, whether environmental or internal, is controlled by endocrine secretions. Since each learning situation is a stressful situation, it is usually followed by the release of E and NE from the adrenal medulla, corticosteroids from the adrenal cortex and ACTH and VP from the pituitary gland (Gold and McCarty, 1981; Gold et al., 1982). Since the degree of retention varies according to the nature and degree of hormonal consequences of the experience, these changes are thought to be the endogenous modulators of memory.

It is evident from the studies reviewed in the previous chapter that post training ip administration of a moderate dose of E (.01-0.1 mg/kg) enhances later retention of an inhibitory avoidance task. A lower dose (0.001 mg/kg) does not effect retention performance while a higher dose (.5 mg/kg) has an amnestic effect.

Peripherally, E is particularly active in stimulating the release of glucose from the liver and inducing hyperglycemia. It has been found that hyperglycemia subsequent to endogeneous release or exogeneous administration of E contributes to the hormone's effect on memory storage (Gold, 1986; Hall and Gold, 1986; Gold,
Vogt and Hall, 1986). A number of earlier investigators have reported that the facilitative/inhibitory effect of E on memory is due to its influence on the process of retrieval (Overton, 1974; Gold and Zornetzer, 1983; Izquierdo and Dias, 1983; Izquierdo and Dias, 1984). It has been demonstrated that the amnestic effect of posttraining peripheral administration of E and other hormones such as ACTH and vasopressin can be reversed by the administration of the same/other hormone, prior to testing (Izquierdo and Dias, 1983; Nagpal, 1985; Gupta, 1987).

Since the effect of E and glucose on memory are exactly similar, the present investigator felt tempted to investigate whether the effect of glucose on memory is also due to its influence on retrieval. The following problem was formulated:

To study the state dependent effect of Epinephrine and Glucose on memory.

It was hypothesised that:

i. The posttraining administration of a high dose of E would have an amnestic effect on retention.

ii. The post-training administration of a high dose of glucose would have an amnestic effect on retention.
iii. The amnestic effect of post-training administration of glucose will be counteracted by pre-testing administration of the same substance.

iv. The amnestic effect of both E and glucose will be counteracted by administration of the other substance prior to testing.