# Mechanism of Action of Water Soluble Hormones (H-2)

1. Water soluble hormones are either formed from Amino acids and or peptides or contain polar functional grps.
2. Being polar, they cannot penetrate through cell membrane and enter into cytoplasm.
3. Water soluble hormones mostly affect cells by binding to receptors on the surface of the target cell.

We have already discussed mechanism of action of water soluble hormone, Adrenaline hormone, which is involved in glucose metabolism. Adrenaline is released when the body requires immediate energy. The mechanism was discussed in the course 'c Life Processes' in IIIrd Sem.

In brief -, How do water soluble hormone work?.

1. The hormone molecule binds to one of the receptor molecules decorated on the surface of the target cell.

2. Binding of the hormone to the particular receptor causes a chemical reaction inside the cell without the hormone molecule itself ever entering the cell.
3. Activation. The chemical reaction activates enzymes inside the cell.
4. The enzymes adjust the biochemical activity of the cell so that the rates of the processes carried-out by the cell are either increased or decreased. That is, certain processes happens faster or slower due to the instruction the cell received by the attachment of the hormone to the receptor on cell surface.

See Figure 1.

## Mechanism of Action of Fat Soluble Hormones

1. The Hormone molecule passes through the cell membrane and then binds to a receptor in the cytoplasm. The hormone receptor combination is called hormone-receptor complex.
2. The hormone receptor complex moves to the nucleus of the cell.

- See page 4

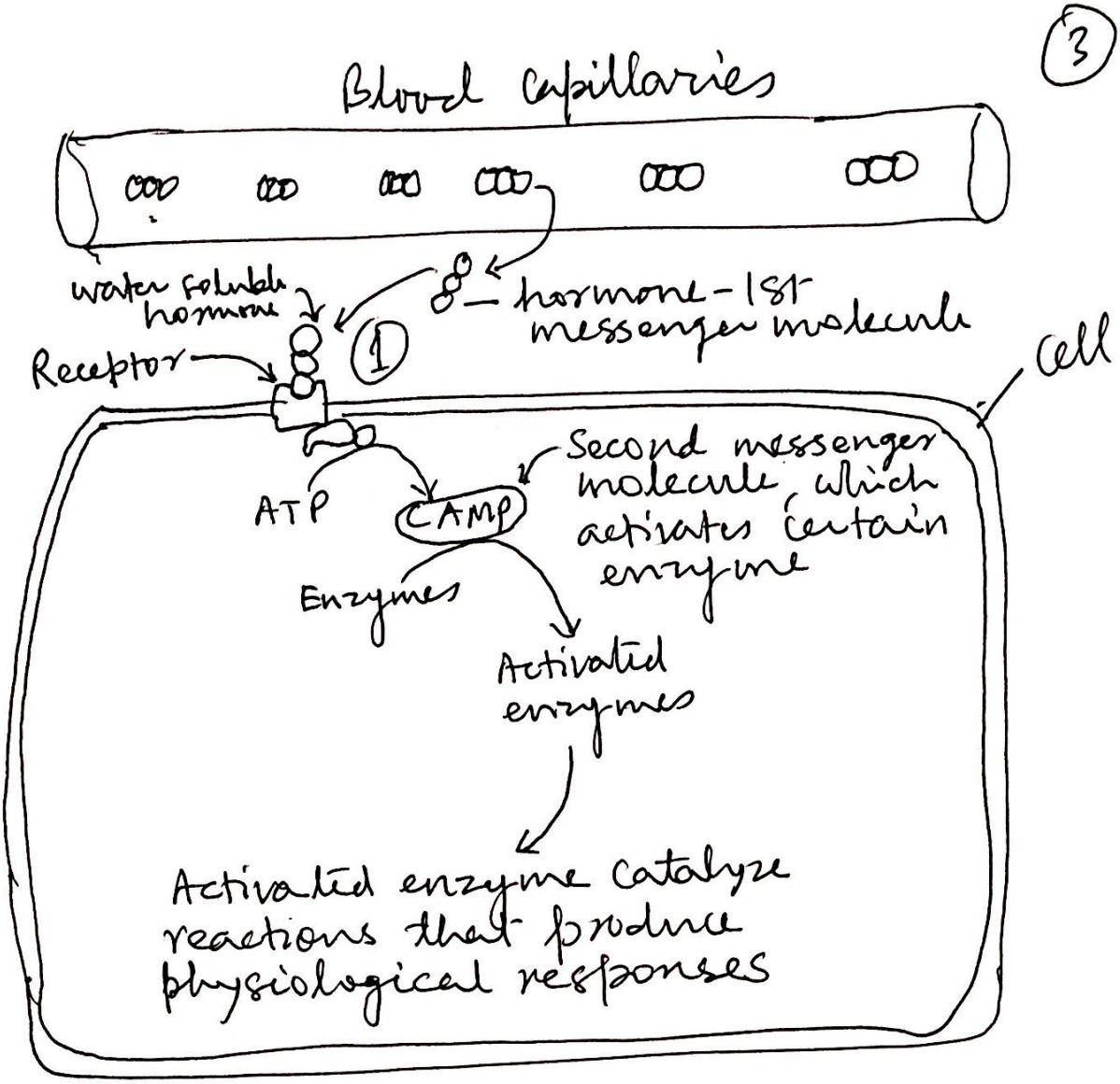


Figure 1. Mechanism of Action of water Soluble Hormone

(Please see details of action of adrenaline from 2nd Sem class note).

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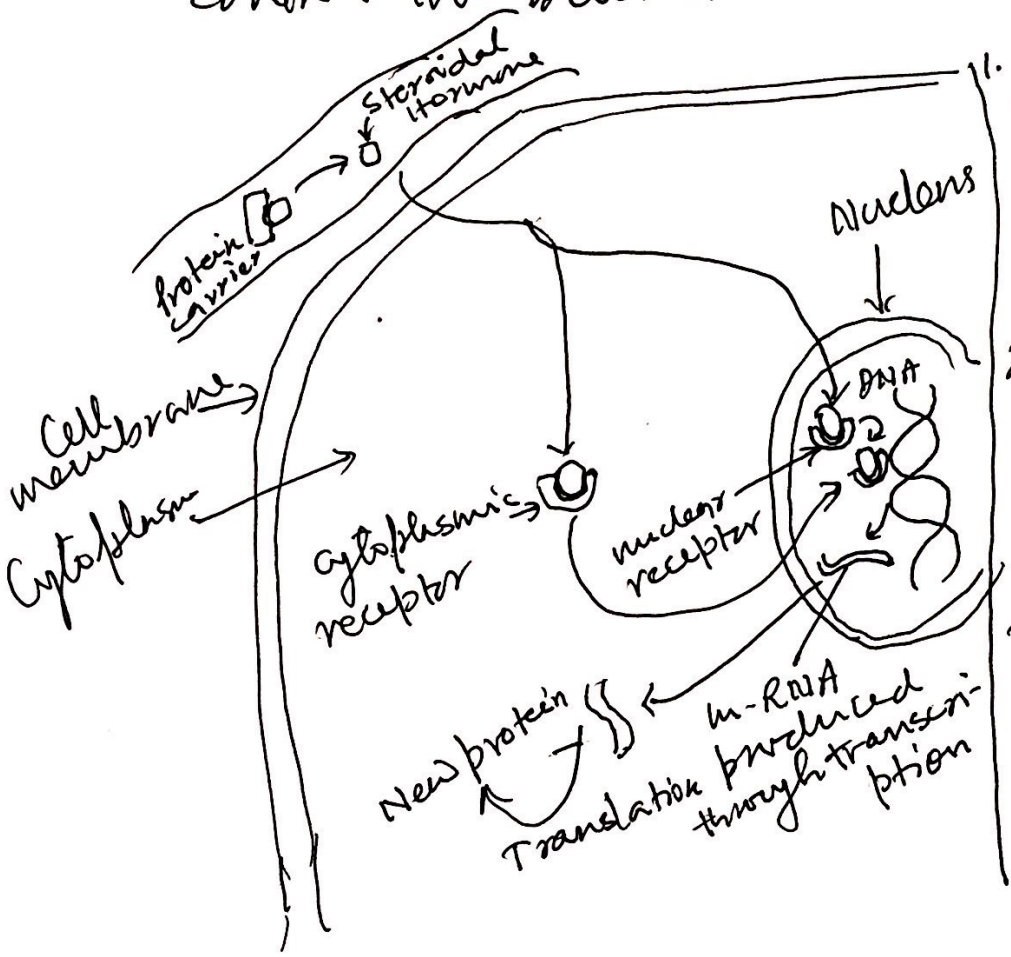
3. In the nucleus of the cell, hormone-receptor complex binds to a region of DNA.

4. Activation. Binding of the hormone receptor complex to the appropriate part of cell's DNA causes genes to 'switch on' or 'off', the activity of the enzyme(s) that, in turn, control the biochemical activity of the cell.




1. Most hydrophobic steroids are bound to plasma protein carriers in the blood.

2. Steroid hormone receptors are in the cytoplasm or in nucleus.

3. The receptor hormone complex binds to DNA and activates or repress one or more genes.

4. Activated genes create new m-RNA that moves back to the cytoplasm
5. Translation produce new proteins for cell processes.
6. Some steroid hormones also bind to membrane receptors that use second messenger system to create rapid cellular response.