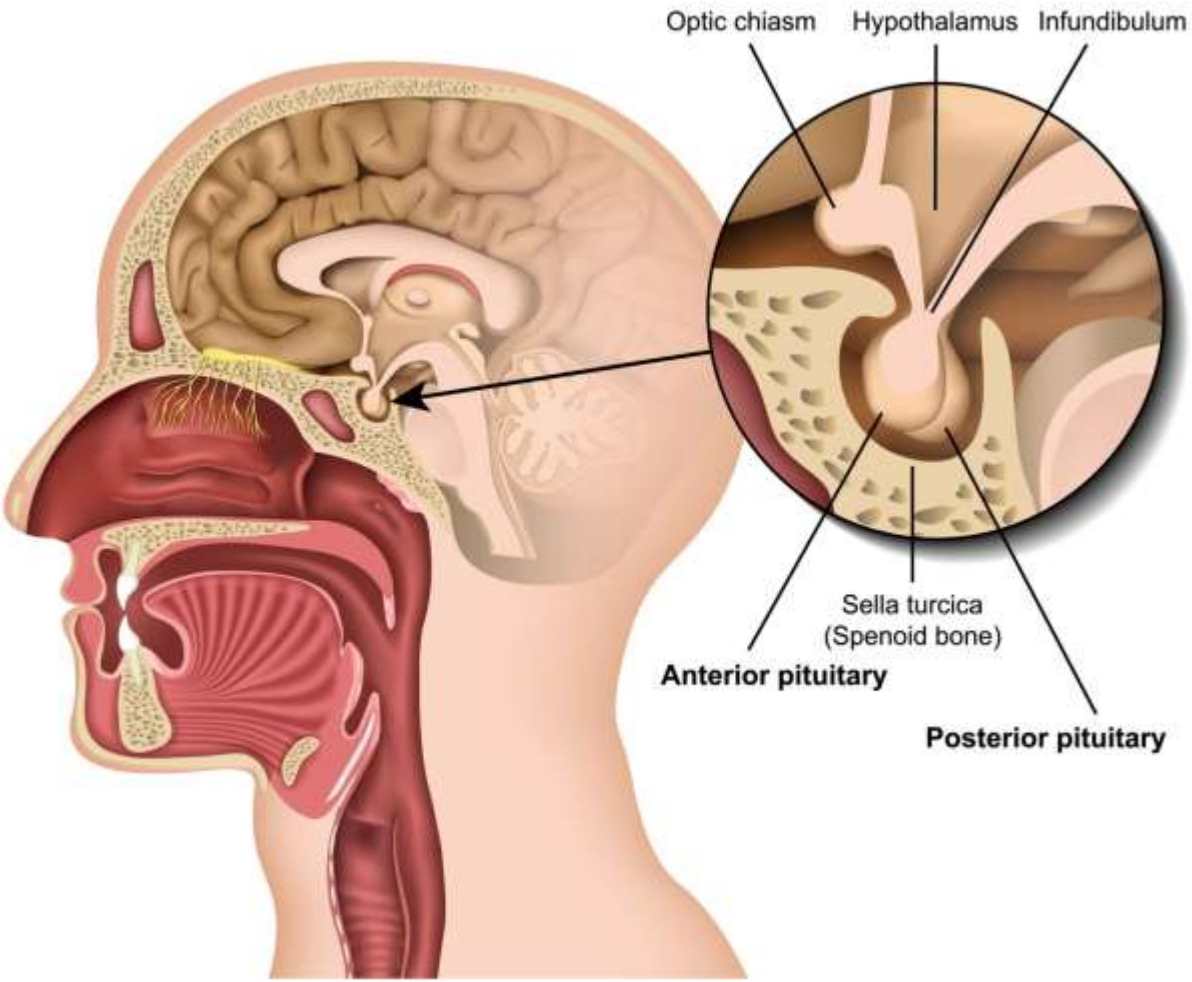
Pituitary Disorders



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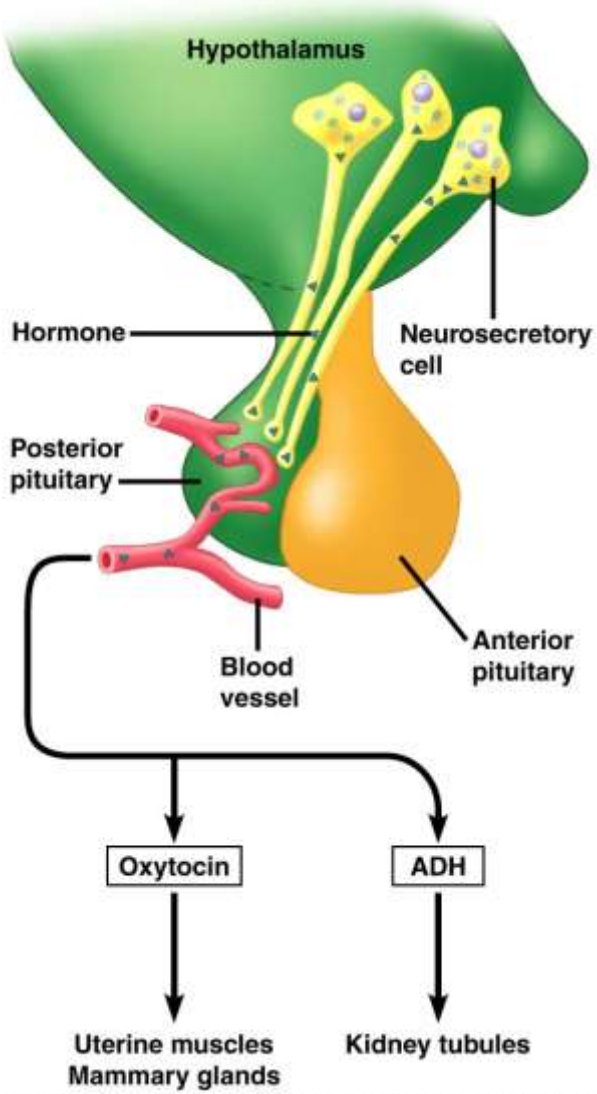

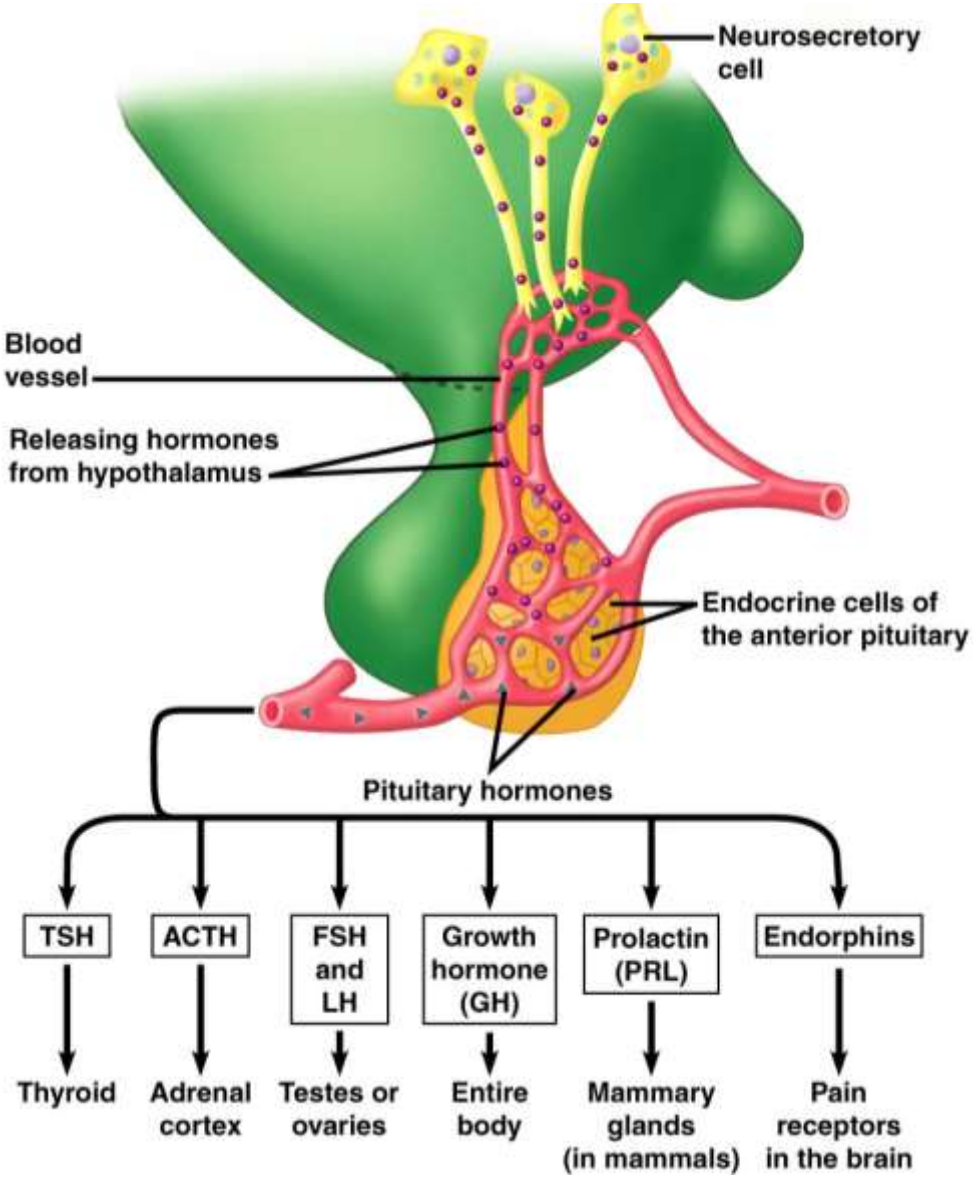

Two reasons for pituitary disorders.

- Hyperactivity
- Hypoactivity

Parts	HYPER	HYPO
Anterior Pituitary	1. Gigantism 2. Acromegaly 3. Cushing's disease	1. Dwarfism 2. Acromicria 3. Simmond's disease
Posterior Pituitary	Syndrome of inappropriate hyper secretion of ADH (SIADH)	Diabetes insipidus

Anterior Pituitary Disorders

Hormone	Increased level	Decreased level
GH	Gigantism (child) Acromegaly (adult)	Dwarfism (child) Lethargy, premature aging
ACTH	Cushing's Disease	Addison's Disease
TSH	Goiter, increased BMR, HR, BP Graves disease	Decreased BMR, HR, CO, BP Cretinism (children)
Prolactin	amenorrhea	Too little milk
FSH		Late puberty, infertility
LH	Menstrual cycle disturbance	Amenorrhea, impotence

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Gigantism: It is caused by overproduction of the Growth Hormone that occurs during childhood. The overproduction of the growth hormone is due to a Pituitary Gland tumor. As the tumor grows it compresses against the Pituitary Gland making an excessive amount of GH.

Signs and symptoms:

- General overgrowth of the person leads to the development of a huge stature, with a height of more than 7-8 feet

The limbs are disproportionally long.

- Giants are hyperglycemic and develop glycosuria and pituitary diabetes.

Hyperglycaemia causes constant stimulation of β-cells of langerhans in pancreas

Treatment :

- Drug therapy: Bromocriptine
- Radiation therapy
- Surgery: To remove pituitary adenoma

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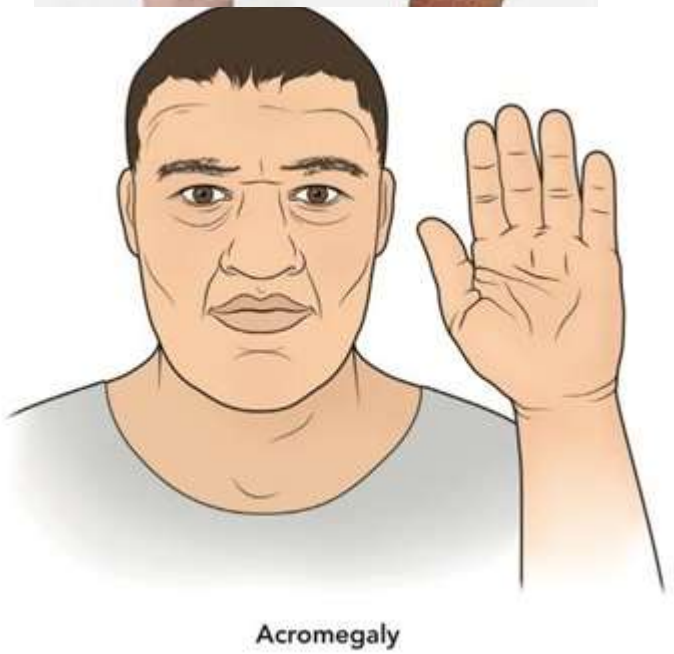
Acromegaly: Hormonal disorder, pituitary gland produces too much growth hormone during adulthood. Acromegalic patient bones increase in size, including hands, feet and face. Acromegaly usually affects middle-aged adults.

Signs and symptoms:

- Acromegalic or (gorilla face). Face with rough feature, such as, thickening of lips, thickening and wrinkles formation on forehead and prognathism (protrusion of lower jaw).
- Enlargement of hands and feet.
- Enlargement of visceral organ, such as, lungs, thymus, heart, liver, etc.
- Hyperactivity of thyroid, parathyroid, and adrenal gland.



Acromegaly: Medical Therapy

Somatostatin Analogs	Growth Hormone Receptor Antagonist[d]	Dopamine Agonists[e]
Octreotide[a] and lanreotide[b]	Pegvisomant	Cabergoline
• Injectable • Result in tumor control • Adverse effects: gastrointestinal, gallbladder disease • Efficacy: approximately 50%-60%[c]	• Injectable • Blocks action of growth hormone and decreases IGF-1 levels	• Oral administration • Well tolerated in patients • More effective when IGF-1 levels are moderately elevated before treatment

a. Somatuline® PI 2013[6]; b. Sandostatin® PI 2011[11]; c. Freda PU. *J Clin Endocrinol Metab.* 2002;87:3013-3018[19];d. SOMAVERT® PI 2013[10]; e. Sandret L, et al. *J Clin Endocrinol Metab.* 2011;96:1327-1335.[12]

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CUSHING'S DISEASE

- Rare disease characterized by obesity.
- Develop by basophilic adenoma of adenohypophysis. It increases secretion of AcTH, which in turn stimulate adrenal cortex to release cortisol.
- Develop by hyperplasia or tumor of adrenal cortex.
- The disorder due to the pituitary cause is cushings diseases and when due to adrenal cause, called cushings syndrome.

Cushing's Syndrome

moon face

Osteoporosis; compressed (codfish) vertebrae

red cheeks

bruisability ecchymoses

Excessive Cortisol

high blood pressure

pendulous abdomen

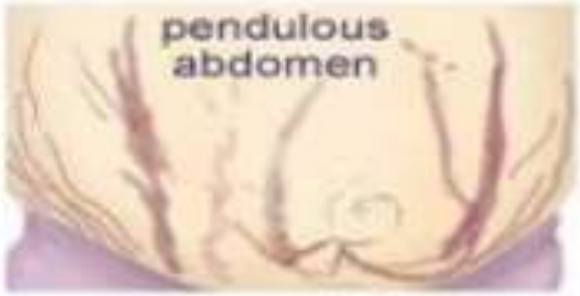
fat pads (buffalo hump)

thin skin

red striae

thin arms and legs

poor wound healing



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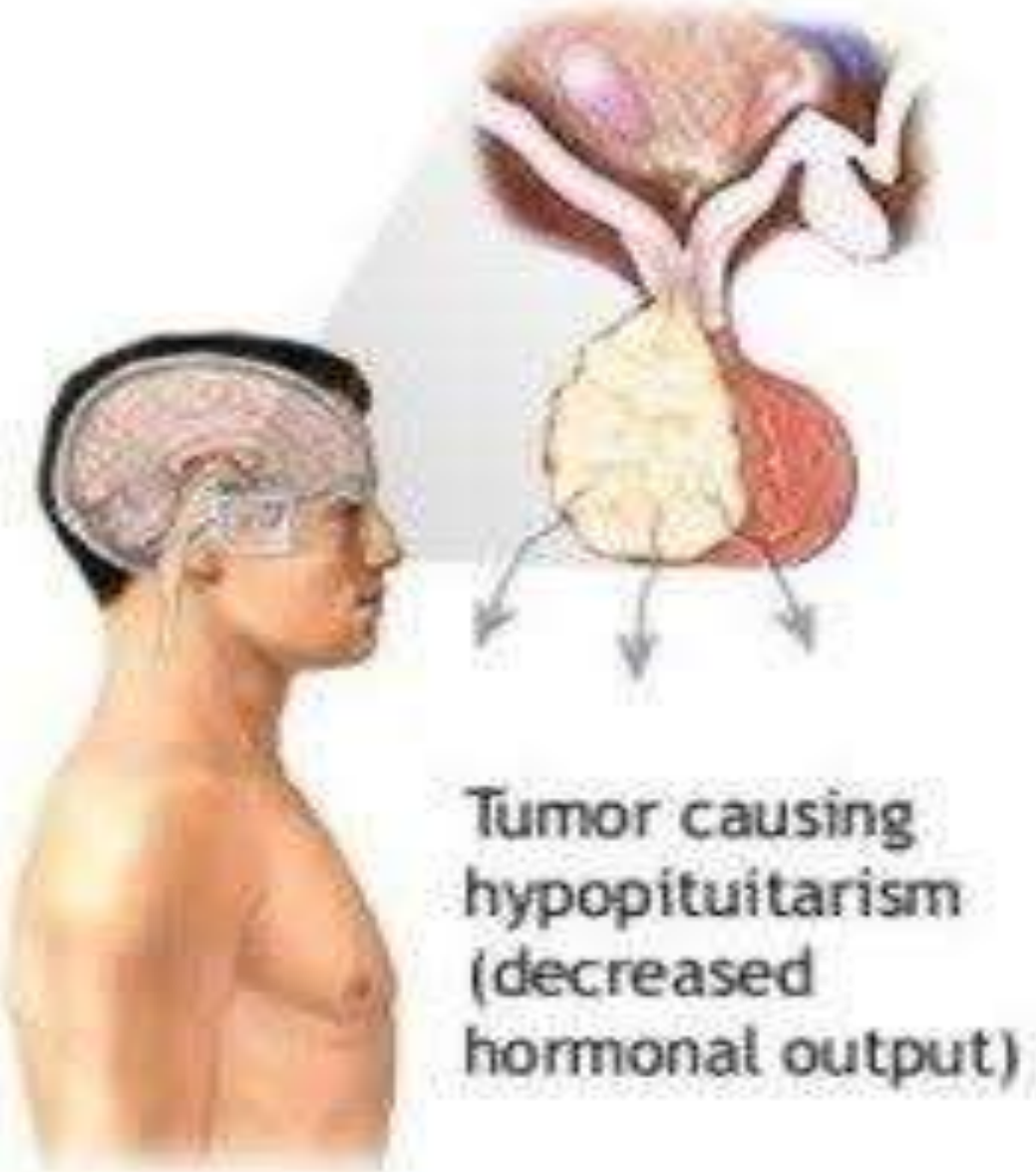
DWARFISM

- It is a pituitary disorder in children, characterized by stunted growth.
- Tumor of chromophobe cell. It is a non functioning tumor, which compresses and destroys the normal cells secreting GH.
- It is a common cause for hyposecretion of GH, leading to dwarfism.
- Deficiency of growth hormone releasing hormone(GRH), secreted by hypoyhalamus.
- Deficiency of somatomedin-C .
- Atrophy or degeneration of acidophilic cells in anterior pituitary.
- Panhypopituitarism: There is reduction in the secretion of all the hormones of anterior pituitary hormones.

Dwarfism



Tumor causing hypopituitarism (decreased hormonal output)

Signs and symptoms:

- Inhibit skeletal growth. Maximum height- 3 feet.
- Body proportions of different parts of body are almost normal, only head becomes slightly larger in relation to body.
- Mental activity normal, with no mental retardation.
- Reproductive function is not affected, if only GH deficient, but during panhypopituitarism, the dwarfs do not obtain puberty due to the deficiency of gonadotropic hormone.

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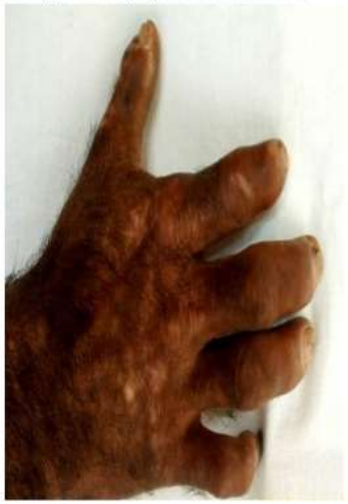
Acromicria

❖Rare disease in adults characterized by the atrophy of the extremities of the body



CAUSES OF ACROMICRIA

- Deficiency of GH in adults
- Secretion of GH decreases in the following conditions:
  - ✓Deficiency of GH releasing hormone
  - ✓Atrophy of acidophilic cells in the anterior pituitary
  - ✓Tumor of chromophobes
  - ✓Panhypopituitarism

SIGNS AND SYMPTOMS

- Atrophy and thinning of extremities (major symptoms)
- Associated with hypothyroidism
- Hyposecretion of adrenocortical hormone
- Person becomes lethargic and obese
- Loss of sexual function

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Simmonds disease is a chronic deficiency of function of the pituitary gland, a form of hypopituitarism, that leads to atrophy of many of the viscera, including the heart, liver, spleen, kidneys, thyroid, adrenals, and gonads. The disease results in emaciation and death if left untreated.

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Syndrome of inappropriate hypersecretion of ADH (SIADH)

❖It is characterized by loss of sodium through urine due to hypersecretion of ADH

CAUSES

- Due to cerebral tumors, lung tumors and lung cancers because the tumor cells secrete ADH.
- Normal secretion of ADH makes the plasma hypotonic.
- Hypotonic solution inhibits the ADH secretion and restoration of plasma osmolarity takes place.
- But in SIADH ,secretion of ADH from tumor is not inhibited by hypotonic plasma.

SIGNS AND SYMPTOMS

1. Loss of appetite
2. Weight loss
3. Nausea and vomiting
4. Headache
5. Muscle weakness , spasm and cramps
6. Fatigue
7. Restlessness and irritability

In last, Patient die because of coma and convulsions

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Diabetes insipidus

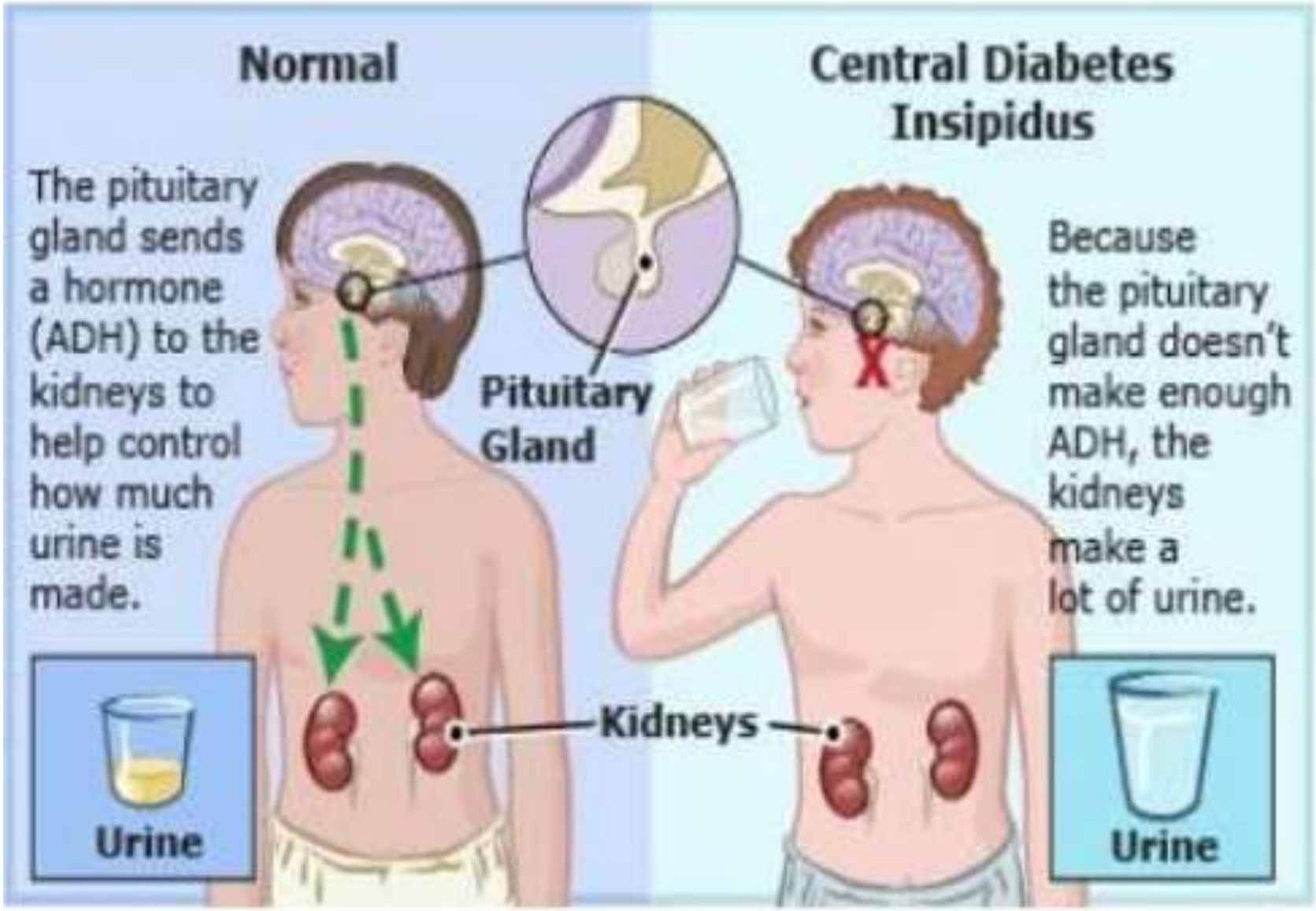
❖Hyposecretion of ADH causes excess excretion of water through urine

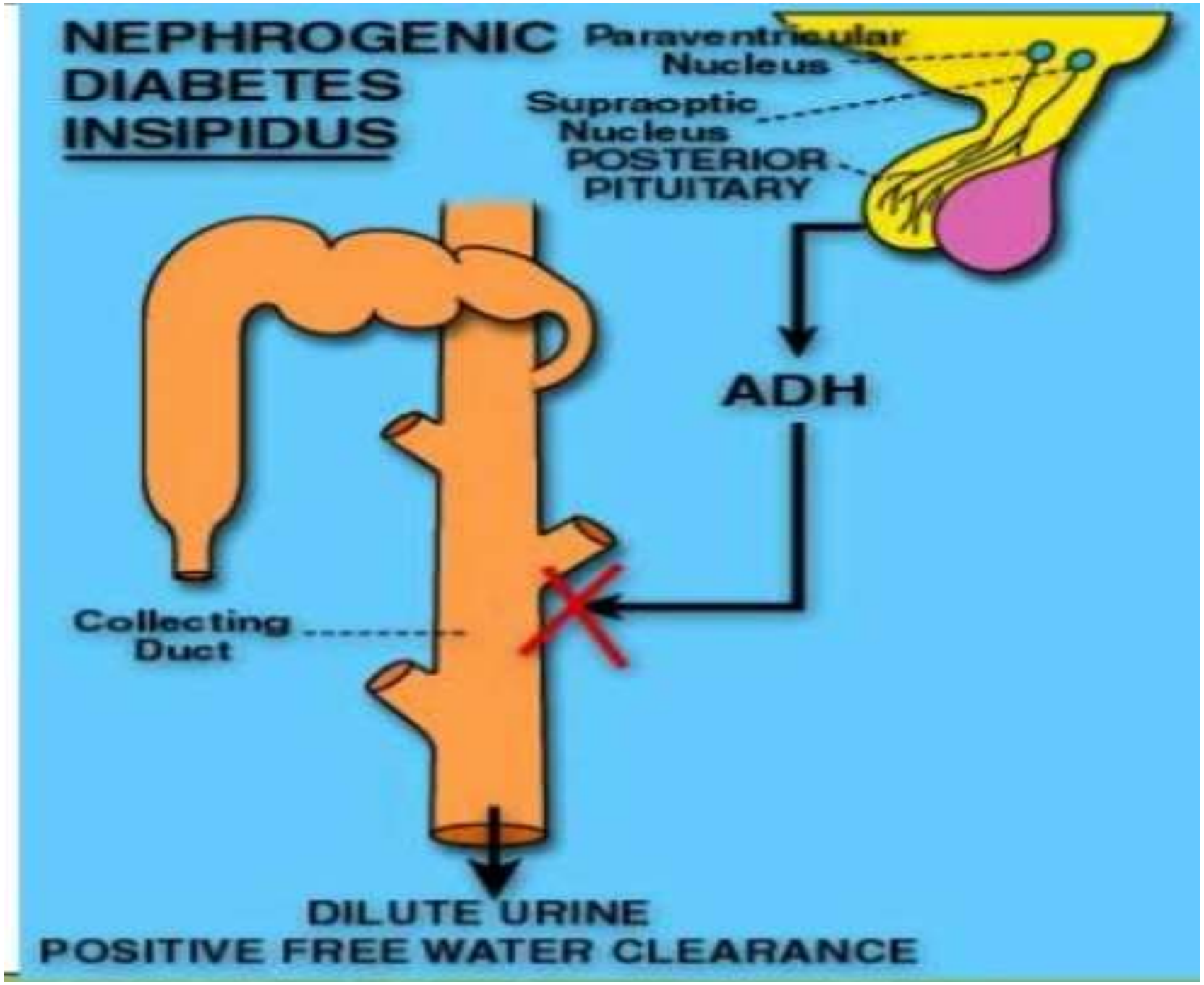
❖It causes water imbalancement in the body. This imbalance leads to intense thirst even after drinking fluids(polydipsia) and excretion of large amounts of Urine(polyuria).

❖It is of two types:

a) central diabetes insipidus.

b) Nephrogenic diabetes insipidus.


Normal
Central Diabetes Insipidus
The pituitary gland sends a hormone (ADH) to the kidneys to help control how much urine is made.
Pituitary Gland
Because the pituitary gland doesn't make enough ADH, the kidneys make a lot of urine.
Kidneys
Urine
Urine


NEPHROGENIC DIABETES INSIPIDUS
Paraventricular Nucleus
Supraoptic Nucleus
POSTERIOR PITUITARY
ADH
Collecting Duct
DILUTE URINE
POSITIVE FREE WATER CLEARANCE

Causes:

A) Central Diabetes Insipidus:

- Degeneration of supraoptic and Paraventricular nuclie of hypothalamus.
- Injury in hypothalamo-hypophyseal tract.
- Degeneration of posterior pituitary.

B) Nephrogenic diabetes Insipidus:

- Inability of Renal tubules to give response to ADH hormone or vasopressin.

Sign and symptoms:

- **Polyuria:** Excretion of large quantity of dilute urine . Daily output is about 4 to 20 L of urine. In absence of ADH, DCT and collecting duct become impermeable to water. Therefore water is not reabsorbed from renal tubules and collecting duct; leads to loss of water through urine.

- **Plydipsia:** Intake of excess of water. It stimulates thirst centre in hypothalamus , resulting intake of large quantity of water.

- **Dehydration:** Thirst centre is affected . Water intake decreases in patient and loss of water is not compensated. Therefore, dehydration develops which may leads to death.

Diagnosis:

- Fluid deprivation test.
- Blood reports
- Urine reports.

Treatment:

- Enough water intake to maintain water level.
- Medicines like Dasmopressin, Aspirin,Thiazide are helpful.


Thank
You