pharma lec 1

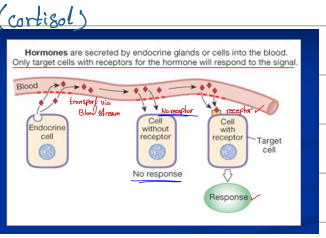
* Endocrine system *

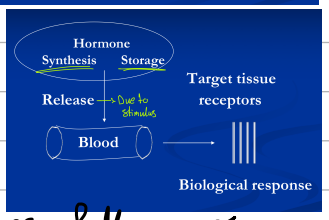
- uses chemical signals (Hormons) for → cell-cell communication
- Coordinates the Function of cells
- Response to an endocrine signal within min-hr (ductless glands)

* Hormonal regulation *

- Growth & Development (GH)
- Reproduction: Fertility, sexual function
- Response to environmental situations (ex: stress) (cortisol)
- Maintenance of Normal homeostasis

■ **Hormones**
- Chemical substances synthesized in and released from highly specialized cells collectively known as endocrine glands, immediately secreted into blood stream and act at some other place
- Considered cell to cell communication molecules
- Transported by blood
- Distant or local target tissue receptors
- Activates physiological response

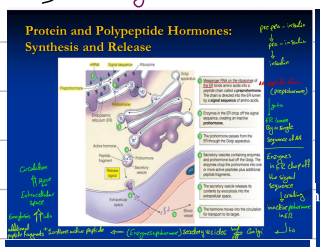


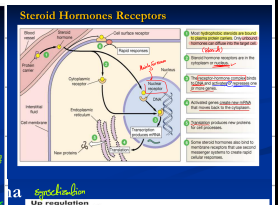


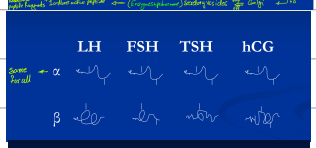
* chemical Nature of Hormones

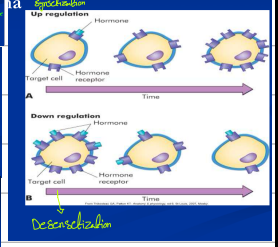
- **Derivatives**
  - T_3, T_4 — Thyroid Hormones — intracellular (nuclear) receptor
  - Dopamine (catecholamine) — Surface Receptor
  - precursor of Tyrosine (AA) — Hormones Derived from (Amine hormones)
- **Peptides**
  - small peptides
  - polypeptides
  - large proteins/Glycoprotein
  - Ex: Hypothalamic hormones, GH, PRL (prolactin), insulin, GluCagon, LH, FSH, TSH, ...
- **Steroids**
  - cortisol, Aldosterone, Estrogen, Progesterone, Androgens

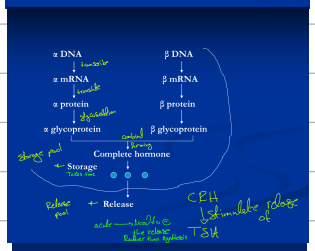
* stored until secreted

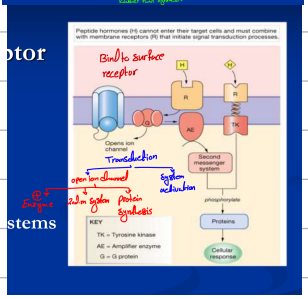












* Based conditions → Minimal release

Stimuli

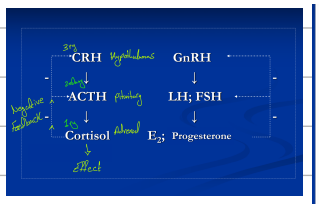
- Nerve impulse
- change in composition of ECM
- Another Hormone (Trophic hormone) → Blood → target cells → receptors → cascade of reactions ← initial change → Recognizable change

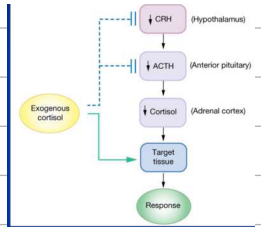
- change in the permeability
- ⊕/⊖ of protein synthesis (transcription or translation)
- ⊕/⊖ of Mediator release (2nd Messenger) Ex: cAMP, DAG, Ca^{+2}, ITP (IP_3) → inositol triphosphate

* How long a hormone stays High in Blood *

Depends on

- Extent of protein binding
- Efficiency of degradable enzymes & clearance (Metabolism & excretion)
- Efficiency of -ve Feedback Mechanisms





* Sources of hormones *

- Natural
  - Human: LH & FSH, HCG
  - Animal: T_3 & T_4
- Synthetic: Most Hormones & their Antagonists

* Disorders affecting endocrine glands *

- Defficiency states
  - Hormonal replacement Therapy (HRT)
  - Drug: ↑ synthesis & or release; ↑ affinity or sensitivity; or # of receptors to Hormone
- Excess production of a specific hormone
  - Surgery
  - inhibitors to: Synthetic Machinery, Release inhibitors, specific Antagonists

* clinical pharmacology of Hormones *

- Major clinical use of Hormones HRT (Physiological doses)
- Supraphysiological doses (pharmacological doses)
  - * Anti-inflammatory effects (Non-endocrine related disease)
- use as Diagnostic tool (TRH test)
- use drugs which aren't hormones → used for Management of diseases of endocrine origin
  - Ex: Antithyroid drugs
  - - oral hypoglycemic agents
- Drugs to treat diseases not related to endocrine system but affecting it
  - Ex: Anticancerous drugs → F & M infertility
- use of Hormones as contraceptives