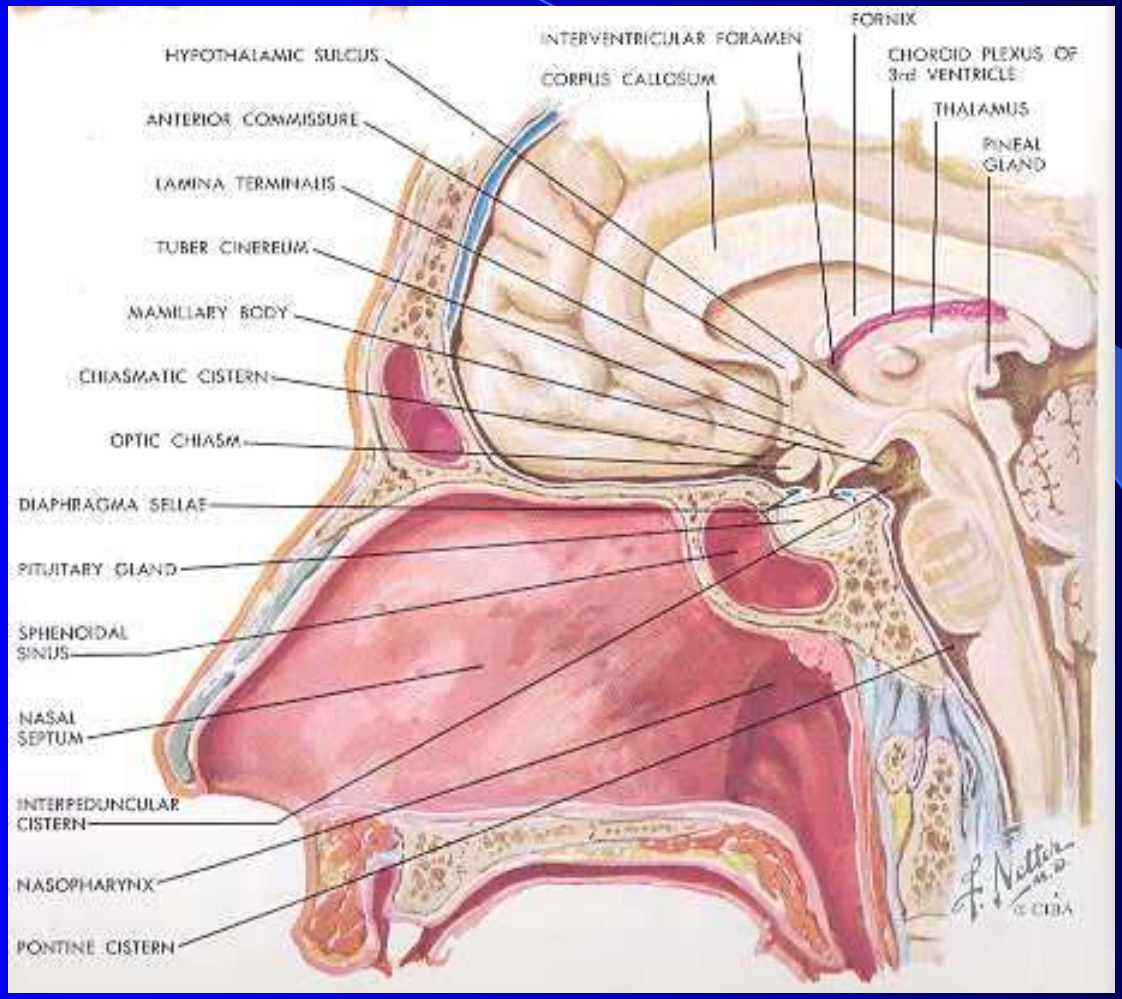
Pituitary gland diseases

Pituitary Gland

- Weight 600 mg
- Is located within the sella turcica
- Anatomically and functionally distinct anterior and posterior lobes


HYPOTHALAMIC SULCUS
ANTERIOR COMMISSURE
LAMINA TERMINALIS
TUBER CINEREUM
MAMILLARY BODY
CHIASMATIC CISTERN
OPTIC CHIASM
DIAPHRAGMA SELLAE
PITUITARY GLAND
SPHENOIDAL SINUS
NASAL SEPTUM
INTERPEDUNCULAR CISTERN
NASOPHARYNX
PONTINE CISTERN
INTERVENTRICULAR FORAMEN
CORPUS CALLOSUM
FORNIX
CHOROID PLEXUS OF 3rd VENTRICLE
THALAMUS
PINEAL GLAND
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Pituitary Development

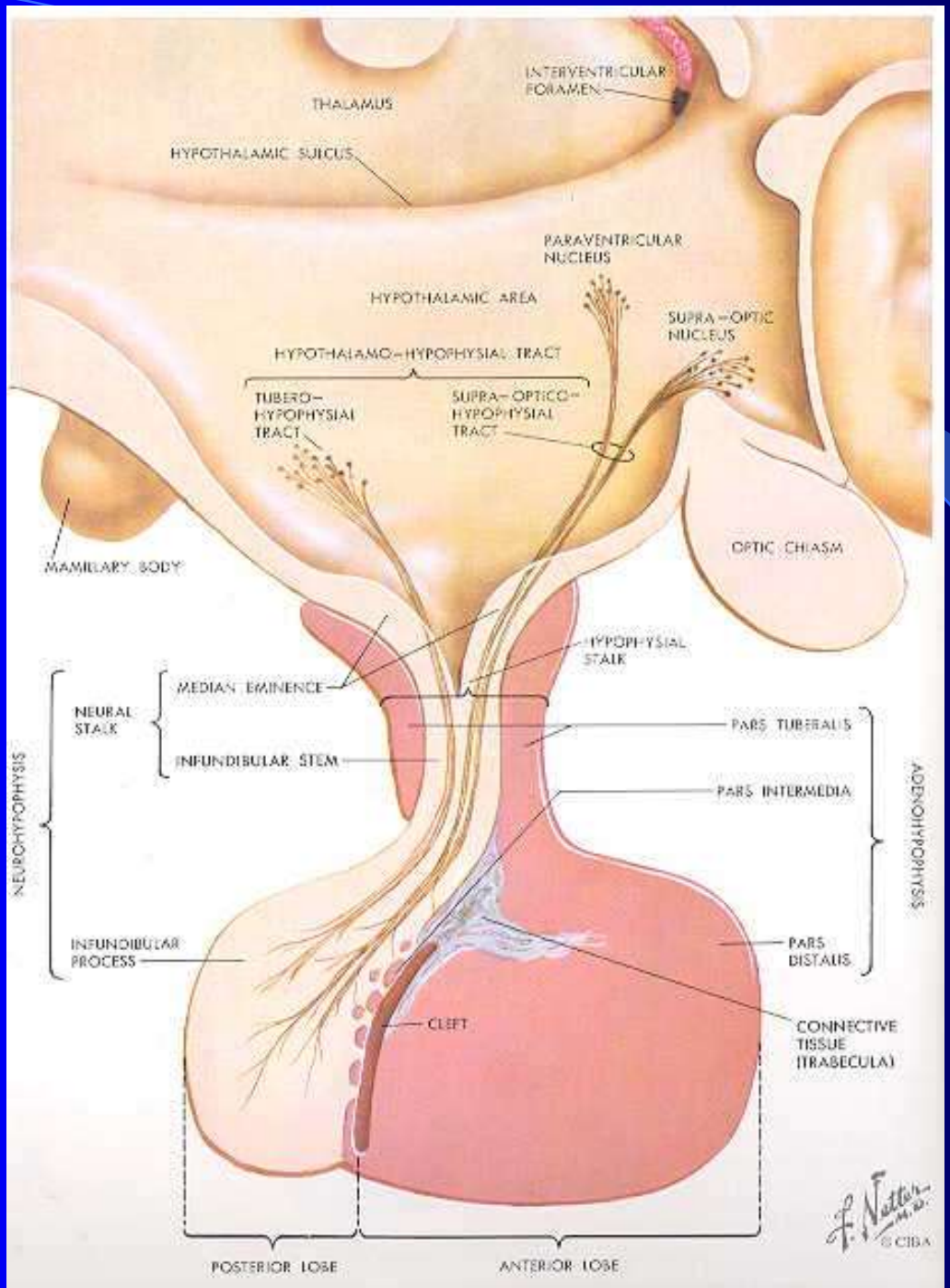
- The pituitary originate from different source.
- The anterior pituitary from Rathke´s pouch (which is an embryonic invaginationof the pharyngeal epithelium).
- The posterior pituitary from an outgrow of the hypothalamus.

Hypothalamic

- Hypothalamic neural cells syntetize specific releasing and inhibiting hormones that are secreted directly into the portal vessels of the pituitary stalk.
- Hypothalamic-pituitary portal plexus provides the major blood source for the anterior pituitary.

- Pituitary cells are exposed to sharp spikes of releasing factors and turn release their hormones as discrete pulses.

- Posterior lobe is directly innervated by hypothalamic neurons (supropticohypophyseal and tuberohypophyseal nerve tracs) via the pituitary stalk


INTERVENTRICULAR FORAMEN
THALAMUS
HYPOTHALAMIC SULCUS
PARAVENTRICULAR NUCLEUS
HYPOTHALAMIC AREA
SUPRA-OPTIC NUCLEUS
HYPOTHALAMO-HYPOPHYSIAL TRACT
TUBERO-HYPOPHYSIAL TRACT
SUPRA-OPTICO-HYPOPHYSIAL TRACT
MAMILLARY BODY
OPTIC CHIASM
HYPOPHYSIAL STALK
NEURAL STALK
MEDIAN EMINENCE
INFUNDIBULAR STEM
PARS TUBERALIS
PARS INTERMEDIA
NEUROHYPOPHYSIS
ADENOHYPOPHYSIS
INFUNDIBULAR PROCESS
PARS DISTALIS
CLEFT
CONNECTIVE TISSUE (TRABECULA)
POSTERIOR LOBE
ANTERIOR LOBE
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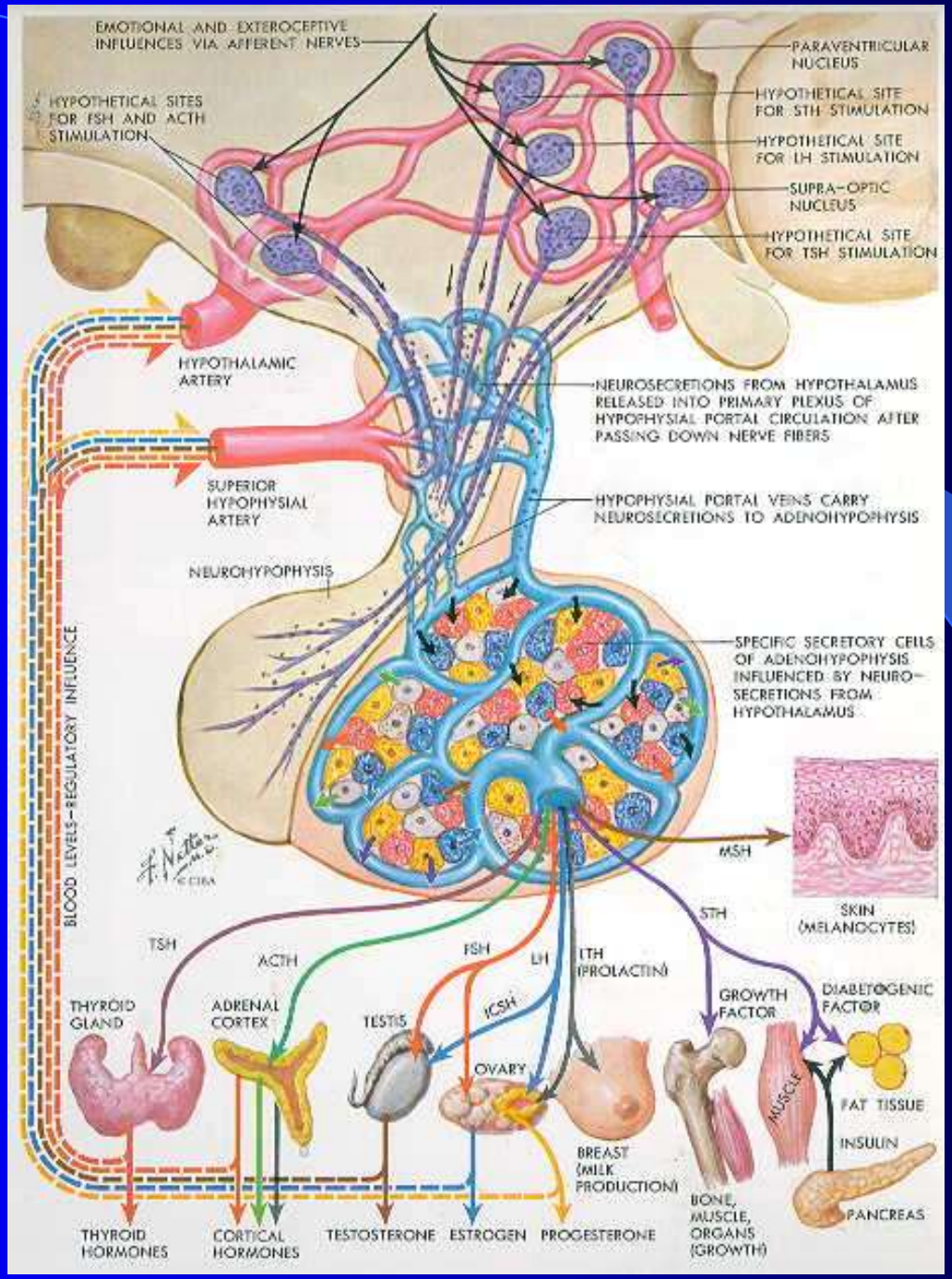
Anterior Pituitary

- Is often referred to as the "MASTER GLAND" because, it orchestrates the complex regulatory functions of multiple other endocrine glands.

Produces six major hormones:

- Prolactin (PRL)
- Growth hormone (GH)
- Adrenoicorticotropin hormone (ACTH)
- Luteinizing hormone (LH)
- Follicle-stimulating hormone (FSH)
- Thyroid-stimulating hormone (TSH)


EMOTIONAL AND EXTEROCEPTIVE INFLUENCES VIA AFFERENT NERVES
PARAVENTRICULAR NUCLEUS
HYPOTHETICAL SITES FOR FSH AND ACTH STIMULATION
HYPOTHETICAL SITE FOR STH STIMULATION
HYPOTHETICAL SITE FOR LH STIMULATION
SUPRA-OPTIC NUCLEUS
HYPOTHETICAL SITE FOR TSH STIMULATION
HYPOTHALAMIC ARTERY
NEUROSECRETIONS FROM HYPOTHALAMUS RELEASED INTO PRIMARY PLEXUS OF HYPOPHYSIAL PORTAL CIRCULATION AFTER PASSING DOWN NERVE FIBERS
SUPERIOR HYPOPHYSIAL ARTERY
HYPOPHYSIAL PORTAL VEINS CARRY NEUROSECRETIONS TO ADENOHYPOPHYSIS
NEUROHYPOPHYSIS
SPECIFIC SECRETORY CELLS OF ADENOHYPOPHYSIS INFLUENCED BY NEURO-SECRETIONS FROM HYPOTHALAMUS
BLOOD LEVELS-REGULATORY INFLUENCE
MSH
SKIN (MELANOCYTES)
STH
TSH
ACTH
FSH
LH
LTH (PROLACTIN)
GROWTH FACTOR
DIABETOGENIC FACTOR
THYROID GLAND
ADRENAL CORTEX
TESTIS
ICSH
OVARY
MUSCLE
FAT TISSUE
INSULIN
BREAST (MILK PRODUCTION)
PANCREAS
BONE, MUSCLE, ORGANS (GROWTH)
THYROID HORMONES
CORTICAL HORMONES
TESTOSTERONE
ESTROGEN
PROGESTERONE

Anterior Pituitary Insufficiency

- Reduced pituitary function can result from inhereited disorders; more commonly, it is acquired and reflects the mass effects of tumors or the consequences of inflamation or vascular damage.

Developmental and Genetic Causes of Hypopituitarism

- Pituitary Displasia
- Tissue-Specific Factor Mutations
- Developmental Hypotalamic Dysfunction:
  - Kallmann Syndrome
  - Laurence-Moon-Bardet-Biedl Syndrome
  - Fröhlich Syndrome
  - Prader-Willi Syndrome.

Acquired Hypopituitarism

- May be caused by accidental or neurosurgical trauma.
- Vascular events such as apoplexy
- Pituitary or hypothalamic neoplasms such as pituitary adenomas, craniopharyngiomas, or metastatic deposits.
- Inflammatory diseases such as lymphocytic hypophysitis.
- Infiltrative disorders such as sarcoidosis, hemochromatosis.

Hypothalamic Infiltration Disorders

- Associated with sarcoidosis, histiocytosis X, amyloidosis, and hemochromatosis.
- Frequently involve both hypotalamic and pituitary.
- Diabetes insipidus occurs in half of patients with these disorders.
- Growth retardation is seen if attenuated GH secretion occurs before pubertal epiphyseal closure.
- Hypogonadotropic hypogonadism and hyperprolactinemia are also common.

Inflammatory Lesions

- Pituitary damage can be seen with chronic infections such as tuberculosis, opportunistic fungal infections associated with AIDS.
- Other inflammatory processes, such as granulomas or sarcoidosis.

Cranial Irradation

- May result in Hypotalamic and pituitary disfunction, specially in children and adolescents who are more susceptible to damage following whole-brain or head and neck therapeutic irradiation.
- Up to two-thirds of patients ultimately develop hormone insufficiency afer a median dose of 50 Gy directed at the skull base.

Lymphocytic Hypophysitis

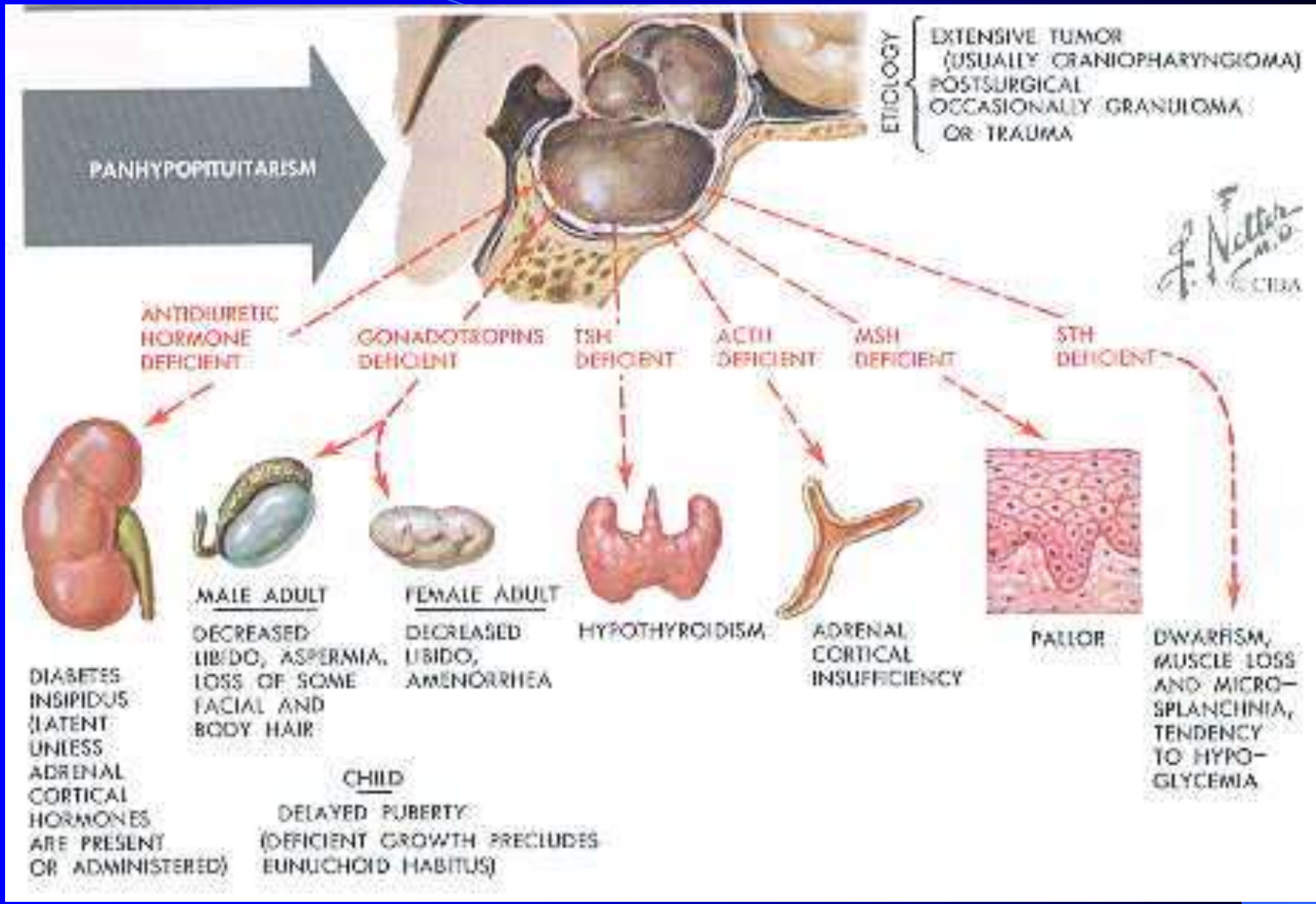
- Occurs mainly in pregnant or post-partum women.
- It usually presents with hyperprolactinemia.
- Pituitary failure caused by diffuse lymphocytic infiltration may be trainsent or permanent but requires immediate treatment.

Pituitary Apoplexy

- May occur spontaneously in a preexisting adenoma (usually nonfunctioning); postpartum (Sheehan´s syndrome); or in association with diabetes, hypertension, or acute shock. Hyperplastic of the pituitary during pregnancy increases the risk for hemorrhage and infarction.
- Symtoms: headache with signs of meningealirritation.

Presentation and Diagnosis

- The clinical manifestations of hypopituitarism depend on which hormones are lost and the extent of the hormone deficiency.
- GH (growth disorders), GFH and LH (menstrual disorders and infertillity), TSH (hypothyroidism)


PANHYPOPITUITARISM
ETIOLOGY
EXTENSIVE TUMOR (USUALLY CRANIOPHARYNGIOMA)
POSTSURGICAL
OCCASIONALLY GRANULOMA OR TRAUMA
F. Netter M.D.
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ANTIDIURETIC HORMONE DEFICIENT
GONADOTROPINS DEFICIENT
TSH DEFICIENT
ACTH DEFICIENT
MSH DEFICIENT
STH DEFICIENT
DIABETES INSIPIDUS (LATENT UNLESS ADRENAL CORTICAL HORMONES ARE PRESENT OR ADMINISTERED)
MALE ADULT
DECREASED LIBIDO, ASPERMIA, LOSS OF SOME FACIAL AND BODY HAIR
FEMALE ADULT
DECREASED LIBIDO, AMENORRHEA
CHILD
DELAYED PUBERTY (DEFICIENT GROWTH PRECLUDES EUNUCHOID HABITUS)
HYPOTHYROIDISM
ADRENAL CORTICAL INSUFFICIENCY
PALLOR
DWARFISM, MUSCLE LOSS AND MICROSPLANCHNIA, TENDENCY TO HYPOGLYCEMIA

Biochemical diagnosis

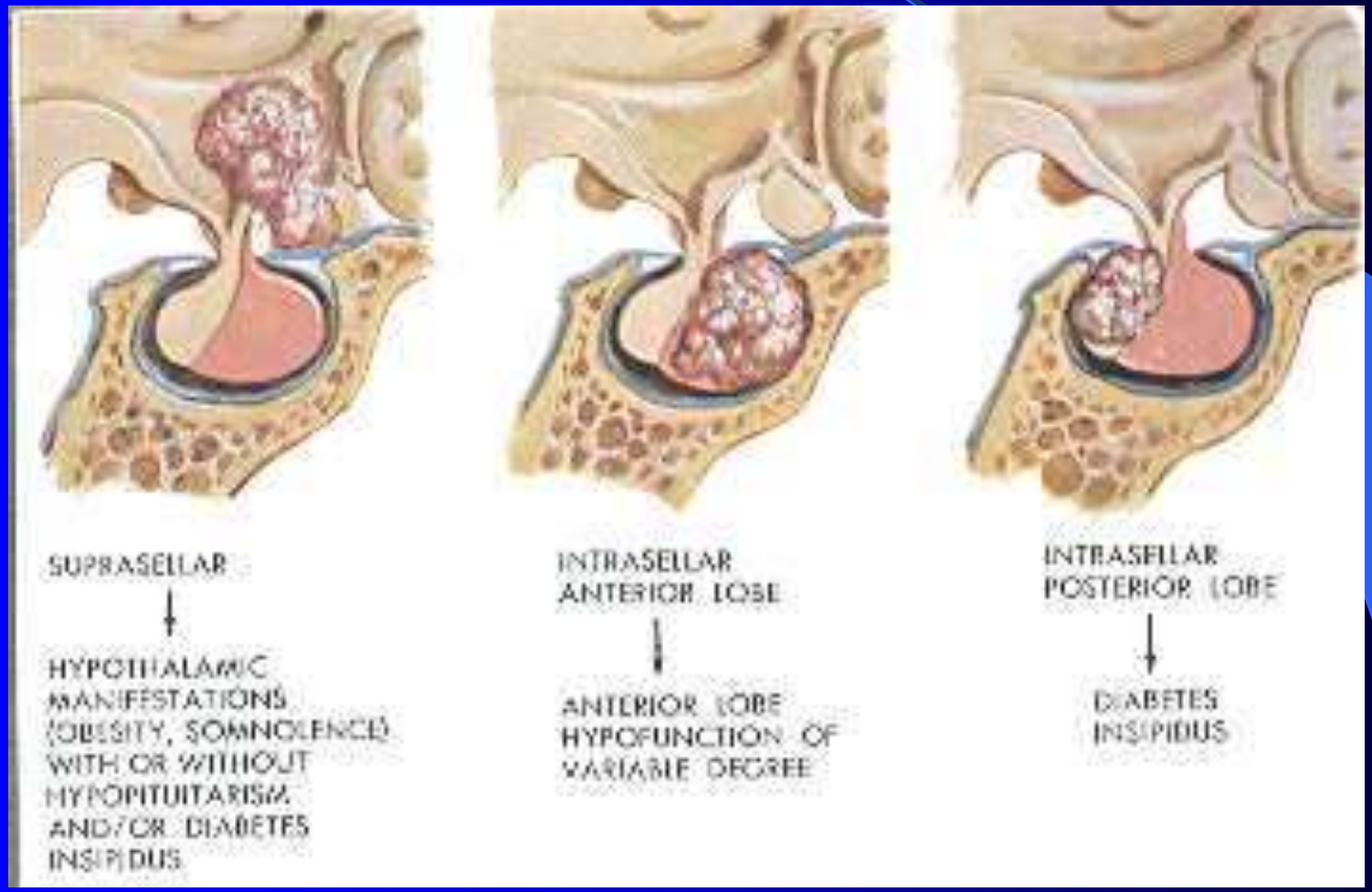
- Is made by demostrating low levels of trophic hormones in the setting of low target hormone levels.

Treatment

- Hormone replacement therapy, including glucocorticoids, thyroid hormone, sex steroids, growth hormone and vasopressin, is usually free of complications.
- Glucocorticoid replacement require careful dose adjustments during stressful events.

Pituitary Masses

- Pituitary Tumors are the most common cause of pituitary hormone hypersecretion and hyposecretion syndromes in adults.


SUPRASELLAR
HYPOTHALAMIC MANIFESTATIONS (OBESITY, SOMNOLENCE) WITH OR WITHOUT HYPOPITUITARISM AND/OR DIABETES INSIPIDUS
INTRASELLAR ANTERIOR LOBE
ANTERIOR LOBE HYPOFUNCTION OF VARIABLE DEGREE
INTRASELLAR POSTERIOR LOBE
DIABETES INSIPIDUS

Clasification of pituitary adenomas.

Cell Origin	Hormone	Syndrome
Lactotrope	PRL	Hypogonadism, galactorrea
Gonadotrope	FSH, LH	Silent or hypogonadism
Somatotrope	GH	Acromegaly/Gigantism
Corticotrope	ACTH	Cushing´s disease
Acidophil stem cell	PRL, GH	Hipogonadism, galactorrhea acromegaly
Thyrotrope	TSH	Thyrotoxicosis

Genetic Syndromes Associated with PituitaryTumors

- Multiple endocrine neoplasia
- Carney syndrome
- McCune-Albright syndrome
- Familial acromegaly

Other Sellar Masses

- Craniopharyngiomas
- Sella Chordomas
- Meningiomas
- Histiocytosis X
- Pituitary metastases
- Hyphotalamic hamartomas and gangliocytomas

GH Hypersecretion

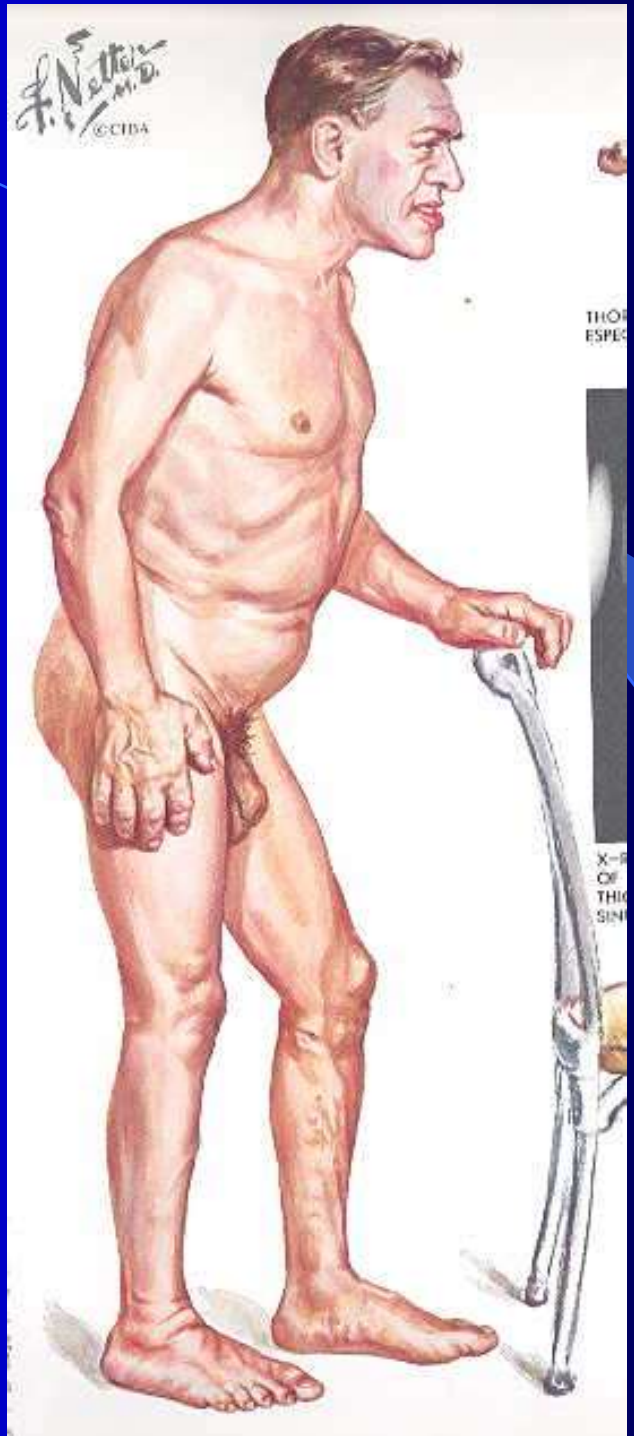
- Is usually the result of somatotrope adenomas but is also rarely caused by extrapituitary.

Presentation and Diagnosis

- Manifestations of GH hypersecretion are indolentand often are not clinically diagnosed.

- Acral bony overgrowth results in frontal bossing, increased hand and foot size, mandibular enlargement prognathism, and widened space betwen the lower incisor teeth.

Acromegaly

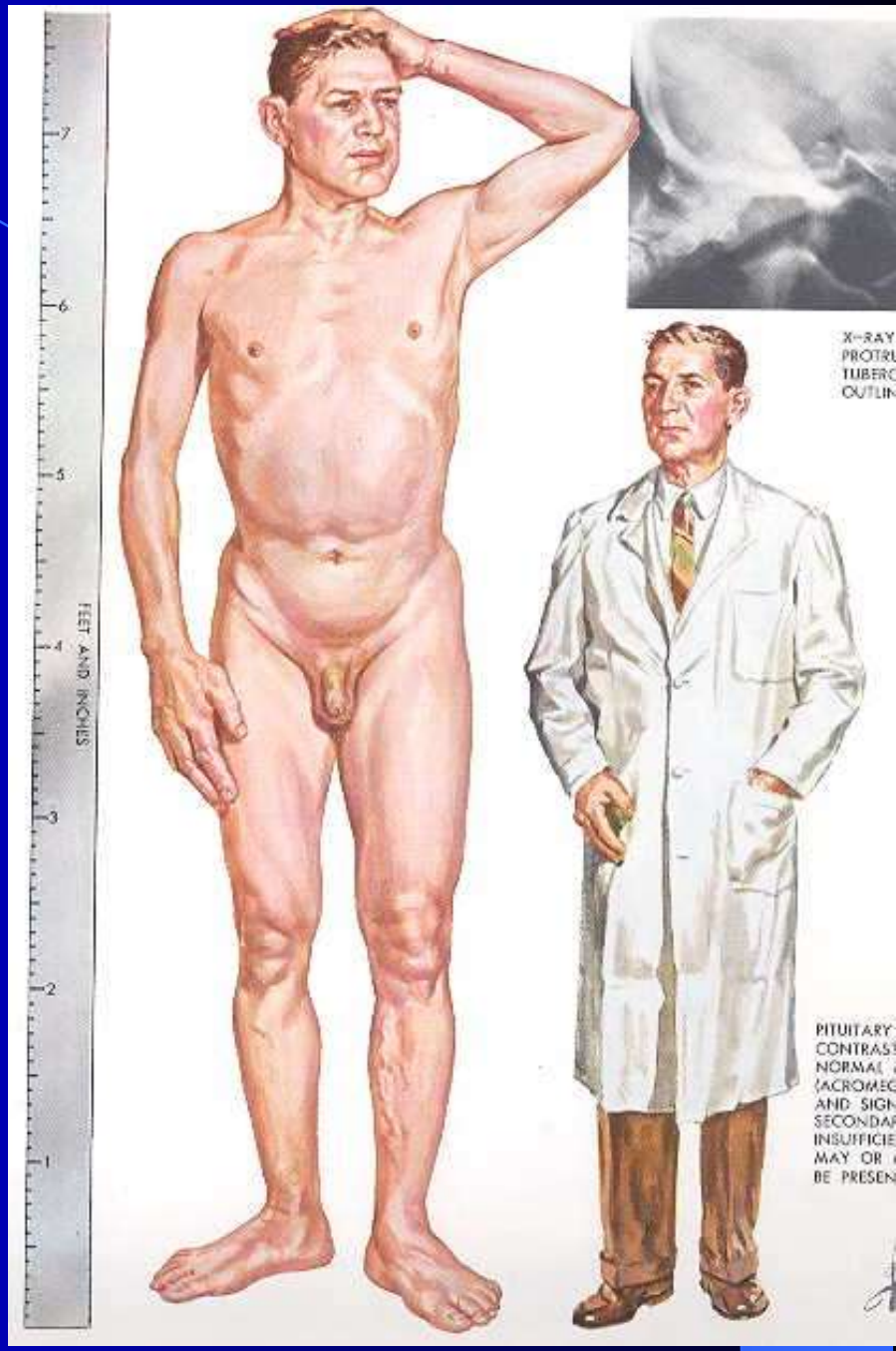


- In children and adolescents, initiation of GH secretion prior to epiphyseal long bone closure is associated with the development of pituitary gigantism.

Clinical features

- Increased heel pad thickness, shoe or glove size, ring tightening, and a large fleshy nose.
- Hyperhidrosis, deep sounding voice, oily skin, arthropathy, kyphosis, carpal tunnel syndromeproximal muscle weakness and skin tags.
- Generalized visceromegaly occurs, including cardiomegaly, and macroglossia.

Acromegaly/gigantism



- Sourced from
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