

Define anisocytosis.

varying cell sizes

Define poikilocytosis

varying cell shapes

From which cells do B cells
arise?

stem cells in bone marrow

From which cells do plasma
cells differentiate?

B cells

How can a Nissl stain be used to differentiate microglia from oligodendroglia?

Microglia are not discernable in a Nissl stain while oligodendroglia appear as small dark nuclei with dark chromatin

In what type of CNS tissue (white or grey) are oligodendroglia predominant?

white matter

Into what cell type does a monocyte differentiate in tissues?

Macrophages

Name 2 substances produced by an eosinophil.

histaminase and arylsulfatase

Name the three types of leukocytic granulocytes.

basophils, eosinophils, and neutrophils

Name the two types of mononuclear leukocytes.

lymphocytes and monocytes

What are 2 functions of T cell lymphocytes?

– cellular immune response –
regulation of B lymphocytes
and macrophages

What are 2 morphological features of microglia?

– small irregular nuclei – and
relatively little cytoplasm

What are 3 examples of peripheral lymphoid tissue?

- follicles of lymph nodes -
- white pulp of spleen -
- unencapsulated lymphoid tissue

What are 3 functions of a macrophage?

- phagocytosis of bacteria, cell debris, and senescent red cells - scavenges damaged cells and tissues - can function as an antigen presenting cell

What are 3 morphological characteristics of monocytes?

- Large - Kidney-shaped nucleus - Extensive 'frosted glass' cytoplasm

What are 4 characteristics of the plasma cell morphology?

- Off center nucleus - Clock face chromatin distribution - Abundant RER - Well developed Golgi apparatus

What are 4 morphologic characteristics of lymphocytes?

– Round – Small – Densely staining nucleus – Small amount of pale cytoplasm

What are 4 substances contained within the lysosomes of neutrophils?

– hydrolytic enzymes – lysozyme – myeloperoxidase – lactoferrin

What are 4 types of cells into which T cells differentiate?

– cytotoxic T cells (MHC I, CD8) – helper T cells (MHCII, CD4) – suppressor T cells – delayed hypersensitivity T cells

What are the 5 important causes for eosinophilia in humans?

Neoplastic, Asthma, Allergic process, Collagen vascular disease, and Parasites (pneumonic NAACP)

What are the blood cell differentiation names of the ACTIVE T CELL line beginning with the pluripotent hematopoietic stem cell? (4)

– Pluripotent hematopoietic stem cell – Lymphoblast – T cell – Active T cell

What are the blood cell differentiation names of the ERYTHROCYTE cell line beginning with pluripotent hematopoietic stem cell? (4)

– Pluripotent hematopoietic stem cell – Proerythroblast – Reticulocyte – Erythrocyte

What are the blood cell differentiation names of the MONOCYTE cell lines beginning with the pluripotent hematopoietic stem cell? (3)

– Pluripotent hematopoietic stem cell – Mono blast – Monocyte

What are the blood cell differentiation names of the NEUTROPHIL, EOSINOPHIL, and BASOPHIL cell lines beginning with the myeloblast stage? (6)

– Myeloblast – Promyelocyte
– Myelocyte – Metamyelocyte
– Stab cell – Neutrophil, eosinophil or basophil

What are the blood cell differentiation names of the PLASMA CELL line beginning with the pluripotent hematopoietic stem cell? (4)

– Pluripotent hematopoietic stem cell – Lymphoblast – B cell – Plasma cell

What are the blood cell differentiation names of the PLATELET CELL line beginning with the hematopoietic stem cell? (4)

– Pluripotent hematopoietic stem cell – Megakaryoblast – Megakaryocyte – Platelets

What are the components of the air–blood barrier?

– Type I pneumocyte – tight junction – endothelial cell

What are the steps of maturation of a B cell? (2 points)

– maturation in the marrow – migration to peripheral lymphoid tissue

What are the substances contained within the densely basophilic granules of the basophil? (4)

- Heparin (anticoagulant) - histamine (vasodilator) - vasoactive amines - Slow reacting substance of anaphylaxis

What are two basic morphological characteristics of neutrophils?

- multilobed nucleus - large, spherical azurophilic primary granules (lysosomes)

What are two important functions of a neutrophil?

- acute inflammatory response of a cell - phagocytosis

What are two names for an increased number of red cells?

Erythrocytosis and polycythemia

What cell type closely resembles a mast cell?

basophil

What cranial nerves are commonly involved in an acoustic neuroma?

CN VII, VIII (association with internal acoustic meatus)

What disease is characterized by destruction of oligodendroglia?

Multiple sclerosis

What does CD stand for?

cluster of differentiation

What drug prevents mast cell degranulation?

Cromolyn sodium

What immunoglobulin can bind to the membrane of a mast cell?

IgE

What is a reticulocyte?

a baby (developing) erythrocyte

What is an important example of a Schwannoma?

Acoustic neuroma

What is another name for pulmonary surfactant?

DPPC
(dipalmitoylphosphatidylcholine)

What is percentage of leukocytes in the blood exist as basophils?

less than 1%

What is the 'gap' between the myelination segment of 2 Schwann cells called?

Node of Ranvier

What is the advantage of the large surface area:volume ratio in erythrocytes?

easy gas exchange (Oxygen and Carbon dioxide)

What is the basic morphologic structure of an erythrocyte?

Anucleate, biconcave

What is the basic morphology of an eosinophil? (2 things)

- bilobate nucleus – packed with large eosinophilic granules of uniform size

What is the embryologic origin of microglia?

mesoderm

What is the function of Interferon gamma with relation to macrophages?

macrophage activation

What is the function of microglia?

phagocytosis in CNS

What is the function of oligodendroglia?

myelination of multiple CNS axons

What is the function of pulmonary surfactant?

lowers alveolar surface tension and prevents atelectasis

What is the function of Schwann cells?

myelination of PNS (a Schwann cell myelinates only one PNS axon)

What is the importance of the lecithin:sphingomyelin ratio?

> 2.0 in fetal lung is indicative of fetal lung maturity

What is the importance of the physiologic chloride shift in erythrocytes?

Membranes contain the chloride bicarbonate antiport allowing the RBC to transport carbon dioxide from the lung periphery for elimination.

What is the last segment of lung tissue in which ciliated cells are found?

respiratory bronchioles

What is the last segment of lung tissue in which goblet cells are found?

terminal bronchioles (remember ciliated cells sweep away mucous produced by goblet cells and therefore run deeper)

What is the primary function of a basophil?

Mediates allergic reactions

What is the primary function of a leukocyte?

Defense against infections

What is the primary function of a mast cell?

Mediates allergic reactions

What is the primary function of a plasma cell?

production of large amounts of a specific antibody to a particular antigen

What is the primary source of energy for erythrocytes?

glucose (90% anaerobically degraded to lactate, 10% by HMP shunt)

What is the process of degranulation in mast cells?

release of histamine, heparin, and eosinophil chemotactic factors

What is the range of concentration for leukocytes in the blood?

4,000 – 10,000 cells per microliter

What is the response of an eosinophil to antigen antibody complexes?

high degree of phagocytosis

What is the response of microglia to tissue damage?

transformation into large ameboid phagocytic cells

What is the response to microglia infected with HIV?

fusion to form multinucleated giant cells in CNS

What is the survival time for an erythrocyte?

120 days

What pathognomonic change is seen in neutrophils of a person who is folate/vitamin B12 deficient?

hypersegmented polys

What percentage of leukocytes exist as eosinophils in the blood?

1 - 6%

What percentage of leukocytes exist as neutrophils in the blood?

40 - 75%

What percentage of leukocytes in blood are monocytes?

2 - 10%

What process occurs when type I pneumocytes are damaged?

Type II pneumocytes develop into type I

What substance in eosinophilic granules is primarily responsible for defense against helminths and protozoan infections?

major basic protein

Where is the site of maturation of T lymphocytes?

Thymus

Which cell type constitutively secretes pulmonary surfactant?

Type II pneumocyte

Which cell type lines the alveoli?

Type I pneumocyte

Which leukemia is the result of plasma cell neoplasm?

Multiple myeloma

Which type of hypersensitivity reaction is a mast cell involved in?

Type I hypersensitivity reaction

Which type of immunity do B cells exhibit?

humoral immunity

After arising from the floor of the primitive pharynx, where does the thyrodiverticulum go?

It descends down into the neck

After the first breath at birth, what causes closure of the ductus arteriosus?

An increase in oxygen

After the first breath at birth, what causes the closure of the foramen ovale?

A decrease resistance in pulmonary vasculature causes increased left atrial pressure vs. right atrial pressure

Although the diaphragm descends during development, it maintains innervation from ____?

C3-C5

An easy pneumonic to remember fetal erythropoiesis is?

Young Liver Synthesizes Blood

At what time in the course of development is the fetus most susceptible to teratogens?

Weeks 3–8

Deoxygenated blood from the SVC is expelled into the pulmonary artery and _____ to the lower body of the fetus.

ductus arteriosus

Do the cardiovascular structures arise from neural crest (ectoderm), mesoderm, or endoderm?

Mesoderm

Do the chromaffin cells of the adrenal medulla arise from neural crest (ectoderm), mesoderm, or endoderm?

Neural Crest (Ectoderm)

Do the enterochromaffin cells arise from neural crest (ectoderm), mesoderm, or endoderm?

Neural Crest (Ectoderm)

Do the lungs arise from neural crest (ectoderm), mesoderm, or endoderm?

Endoderm

Do the lymphatics arise from neural crest (ectoderm), mesoderm, or endoderm?

Mesoderm

Do the melanocytes arise from neural crest (ectoderm), mesoderm, or endoderm?

Neural Crest (Ectoderm)

Do the neural crest cells arise from mesoderm, ectoderm, or endoderm?

Ectoderm

Do the odontoblasts arise from neural crest (ectoderm), mesoderm, or endoderm?

Neural Crest (Ectoderm)

Do the parafollicular (C) cells of the thyroid arise from neural crest (ectoderm), mesoderm, or endoderm?

Neural Crest (Ectoderm)

Do the Schwann cells arise from neural crest (ectoderm), mesoderm, or endoderm?

Neural Crest (Ectoderm)

Do the urogenital structures arise from neural crest (ectoderm), mesoderm, or endoderm?

Mesoderm

Does blood arise from neural crest (ectoderm), mesoderm, or endoderm?

Mesoderm

Does bone arise from neural crest (ectoderm), mesoderm, or endoderm?

Mesoderm

Does muscle arise from neural crest (ectoderm), mesoderm, or endoderm?

Mesoderm

Does the thyroid arise from neural crest (ectoderm), mesoderm, or endoderm?

Endoderm

Does the adrenal cortex arise from neural crest (ectoderm), mesoderm, or endoderm?

Mesoderm

Does the ANS arise from neural crest (ectoderm), mesoderm, or endoderm?

Neural Crest (Ectoderm)

Does the celiac ganglion arise from neural crest (ectoderm), mesoderm, or endoderm?

Neural Crest (Ectoderm)

Does the dorsal root ganglion arise from neural crest (ectoderm), mesoderm, or endoderm?

Neural Crest (Ectoderm)

Does the dura connective tissue arise from neural crest (ectoderm), mesoderm, or endoderm?

Mesoderm

Does the gut tube epithelium arise from neural crest (ectoderm), mesoderm, or endoderm?

Endoderm

Does the liver arise from neural crest (ectoderm), mesoderm, or endoderm?

Endoderm

Does the pancreas arise from neural crest (ectoderm), mesoderm, or endoderm?

Endoderm

Does the parathyroid arise from neural crest (ectoderm), mesoderm, or endoderm?

Endoderm

Does the pia arise from neural crest (ectoderm), mesoderm, or endoderm?

Neural Crest (Ectoderm)

Does the serous linings of body cavities arise from neural crest (ectoderm), mesoderm, or endoderm?

Mesoderm

Does the spleen arise from neural crest (ectoderm), mesoderm, or endoderm?

Mesoderm

Does the thymus arise from neural crest (ectoderm), mesoderm, or endoderm?

Endoderm

From what does the ligamentum teres hepatis arise?

Umbilical vein

How does a bicornate uterus form?

Results from incomplete fusion of the paramesonephric ducts

How does a cleft lip form?

Failure of fusion of the maxillary and medial nasal processes

How does a cleft palate form?

Failure of fusion of the lateral palatine processes, the nasal septum, and/or the median palatine process

How does a horseshoe kidney form?

Inferior poles of both kidneys fuse, as they ascend from the pelvis during development they get trapped under the inferior mesenteric artery, and remain low in the abdomen

How is meckel's diverticulum different than an omphalomesenteric cyst?

Omphalomesenteric cyst is a cystic dilatation of the vitelline duct

How long does full development of spermatogenesis take?

2 months

How many arteries and veins does the umbilical cord contain?

- 2 umbilical arteries (carries deoxygenated blood away from fetus) - 1 umbilical vein (oxygenated blood to fetus)

Is a primary spermatocyte 2N or 4N?

4N

Is a primary spermatocyte haploid or diploid?

Diploid, 4N

Is a secondary spermatocyte
haploid or diploid?

Haploid, $2N$

Is a secondary spermatocyte
 N or $2N$?

$2N$

Is a spermatogonium haploid or
diploid?

Diploid, $2N$

Is a spermatid haploid or
diploid?

Haploid, N

Meiosis I is arrested in which phase until ovulation?

Prophase

Meiosis II is arrested in which phase until fertilization?

Metaphase (an egg MET a sperm)

Most oxygenated blood reaching the heart via IVC is diverted through the _____ and pumped out the aorta to the head.

foramen ovale

The right common cardinal vein and right anterior cardinal vein give rise to what adult heart structure?

Superior vena cava

The stapedius muscle of the ear is formed by which branchial arch?

2nd

This type of bone formation consists of ossification of cartilaginous molds and forms long bones at primary and secondary centers.

Endochondral

True or False, blood in the umbilical vein is 100% saturated with oxygen?

False, it is 80% saturated

True or False, there are two types of spermatogonia?

True, type A & type B

What are the 1st branchial arch derivatives innervated by?

CN V2 and V3

What are the 2nd branchial arch derivatives innervated by?

CN VII

What are the 3rd branchial arch derivatives innervated by?

CN IX

What are the 4th and 6th branchial arch derivatives innervated by?

CN X

What are the cartilage derivatives (5) of the 4th and 6th branchial arches?

- Thyroid - Cricoid - Arytenoids - Corniculate - Cuneiform

What are the five 2's associated with meckel's diverticulum?

- 2 inches long - 2 feet from the ileocecal valve - 2% of the population - Commonly presents in the first 2 years of life - May have 2 types of epithelia

What are the rule of 2's for the 2nd week of development?

- 2 germ layers: epiblast & hypoblast - 2 cavities: amniotic cavity & yolk sac - 2 components to the placenta: cytotrophoblast & syncytiotrophoblast

What are the rule of 3's for the 3rd week of development?

3 germ layers (gastrula): ectoderm, mesoderm, endoderm

What can a persistent cervical sinus lead to?

A branchial cyst in the neck

What can be found in the cortex of the thymus?

It is dense with immature T cells

What can be found in the medulla of the thymus?

It is pale with mature T cells, epithelial reticular cells, and Hassall's corpuscles

What connects the thyroid diverticulum to the tongue?

The thyroglossal duct

What developmental contributions does the 5th branchial arch make?

None

What do the 2nd – 4th branchial clefts form, which are obliterated by proliferation of the 2nd arch mesenchyme?

Temporary cervical sinuses

What does aberrant development of the 3rd and 4th pouches cause?

DiGeorge's syndrome

What does the 1st aortic arch give rise to?

Part of the maxillary artery

What does the 2nd pharyngeal pouch develop into?

Epithelial lining of the palatine tonsils

What does the 3rd aortic arch give rise to?

Common carotid artery and proximal part of the internal carotid artery

What does the 4th pharyngeal pouch develop into?

Superior parathyroids

What does the 5th aortic arch give rise to?

Nothing

What does the 5th pharyngeal pouch develop into?

C cells of the thyroid

What does the 6th aortic arch give rise to?

The proximal part of the pulmonary arteries and (on left only) ductus arteriosus

What does the ductus arteriosus give rise to?

Ligamentum arteriosum

What does the ductus venosus shunt blood away from?

Liver

What does the first branchial cleft develop into?

The external auditory meatus

What does the foramen ovale give rise to?

Fossa ovalis

What does the left 4th aortic arch give rise to?

Aortic arch

What does the ligamentum venosum come from?

Ductus venosus

What does the notochord give rise to?

Nucleus Pulposus

What does the primitive atria give rise to?

Trabeculated left and right atrium

What does the primitive ventricle give rise to?

Trabeculated parts of the left and right ventricle

What does the right 4th aortic arch give rise to?

Proximal part of the right subclavian artery

What does the right horn of the sinus venosus give rise to?

Smooth part of the right atrium

What does the spleen arise from?

Dorsal mesentery, but is supplied by the artery of the foregut

What does the thymus arise from?

Epithelium of the 3rd branchial pouch

What does the thyroid diverticulum arise from?

The floor of the primitive pharynx

What does the truncus arteriosus give rise to?

The ascending aorta and pulmonary trunk

What does the umbilical arteries give rise to?

Medial umbilical ligaments

What ear muscle does the 1st branchial arch form?

Tensor tympani

What effect does 13-cis-retinoic acid have on the fetus?

Extremely high risk for birth defects

What effect does ACE inhibitors have on the fetus?

Renal Damage

What effect does iodide have on the fetus?

Congenital goiter or hypothyroidism

What effect does warfarin and x-rays have on the fetus?

Multiple anomalies

What effects does cocaine have on the fetus?

Abnormal fetal development and fetal addiction

What embryonic structure are the smooth parts of the left and right ventricle derived from?

Bulbus cordis

What embryonic structure does the coronary sinus come from?

Left horn of the sinus venosus

What embryonic structure does the median umbilical ligament come from?

Allantois (urachus)

What fetal landmark has developed within week 2 of fertilization?

Bilaminar disk

What fetal landmark has occurred within week 1 of fertilization?

Implantation

What fetal landmark has occurred within week 3 of fertilization?

Gastrulation

What fetal landmarks (2) have developed within week 3 of fertilization?

Primitive streak and neural plate begin to form

What five things arise from neuroectoderm?

– Neurohypophysis – CNS neurons – Oligodendrocytes – Astrocytes – Pineal gland

What four structures make up the diaphragm?

– Septum transversum – pleuroperitoneal folds – body wall – dorsal mesentery of esophagus

What four things arise from surface ectoderm?

– Adenohypophysis – Lens of eye – Epithelial linings – Epidermis

What four things does Meckel's cartilage (from the 1st arch) develop into?

– Mandible – Malleus – Incus – Sphenomandibular ligament

What four things does Reichert's cartilage (from the 2nd arch) develop into?

– Stapes – Styloid process – Lesser horn of hyoid – Stylohyoid ligament

What four things does the dorsal pancreatic bud become?

Body, tail, isthmus, and accessory pancreatic duct

What four things does the mesonephric (wolffian) duct develop into?

- Seminal vesicles -
Epididymis - Ejaculatory duct
- Ductus deferens

What induces the ectoderm to form the neuroectoderm (neural plate)?

Notochord

What is a hiatal hernia?

Abdominal contents herniate into the thorax due to incomplete development of the diaphragm

What is a hypospadias?

Abnormal opening of penile urethra on inferior side of penis due to failure of urethral folds to close

What is a single umbilical artery associated with?

Congenital and chromosomal anomalies

What is a urachal cyst or sinus a remnant of?

The allantois

What is an abnormal opening of penile urethra on superior side of penis due to faulty positioning of the genital tubercle?

Epispadias

What is associated with an epispadias?

Exstrophy of the bladder

What is Meckel's diverticulum?

Persistence of the vitelline duct or yolk sac

What is oligohydramnios associated with?

Bilateral renal agenesis or posterior urethral valves (in males)

What is oligohydramnios?

< 0.5 L of amniotic fluid

What is polyhydramnios associated with?

Esophageal/duodenal atresia, anencephaly

What is polyhydramnios?

> 1.5–2 L of amniotic fluid

What is Potter's syndrome?

Bilateral renal agenesis, that results in oligohydramnios causing limb and facial deformities and pulmonary hypoplasia (Babies with Potter's can't pee in utero)

What is the acrosome of sperm derived from?

Golgi apparatus

What is the female homologue to the corpus spongiosum in the male?

Vestibular bulbs

What is the female homologue to the prostate gland in the male?

Urethral and paraurethral glands (of Skene)

What is the female homologue to the scrotum in the male?

Labia majora

What is the female homologue to the ventral shaft of the penis in the male?

Labia minora

What is the flagellum (tail) derived from?

One of the centrioles

What is the food supply of sperm?

Fructose

What is the male homologue to the glans clitoris in the female?

Glans penis

What is the male homologue to the greater vestibular glands (of Bartholin) in the female?

Bulbourethral glands (of Cowper)

What is the most common congenital anomaly of the GI tract?

Meckel's diverticulum

What is the most common ectopic thyroid tissue site?

The tongue

What is the normal remnant of the thyroglossal duct?

Foramen cecum

What is the postnatal derivative of the notochord?

The nucleus pulposus of the intervertebral disc

What is the site of T-cell maturation?

Thymus

What part of the gut is the pancreas derived?

Foregut

What suppresses the development of the paramesonephric ducts in males?

Mullerian inhibiting substance
(secreted by the testes)

What teratogenic agent causes limb defects ('flipper' limbs)?

Thalidomide

What three structures does the 3rd pharyngeal pouch develop into?

- Thymus - Left inferior parathyroid - Right inferior parathyroid

What three things does the 1st pharyngeal pouch develop into?

- Middle ear cavity - Eustachian tube - Mastoid air cells

What three things does the paramesonephric (mullerian) duct develop into?

- Fallopian tube - Uterus - Part of the vagina

What three things does the ventral pancreatic bud become?

- Pancreatic head - uncinata process - main pancreatic duct

What two things occur during week 4 of fetal development?

Heart begins to beat, upper and lower limb buds begin to form

What type of bone formation is spontaneous without preexisting cartilage?

Intramembranous

What type of twins would have 1 placenta, 2 amniotic sacs, and 1 chorion?

Monozygotic twins

What type of twins would have 2 amniotic sacs and 2 placentas?

Monozygotic or dizygotic twins

What will DiGeorge's syndrome lead to?

T cell deficiency & hypocalcemia

When do primary oocytes begin meiosis I?

During fetal life

When do primary oocytes complete meiosis I?

Just prior to ovulation

When does fetal erythropoiesis occur in the bone marrow?

Week 28 and onward

When does fetal erythropoiesis occur in the liver?

Weeks 6–30

When does fetal erythropoiesis occur in the spleen?

Weeks 9–28

When does organogenesis occur in the fetus?

Weeks 3–8

Where does positive and negative selection occur in the thymus?

At the corticomedullary junction

Where does spermatogenesis take place?

Seminiferous tubules

Where is the first place fetal erythropoiesis occurs and when does this take place?

Yolk sac (3–8 wk)

Which aortic arch does the stapedial artery and the hyoid artery come from?

2nd aortic arch

Which branchial arch are the greater horn of hyoid and the stylopharyngeus muscle derived from?

3rd branchial arch

Which branchial arch does Meckel's cartilage develop from?

1st arch

Which branchial arch forms the anterior 2/3 of the tongue?

1st arch

Which branchial arch forms the incus and malleus of the ear?

1st arch

Which ear bone(s) does the 2nd branchial arch form?

Stapes

Which embryonic tissue are branchial clefts derived from?

Ectoderm

Which embryonic tissue are branchial pouches derived from?

Endoderm

Which is more common a hypospadias or epispadias?

Hypospadias

Which muscles (3) are derivatives of the 4th branchial arch?

– Most pharyngeal constrictors – Cricothyroid – Levator veli palatini

Which muscles (4) are derivatives of the 2nd branchial arch?

- Muscles of facial expression
- Stapedius - Stylohyoid - Posterior belly of digastric

Which muscles (8) are derivatives of the 1st branchial arch?

- Temporalis - Masseter - Lateral pterygoid - Medial pterygoid - Mylohyoid - Anterior belly of digastric - Tensor tympani - Tensor veli palatini

Which muscles are derivatives of the 6th branchial arch?

All intrinsic muscles of the larynx, except the cricothyroid

Which pharyngeal arch does Reichert's cartilage develop from?

2nd arch

Which teratogenic agent causes vaginal clear cell adenocarcinoma?

DES

Which two branchial arches form the posterior 1/3 of the tongue?

3rd and 4th arches

Which two embryonic tissues are branchial arches derived from?

Mesoderm and neural crests

Which week of fetal development have the genitalia taken on male/female characteristics?

Week 10

A common football injury caused by clipping from the lateral side will damage what structures (3 answers)?

--Medial collateral ligament
--Medial meniscus --Anterior cruciate ligament

A lumbar puncture is performed at what landmark/

Iliac crest

A positive anterior drawer sign indicates damage to what structure?

Anterior cruciate ligament (ACL)

A pudendal nerve block is performed at what landmark?

Ischial spine

Abnormal passive abduction of the knee indicates damage to what structure?

Medial collateral ligament (MCL)

Anterior' in ACL refers to what attachment?

Tibial

At what level is a lumbar puncture performed?

Between L3-L4 or L4-L5

Common peroneal nerve damage manifests what deficit?

Loss of dorsiflexion(Foot Drop)

Common peroneal, Tibial, Femoral, and Obturator nerves arise from what spinal cord segments (4 answers)?

--L4-S2 (common peroneal)
--L4-S3 (tibial) --L2-L4 (femoral) and (obturator)

Coronary artery occlusion usually occurs where?

Left anterior descending artery (LAD)

Do the coronary arteries fill during systole or diastole?

Diastole

Erection and sensation of the penis is in what dermatomes?

S2-S4

Femoral nerve damage manifests what deficit?

Loss of knee jerk

How does the course of the left recurrent laryngeal nerve differ from that of the right?

The left wraps around the arch of the aorta and the ligamentum arteriosum while the right wraps around the subclavian artery.

How is the appendix located?

2/3 of the way from the umbilicus to the anterior superior iliac spine

How many lobes are in the right and left lungs and what are their names?

--Right has three (superior, middle, inferior) --
Left has two (superior and inferior) and the lingula

Name five portal-systemic anastomoses.

1. Left gastric-azygous vv.
2. Superior-Middle/Inferior rectal vv.
3. Paraumbilical-inferior epigastric
4. Retroperitoneal-renal vv.
5. Retroperitoneal-paravertebral vv.

Name the 4 ligaments of the uterus.

- Suspensory ligament of ovaries
- Transverse cervical (cardinal) ligament
- Round ligament of uterus
- Broad ligament

Name the hypothenar muscles.

- Opponens digiti minimi
- Abductor digiti minimi
- Flexor digiti minimi

Name the retroperitoneal structures (9).

1. Duodenum(2nd-4th parts)
2. Descending colon
3. Ascending colon
4. Kidney & ureters
5. Pancreas
6. Aorta
7. Inferior vena cava
8. Adrenal glands
9. Rectum

Name the rotator cuff muscles.

--Supraspinatus --
Infraspinatus --teres minor
--Subscapularis

Name the thenar muscles

--Opponens pollicis --
Abductor pollicis brevis --
Flexor pollicis brevis

Obturator nerve damage manifests what deficit?

Loss of hip adduction

Pain from the diaphragm is usually referred where?

Shoulder

Subarachnoid space extends to what spinal level?

S2

The area of the body that contains the appendix is known as what?

McBurney's point

The femoral triangle contains what structures from lateral to medial?

--Femoral nerve --Femoral artery --Femoral vein --Femoral Canal (lymphatics)

The inguinal ligament exists in what dermatome?

L1

The kneecaps exist in what dermatome?

L4

The male sexual response of ejaculation is mediated by what part of the nervous system?

Visceral and somatic nerves

The male sexual response of emission is mediated by what part of the nervous system?

Sympathetic nervous system

The male sexual response of erection is mediated by what part of the nervous system?

Parasympathetic nervous system

The nipple exists in what dermatome?

T4

The recurrent laryngeal nerve arises from what cranial nerve and supplies what muscles?

1.CN X 2.All intrinsic muscles of the larynx except the cricothyroid muscle.

The SA and AV nodes are usually supplied by what artery?

Right Coronary Artery (RCA)

The spinal cord ends at what level in adults?

L1-L2

The umbilicus exists in what dermatome?

T10

The xiphoid process exists in what dermatome?

T7

Tibial nerve damage manifests what deficit?

Loss of plantar flexion

What are hernias?

Protrusions of peritoneum through an opening, usually sites of weakness.

What are JG cells?

Modified smooth muscle of afferent arteriole in the juxtaglomerular apparatus of the kidney

What are the boundaries of the inguinal (Hesselbach) triangle?

--Inferior epigastric artery --
Lateral border of the rectus abdominus --Inguinal ligament

What are the layers encountered from the outside down to the brain?

--Skin --Connective tissue
--Aponeurosis --Loose connective tissue --
Pericranium --Dura mater --
Subdural space --Arachnoid
--Subarachnoid space --Pia mater --Brain

What are the manifestations of portal hypertension?

--Esophageal varices --
Hemorrhoids --Caput medusae

What condition is usually associated with portal hypertension?

Alcoholic cirrhosis

What defect may predispose an infant for a diaphragmatic hernia?

Defective development of the pleuroperitoneal membrane

What gut regions and structures does the celiac artery supply?

1.Foregut 2.--Stomach to duodenum --liver --gallbladder --pancreas

What gut regions and structures does the IMA supply?

1.Hindgut 2.--Distal 1/3 of transverse colon to upper portion of rectum

What gut regions and structures does the SMA supply?

1. Midgut 2.--Duodenum to proximal 2/3 of transverse colon

What is a diaphragmatic hernia?

Abdominal retroperitoneal structures enter the thorax

What is a femoral hernia?

entrance of abdominal contents through the femoral canal.

What is a hiatal hernia?

Stomach contents herniate upward through the esophageal hiatus of the diaphragm

What is the arterial blood supply difference above and below the pectinate line?

- Superior rectal a. (Above)
- Inferior rectal a. (Below)

What is the course of a direct inguinal hernia?

Through weak abdominal wall, into the inguinal triangle, medial to the inferior epigastric artery, through the external inguinal ring only.

What is the course of an indirect inguinal hernia?

Through the internal (deep) inguinal ring and the external (superficial) inguinal ring lateral to the inferior epigastric artery and into the scrotum

What is the course of the ureters?

Pass under uterine artery and under the ductus deferens

What is the function of Myenteric plexus?
Submucosal plexus?

1.Coordinates motility along entire gut wall
2.Regulates local secretions, blood flow, and absorption

What is the function of the JG cells?

--secrete renin and erythropoietin

What is the innervation difference above and below the pectinate line?

--Visceral innervation (Above)
--Somatic innervation (Below)

What is the innervation of the diaphragm?

Phrenic nerve (C3,4,5)

What is the macula densa?

Sodium sensor in part of the distal convoluted distal tubule in the juxtaglomerular apparatus of the kidney

What is the Myenteric plexus also known as? Submucosal plexus?

1. Auerbach's plexus 2. Meissner's plexus

What is the pectinate line of the rectum?

Where the hindgut meets ectoderm in the rectum

What is the relationship of the two pulmonary arteries in the lung hilus?

Right anterior Left superior

What is the usual pathology above the pectinate line of the rectum?

Internal hemorrhoids (not painful) Adenocarcinoma

What is the usual pathology below the pectinate line of the rectum?

External hemorrhoids (painful) Squamous cell carcinoma

What is the venous drainage difference above and below the pectinate line?

--Superior rectal v. to IMV to portal system (Above) --
Inferior rectal v. to internal pudendal v. to internal iliac v. to IVC (Below)

What layers of the gut wall contribute to motility (4)?

--Muscularis mucosae --
Inner circular muscle layer --
Myenteric plexus --Outer longitudinal muscle layer

What layers of the gut wall contribute to support (3)?

--Serosa --Lamina propria --
Submucosa

What muscle opens the jaw?

Lateral pterygoid

What nerve innervates most of the 'glossus' muscles and which is the exception?

1.Vagus Nerve (CNX)
2.Palatoglossus (innervated by hypoglossal n.)

What nerve innervates most of the 'palat' muscles and which is the exception?

1.Trigeminal Nerve, Mandibular branch
2.Tensor veli palatini (innervated by vagus n)

What nerve innervates the muscles that close and open the jaw?

Trigeminal Nerve (V3)

What neurons do the GI enteric plexus contain?

Cell bodies of parasympathetic terminal effector neurons

What part of the heart does the LAD supply?

anterior interventricular septum

What spinal cord levels are vertebral disk herniation most likely to occur?

Between L5 and S1

What structure is in the femoral triangle but not in the femoral sheath?

--Femoral nerve

What structures are in the carotid sheath?

1.Internal Jugular Vein (lateral) --2.Common Carotid Artery (medial) --3.Vagus Nerve (posterior)

What structures are pierced when doing an LP?

1.Skin/superficial fascia
2.Ligaments (supraspinatous, interspinous, ligamentum flavum)
3.Epidural space 4.Dura mater 5.Subdural space
6.Arachnoid 7.Subarachnoid space--CSF

What structures do the broad ligament contain (4)?

--Round ligaments of the uterus --Ovaries --Uterine tubules --Uterine vessels

What structures make up the bronchopulmonary segment?

--Tertiary bronchus --
Bronchial artery --Pulmonary artery

What structures perforate the diaphragm at what vertebral levels?

--IVC at T8 --esophagus,
vagal trunks at T10 --aorta,
thoracic duct, axillary vein at
T12

What three muscles close the jaw?

--Masseter --Temporalis --
Medial pterygoid

What usually provides the blood supply for the inferior left ventricle?

Posterior descending artery
(PD) of the RCA

When do the JG cells secrete renin?

in response to decreased renal BP, decreased sodium delivery to distal tubule, and increased sympathetic tone

When is damage to the recurrent laryngeal nerve most likely to happen and what are its results(2 answers)?

- 1.Thyroid surgery
- 2.Hoarseness

Where is the CSF found?

Subarachnoid space

Where is the Myenteric plexus located? Submucosal plexus?

- 1.Between the inner and outer layers of smooth muscle in GI tract wall
- 2.Between mucosa and inner layer of smooth muscle in GI tract wall.

Which ligament contains the ovarian vessels?

Suspensory ligament of the ovary

Which ligament contains the uterine vessels?

Transverse cervical (cardinal) ligament

Which lung is the usual site of an inhaled foreign body?

Right lung

Which lung provides a space for the heart to occupy?

Left lung (in the place of the middle lobe)

Which meningeal layer is not pierced during an LP?

Pia mater

Who usually gets a direct inguinal hernia? indirect hernia (and why)?

1.Older men 2.Infants (failure of processus vaginalis to close)

What are the 3 layers of peripheral nerves? (inner to outer)

1) Endoneurium 2) Perineurium 3) Epineurium

Where is type I collagen found?(7)

1. bone 2. tendon 3. skin 4. dentin 5. fascia 6. cornea 7. late wound repair

Where is type II collagen found? (3)

1. cartilage (including hyaline)
2. vitreous body
3. nucleus pulposus.

What are the functions of the major structures of the inner ear bony labyrinth?

1. Cochlea- hearing
2. vestibule- linear acceleration
3. semicircular canals- angular acceleration.

What are the major structures of the inner ear bony labyrinth?

1. Cochlea
2. vestibule
3. semicircular canals

What are the major structures of the inner ear membranous labyrinth?

1. Cochlear duct
2. utricle.
3. saccule
4. semicircular canals.

Name two proteins involved in the structure of macula adherens.

1. Desmoplakin 2. Keratin

Name 6 functions of Golgi apparatus.

1. Distribution center of proteins and lipids from ER to plasma membrane, lysosomes, secretory vesicles 2. Modifies N-oligosaccharides on asparagine 3. Adds O-oligosaccharides to Ser and Thr residues 4. Proteoglycan assembly from proteoglycan core proteins 5. Sulfation of sugars in proteoglycans and of selected tyrosine on proteins

Name 6 functions of Golgi apparatus (continued answer)

6. Addition of mannose-6-phosphate to specific lysosomal proteins, which targets the protein to the lysosome

Name two proteins involved in the structure of zona adherens?

1. E-cadherins 2. actin filaments

Which cells are rich in smooth ER?

1. liver hepatocytes, 2. steroid hormone-producing cells of adrenal cortex.

Describe the immune response stimulated via Peyer's patches.

1. M cells take up antigen. 2. stimulated B cells leave Peyer's patch and travel through lymph and blood to lamina propria of intestine. 3. In lamina propria B cells differentiate into IgA-secreting plasma cells. 4. IgA receives protective secretory component. 5. IgA is transported across epithelium to gut to deal with intraluminal Ag.

Which cells are rich in rough ER?

1. Mucus-secreting goblet cells of small intestine, 2. antibody-secreting plasma cells.

What are the functions of the lymph node?

1. Nonspecific filtration by macrophages. 2. storage/proliferation of B and T cells
3. Ab production.

Where is type III collagen found? (5)

1. skin
2. blood vessels
3. uterus
4. fetal tissue
5. granulation tissue

Name five types of epithelial cell junctions.

1. zona occludens
2. zona adherens
3. macula adherens
4. gap junction
5. hemidesmosome

Describe microtubule arrangement of cilia.

9+2 arrangement of microtubules.

Describe the outer structure of a Peyer's patch.

A Peyer's patch is 'covered' by single layer of cuboidal enterocytes, interspersed with specialized M cells (no goblet cells).

What is a lymph node?
Include information on
structural components.

A secondary lymphoid organ.
Has many afferents, one or
more efferents. With
trabeculae. Major histological
regions = Follicle, Medulla,
Paracortex

What is the primary
regulatory control of zona
fasciculata secretion?

ACTH, hypothalamic CRH

What is the primary
regulatory control of zona
reticularis secretion?

ACTH, hypothalamic CRH

What are/is the primary
secretory product of the zona
glomerulosa?

aldosterone

What do Brunner's glands secrete?

alkaline mucus

What is the function of liver sinusoids?

Allow macromolecules of plasma full access to surface of liver cells through space of Disse.

What is the function of a gap junction?

Allows adjacent cells to communicate for electric and metabolic functions.

What is produced by alpha cells of the Islets of Langerhans?

alpha cells produce glucagon

What three cell types are found in Islets of Langerhans?

alpha, beta, and gamma cells

What type of cells are Nissl bodies found? In what parts of the cell?

Are found in neurons. Are not found in axon or axon hillock.

IN what area of the spleen are B cells found?

B cells are found within the white pulp of the spleen.

What is type IV collagen found? (1)

basement membrane or basal lamina

What is produced by beta cells of the Islets of Langerhans?

beta cells produce insulin

What is the only GI submucosal gland?

Brunner's glands

Describe the histological layers of the adrenal glands (outside to in)

Capsule, Zona glomerulosa, Zona fasciculata, Zona reticularis, Medulla.

What are/is the primary secretory product of the adrenal medulla?

Catecholamines (Epi, NE)

Memo to you.

Check out the picture in the book.

Memo to you.

Check out the picture in the book. p. 105

What do the medullary cords consist of?

Closely packed lymphocytes and plasma cells.

What is the most common type of collagen?

Collagen Type I – 90%

What is the most abundant protein in the human body?

Collagen.

Define Islets of Langerhans.

Collections of endocrine cells.

What is the function of hemidesmosomes?

Connect cells to underlying extracellular matrix.

What are/is the primary secretory product of the zona fasciculata?

cortisol, sex hormones.

What is another name for macula adherens?

Desmosome

What is the effect of duodenal ulcers on Brunner's gland histology?

Duodenal ulcers cause hypertrophy of Brunner's glands.

How does dynein function in cilia function?

Dynein causes the bending of cilium by differential sliding of doublets.

What kind of protein is dynein?

Dynein is an ATPase.

Describe the role of dynein in cilia structure.

Dynein links peripheral 9 doublets of microtubules.

What makes endolymph?

Endolymph is made by the stria vascularis.

What is Endoneurium?

Endoneurium invests single nerve fiber of the peripheral nerve.

What is Epineurium?

Epineurium (dense connective tissue) surrounds entire nerve (fascicles and blood vessels)

What is type X collagen found? (1)

epiphyseal plate

Plasma is filtered on the basis of what properties?

Filtration of plasma occurs according to net charge and size.

How is the glomerular basement membrane formed?

From the fusion of endothelial and podocyte basement membranes.

What is produced by gamma cells of the Islets of Langerhans?

gamma cells produce somatostatin.

What is the mnemonic to remember layers and products of adrenal cortex?

GFR (Glomerulosa, Fasciculata, Reticularis) corresponds to Salt (Na^+), Sugar (glucocorticoids) and Sex (androgens) The deeper you go, the sweeter it gets.

What is the function of hair cells?

Hair cells are the sensory elements in both the cochlear and vestibular apparatus.

Name a protein involved in the structure of hemidesmosomes.

Integrin.

What is another name for zona adherens?

Intermediate junction.

Describe the histological structure of sinusoids of the liver.

Irregular 'capillaries' with round pores 100–200 nm in diameter and no basement membrane.

What is the function of smooth ER?

Is the site of steroid synthesis and detoxification of drugs and poisons

What is the function of rough ER?

Is the site of synthesis of secretory (exported proteins and of N-linked oligosaccharide addition to many proteins.

What part of pancreas are the Islets of Langerhans concentrated?

Islets of Langerhans are most numerous in the tail of pancreas.

What structural defect causes Kartagener's syndrome? What is the consequence?

Kartagener's syndrome is due to dynein arm defect. Results in immotile cilia.

Define Pacinian corpuscles.

Large, encapsulated sensory receptors found in deeper layers of skin at ligaments, joint capsules, serous membranes, mesenteries.

Where are Brunner's glands located?

Located in submucosa of duodenum

Describe the histologic structure of sinusoids of the spleen.

Long, vascular channels in red pulp. With fenestrated 'barrel hoop' basement membrane.

What is the histologic change in lymph nodes during an extreme cellular immune response?

Lymph node paracortex becomes enlarged during extreme cellular immune response.

What is the histologic presentation of DiGeorge's syndrome?

Lymph node paracortex is not well developed in patients with DiGeorge's syndrome.

What kind of cells are found nearby the sinusoids of the spleen?

Macrophages

What are the major structures of the lymph node medulla?

Medulla consists of medullary cords and medullary sinuses.

What do medullary sinuses communicate with?

Medullary sinuses communicate with efferent lymphatics.

What do medullary sinuses consist of?

Medullary sinuses contain reticular cells and macrophages.

What is the function of Meissner's corpuscles?

Meissner's corpuscles are involved in light discriminatory touch of glabrous skin.

What is the histologic change in nephrotic syndrome? What is the consequence of this change?

Negative charge is lost. Plasma protein is lost in urine

What is the glomerular basement membrane coated with? (provides negative charge to filter).

Negatively charged heparan sulfate.

What is the most common tumor the adrenal medulla in children?

Neuroblastoma

What is the function of Pacinian corpuscles?

Pacinian corpuscles are involved in pressure, coarse touch, vibration, and tension.

What do the Islets of Langerhans arise from?

Pancreatic buds.

What specialized vascular structure is found in the lymph node paracortex?
What is the function of this structure?

Paracortex contains high endothelial venules (HEV). T and B cells enter from the blood through the HEV.

What cells are found in the lymph node paracortex?

Paracortex houses T cells.

What is Perineurium?

Perineurium (permeability barrier) surrounds a fascicle of nerve fibers.

What is the most common tumor the adrenal medulla in adults?

Pheochromocytoma

Compare the consequences of pheochromocytoma vs. neuroblastoma on blood pressure

Pheochromocytoma causes episodic hypertension
Neuroblastoma does NOT cause episodic hypertension

What is the space of Disse?

Pores in liver sinusoids allowing plasma macromolecules access to liver cell surfaces.

What is the primary regulatory control of adrenal medulla secretion?

Preganglionic sympathetic fibers

What is the function of zona occludens?

Prevents diffusion across intracellular space.

Describe the appearance and status of primary vs. secondary follicles.

Primary follicles are dense and dormant. Secondary follicles have pale central germinal centers and are active.

Describe the location of the lymph node paracortex.

Region of cortex between follicles and medulla.

What is the primary regulatory control of zona glomerulosa secretion?

Renin-angiotensin

What is the glomerular basement membrane responsible for?

Responsible for the actual filtration of plasma.

What is another name for type III collagen?

reticulin

What are Nissl bodies?

rough ER

Where in the inner ear are the ampullae found? What is the function of this structure?

Semicircular canals contain ampullae Functions in detecting angular acceleration.

What are/is the primary secretory product of the zona reticularis?

sex hormones (e.g. androgens)

What is the function of lymph node follicles?

Site of B-cell localization and proliferation.

Define macula adherens.

Small, discrete sites of attachment of epithelial cells.

Define Meissner's corpuscles.

Small, encapsulated sensory receptors found in dermis of palm, soles and digits of skin.

What is an M cell? What is its function.

Specialized cell interspersed between the cuboidal enterocytes covering a Peyer's patch. M cells take up antigens.

Name the layers of epidermis from surface to base.

stratum Corneum, stratum Lucidum, stratum Granulosum, stratum Spinosum, stratum Basalis.

What is the location of zona adherens?

Surrounds the perimeter just below zona occludens.

What is the function of Nissl bodies?

Synthesize enzymes (e.g. ChAT) and peptide neurotransmitters.

In what area of the spleen are T cells found?

T cells are found in the PALS and the red pulp of the spleen.

Which part of the cochlea picks up high frequency sound? Which picks up low frequency?

The base of the cochlea picks up high frequency sound the apex picks up low frequency sound

What is the bony labyrinth filled with? Describe its composition.

The bony labyrinth is filled with perilymph. Perilymph is Na⁺ rich, similar to ECF

What is the cause of I cell disease? What is the consequence?

The failure of addition of mannose-6-phosphate to lysosome proteins. These enzymes are secreted outside the cell instead of being targeted to the lysosome.

What is the membranous labyrinth filled with? Describe its composition.

The membranous labyrinth is filled with endolymph. Endolymph is K⁺ rich, similar to ICF.

What layer of the peripheral nerve must be rejoined in microsurgery for limb reattachment?

The perineurium must be rejoined in microsurgery for limb reattachment.

Where in the inner ear are the maculae found? What is the function of this structure?

The utricle and saccule contain maculae Functions in detecting linear acceleration.

How is the function of gap junctions accomplished?

Through a connection with central channels.

What is another name for zona occludens?

Tight junction.

What are mnemonics for remembering locations for type I, II and IV collagen?

Type ONE: bONE Type TWO: carTWOlage Type FOUR: under the FLOOR (basement membrane)

What is a Peyer's patch?

Unencapsulated lymphoid tissue found in lamina propria and submucosa of small intestine.

What type of infection may induce an extreme cellular immune response? What happens to the lymph node during such an immune response?

Viral response is an example. The paracortex enlarges.

According to the Homunculus man, place the following in order (from medial to lateral). hand, foot, tongue, face, trunk

foot, trunk, hand, face, tongue

(T or F) Can Bell's palsy occur
idiopathically?

true

(T or F) Can fasciculations be
present in a LMN lesion?

True

(T or F) Is the anterior nucleus
of the thalamus part of the
limbic system?

True

(T or F) Is the cingulate gyrus
part of the limbic system?

True

(T or F) Is the Entorhinal cortex part of the limbic system?

True

(T or F) Is the hippocampal formation part of the limbic system?

True

(T or F) Is the mammillary body part of the limbic system?

True

(T or F) Is the septal area part of the limbic system?

True

(T or F) Thoracic outlet syndrome results in atrophy of the interosseous muscles?

True

(T or F) Thoracic outlet syndrome results in atrophy of the thenar and hypothenar eminences?

True

(T or F) Thoracic outlet syndrome results in disappearance of the radial pulse upon moving the head to the opposite side?

True

(T or F) Thoracic outlet syndrome results in sensory deficits on the medial side of the forearm and hand?

True

A lesion of the globus pallidus causes what disease?

Wilson's disease

A lesion of the mammillary bodies (bilateraly) produces what?

Wernicke-Korsakoff's encephalopathy (confabulations, anterograde amnesia)

A lesion of the optic chiasm produces?

bitemporal hemianopsia

A lesion of the right dorsal optic radiation (parietal lesion) produces?

left lower quadrantic anopsia (a temporal lesion)

A lesion of the right Meyer's loop (temporal lobe) produces?

left upper quadrantic anopsia
(a temporal lesion)

A lesion of the right optic nerve produces?

right anopsia

A lesion of the right optic tract produces?

left homonymous hemianopsia

A lesion of the right visual fibers just prior to the visual cortex produces?

left hemianopsia with macular sparing

A lesion of the Striatum can cause which 2 diseases?

Huntington's and Wilson's disease

A positive Babinski is an indicator for a (UMN or LMN) lesion?

UMN lesion

A rupture of the middle menigeal artery causes what type of hematoma? (epidural or subdural)

epidural hematoma

A rupture of the superior cerebral veins causes what type of hematoma? (epidural or subdural)

subdural hematoma

An aneurysm of the anterior communicating artery may cause what type of defects?

visual defects

An aneurysm of what artery may cause CN III palsy?

posterior communicating artery

Are D1 neurons in the basal ganglia inhibitory or excitatory?

Excitatory

Are D2 neurons in the basal ganglia inhibitory or excitatory?

Inhibitory

Beginning with anterior communicating artery describe the path around the circle of Willis.

ant. comm. – ACA – ICA –
post. comm. – PCA – PCA –
post. comm. – ICA – ACA –
ant. comm.

Bell's Palsy is seen as a complication in what 5 things?

AIDS, Lyme disease,
Sarcoidosis, Tumors,
Diabetes (Alexander Bell with
STD)

Brodmann's area 17 is?

principal visual cortex

Brodmann's area 22 is?

Wernicke's area (associative
auditory cortex)

Brodmann's area 3,1,2 is?

principal sensory area

Brodmann's area 4 is?

principal motor area

Brodmann's area 41, 42 is?

primary auditory cortex

Brodmann's area 44, 45 is?

Broca's area (motor speech)

Brodmann's area 6 is?

premotor area

Brodmann's area 8 is?

frontal eye movement and
pupillary change area

CN I has what function?

smell

CN I passes through what
'hole'?

cribriform plate

CN II has what function?

sight

CN II passes through what 'hole'?

optic canal

CN III has what 4 functions?

eye movement, pupil
constriction, accommodation,
eyelid opening

CN III innervates what 5
muscles.

medial rectus, superior
rectus, inferior rectus, inferior
oblique, levator palpebrae
superioris

CN III passes through what 'hole'?

superior orbital fissure

CN IV has what function?

eye movement

CN IV innervates what muscle.

superior oblique

CN IV passes through what 'hole'?

superior orbital fissure

CN IX has what 4 functions?

posterior 1/3 taste,
swallowing, salivation
(parotid), monitoring carotid
body and sinus

CN IX passes through what
'hole'?

jugular foramen

CN V has what 2 functions?

mastication, facial sensation

CN VI passes through what
'hole'?

superior orbital fissure

CN V2 passes through what
'hole'?

foramen rotundum

CN V3 passes through what
'hole'?

foramen ovale

CN VI has what function?

eye movement

CN VI innervates what muscle.

lateral rectus

CN VI passes through what 'hole'?

superior orbital fissure

CN VII has what 4 functions?

facial movement, anterior 2/3
taste, lacrimation, salivation
(SL, SM glands)

CN VII passes through what 'hole'?

internal auditory meatus

CN VIII has what 2 functions?

hearing, balance

CN VIII passes through what 'hole'?

internal auditory meatus

CN X has what 5 functions?

taste, swallowing, palate elevation, talking, thoracoabdominal viscera

CN X passes through what 'hole'?

jugular foramen

CN XI has what 2 functions?

head turning, shoulder shrugging

CN XI passes through what 'hole'?

jugular foramen (descending)
-- foramen magnum (ascending)

CN XII has what function?

tounge movements

CN XII passes through what 'hole'?

hypoglossal canal

Complete the muscle spindle reflex arc by placing the following in order: alpha motor, Ia afferent, muscle stretch, extrafusal contraction, intrafusal stretch.

muscle stretch – intrafusal stretch – Ia afferent – alpha motor – extrafusal contraction

Extrafusal fibers are innervated by what motor neuron?

alpha motor neuron

From which 3 spinal roots does long thoracic nerve arises?

C5, C6, C7

General sensory/motor dysfunction and aphasia are caused by stroke of the? (ant. circle or post. circle)

anterior circle

Give 3 characteristics of a LMN lesion.

atrophy, flaccid paralysis, absent deep tendon reflexes

Give 3 characteristics of internuclear ophthalmoplegia (INO)

medial rectus palsy on lateral gaze, nystagmus in abducted eye, normal convergence.

Give 4 characteristics of an UMN lesion.

spastic paralysis, increased deep tendon reflexes, + Babinski, minor to no atrophy

Golgi tendon organs send their signal via what nerve?

group Ib afferents

Horner's Syndrome is present if the lesion in Brown-Sequard is above what level?

T1

How are the fibers of the corticospinal tract laminated? (legs/arms medial or lateral?)

arms– medial, legs–lateral

How are the fibers of the dorsal column laminated? (legs/arms medial or lateral?)

legs–medial, arms–lateral

How are the fibers of the spinothalamic tract laminated? (sacral/cervical medial or lateral?)

cervical–medial, sacral–lateral

How do glucose and amino acids cross the blood–brain barrier?

carrier–mediated transport mechanism

How does the hypothalamus control the adenohypophysis?

via releasing factors (ie. TRH, CRF, GnRF, etc.)

Huntington's patients typically have what type of movements?

Chorea

If the radial nerve is lesioned, what 2 reflexes are lost?

triceps reflex and brachioradialis reflex

If you break your humerus mid-shaft, which nerve would likely injure?

radial nerve

If you break your medial epicondyle of the humerus, which nerve would likely injure?

ulnar nerve

If you break your supracondyle of the humerus, which nerve would likely injure?

median nerve

If you break your surgical neck of the humerus, which nerve would likely injure?

axillary nerve

In a lesion of the radial nerve, what muscle is associated with wrist drop?

extensor carpi radialis longus

Intrafusal fibers are encapsulated and make up muscle spindles that send their signal via what nerve?

group Ia afferents

Intrafusal fibers are innervated by what motor neuron?

gamma motor neuron

Is Bell's palsy an UMN or a LMN lesion?

LMN

Is the Babinski reflex (positive or negative) when the big toe dorsiflexes and the other toes fan-out?

positive (pathologic)

Name 2 locations for lesions in Syringomyelia?

ventral white commissure and ventral horns

Name 3 locations for lesions in Vit.B12 neuropathy (Friedreich's ataxia)?

dorsal columns, lateral corticospinal tracts, and spinocerebellar tracts

Name 7 functions of the hypothalamus?

Thirst/waterbalance, Adenohypophysis control, Neurohypophysis control, Hunger/satiety, Autonomic regulation, Temperature regulation, Sexual emotions.
TAN HATS

Name the 4 foramina that are in the posterior cranial fossa?

internal auditory meatus, jugular foramen, hypoglossal canal, and foramen magnum.

Name the 5 foramina that are in the middle cranial fossa?

optic canal, superior orbital fissure, foramen rotundum, foramen ovale, and foramen spinosum.

Name the 5 functions of the Limbic system?

Feeding, Fighting, Feeling, Flight, sex (F--K) [the famous 5 F's]

Name the 5 segments of the brachial plexus in order from proximal to distal.

roots – trunks – divisions – cords – branches

Name the type of movement with slow writhing movements (esp. the fingers)?

Athetosis

Name the type of movement
with sudden, jerky,
purposeless movements?

Chorea

Name the type of movement
with sudden, wild flailing of
one arm?

Hemiballismus

Neurons from the globus
pallidus have what action on
the ventral anterior nucleus?

Inhibitory

Neurons from the striatum
have what action on the
globus pallidus?

Inhibitory

Place the following in order (from light entering the eye to reflex). Pretectal nuclei, pupillary constrictor muscle, retina, ciliary ganglion, Edinger–Westphal nuclei, CN II, CN III.

retina, CN II, pretectal nuclei, Edinger–Westphal nuclei, CN III, ciliary ganglion, pupillary constrictor muscle

Stimulation from the paraventricular nucleus cause the release of what hormone?

oxytocin

Stimulation from the supraoptic nucleus cause the release of what hormone?

ADH (vasopressin)

The Blood–Brain Barrier is formed by what 3 structures?

choriod plexus epithelium, intracerebral capillary endothelium, astrocytes. (First Aid says Arachnoid but the brains say that's a typo)

The central retinal artery is a branch off what larger artery?

ophthalmic artery

The embryologic defect of having a cervical rib can compress what 2 structures?

subclavian artery and inferior trunk of the brachial plexus

The fasciculus cuneatus contains fibers from the upper or lower body?

upper extremities

The fasciculus gracilis contains fibers from the upper or lower body?

lower extremities

The hippocampal formation is connected to the mammillary body and septal area via what structure?

fornix

The hippocampus has input from what two areas?

entorhinal cortex, septal area

The hippocampus has output to what two areas?

mammillary body, septal area

The infraorbital nerve is a branch off what larger nerve?

CN V2

The Nucleus Ambiguus has fibers from what 3 CNs?

CN IX, X, XII

The Nucleus Solitarius has fibers from what 3 CNs?

CN VII, IX, X

Traction or tear of the superior trunk of the brachial plexus causes what syndrome?

Erb–Duchenne palsy (waiter's tip)

Vertigo, ataxia, visual deficits, and coma are caused by stroke of the? (ant. circle or post. circle)

posterior circle

Visual fibers from the lateral geniculate body terminate on the upper and lower banks of what fissure?

Calcarine fissure

What 1 nerve root is assoc. with the achilles reflex?

S1

What 1 nerve root is assoc. with the biceps reflex?

C5

What 1 nerve root is assoc. with the patella reflex?

L4

What 1 nerve root is assoc.
with the triceps reflex?

C7

What 2 areas have sensation
deficit in a lesion of the
median nerve?

lateral palm/thumb and the
radial 2 1/2 fingers

What 2 areas have sensation
deficit in a lesion of the ulnar
nerve?

medial palm and the ulnar 1
1/2 fingers

What 2 cutaneous nerves are
lost in a lesion of the radial
nerve?

posterior brachial cutaneous
and posterior antebrachial
cutaneous

What 2 spinal roots make up the inferior trunk of the brachial plexus?

C8, T1

What 2 spinal roots make up the superior trunk of the brachial plexus?

C5, C6

What 2 structures pass through the internal auditory meatus?

CN VII, VIII

What 2 symptoms are seen with a lesion of the musculocutaneous nerve?

difficulty flexing the arm,
variable sensory loss

What 2 symptoms are seen with a lesion of the ulnar nerve?

weak intrinsic muscles of the hand, Pope's blessing

What 3 blood barriers does the body have?

blood-brain, blood-gas, blood-testis

What 3 muscles are lost in a lesion of the musculocutaneous nerve?

coracobrachialis, biceps brachii, and brachialis

What 3 muscles are lost in a lesion of the radial nerve?

triceps brachii, brachioradialis, and extensor carpi radialis longus

What 3 structures pass through the foramen magnum?

spinal roots of CN XI (ascending), brainstem, vertebral arteries

What 3 structures pass through the optic canal?

CN II, ophthalmic artery, central retinal vein

What 4 'muscles' does the radial nerve innervate?

Brachioradialis, Extensors of the wrist and fingers, Supinator, Triceps. (BEST)

What 4 areas is there decreased output in Parkinson's?

substantia nigra pars compacta, globus pallidus, ventral anterior nucleus, cortex

What 4 movements are impaired in a lesion of the ulnar nerve?

wrist flexion, wrist adduction, thumb adduction, and adduction of the 2 ulnar fingers

What 4 movements are lost in a lesion of the median nerve?

forearm pronation, wrist flexion, finger flexion, and several thumb movements

What 4 structures pass through the jugular foramen?

CN IX, X, XI(descending), jugular vein

What 4 things do the lateral striate arteries supply?

internal capsule, caudate, putamen, globus pallidus

What 5 spinal nerves that make up the brachial plexus?

C5, C6, C7, C8, T1

What 5 structures pass through the superior orbital fissure?

CN III, IV, V1, VI, ophthalmic vein

What 5 types of cells make up the supportive cells of the CNS/PNS?

Astrocytes, Microglia, Oligodendroglia, Schwann cells, Ependymal cells.

What are 2 characteristics of Tabes Dorsalis?

impaired proprioception and locomotor ataxia

What are 3 clinical findings of the arm in Erb-Duchenne palsy?

arm hangs by the side, medially rotated, forearm is pronated

What are the 2 classic causes of Erb-Duchenne palsy?

blow to the shoulder and trauma during birth

What are the 3 classic symptoms of Horner's syndrome?

ptosis, miosis, anhidrosis

What are the 4 classic findings of Brown-Sequard syndrome?

ipsi motor paralysis(spastic), ipsi loss of dorsal column, contra loss of spinothalamic, ipsi loss of ALL sensation at the level of the lesion

What are the input and output of the anterior nucleus of the thalamus?

input – mammillary body,
output – cingulate gyrus

What are the input and output of the cingulate gyrus?

input – anterior nucleus of the thalamus, output – entorhinal cortex

What are the input and output of the entorhinal cortex?

input – cingulate gyrus,
output – hippocampal formation

What are the input and output of the mammillary body?

input – hippocampal formation, output – anterior nucleus of the thalamus

What are the input and output of the septal area?

input – hippocampal formation, output – hippocampal formation

What artery do the lateral striate branch off of?

internal carotid artery

What artery does the anterior inferior cerebellar artery branch off of?

basilar artery

What artery does the anterior spinal artery branch off of?

vertebral artery

What artery does the posterior inferior cerebellar artery branch off of?

vertebral artery

What artery does the superior cerebellar artery branch off of?

basilar artery

What artery supplies Broca's and Wernicke's speech areas?

middle cerebral artery

What artery supplies the medial surface of the brain (foot-leg area)?

anterior cerebral artery

What bone do all the foramina of the middle cranial fossa pass through?

sphenoid bone

What CN arises dorsally?

CN IV trochlear

What CN is the afferent limb of the pupillary light reflex?

CN II

What CN is the efferent limb of the pupillary light reflex?

CN III

What CNs lie medially at the brain stem?

CN III, VI, XIII (3 - 6 - 12)

What CNS/ PNS supportive cell has the following functions: central myelin production?

Oligodendroglia

What CNS/ PNS supportive cell has the following functions: inner lining of the ventricles?

Ependymal cells

What CNS/ PNS supportive cell has the following functions: peripheral myelin production?

Schwann cells

What CNS/ PNS supportive cell has the following functions: phagocytosis?

Microglia

What CNS/ PNS supportive cell has the following functions: physical support, repair, K⁺ metabolism?

Astrocytes

What disease does Tabes Dorsalis result from?

tertiary syphilis

What disorder results from a lesion in the medial longitudinal fasciculus (MLF).

Internuclear ophthalmoplegia (INO)

What embryologic defect is thoracic outlet syndrome caused by

by having a cervical rib.

What happens if a swinging light test is performed on a Marcus Gunn pupil (afferent pupil defect)?

results in pupil dialation of the defective eye as the light is swung from the normal eye to the defective eye

What happens if you illuminate one pupil in a normal patient?

both eyes constrict (consensual reflex)

What hypo/hyper-kinetic disorder is marked by decreased serum ceruloplasm and Keyser-Fleischer rings in the eyes.

Wilson's disease

What is a Argyll Robertson pupil?

the eyes DO NOT constrict to light, but DO accommodate to near objects

What is affected in a central VII lesion (lesion above the facial nucleus – UMN)?

paralysis of the contralateral lower quadrant

What is affected in a peripheral VII lesion (lesion at or below the facial nucleus – LMN)?

paralysis of the ipsilateral face both upper and lower.

What is the common name for a peripheral VII lesion?

Bell's palsy

What is the consequence when your CNS stimulates the gamma motor neuron and the intrafusal fibers contract?

increased sensitivity of the reflex arc

What is the direct pathway from the striatum to the cortex?

The striatum to the substantia nigra pars reticularis / medial globus pallidus to the thalamus to the cortex (excitatory path)

What is the embryologic tissue origin of Microglia (ecto/meso/edo)?

Mesoderm

What is the indirect pathway from the striatum to the cortex?

The striatum to the lateral globus pallidus to the subthalamic nucleus to the substantia nigra/medial globus pallidus to the thalamus to the cortex (inhibitory pathway but still increases the thalamic drive)

What is the lesion in Brown-Sequard syndrome?

hemisection of the spinal cord

What is the most common circle of Willis aneurysm?

anterior communicating artery

What is the name for the small muscle fiber type that regulates muscle length?

Intrafusal fibers

What lesion produces coma?

reticular activating system

What lesion produces conduction aphasia, poor repetition w/ poor comprehension, and fluent speech?

Arcuate fasciculus

What lesion produces Kluver-Bucy syndrome (hyperorality, hypersexuality, disinhibited behavior)?

Amygdala (bilateral)

What lesion produces motor (expressive) aphasia with good comprehension?

Broca's area (motor speech)

What lesion produces personality changes and deficits in concentration, orientation, judgement?

frontal lobe – these are frontal release signs

What lesion produces sensory (fluent/receptive) aphasia with poor comprehension?

Wernicke's area (associative auditory cortex)

What lesion produces spatial neglect syndrome?

right parietal lobe -- contralateral neglect.

What lobe of the brain is the Broca's area in?

frontal

What lobe of the brain is the frontal eye movement and pupillary change area in?

frontal

What lobe of the brain is the premotor area in?

frontal

What lobe of the brain is the primary auditory cortex area in?

temporal

What lobe of the brain is the principal motor area in?

frontal

What lobe of the brain is the principal sensory area in?

parietal

What lobe of the brain is the principal visual cortex area in?

occipital

What lobe of the brain is the Wernicke's area in?

temporal

What midbrain structure is important in mitigating voluntary movements and making postural adjustments?

Basal Ganglia

What mineral causes the pathology of Wilson's disease

copper

What muscle depresses and
extorts the eye?

inferior rectus

What muscle elevates and
intorts the eye?

superior rectus

What muscle extorts,
elevates, and adducts the
eye?

inferior oblique

What muscle fiber type makes
up the muscle bulk and
provides the force for
contraction?

Extrafusal fibers

What muscle intorts,
depresses, and abducts the
eye?

superior oblique

What muscle sensor senses
tension and provides
inhibitory feedback to alpha
motor neurons?

golgi tendon organs

What muscular disorder is a
medial longitudinal fasciculus
syndrome associated with?

Multiple Sclerosis (MLF=MS)

What nerve is known as the
great extensor nerve?

radial nerve

What neurotransmitter is decrease in Parkinson's disease

dopamine

What nucleus if typically lesioned in hemiballismus?

contralateral subthalamic nucleus

What nucleus of the hypothalamus controls circadian rhythms?

suprachiasmatic nucleus

What nucleus of the hypothalamus controls hunger?

lateral nucleus

What nucleus of the hypothalamus controls satiety?

ventromedial nucleus

What nucleus of the hypothalamus controls sexual emotions?

septate nucleus

What nucleus of the hypothalamus controls thirst and water balance?

supraoptic nucleus

What part of the hypothalamus (ant./post.) controls autonomic regulation?

anterior hypothalamus

What part of the hypothalamus (ant./post.) controls cooling when hot?

anterior hypothalamus

What part of the hypothalamus (ant./post.) controls heat conservation when cold?

posterior hypothalamus

What part of the ventral spinal cord is spared with complete occlusion of the ventral artery?

dorsal columns

What passes through the cavernous sinus? (nerves and artery)

CN III, IV, V1, V2, VI, post-ganglionic SNS and the Internal carotid artery

What reflex is lost in a lesion of the musculocutaneous nerve?

biceps reflex

What structure passes through the foramen ovale?

CN V3

What structure passes through the foramen rotundum?

CN V2

What structure passes through the foramen spinosum?

middle meningeal artery

What structure passes through the hypoglossal canal?

CN XII

What symptom is seen with a lesion of the axillary nerve?

Deltoid paralysis

What symptom is seen with a lesion of the median nerve?

decreased thumb function

What syndrome is seen with a lesion of the long thoracic nerve?

Winged scapula

What syndrome is seen with a lesion of the lower trunk of the brachial plexus?

Claw hand

What syndrome is seen with a lesion of the posterior cord of the brachial plexus?

Wrist drop

What syndrome is seen with a lesion of the radial nerve?

Saturday night palsy

What syndrome is seen with a lesion of the upper trunk of the brachial plexus?

Waiter's tip (Erb–Duchenne palsy)

What two bones do all the foramina of the posterior cranial fossa pass through?

temporal and occipital bones

What two hypothalamic nuclei does the posterior pituitary (neurohypophysis) receive neuronal projections from?

supraoptic nucleus and paraventricular nucleus.

What type of fibers do the corticospinal tracts carry?

motor

What type of fibers do the dorsal columns carry?

sensory – pressure, vibration, touch, proprioception

What type of fibers do the spinothalamic tracts carry?

sensory – pain and temperature

What type of function does CN I have? (sensory, motor, or both)

sensory

What type of function does CN II have? (sensory, motor, or both)

sensory

What type of function does CN III have? (sensory, motor, or both)

motor

What type of function does
CN IV have? (sensory, motor,
or both)

motor

What type of function does
CN IX have? (sensory, motor,
or both)

both

What type of function does
CN V have? (sensory, motor,
or both)

both

What type of function does
CN VI have? (sensory, motor,
or both)

motor

What type of function does
CN VII have? (sensory, motor,
or both)

both

What type of function does
CN VIII have? (sensory, motor,
or both)

sensory

What type of function does
CN X have? (sensory, motor,
or both)

both

What type of function does
CN XI have? (sensory, motor,
or both)

motor

What type of function does CN XII have? (sensory, motor, or both)

motor

What type of lesion is seen in Amyotrophic Lateral Sclerosis?

combo of UMN and LMN lesions with no sensory deficit

What type of lesion is seen in Multiple Sclerosis?

random asymmetric lesions in mostly white matter of the cervical region

What type of lesion is seen in Poliomyelitis and is it genetic or acquired?

acquired LMN lesion causing flaccid paralysis

What type of lesion is seen in Werdnig–Hoffmann disease and is it genetic or acquired?

genetic LMN lesion causing flaccid paralysis (aka. Floppy infant disease)

What type of molecule can cross the blood–brain barrier most easily? (lipid/nonlipid, polar/nonpolar)

Lipid–soluble/nonpolar molecules

What vagal nuclei controls motor innervation to the pharynx, larynx, and upper esophagus?

Nucleus Ambiguus
(Motor=aMbiguus)

What vagal nuclei controls visceral sensory information like taste and gut distention?

Nucleus Solitarius
(Sensory=Solitarius)

What vagal nuclei sends
parasympathetic fibers to the
heart, lungs, and upper GI?

dorsal motor nucleus of CN X

What would happen
temperature regulation if you
lesioned your posterior
hypothalamus?

lose the ability to conserve
heat

What would happen
temperature regulation if you
lesioned your ventromedial
nucleus of the hypothalamus?

have hyperphagia and
become obese

When is a positive Babinski a
normal reflex?

during the first year of life

Where is the lesion in a patient with hemiballismus?

Subthalamic nucleus

Where is the lesion in Parkinson's?

Substantia nigra pars compacta

Which CN is the only nerve that does not abut the wall in the cavernous sinus?

CN VI (abducens)

Which CNs pass through the middle cranial fossa?

CN II – VI

Which CNs pass through the posterior cranial fossa?

CN VII – XII

Which division of the facial motor nucleus has dual innervation? (upper or lower)

upper division

Which thalamic nucleus has a visual function?

Lateral Geniculate Nucleus (LGB)

Which thalamic nucleus has an auditory function?

Medial Geniculate Nucleus (MGB)

Which thalamic nucleus has pre-motor function?

Ventral Anterior Nucleus (VA)

Which thalamic nucleus has the function of body senses (proprioception, pressure, pain, touch, vibration)?

Ventral Posterior Lateral Nucleus (VPL)

Which thalamic nucleus has the function of facial sensation and pain?

Ventral Posterior Medial Nucleus (VPM)

Which thalamic nucleus is the primary motor cortex?

Ventral Lateral Nucleus (VL)

Which way does the head deviate in a unilateral lesion (LMN) of CN XI? (toward or away)

toward the lesion -- note: First-Aid is wrong in the book)

Which way does the jaw deviate in a unilateral lesion (LMN) of CN V? (toward or away)

toward the lesion

Which way does the patient tend to fall in a unilateral lesion (LMN) of the cerebellum? (toward or away)

toward the lesion

Which way does the tongue deviate in a unilateral lesion (LMN) of CN XII? (toward or away)

toward the lesion

Which way does the uvula deviate in a unilateral lesion (LMN) of CN X? (toward or away)

away from the lesion

Why does the arm hang by the side in Erb–Duchenne palsy?

paralysis of shoulder abductors

Why is L–dopa use for parkinsonism instead of dopamine?

L–dopa crosses the blood–brain barrier while dopamine does not.

Why is the arm medially rotated in Erb–Duchenne palsy?

paralysis of the lateral rotators

Why is the forearm pronated
in Erb-Duchenne palsy?

loss of the biceps brachii