

# Session 3: Cavities of the Head, Abdomen, & Pelvis

## Part 1: Abdomen

### 1.1 Abdominal wall

*Describe the layers of the anterolateral abdominal wall.*

- Three muscles form the layers of the anterior abdominal wall laterally: external and internal obliques and the innermost transversus abdominus m. The median muscles of the abdominal wall are the rectus abdominus mm.

*How is the inguinal ligament formed?*

- The inguinal ligament is the inferior “free border” of the external abdominal oblique m. as it attaches to the pubic tubercle and anterior superior iliac spine

### 1.2 Inguinal Canal

*Describe the movement of the spermatic cord or round ligament through the inguinal canal. How is the inguinal canal formed?*

- The inguinal canal is formed between the superficial and deep inguinal rings (formed from the external abdominal oblique and the transversalis fascia respectively) and the spermatic cord or round ligament move through the abdominal wall layers by traversing these rings (and thereby moving through all the layers of the abdominal wall).

### 1.3 Abdominal Organs

*List the primary organs in each of the four quadrants.*

- RUQ: liver and gallbladder
- RLQ: appendix and cecum
- LUQ: spleen and stomach
- LLQ: descending colon and rectum

### 1.4 GI Organs

*Describe the movement of food from the oral cavity through the anal canal.*

- Food moves from oral cavity -> oropharynx -> laryngopharynx -> esophagus -> stomach -> duodenum -> small intestine -> large intestine -> rectum -> anal canal

## 1.5 Celiac Trunk

*How does the arterial supply of the foregut anastomose with the midgut arterial supply?*

- This occurs primarily via the pancreaticoduodenal blood vessels (superior pancreaticoduodenal aa. from gastroduodenal a. from celiac trunk and inferior pancreaticoduodenal aa. from superior mesenteric a.)

*Which structures are part of the foregut?*

## 1.6 Superior & Inferior Mesenteric aa.

*How does the arterial supply of the midgut anastomose with the hindgut arterial supply?*

- The marginal artery connects the ileocolic, right colic, middle colic, and left colic aa.

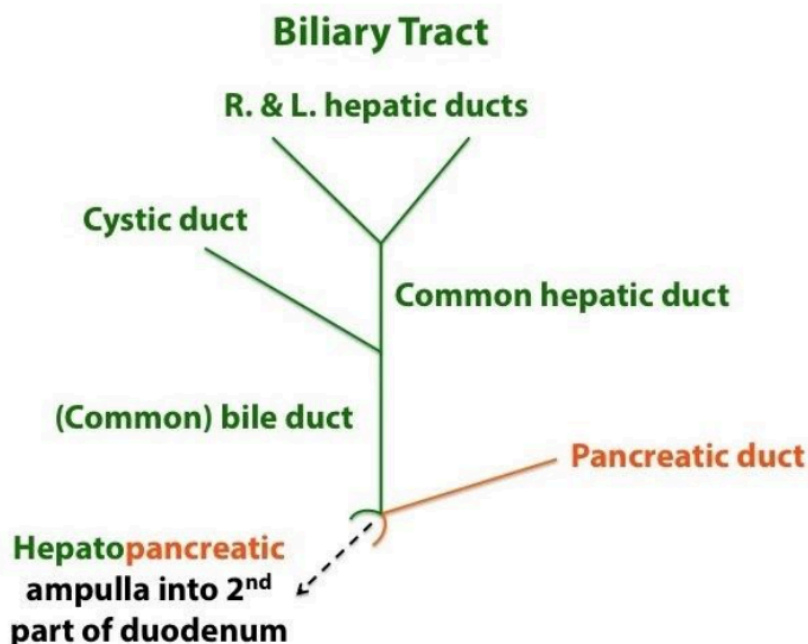
*Which structures are part of the midgut and hindgut?*

- The midgut includes the distal duodenum to transverse colon. The hindgut includes the transverse colon to the rectum.

## 1.7 Biliary Tree

*Describe the flow of bile from the liver to the duodenum being sure to include the connection of the hepatic ductal system to the pancreatic ductal system.*

- From Bluelink:



## 1.8 Autonomics

*From which levels of the spinal cord do pre-ganglionic sympathetic neurons originate?*

- T1-L2

*From which central nervous system structures do pre-ganglionic parasympathetic neurons originate?*

- CN III, VII, IX, X as well as sacral outflow via pelvic splanchnic nerves (S2-4)

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## Part 2: Pelvis

### 2.1 Pelvic Organs

*Describe how the peritoneum drapes over the pelvic organs to form the various pouches.*

- The inferior most aspect of the peritoneum settles over the pelvic organs to form the rectovesical, vesicouterine, and rectouterine pouches as the tissue drapes in the spaces between various organs of the pelvis.

### 2.2 Uterus

*What are the parts of the uterus and uterine tube?*

- The uterus, from superior to inferior, has a fundus, body, and cervix. The uterine tubes have, from ovary to uterus, an infundibulum, ampulla, and isthmus.

### 2.3 Autonomics

*Describe the sensory innervation of organs above and below the pelvic pain line.*

- Pain fibers from pelvic organs covered in peritoneum follow sympathetic pathways and from pelvic organs inferior to the peritoneum follow parasympathetic pathways.

### 2.4 Perineum

*Describe the homologous structures.*

- The bulb (corpus spongiosum) is a midline structure, which contains the spongy urethra or surrounds the vestibule (urethral and vaginal openings). The crura (corpora cavernosa) are paired structures that unite on the dorsum of the penis or clitoris. The glans (corpus spongiosum) is the most distal aspect of the penis (containing the urethral opening) or clitoris (anterior to the urethral opening).

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## Part 3: Nasal & Oral Cavities

### 3.1 Osteology of Nasal Cavity

*Describe the bones and cartilage that form the nasal septum and conchae.*

- The septum is formed from the perpendicular plate of ethmoid bone and the vomer with septal cartilage completing the anterior aspect. The conchae (a.k.a. turbinates) are formed from ethmoid bone (superior and middle conchae) and are named bones inferiorly (inferior conchae).

### 3.2 Spaces of the Head

*Which two bones form the hard palate?*

- Maxillary and palatine bones

### 3.3 Nasal Conchae

*Describe the neurovasculature supplying the two nasal “triangles”.*

- The superior/anterior triangle is served by ethmoidal and facial artery branches as well as CN V<sub>1</sub>
- The inferior/posterior triangle is served by sphenopalatine artery branches as well as CN V<sub>2</sub>

### 3.4 Paranasal Sinuses

*Describe the locations of the paranasal sinuses.*

- The frontal sinuses are within frontal bone (superior to the orbit), the ethmoidal sinuses are within ethmoid bone (medial to the orbit), the sphenoid sinus is within sphenoid bone (near the pituitary gland), and the maxillary sinus is within maxillary bone (inferior to orbit and superior to oral cavity). Please refer to the image within the lab manual.

### 3.5 Openings to the Nasal Cavity

*Describe where paranasal sinuses and the nasolacrimal duct drain into the nasal cavity.*

- The sphenoethmoidal recess contains the opening to the sphenoid sinus. The superior meatus contains openings to the posterior ethmoidal air cells. The middle meatus contains openings to the frontonasal duct, maxillary sinus, anterior, and middle ethmoidal air cells. The inferior meatus contains the opening from the nasolacrimal duct.

### 3.6 Hard Palate

*From which nerve do the greater and lesser palatine nn. branch?*

- CN V<sub>2</sub>

*From which artery do the aa. branch?*

- Maxillary a.

### 3.7 Tonsils

*What are the fauces?*

- This is the arched opening at the posterior aspect of the oral cavity leading to the oropharynx.

*Describe the location of the four sets of tonsils.*

- There are tonsils within the nasopharynx (pharyngeal tonsils and tubal tonsils) as well as between the palatopharyngeal and palatoglossal folds (palatine tonsils) and at the posterior aspect of the tongue (lingual tonsils).

### 3.8 Dorsum of Tongue

*Diagram the general and special taste afferent innervation of the tongue.*

- The anterior two thirds of the tongue receives general afferent innervation from lingual n. (CN V<sub>3</sub>) and special (taste) afferent from chorda tympani (branch of CN VII that travels with lingual n. The posterior one third of the tongue receives general and special (taste) afferent innervation from CN IX

### 3.9 Tongue Muscles

Describe the innervation and actions of the intrinsic and extrinsic mm. of the tongue.

- The tongue is innervated efferently by CN XII. The intrinsic mm. adjust the shape of the tongue while the extrinsic mm. contribute to gross movements of the tongue within (and outside of) the oral cavity.

### 3.10 Enter Sublingual Space

*Describe the boundaries of the oral cavity proper and the oral vestibule.*

- Oral cavity: anteriorly -> lips, laterally -> buccal tissues, superiorly -> hard palate, inferiorly -> floor of mouth, posteriorly -> arches (anterior to palatine tonsils). The vestibular space is that sub portion of the oral cavity which is between the teeth and the buccal and lip tissues.

### **3.11 Salivary Glands**

*Which cranial nerve supplies pre-ganglionic parasympathetic fibers to the submandibular and sublingual glands?*

- CN VII (via the chorda tympani n.)

### **3.12 Structures of Sublingual Space**

*Describe the relationship between the lingual n. and the submandibular duct in the sublingual space.*

- The lingual nerve is inferior to the submandibular duct

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## Part 4: Ear

### 4.1 Ear Model

*Identify the vestibulocochlear n. (CN VIII) and discuss its role in hearing and equilibrium.*

- CN VIII is the only nerve (solely afferent) serving the inner ear and is responsible for hearing (cochlea) and balance (vestibule and semicircular canals).

### 4.2 Middle & Inner Ear

*Identify the external, middle, and inner divisions of the ear and discuss characteristics of each.*

- The outer ear contains the external auditory canal and the auricle (to focus and direct sound to the middle and inner ear). The tympanic membrane lies between outer and middle ear spaces. The middle ear contains the ossicles and connects to the nasopharynx. The inner ear contains the cochlea and semicircular canals (for hearing and balance).

### 4.4 Ossicles

*Outline the pathway of sound perception.*

- Sound waves travel into the external acoustic meatus toward the tympanic membrane, which then conducts vibrations to the ossicles. The ossicles transmit sound from to the oval window toward the inner ear where the kinetic energy is converted to electrical stimulation which is interpreted by the CNS as sound.

### 4.6 Cochlea & Semicircular Canals

*Discuss inner ear structures involved in maintaining equilibrium*

- The semicircular canals contain specialized cells which can sense the body's movements in three-dimensional space. These specialized cells transmit signals to the CNS where the brain interprets and utilizes the data in maintaining the body's equilibrium.