Ch. CHEMICAL CONTROL AND CO-ORDI"

HORMONES:

Chemical Sub. intercellular messenger → produced in trace amount.

Non-nutrient

① Proteinaceous Hormones:
- formed of Proteins

Eg Glucagon, Insulin, Oxytocin, ADH, Relaxin

=# mem bound receptors

② Steroidal Hormones
- derived from Cholesterol

Eg Testo, Estrogen, Progesterone, Cortisol, Aldosterone, Androgen

=# Intra Cytoplasmic receptors.

③ Biogenic Hormone
- derived from AA

① Catecholamines (Tyrosine derived)
Epinephrine, non-Epinephrine, Dopamine

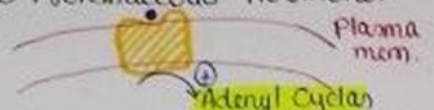
② Tryptophan deriv
Serotonin, melatonin, Auxin

③ Histidine derived
Histamine

=# Mem. bound Receptors

Mechanism of Action:

① Proteinaceous Hormones:

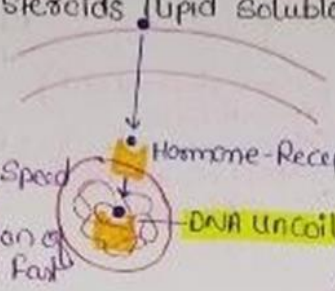


1st messenger

=# Action Speed Fast

=# duration of action physiological slow

② Steroids / Lipid Soluble:



=# Action Speed Slow

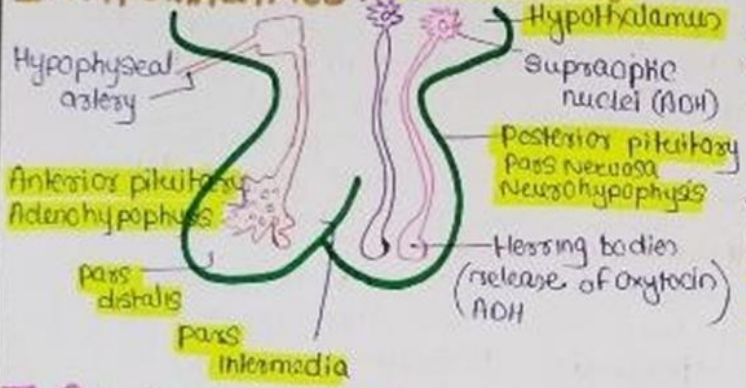
=# duration of Action Fast

Physiological activity ←

Endocrine Gland:

I. HYPOTHALAMUS:

Ectodermal origin



- Anatomical Connection blw Endocrine & Neural system.
- Present in diencephalon part of forebrain
- Master of master Gland.
- Neural Centres.
  ① Thermoregulation ③ osmoregulation
  ② Satiety / Hunger ④ Sexual desire
- Hormones:

Releasing	Inhibiting
GnRH (Gonadotropin)	GIFIH
GHRH (Growth hormone)	PIH
PRH (Prolactin)	MIH (melanocyte Inhibiting)
TRH (Thyrotropin)	
CRH (Corticotropin)	
MRH (melanocyte)	

II. Pituitary Gland

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Adenohypophysis (Anterior pituitary)		Neurohypophysis (Pars Nervosa / post pituitary)
Pars distalis	Pars Intermedia	- oxytocin (foetal ejection)
- FSH, LH	MSH	- Vasopressin (prevents body from dehydration, reabsorbs water & Na^+ from DCT & CD)
- TSH		
- Prolactin		
- ACTH		
- Growth hormone		

III Thyroid Gland

- Butterfly Gland / H-gland
- largest Endocrine gland
- only gland which can store its Secret
- present on ventral side of trachea.



=# Functions:
① Basal metabolic rate
② metamorphosis in frog
③ osmoregulation, Erythropoisis.

=# Disorders:

HYPOTHYROIDISM:
1. Cretinism: Before Puberty, mental retardation, stunted growth, pigeon chest
2. Myxedema: After Puberty, BMR↓, low BP
3. Hashimoto: Auto immune disorder
4. Simple Goitre: low I2, Swelling around neck

HYPERTHYROIDISM:
1. Exophthalmic goitre (Graves) Auto immune disorder, T3 & T4↑, BMR↑ weakness, weightloss, Puffy Face

IV. Pineal Gland

- Ectodermal.
- Epiphysis of fore brain
- Melatonin

=# Functions:
① Biological clock (diurnal)
② Skin Pigmentation
③ Immunity
④ Delays Puberty

V. THYMUS GLAND

- Endodermal
- near heart
- Thymosine

=# Functions:
① maturation of T-lympho

=# with age size of gland decrease. Cell mediated Immunity ↓

1° lymphoid Organ.

VI. Parathyroid Gland

- Endodermal
- 4 dorsal lobes present at the back of thyroid Gland.
- Collips hormone / parathormone
  ↓
  ↑ Ca^{+2} PO_4^{-3} in blood
  Hypercalcemic

Metabolism of Calcium:

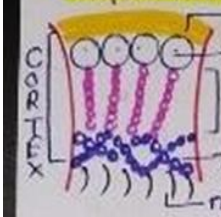
Ca^{+2} in blood ↑
↓
Thyroid Gland
↓
Parafollicular cells
(Thyrocalcitonin)
↓
Allow absorption of Ca^{+2} blood into bones
↓
Bone mineralisation

Ca^{+2} in blood ↓
↓
Parathyroid Gland
↓
PTH Secretion

- Bone: Bone resorption → Ca^{+2} in blood
- Kidney: vit D3 Calciferol
- more reabsorption of Ca^{+2} in PCT

VII. Adrenal Gland

- Supra renal Gland / Emergency



① Aldosterone:
- Act on DCT for absorption of water & Na^+
- Prevents dehy.

② Cortisol:
- Stress hormone
- Glycogenolysis ↑
- Hyperglycemic
- lypolysis ↑
- BP ↑, Erythropoisis ↑

③ Androgen:
- Sexual Character

④ Emergency Hormone:
- Fight / Flight / fright
- BP ↑
- Eyes dilate
- Breathing rate ↑
- Glycolysis ↑
- Heart rate ↑

=# Disorders:

1. Addison's Disease:
- deficiency of aldosterone & Cortisol
- Bacterial infection destroys adrenal cortex
- no mineral balance, dehydration
- Pigmentation of skin
- BP ↓
- K^+ in blood ↑ → ↑ chances of heart attack

2. Conn's Syndrome:
- amount of aldosteron ↑
- Na^+ in blood ↑, K^+ in blood ↓
- delay clotting

3. Cushing disease:
- Cortisol in blood ↑
- BP ↑, GFR ↑
- kidney brain damage
- High metabolic wt.
- wt. gain in abdominal area

4. Adrenal virilism:
- Excess of Sex Corticoids

♀ Testosterone ↑ → Hirsutism / Facial hair, masculine body

♂ E2 ↑ → Gynaecomastia, Size of breast ↑

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VIII. Pancreas

=# Heterocrine Gland:

Exocrine (99%)
P. acini
↳ pancreatic juice

Endocrine (1-3%)
Islets of Langerhans

① α Cells - Glucagon
↑ blood sugar (hyperglycemic)

② β Cells - Insulin
↓ blood sugar (hypoglycemic)

③ δ Cells - Somatostatin
suppsers release of glucagon & Insulin.

④ F cells - P Polypeptide
suppsers pancreatic juice Secretion.