PITUITARY GLAND:

Anterior pituitary (Adeno hypophysis)

Post pituitary (Neuro hypophysis)

Hormones secreted by hypothalamus are transported to ant pituitary of post-pit. is called "hypothalmo-hypophyseal Relation"

Hormons to Ant pit → hypothalmo hypophyseal portal (Blood vessel)

Hormons to post pit → hypothalmo-hypophyseal tract

ANTERIOR PITUITARY: — Master Gland:

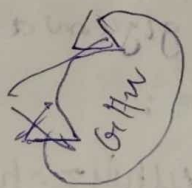
Relasing & Inhibiting Hormones: by Hypothal

1) Growth hormone Relasing horme - GHRH.
2) Growth hormone Relasing peptide - GHRP.
3) Growth hormone Inhibiting hormone GH IH.
4) Thyrotropic Relasing hormone (TRH)
5) Corticotropin Relasing hormone (CRH)
6) GnRH
7) Prolactin Inhibitory hormone.

Hormones secreted by Ant Pit:

1) GH or STH
2) TSH
3) ACTH
4) FSH
5) LH or ICSH in male
6) Prolactin → Milk secretion.

It is known as → Tropic hormones.



GROWTH HORMONE: (prodiabetogenic H

Secreated by somatotropes which are acidophilic cells of Ant-pituitary.

MECHANISM OF ACTION:

Acute metabolic effects of GH are due to its direct actions on target tissue whereas, many long term effects of GH are mediated by somatomedins (IGF-1 & IGF-2) produced by the liver.

STEPS INVOLVED IN THE PRODUCTION (JAK-STAT-Pathway)

⇒ GH has 2 binding site for Receptor.

Binding of 2 GH ~~Hormone~~ Receptor molecule at diff site on 1 molecule of GH produce a homodimer

↓

This process of dimerization Activates the Receptor

↓

Attract, dock & Activate Janus kinase

↓

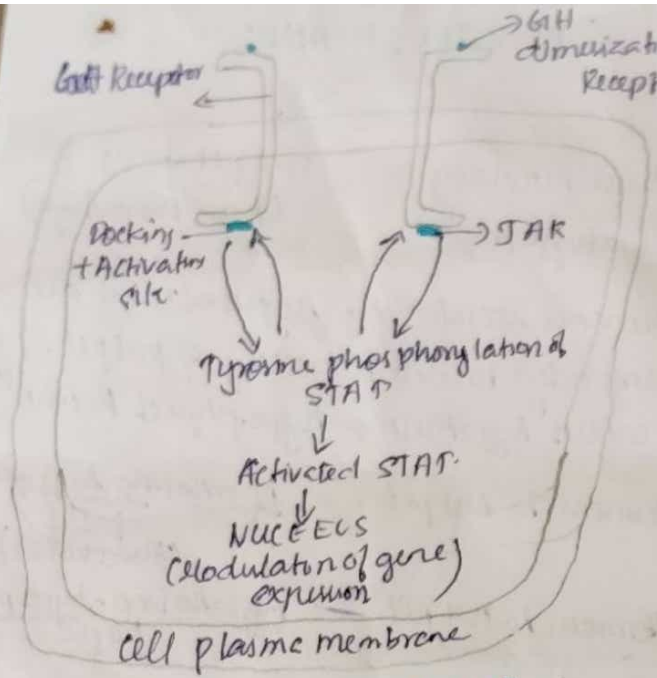
Cause phosphorylation of STAT (signal transdu & Activator of transcription factors)

↓

Induces or Represses expression of GH target genes such as IGF-genes.

↓

GH stimulated expression of IGF gene leads to production of IGFs, primarily in the liver



ACTION OF GROWTH HORMONE:

GH is Responsible for the growth of almost all tissues of the body, which r capable of growing. It Inc the size and no of cells by mitotic division.

ON METABOLISM:

GH Inc the syn the proteins, mobilization of lipids and conservation of carbohydrates.

n protein metabolism:

Inc AA transport through cell membrane
Inc Ribonucleic Acid translation
Inc transcription of DNA to RNA.
. Catabolism of protein.
romote Anabolism of proteins ~~Inc~~ Indirectly

at Metabolism:

obilize fat from Adipose tissue
he FFA in Blood: → Thus also used.
ergy in hypoglycemia & stress.

ohydrate Meta:

e peripheral utilization of glucose
oduction (3) of energy

(II) ↑ in the deposition of glycogen
the cell

(III) Diabetogenic effect of GH

Hypersecretion of GH
↓ (Indirect)
Inc the Blood Glucose level
(by stimulating β cell of pan).

In Addition GH also stimulate directly
- cause secretion of Insulin
lead to - true DM or full blown DM.

On Bone:

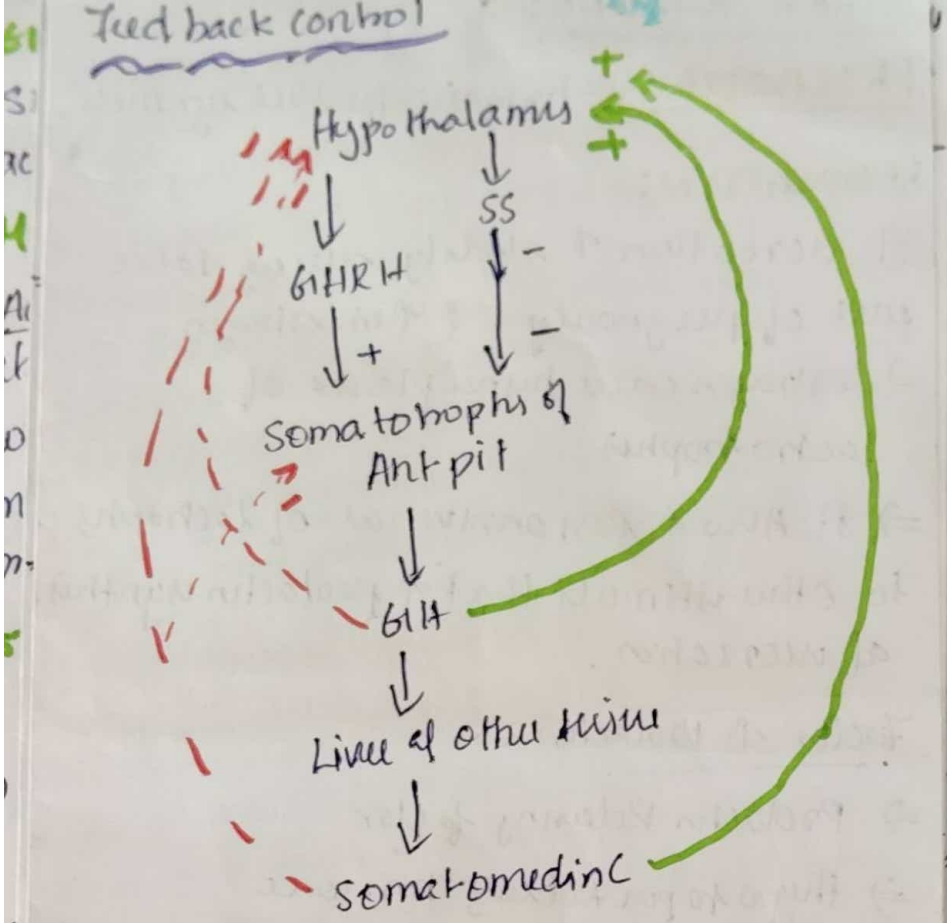
⇒ Syn & deposition of protein by Chondrocytes & osteogenic cells
⇒ Multiplication of chondrocytes & osteogenic cells.
→ Availability of calcium for mineralization of bone Matrix.

REGULATION OF GH:

GH secretion is stimulated by:
⇒ Hypoglycemia
⇒ Fasting
⇒ Starvation
⇒ Stress & trauma
⇒ Initial stage of sleep.

GH is Inhibited by
⇒ Hyperglycemic
⇒ ↑ in free fatty Acids
⇒ Late stage of sleep.

GH Hypo regulate GH through 3 hormone
⇒ GHRH → ↑ ~~GHRH from hypo~~ of GH from pit
⇒ GHIH ⇒ ↓ GH secretion.
⇒ GHRP ⇒ ↑ GHRH from hypo. & GH from pit



HYPERACTIVITY OF ANT PITUTARY:

1) **GIGANTISM** – excessive growth of the body.

⇒ Hypersecretion of GH before the fusion of epiphyses of bone with shaft.

CAUSE: because of tumor of Acidophil cell in Ant pit.

FEATURES:

⇒ Abnormally tall, disproportionaly long. due to ↑es epiphyseal growth of long bones.

⇒ Tumor of pit gland cause constant headache

⇒ hyperglycemic & develop glycosuria pituitary diabetes ⟶ lead to DM.

MANGEMENT: surgical Removal of tumour.

diagnosed by CT or MRI

Effect on Immunity

ACROMEGALY:

disorder by the enlargement → thickening of bone ending of bone, especially in extremities of the body.

CAUSE: hypersecretion in Adult after the fusion of epiphysis.

FEATURE:

⇒ Gorilla face → face with Rough feature such as protrusion of supraorbital ridges, broadening of nose, thickening of lips wrinkles formation on forehead.

⇒ Enlargement of hand & feet

⇒ Overgrowth of body hair

⇒ Visual disturbance

⇒ Hypertension

HYPOACTIVITY OF ANT PIT:

1) **DWARFISM:** disorder in children.

CAUSE: ↓ GH secretion in infancy of early childhood cause dwarfism.

⇒ ↓ GIRH deficiency.

⇒ ↓ IGF synthesis by liver

⇒ ↓ GH Receptor Response (Laron dwarfism)

FEATURE:

⇒ ↓ muscle & total body mass.

⇒ Mental power, Relatively Remain normal

OTHER HORMONES:

PROLACTIN: — hormone for Milk synthesis

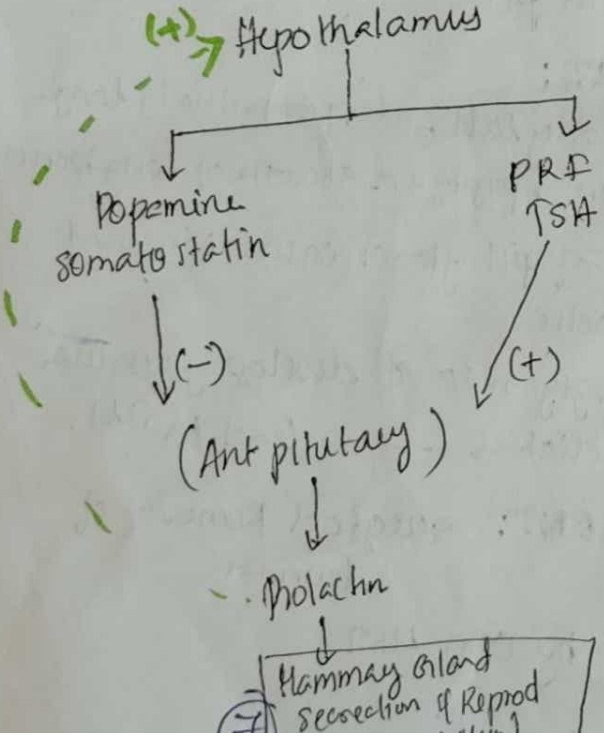
REGULATION:

Its secretion ↑ steadily during later part of pregnancy. & ↑ in estrogen.
⇒ estrogen cause hyperplasia of lactotrophs
⇒ It also ↑ Responsiveness of lactotrophs to other stimuli that ↑ prolactin synthesis of secretion.

Factor ↑ Prolactin.
⇒ Prolactin Releasing factor
⇒ thyrotropin releasing hormone
⇒ pregnancy
⇒ estrogen.

Factor ↓ Prolactin
Dopamine, GABA, somatostatin.

Feedback Mechanism
Feed back Regulation



Binding of hormone with the Receptor Activates the cytoplasmic domain of the Receptor, which in turn Activates cytoplasmic "tyrosine kinase"
⇒ Activation of JAK-STAT signal Induction pathway
⇒ ↑ mRNA formation. promote specific Protein synthesized in the Ribosome which cause formation of casein, lipid, lactose, the ingredient of milk.
⇒ Thus milk production is stimulated.

PHYSIOLOGICAL EFFECTS

Effect on Milk synthesis & secretion:
⇒ The primary function of prolactin is to stimulate milk-synthesis & secretion.
Prolactin ↑ → during lactation.

Effect on Breast development:
⇒ cause hyperplasia of breast tissue.
⇒ Together with GH, cortisol, progesterone
⇒ It ↑ the lobules of Alveoli of the mammary gland in which milk is produced
⇒ During lactation with Insulin & cortisol It ↑ the milk secretion & synthesis in MG.

Effect on Reproduction

⇒ **In Females**
∘ ↑ prolactin
↓ GnRH
↓ LH & FHS
↓ Inhibit ovulation.
↓ Inhibit of libido.

In Males
↓ its spermatogenesis

effect on Immunity

⇒ prolactin brings the immunological balance

effect on Liver

⇒ Its syn of synlactin

↓

Intermediary G H secreted from liver.

CLINICAL CORRELATIONS:

Amenorrhea - Galactorrhea Syndrome

Excess prolactin

occurs in tumors of lactotrophs.

⇒ Hyperprolactinemia causes Amenorrhea & Infertility. causes

↓

↑ milk secretion

(Absence of pregnancy & postpartum lactation)

⇒ seen in hypothalamic or pit tumor

DIAGNOSIS:

high plasma prolactin level or by CT or MRI

TREATMENT:

treated by dopamine drug.

↓

Inhibit prolactin.