

Hormones

(H-1)

(1)

- 1) Classification of Hormones
 - 2) Mechanism of action of water-soluble and fat soluble hormones
 - 3) Secondary messengers
 - 4) Negative feedback mechanism
 - 5) Antifertility Agents
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Hormones - Hormones are member of signalling molecules produced ^{generally} by glands in multicellular organisms. They are transported by circulatory system to target distant organs to regulate physiology and behaviour.

Ernest Starling, a professor of physiology at University College London coined the word hormone during his lecture ~~see~~ "On the chemical correlation of the function of the body" in 1905.

There are many different ways of classification of hormones, i.e. based on their point of release to their target tissue, based on their structural diversity, etc.

Classification on the basis of point of release and transportation -

- 1) Endocrine Hormones: They are released by endocrine glands to blood stream and

carried to target cells throughout the body.
Examples - insulin, glucagon, etc.

2. Paracrine Hormones - They are released into intracellular space and then they diffuse to neighbouring target cells.

Examples - most of the eicosanoid hormones

3. Autocrine Hormones - They affect same cells which released them.

Classification of Hormones based on their structural diversity:

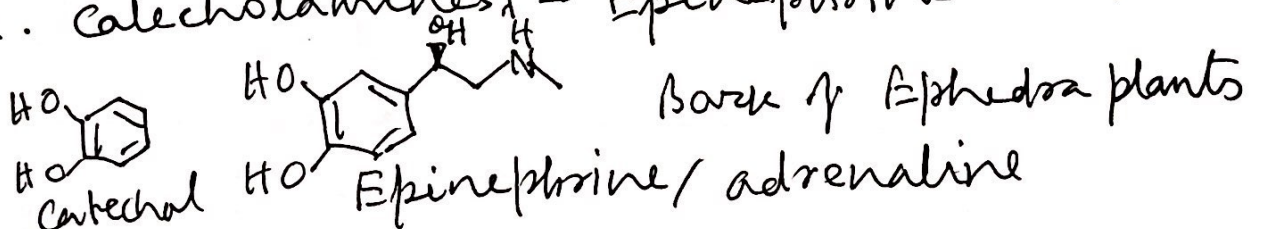
1. Peptide Hormones - Insulin, glucagon

Insulin - It is composed of two peptide chains A and B linked by two disulfide bonds. An additional disulfide chain within A peptide.

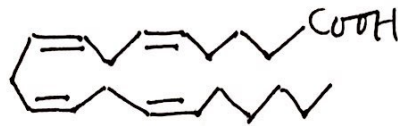
A peptide - 21 AA.	} Controls blood sugar level
B peptide - 30 AA.	

Glucagon - It is a ~~29~~ 29 AA polypeptide chain involved in controlling blood sugar level.

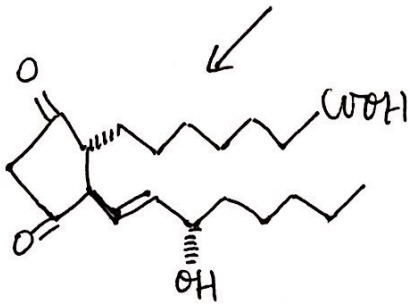
2. Catecholamines ^{hormones} - Epinephrine



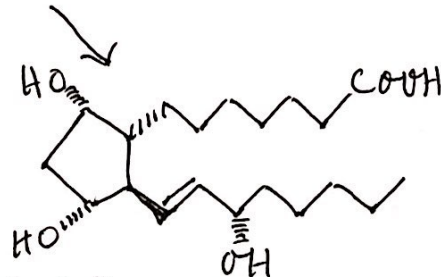
3. Eicosanoid hormones - Prostaglandin E_1 ($PG E_1$)
Prostaglandin $F_{1\alpha}$ ($PG F_{1\alpha}$)



Arachadonic Acid

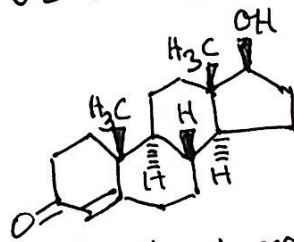


Prostaglandin E₁ (PGE₁)



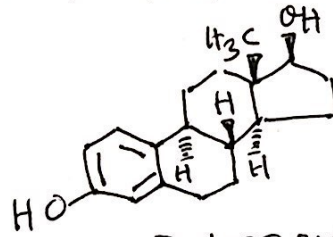
Prostaglandin F_{1α} (PGF_{1α})

4. Steroidal Hormones - Testosterone, Estrogen



Testosterone

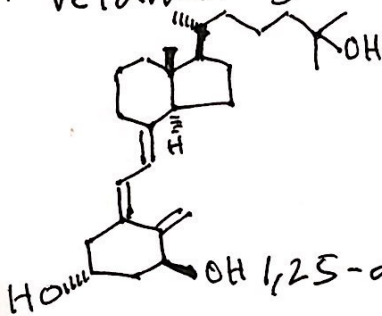
Primary male sex hormone - plays major role in the development of male reproductive tissues.



Estrogen/Oestrogen

Primary female sex hormone

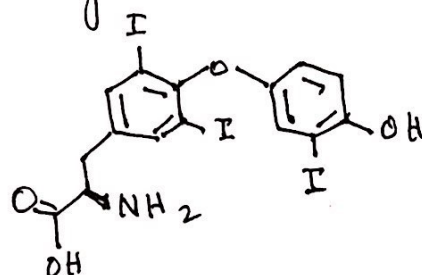
5. Vitamin D - 1,25-dihydroxycholecalciferol



Calcitriol is the active form of Vitamin D, normally made in kidney and used to treat kidney disease.

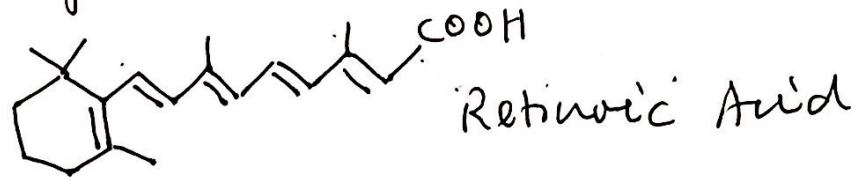
1,25-dihydroxycholecalciferol

6. Thyroid Hormone - Triiodothyroxine (T₃)



It plays vital role in body's metabolic rate, heart and digestive functions

7. Retinoid Hormone - Retinoic Acid (4)
It is derived from Vitamin A and plays important role in cell growth, differentiation and organogenesis.



8. Nitric oxide hormone - NO
Nitric oxide dilates blood vessels, raising blood supply and lowering blood pressure. NO also acts as neurotransmitter.

Classification of Hormones based on Solubility

Water Soluble Hormones - Those hormones soluble in water, i.e. Adrenaline, nor-adrenaline, thyroid-stimulating hormone (TSH), human growth hormone (HGH), etc.

Water - Insoluble / Fat Soluble Hormones

Sex hormones, i.e. Testosterone, Progesterone, Oestrogen, etc.

Prostaglandin hormones (PG E₁, PG F_{1α})