

| Hormones | |
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| Hypothalamus | releasing and inhibiting factors |
| Pituitary Gland - anterior lobe | GH, TSH, ACTH, FSH, LH, Prolactin |
| Pituitary Gland - posterior lobe | ADH (vasopressin), oxytocin |
| Thyroid Gland | T3, t4, calcitonin |
| Adrenal Gland - medulla | epinephrine, norepinephrine |
| Adrenal Gland - cortex | glucocorticoids, mineralocorticoids, sex hormones |
| Gonads | testes = testosterone // ovaries =estrogen, progesterone |
| Pancreas | insulin, glucagon, somatostatin, PP (including gastrin) |
| Parathyroid Glands | parathyroid hormone |

| Hypothalamic Hormones // Pituitary Hormones | |
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| CRH | increase ACTH |
| GnRH | increase FSH and LH |
| PIH | decrease prolactin |
| GHRH | increase GH |
| GHIH | decrease GH |
| TRH | increase TSH |

| Pituitary Hormones | |
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| GH | promotes tissue growth, increase bone, muscle and fat |
| TSH | promotes production and secretion of T3 & T4 in thyroid |
| ACTH | promotes secretion of glucocorticoids in adrenal cortex |
| FSH & LH | the gonadotropic hormones - promotes gamete production and sex hormones secretion in gonads |
| Prolactin | stimulates milk production in mammary glands |
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| ADH | controls thirst and amount of urine produced by kidneys |
| oxytocin | stimulates uterine contractions in women and acts on mammary glands to release milk |
| pituitary gland functions with a feedback loop | |

| Thyroid Disorders | |
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| Goiter | thyroid enlargement; causes = puberty/pregnancy, iodine deficiency (endemic goiter), hashimotos thyroiditis, goitrogens (food that suppress production of thyroid hormones) |
| Hyperthyroidism | Thyrotoxicosis, increased T3 & T4, decreased TSH |
| Hypothyroidism | Myxedema, decreased t3 & T4, increased TSH (primary) |
| Hyperthyroidism results in... | generalized increase in metabolic rate, heat intolerance, sweating, irritability, weight loss, increased appetite, exophthalmia, lid lag, tremor, hyperpigmentation, friable/fine hair, tachycardia, thyroid storm |
| hypothyroidism results in... | fatigue, depression, cold intolerance, dry skin, decreased intellectual function slow HR, constipation, enlarged tongue (macroglossia), malocclusion, gingivitis, rampant decay, candidiasis |
| Graves Disease | Hyperthyroidism, autoimmune disease; dx = TSI, elevated T3/T4 but low TSH, diffuse radioactive iodine uptake (thyroid scan) |
| Graves disease clinical features - triad | thyrotoxicosis, infiltrative ophthalmopathy, localized dermopathy |
| thyroid storm | abrupt onset of hyperthyroidism; when exposed to stress or have graves disease; can lead to uncontrolled heart arrhythmias, pulmonary edema, CHF --> coma --> death |
| childhood oral manifestation of thyroid storm | premature loss of primary teeth and early eruption of permanent |



Thyroid Disorders (cont)

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| primary hyperthyroidism | diffuse toxic goiter or tumor; serum levels show INCREASED T3/T4, BUT DECREASED TSH |
| secondary hyperthyroidism | TSH-producing pit. tumor; serum levels show INCREASED T3/T4 AND INCREASED TSH |
| Cretinism | congenital hypothyroidism; symptoms = coarse/dry skin, puffy, pale lips, impaired development of skeletal and CNS (results in dwarfism and mental retardation); oral manifestations = macroglossia, mouth breathing, underdeveloped mandible, overdeveloped maxilla, late eruption, enamel hypoplasia |
| Juvenile Hypothyroidism | primary hypothyroidism in children; mental sluggishness, dragging, cold intolerance, obesity, constipation |
| Hashimoto's Thyroiditis | primary hypothyroidism; characterized by lymphoid infiltrated and Hurthle cells |

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| primary vs. secondary hypothyroidism | primary has INCREASED TSH // secondary has DECREASED TSH |
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function of T3 & T4 = physical and brain growth and maturation, help oxygen consumption, elevated basal metabolic rate, increases body heat, upregulates metabolism, protein synthesis

function of calcitonin = helps Ca²⁺ absorption by bone and inhibit osteoclast resorption

low levels of circulation T3 & T4 --> no negative feedback to ant. pit. --> increase TSH --> trophic effect on thyroid gland --> GOITER

Pituitary Disorders

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| Hypopituitarism | deficiency in one or multiple hormones; can result from ischemic injury or non-functional pituitary neoplasms |
| Hyperpituitarism | excessive secretion of hormones (adenoma, hyperplasia, carcinoma) |

Space Occupying Lesion (SOL)

Pituitary Disorders (cont)

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| Sheehan Syndrome | postpartum necrosis/postpartum hypopituitarism; hypertrophy/plasia of lactotrophs; results in enlargement of ant. pit. lobe; symptoms:agalactorrhea, amenorrhea, hot flashes, decreased libido; has features of both hypopituitarism (fatigue, intolerance to cold, constipation, weight gain, hair loss, low BP) and adrenal insufficiency (similar to addisons) |
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| Craniopharyngioma | rare, benign tumor in children; develops from remnants of Rathke's pouch; a tumor mimicking the enamel organ of embryonic tooth |
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| Bitemporal Hemianopia | bilateral loss of outer/peripheral visual fields, tunnel vision |
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Pituitary Adenomas: -----

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| Prolactinoma | most common type of functional adenoma; hyperprolactinemia; clinically- amenorrhea, galactorrhea, loss of libido, infertility |
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| Giantism | GH adenoma - BEFORE closure of epiphyses; juvenile, generalized increased body size with disproportioned limbs, CV problems; dx= elevated GH levels and CT positive pit tumor |
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| Acromegaly | GH adenoma - AFTER closure of epiphyses; adult, coarse skin, enlargement of visceral organs, increase in facial bones (prognathism, flaring of teeth), CV problems, diabetes mellitus, hypertension, arthritis; dx= elevated GH levels and failure to suppress GH by oral load of glucose |
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| ACTH-producing adenoma | thyrotrophs; results in hyperthyroidism |
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pan-hypopituitarism: -----

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| diminished GH | failure of growth --> Dwarfism |
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| diminished TSH | hypothyroidism |
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| diminished LH/FSH | failure of sexual maturity and fuunction (amenorrea, infertility) |
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| diminished ACTH | Addison's Disease |
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Pituitary Disorders (cont)

diminished ADH diabetes insipidus (excessive thirst and urination)

Adrenal Gland Disorders

Hyperadrenalism excess cortisol production

Hypoadrenalism decreased cortisol production??

Cushing Syndrome hyperadrenalism; ACTH-producing pituitary adenoma (60% of cases); clinical = weight gain, truncal obesity, hypertension, thinning skin, flushing of face, purple striae, easy bruising, hirsutism (excess hair), acne, osteoporosis, buffalo hump, moon faces, muscle weakness

Hyperaldosteronism ??

Addison's Disease chronic adrenocortical insufficiency; reduction/lack of cortisol and aldosterone; excess ACTH?; symptoms = tiredness, lack of energy, weight loss, GI disturbances, hypoglycemia, hyperpigmentation (bronzing), susceptible to infection

primary vs secondary Addisons disease primary = reduction/lack of cortisol and aldosterone // secondary = due to deficiency of ACTH (hypothalamic/pituitary dysfunction)

Waterhouse-Friderichsen syndrome caused by overwhelming sepsis due to bacterial infection, usually Neisseria meningitidis; symptoms = rapid hypotension leading to shock, DIC, wide spread purpura on skin, acute and rapid adrenocortical insufficiency

Adrenal Crisis hypotension, weakness, collapse, N/V, headache, fever; tx = hydrocortisone

Adrenal Gland Disorders (cont)

Pheochromocytoma tumor of adrenal medulla; catecholamines-producing tumor arising from medullary paraganglionic cells (chromophine cells); clinical = epinephrine increase HR and force of contraction, relaxation of bronchiolar smooth muscle and glycogenolysis

Endocrine Pancreas Disorders

Gastrinoma gastrin-producing tumor in pyloric antrum and duodenum

Glucagonoma glucagon-producing tumor (ultra cells)

Insulinoma insulin-producing tumor (beta cells)

Somatostatinoma somatostatin-producing tumor (delta cells)

Zollinger-Ellison syndrome 1 or more gastrinoma in duodenum; results in excess HCL production, leading to frequent peptic ulcers and hyperplasia of gastric mucosa

islets of langerhans (pancreas) glucagon, insulin, somatostatin, PP cells, gherlin (epsilon cells)

