somatotropin, prolactin, adrenocorticotropic, follicle stimulating hormone

somatotropin- before = gigantism _ after = acromegaly

prolactin- (PL) Prolactinoma is the most common type of hyperfunctioning pituitary adenoma. Dopamine serves as the major prolactin-inhibiting factor or brake on prolactin secretion.

Adrenocorticotropic- When hypercortisolism is due to excessive production of ACTH by the pituitary, the process is called Cushing’s disease. Large aggressive corticotroph adenomas can occur after removal of the adrenal glands for Cushing’s syndrome. This is known as Nelson’s syndrome.

follicle stimulating hormone - Gonadotroph (LH & FSH) adenomas = no symptoms = null cell adenomas

3-4. anterior or posterior pituitary gland, antidiuretic hormone, oxytocin
anterior pituitary gland-(adenohypophysis) pars intermedia- developed from dorsal portion of Rathke’s pouch
pars tuberalis- surround infundibulum of neurohypophysis & secretes mostly gonadotropins (LH & FSH)
pars distalis- (ACTH, TSH, GH, and P).
posterior pituitary gland- (neurohypophysis) develops from nerve tissue- oxytocin and vasopressin
antidiuretic hormone- Loss of this hormone produces diabetes insipidus which causes polyuria (excess urination).
oxytocin- released from posterior pituitary gland. It stimulates smooth muscle contraction in the pregnant uterus and lactiferous ducts of the mammary glands.

5.6. Symptoms of hyperthyroidism and hypothyroidism: Graves and nontoxic goiter

Hyperthyroidism - a hypermetabolic state
Primary- an intrinsic thyroid problem. Secondary- tumor
Clinical manifestations: A hypermetabolic state and overactivity of the sympathetic nervous system. Presenting symptoms are tremor, tachycardia, diarrhea, hyperreflexia, and irritability. The skin is warm and flushed with sweating

Hypothyroidism- Hashimoto’s thyroiditis
Clinical manifestations: cretinism and myxedema. Cretinism occurs during infancy or early childhood Myxedema (Gull’s disease) occurs in older children and adults as diffuse, nonpitting puffiness of the skin (myxedema). Plasma cholesterol and triglycerides increase. Constipation is common. The skin is cool and dry, the hair is brittle and lacking luster, and frequently there is loss of body hair. DTRs are sluggish. Carotenemia (yellow-orange skin) may develop

Grave’s Disease- the most common cause of endogenous hyperthyroidism. Triad of manifestations: thyrotoxicosis, infiltrative ophthalmopathy with resultant exophthalmos, and pretibial myxedema. autoimmune disorder
Thyroid gland is enlarged eyeballs bulge out

Diffuse Nontoxic Goiter- most common thyroid disease. Goiter associated with decreased thyroid hormone is nontoxic. Plummer’s syndrome can occur if TSH levels rise

7.8. thyroiditis: Hashimoto’s granulomatous, nonspecific, deQuervain’s
Hashimoto’s granulomatous- an autoimmune inflammatory disease of the thyroid
painless enlargement - May lead to atrophy of the thyroid gland
deQuervain’s thyroiditis- characterized by pain in the neck

9. thyroid carcinomas: papillary, follicular, medullary, anaplastic
Papillary carcinoma- most common form of thyroid carcinoma (80%) any age due to ionizing radiation
appear optically clear
Psammoma bodies
Follicular carcinoma- older age... areas of deficient iodine
Hurthle cells
often present as “cold” (doesn’t take up radioactive iodine)
Medullary carcinoma- arise from parafollicular cells or “C-cells”. These secrete calcitonin
Anaplastic carcinoma- most aggressive human neoplasms. elderly patients in areas of endemic goiter.

10.12. Parathyroid glands: symptoms of hyperparathyroidism, hypoparathyroidism
Chief cells synthesize and secrete parathyroid hormone
Primary hyperparathyroidism- causes hypercalcemia. Caused by a parathyroid adenoma
“painful bones, renal stones, abdominal groans, and psychic moans”
Secondary hyperparathyroidism- Renal failure is the most common cause. Other causes: inadequate intake of calcium, steatorrhea, and vit. D deficiency
Metastatic calcification of blood vessels can produce ischemic damage to skin and other organs = calciphylaxis

Hypoparathyroidism- most common cause is hypocalcemia
(D)George’s syndrome)
tingling, neuromuscular irritability with Chvostek’s and Trousseau’s signs, cataracts calcification of the basal ganglia, dental abnormalities, osteosclerosis, and osteomalacia

13. Vitamin D activation (Know 25 hydroxulase or alpha 1 hydroxylase to activate D...know the sequence)
14. Increased serum phosphate levels decrease calcium levels, which in turn stimulate the parathyroids. Kidney disease results in less alpha-1 hydroxylase enzyme (makes the 1,25 (OH)2 vitamin D), so there is a decrease in dihydroxy vitamin D (Vitamin D normally gets converted to dihydroxy vitamin D, but in this case there is less of the enzyme available to do so)
15. **Parathyroid histology and what are its cells sensitive to.** Parathyroid glands develop from the pharyngeal pouches

15.20. **Cushing’s, Conn’s, Addison’s, pheochromocytoma**

* **Cushing’s syndrome** (hypercortisolism)-
  - Plasma renin levels are normal but angiotensinogen levels are elevated
  - *truncal obesity, “moon” facies, and “buffalo hump”*
  - skin becomes thin, fragile, and bruises easily

* **Conn’s** hyperaldosteronism - 
  - sodium retention and potassium excretion, with resultant hypertension and hypokalemia.
  - Serum renin is low.

* **Addison’s** (chronic adrenocortical insufficiency) - weakness and easy fatigability.

**Gastrointestinal disturbances**

hyperpigmentation of the skin

**hyperkalemia, hyponatremia, hypotension, hypoglycemia**

**Pheochromocytoma** - hypertension, associated tachycardia

Increased urinary excretion of free catecholamines.

21.26. **Osteogenesis imperfecta, osteoporosis, rickets, osteomalacia, hyperparathyroidism** (defects in collagen, decrease in bone mass, hyperparathyroidism and cysts in bone…know which one is vitamin D in young people or adults (2 things))

**Osteogenesis imperfecta** (OI) “brittle bone disease” that is hereditary and is characterized by the abnormal development of type I collagen.

- Bones are very fragile, and other tissues such as eyes, skin, and joints are also affected.

  - Type I OI- reduced synthesis of type I collagen, blue sclera and premature hearing loss.
  - Type II OI- structurally abnormal type I collagen, prenatal fractures, abnormal bone deformities, blue sclera, Death usually results from respiratory difficulties.

  - Types III and IV OI- type III- prenatal fractures, very short stature, usually nonambulatory, blue scleras and hearing loss; type IV- postnatal fractures, mild deformities, premature hearing loss, and normal or gray scleras.

**Osteoporosis** - bone loss.

**Rickets** and **osteomalacia** - both are manifestations of vitamin D deficiency. increase in nonmineralized osteoid.

**hyperparathyroidism**- **ostitis fibrosa cystica**, bone diseases associated with hyperparathyroidism-

  - The effects of PTH are: osteoclast activation, with increased bone resorption and calcium mobilization; increased resorption of calcium by the renal tubules; increased synthesis of active vitamin D, 1, 25-(OH)2 D by the kidneys alpha1-hydroxylase enhances calcium absorption from the gut; “brown tumor”

**Osteitis fibrosa cystica** (von Recklinghausen’s disease) is the name used for the bone lesions produced by excess PTH.

27.31. **Osteomyelitis, Paget’s disease, tuberculosis** (Osteomyelitis (brody’s abscess)...osteoarthritis (don’t mix terms up)

  - involucrum is part of new limb of bone…Brown’s tumor is from hyperparathyroidism-previous question?..know TB term in lumbar spine..Paget’s disease know the other term and hallmark (mosaic bone pattern)

**Osteomyelitis**- Staphylococcus aureus

- Residual necrotic bone is called sequestrum
- Larger sequestra may not be totally resorbed and surrounded by a rim of reactive new bone termed, the involucrum.
- When sclerotic bone surrounds an abscess it is designated as Brodie’s abscess

**Paget’s disease**- (ostitis deformans)- 

  - *chalkstick fractures, osteclastic>osteoblastic>osteosclerotic*
  - spine, skull, and pelvic bones are especially affected

  - mosaic JIGSAW pattern

  - Increased levels of alkaline phosphatase

**Tuberculosis**- vertebral bodies = Pott’s disease

- adjacent soft tissues = “cold abscess” in the psosas muscle.

32.35. **Osteoma, Osteoid Osteoma, Osteosarcoma, Ewing’s Sarcoma…**

**Osteoma** = Encountered in the head and neck - do not undergo malignant transformation.

**Osteoid Osteoma** = Benign neoplasms. Arise most often in the proximal femur and tibia and occur most often in males.

- Pain is relieved by aspirin. - They have a central area of tumor called nidus that may become mineralized and sclerotic.

**Osteosarcoma** = **CODMANS TRIANGLE**

**Ewing’s Sarcoma** = onion skin pattern

36.37. **Osteoarthritis, Gout**...Gout is increased (uric acid) not urea...osteoarthritis (know a couple associated terms – fusion of joint)

**Osteoarthritis** = It is called degenerative joint disease. It occurs as a result of aging and causes disability in people over 65. There may also be Heberden’s nodes (on DIP’s) or Bouchard’s nodes (on PIP’s). There is no joint fusion as would occur in RA

**Gout** = Caused by the excessive accumulation of uric acid. The crystals are called tophi, leading to ankylosis

38.40. **Muscle Atrophy, Myasthenia Gravis, Muscular Dystrophies, Fibromatoses…**

**Muscle Atrophy** = floppy infant syndrome.

**Myasthenia Gravis** = autoimmune disorder of females more than males. Antibodies inhibit the binding of acetylcholine

- A thyromecomy may help.

**Muscular Dystrophies** = X linked
a). Duchenne = absence of dystrophin. Most patients die in their 20s
b). Becker = mutation of dystrophin gene. Patients can be ambulatory into adult life.

**Fibromatoses** = Superficial include palmar (Dupuytren’s contracture) and penile (Peyronie’s disease). Deep = desmoids

41-42. **Karyorrhexis, Chromatolysis, Karyolysis**...Know chromatolysis

**Karyorrhexis** = Fragmentation

**Karyolysis** = Loss of Staining

**Chromatolysis** = Axon damage to the neuron that disperses the Nisl Body and causes eccentric placement of the nucleus, swelling.

43. **44. Oligodendrocytes, Ependymal Cells, Microglia, Astrocytes**

Oligodendrocytes = Myelinating cells of the CNS. **multiple sclerosis**.

Ependymal Cells = These cells line the cerebral ventricles and line the central canal of the spinal cord.

Microglia = come from circulating monocytes and are phagocytic

Astrocytes = Major supporting cells of the brain that help form the **blood-brain barrier**. They form a glial scar

45. **Bran herniations** = tonsilar…falx cerebellar

a). **Transtentorial Herniation** = temporal lobe > tentorium cerebelli > third cranial nerve gets compressed

b). **Subfalcine Herniation** (cingulated gyrus) = displaces the cingulated gyrus under the falx cerebri.

c). **Tonsillar Herniation** = cerebellar tonsils > foramen magnum, cause secondary infarcts = Duret’s hemorrhages

**Hydrocephalus**

a). Noncommunicating = The obstruction of CSF flow is in the **ventricular system**

b). Communicating = **Obstruction of CSF is outside the ventricular system**

c). Hydrocephalus Ex vacuo = No obstruction of CSF...

47.50. **Brain Infarcts, TIA’s, Intracranial Hemorrhages**...

**Brain Infarcts** = **middle cerebral artery.** atherosclerosis from hypertension and smoking

**TIA** = predictor of stroke

**Hemorrhages** = Primary hemorrhages in epidural or Subdural spaces are typical of trauma

Brain and Subarachnoid hemorrhage is usually a manifestation of hypertension

a). Primary Brain Parenchymal Hemorrhages = hypertension

b). Subarachnoid Hemorrhage and Saccular Aneurysms = The most common cause of spontaneous (non-traumatic) Subarachnoid hemorrhage is rupture of a saccular (BERRY) aneurysm.

51.52. **Epidural and Subdural Hematomas**...Know the difference between the two (venous, artery, or what the veins are called)

**Epidural** = **middle meningeal artery.** - lucid interval immediately after injury followed by progressive loss of consciousness.

**Subdural Hematoma** = veins rupture from violent forces like whiplash, shaken baby syndrome.

The blood is under low pressure and symptoms are due to mass effect and may not occur for several days.

53. **Concussion, Diffuse Axonal Injury, Contusions**...Know what the terms mean...which one is associated with coup and contra coup

Concussion = A transient loss of consciousness and widespread paralysis followed by recovery in hours to days.

Diffuse Axonal Injury = Produces post-traumatic dementia and is also responsible for most cases of persistent vegetative state. Lesions result from sudden angular deceleration, which shears nerve cell processes.

Contusions = When the head is stable = coup contusion.

When the head is forced violently against a stable object, = contra coup = more severe

54-55. **Neural Tube Defects**

1). Myelocle: Most severe. **Neuroectodermal tissue exposed.**

2). Spinal Meningocle: Cyst filled with CSF and no spinal cord tissue.

3). Meningomyelocle = meninges and the spinal cord protrude through the vertebral defect.

Chiarl Malformation = medulla through foramen magnum

4). Spina Bifida Occulta = spinal cord and meninges intact. fawn’s beard

56. **Astrocytomas**...3 different kinds (know which one is well differentiated, not well differentiated and anaplastic)

1). Astrocytoma = Well differentiated...Increased # of astrocytes infiltrating the neurons

2). Anaplastic Astrocytoma = differentiated with RADIOGRAPHIC IMAGING.

3). Glioblastoma Multiformed = Most Aggressive

57. **Multiple Sclerosis, thiamine and B12 deficiencies**...Know the symptom of alcoholism or which one is MS

**MS** = **demyelinating disease of the CNS**

**Thiamine Deficiency** = Wernicke-Korsakoff = confusion, paralysis of eye muscles, ataxia - alcoholics

**B-12 Deficiency** (Cobalamin) = pernicious anemia. **combined degeneration of the spinal cord.**

58.60. **Alzheimer’s, Parkinson’s, Huntington’s, Lou Gehrig’s**...3 of the 4 are used...which is upper or lower motor neuron disease?

**Alzheimer’s** = genetic, B amyloid, neuro tangles
Parkinson’s = A disturbance of motor function characterized by rigidity, expressionless faces, stooped posture, gait disturbances, slowing of voluntary movements and characteristic “pill rolling tremor.”

Huntington’s = “extrapyramidal” = chorea – choreiform movements are involuntary

Amyotrophic Lateral Sclerosis (ALS or Lou Gehrig’s) = UMN and LMN, + Babinski reflex = 5 yr survival