

## MECHANISM OF HORMONE ACTION

- Each hormone affects only certain kind of cells, which is called as target cells.
- All hormones do not act in the same way due to different location of their receptor.

Hormones are two types:

1. **Water soluble hormones (Proteinaceous, Polar)**
2. **Lipid soluble hormones (Steroidal, Non-Polar)**

- Hormones produce their effects on target tissues by binding to specific proteins called hormone receptors located in the target tissues only.
- Hormone receptors present on the cell membrane of the target cells are called membrane-bound receptors and the receptors present inside the target cell are called intracellular receptors, mostly nuclear receptors (present in the nucleus).
- Binding of a hormone to its receptor leads to the formation of a hormone-receptor complex.
- Each receptor is specific to one hormone only and hence receptors are specific.
- Hormone-Receptor complex formation leads to certain biochemical changes in the target tissue. Thus, target tissue metabolism and physiological functions are regulated.

### 1. Water soluble hormones:

They interact with membrane bound receptor and normally do not enter into the target cell, but generate secondary messenger (e.g. cyclic AMP,  $IP_3$ ,  $Ca^{++}$  etc.) which in turn regulate cellular metabolism.

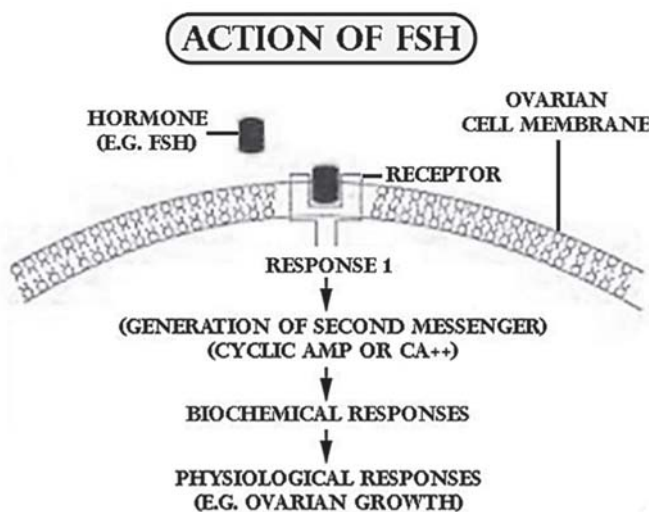
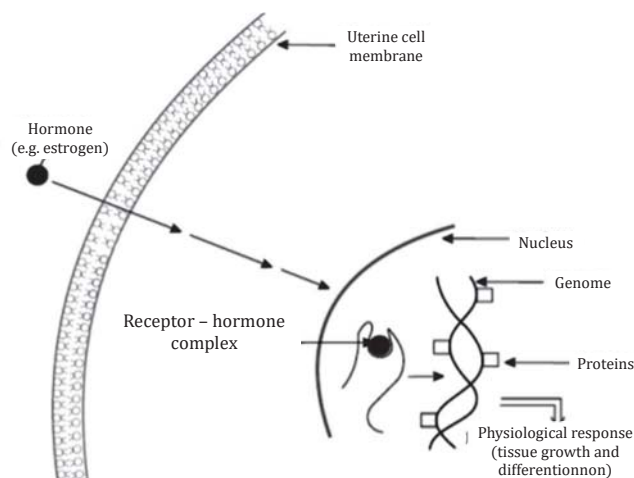


Fig. (a) Protein or water soluble hormone

### 2. Lipid soluble hormone:

They interact with intracellular receptors (mostly nuclear). Mostly regulate gene expression or chromosome function by the interaction of hormone receptor complex with the genome. Cumulative biochemical action results in physiological and developmental effects.



**Fig. (b) Steroid or lipid soluble hormone**

The action of lipid soluble hormones is slower and long lasting than the action of water soluble hormones.

### **Synergistic hormone**

When two or more hormone complement the function of each other and both are needed for full expression of hormone effect.

### **Example:**

Insulin and growth hormone/Thyroxin have synergistic effect for body growth. Estrogen, progesterone, prolactin and oxytocin have synergistic effect for physical growth of mammary gland.

### **Antagonistic hormone**

When two hormones oppose the actions of each other.

### **Example:**

Insulin and glucagon Parathyroid hormone and Calcitonin MSH and melatonin