

**BIO 4432 – Human Anatomy***Final Review for Human Anatomy*

**This week is the last week of class, and typically in this week (and the surrounding weeks of class) you are reviewing for the final exam. Please use the review below (as well as other resources from the semester) as a general overview of some of the key concepts taught in the course!** Please take a look at all 12 weekly resources listed on our website, as well as the math content review, to help you review for the final exam!

If you have any questions about these study guides, the final schedule of group tutoring sessions, private 30 minute tutoring appointments, the Baylor Tutoring YouTube channel or any tutoring services we offer, please visit our website [www.baylor.edu/tutoring](http://www.baylor.edu/tutoring) or call our drop in center during open business hours. M-Th 9am-8pm on class days 254-710-4135. **The last day of tutoring in the drop-in center will be the last day of class.** To learn about additional resources available during Finals Week, please visit CASE in the West Wing basement of Sid Rich! Good luck on your final exam!

**Keywords: Final review**

*Topic of the Week: Final Review!*

**Cranial Nerves:** (S = sensory, M = motor, B = both)

CN I: Olfactory (S) – cribriform foramina

CN II: Optic (S) – optic canal

CN III: Oculomotor (M) – superior orbital fissure

CN IV: Trochlear (M) – superior orbital fissure

CN V<sub>1</sub>: Ophthalmic (S) – superior orbital fissure

- Nasociliary, frontal, lacrimal

- Zygomatic, nasopalatine, superior alveolar, infraorbital, lesser palatine, greater palatine

CN V<sub>3</sub>: Mandibular (B) – foramen ovale

- Auriculotemporal, inferior alveolar, lingual

CN VI: Abducens (M) – superior orbital fissure

CN VII: Facial (B) – internal acoustic meatus

CN VIII: Vestibulocochlear (S) – internal acoustic meatus

CN IX: Glossopharyngeal (B) – jugular foramen

CN X: Vagus (B) – jugular foramen

CN XI: Accessory (M) – jugular foramen

CN XII: Hypoglossal (M) – hypoglossal canal

**Vertebrae**

**Lamina:** connects the transverse and spinous processes

**Pedicle:** connects the vertebral arch and body

**Superior and inferior articular facets:** form facet joints that allow for flexion and extension between vertebrae

- Cervical: superior facets point up and inferior point down
- Thoracic: superior facets point posteriorly and inferior point anteriorly
- Lumbar: superior facets point medially and inferior point laterally

**Intervertebral foramen:** where spinal nerves exit the vertebral column

Features of Upper Limb	Features of Lower Limb
<p><b>Humerus</b></p> <ul style="list-style-type: none"> <li>- Greater tubercle and lesser tubercle</li> <li>- Head: articulates with glenoid fossa of scapula</li> <li>- Anatomical neck and surgical neck: fractures occur here; affect the axillary nerve)</li> <li>- Deltoid tuberosity</li> <li>- Radial groove: mid-humeral fractures; affect the radial nerve</li> <li>- Trochlea</li> <li>- Capitulum</li> <li>- Lateral and medial epicondyles: ulnar nerve runs behind the medial epicondyle</li> <li>- Olecranon fossa</li> <li>- Coronoid fossa</li> </ul> <p><b>Radius</b></p> <ul style="list-style-type: none"> <li>- Radial tuberosity: where the biceps brachii insert</li> <li>- Styloid process</li> </ul> <p><b>Ulna</b></p> <ul style="list-style-type: none"> <li>- Olecranon: your elbow bone; articulates with olecranon fossa of humerus</li> <li>- Coronoid process: articulates with coronoid fossa of humerus</li> </ul>	<p><b>Femur</b></p> <ul style="list-style-type: none"> <li>- Greater and lesser trochanters</li> <li>- Head and neck: head articulates with acetabulum of bony pelvis</li> <li>- Pectineal line</li> <li>- Medial and lateral condyle</li> </ul> <p><b>Tibia</b></p> <ul style="list-style-type: none"> <li>- Tibial tuberosity: where tendon of quadriceps inserts</li> <li>- Medial malleolus</li> </ul>

## Articulations

### Movement:

- Synarthrosis = immovable
- Amphiarthrosis = slightly movable
- Diarthrosis = freely

### movable Structure:

- Fibrous: joint is made up of fibrous ligaments
- Cartilaginous: joint is made up of either hyaline cartilage or fibrocartilage
  - o Hyaline = synchondrosis
  - o Fibrocartilage = symphysis
- Synovial: joint has a joint cavity and surrounded by a synovial membrane; freely movable

**Mechanical classifications:** hinge, pivot, ball and socket, condyloid/ellipsoid, gliding/plane, saddle

## Extraocular Muscles

1. **Superior rectus** – looks up (elevates eye)
2. **Inferior rectus** – looks down (depresses eye) (CN III)
3. **Medial rectus** – looks medially (towards nose) (CN III)
4. **Lateral rectus** – looks laterally (CN VI)
5. **Superior oblique** – depresses the adducted eye (CN IV)
6. **Inferior oblique** – elevates the adducted eye (CN III)

**LR<sub>6</sub>SO<sub>4</sub>AO<sub>3</sub>**

Lateral Rectus – CN VI

Superior Oblique – CN IV

All Others – CN III

## Spinal Cord

### Dorsal Rami

Sensory to: **the skin over the back**

Motor to: **the deep/intrinsic back muscles**

### Ventral Rami

Sensory to: **the skin over ventral trunk and limbs**

Motor to: **skeletal muscles of neck, trunk, and extremities**

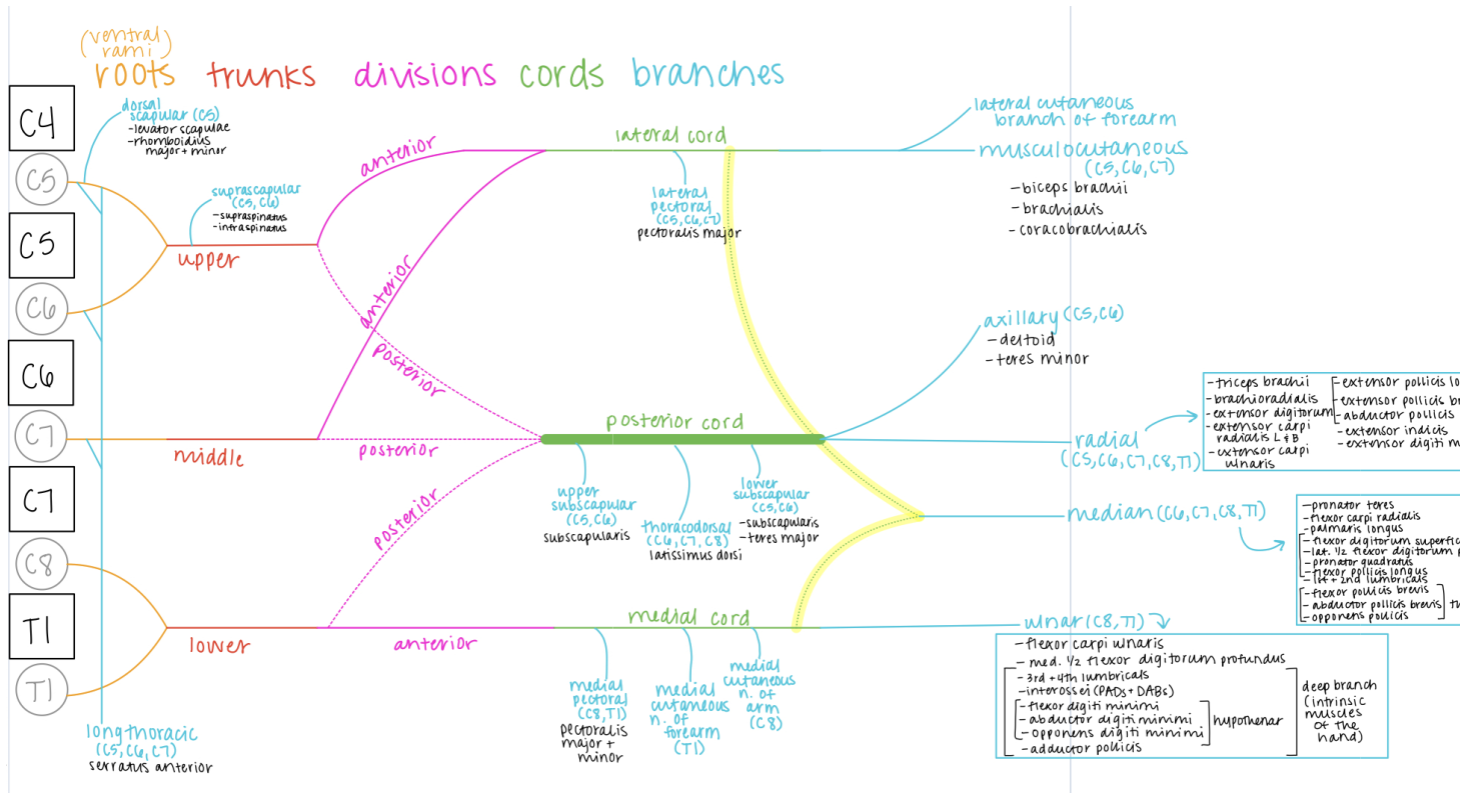
Myotomes (movement)	Dermatomes (touch)
<b>C5:</b> should abduction <b>C6:</b> elbow flexion <b>C7:</b> elbow extension <b>C8:</b> finger flexion (make a fist) <b>T1:</b> finger abduction <b>L2:</b> hip flexion <b>L3:</b> hip adduction <b>L4:</b> knee extension <b>L5:</b> dorsiflexion <b>S1:</b> plantar flexion	<b>C2:</b> back of the head <b>C5:</b> lateral epicondyle <b>C6:</b> dorsal surface of thumb (digit 1) <b>C7:</b> dorsal surface of middle finger (digit 3) <b>C8:</b> dorsal surface of little finger (digit 5) <b>T1:</b> medial epicondyle <b>T4:</b> level of the nipple <b>T10:</b> level of bellybutton/umbilicus <b>L1:</b> inguinal ligament <b>L3:</b> medial knee <b>L4:</b> medial malleolus <b>L5:</b> dorsum of foot at 3 <sup>rd</sup> metatarsophalangeal joint <b>S1:</b> lateral aspect of calcaneus <b>S2:</b> popliteal fossa (back of knee)

## Lower Limb Musculature (muscle and innervation only; make sure to review functions!!)

Muscles of anterior thigh/leg	Muscles of posterior thigh/leg
<b>Thigh:</b> <b>femoral nerve</b> - Rectus femoris - Vastus lateralis - Vastus medialis - Vastus intermedius - Sartorius <b>Leg:</b> <b>deep fibular nerve</b> - Anterior tibialis - Extensor digitorum longus - Extensor hallucis longus	<b>Thigh:</b> <b>tibial nerve</b> - Biceps femoris long head - Biceps femoris short head: <b>common fibular nerve</b> - Semitendinosus - Semimembranosus <b>Leg:</b> <b>tibial nerve</b> - Gastrocnemius - Soleus - Posterior tibialis - Flexor digitorum longus

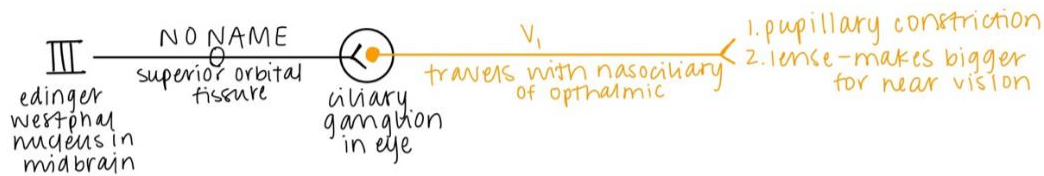
- Flexor hallucis longus

## Brachial Plexus and Upper Limb Musculature



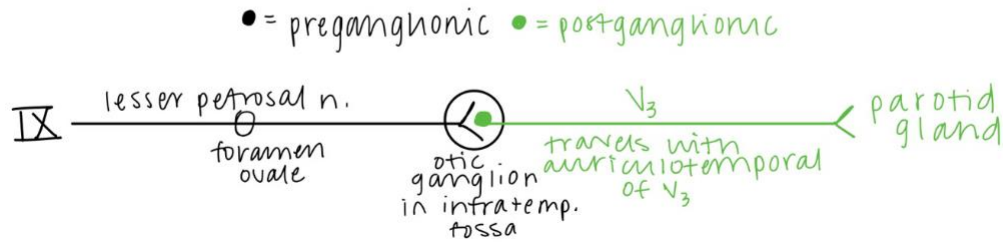
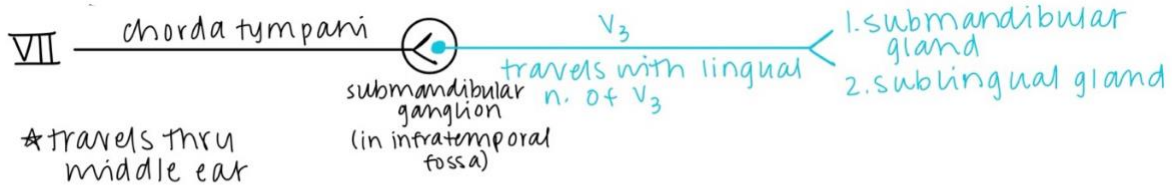
## Parasympathetics

● = preganglionic ● = postganglionic

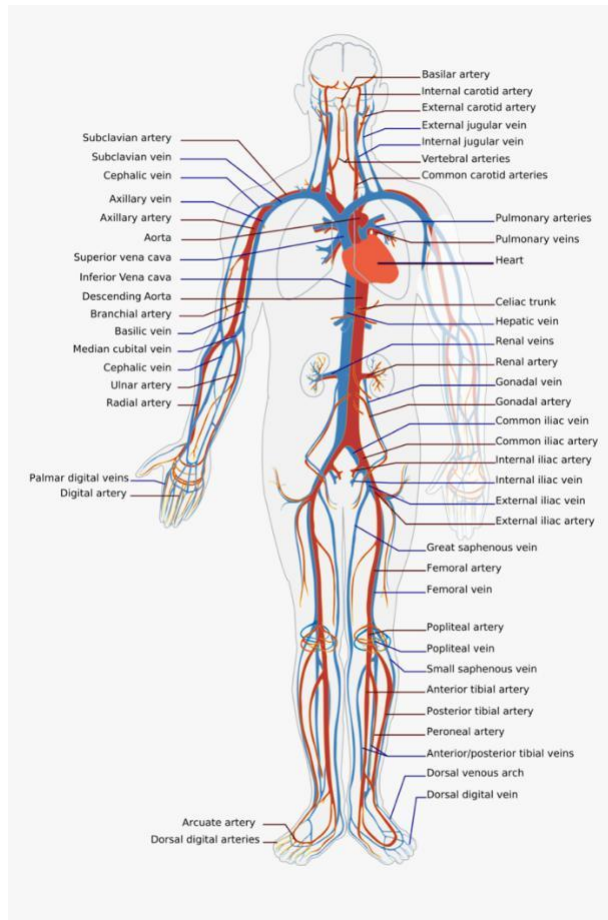


● = preganglionic ● = postganglionic





### Vessels Diagram



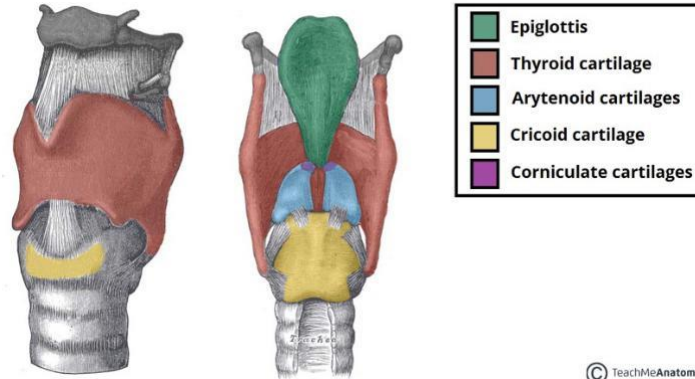
This image is from [https://www.kindpng.com/imgv/hRTho\\_diagram-of-veins-and-arteries-in-body-hd/](https://www.kindpng.com/imgv/hRTho_diagram-of-veins-and-arteries-in-body-hd/).

### Lungs

The right lung has 3 lobes and 2 fissures. The left lung has 2 lobes, 1 fissure, and the cardiac notch.

**RALS:** For the right lung: pulmonary artery is anterior to the bronchus. For the left lung: pulmonary artery is superior to the bronchus

## Larynx



This image was taken from [teachmeanatomy.info](http://teachmeanatomy.info).

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Muscles	Vessels	Nerves
<p><b>Respiratory muscles</b> – posterior cricoarytenoid</p> <p><b>Phonatory muscles</b> – lateral cricoarytenoid, arytenoids, cricothyroid, and thyroarytenoid</p>	<p><b>Superior laryngeal artery:</b></p> <ul style="list-style-type: none"> <li>- Supplies above the vocal folds</li> <li>- Runs with internal laryngeal nerve</li> </ul> <p><b>Inferior laryngeal artery:</b></p> <ul style="list-style-type: none"> <li>- Supplies below the vocal folds</li> <li>- Runs with recurrent laryngeal nerve</li> </ul>	<p><b>Recurrent laryngeal n.</b></p> <ul style="list-style-type: none"> <li>- Motor: all intrinsic muscles of the larynx except for the <u>cricothyroid muscle</u></li> <li>- Sensory: below the vocal folds</li> </ul> <p><b>Internal laryngeal n.:</b> to above the vocal folds</p> <p><b>External laryngeal n.</b> innervates the cricothyroid</p>

## GI

**Foregut:** from the last 1/3 of the esophagus to the first half of the duodenum

- Blood supply: celiac trunk
- Sympathetic Innervation: greater splanchnics (T5-T9)
- Parasympathetic innervation: vagus nerve

**Midgut:** from the second half of the duodenum to the first half of the transverse colon

- Blood supply: superior mesenteric artery
- Sympathetic innervation: lesser splanchnics (T10-T11), least splanchnics (T12), and lumbar splanchnics
- Parasympathetic innervation: vagus nerve

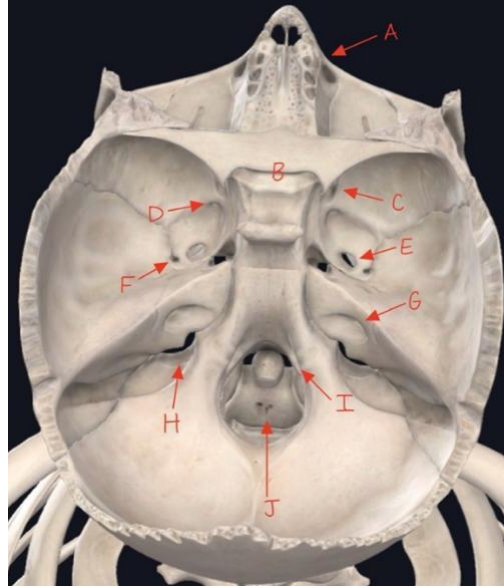
- Blood supply: inferior mesenteric artery
- Sympathetic innervation: lumbar splanchnics (L1-L2) and sacral splanchnics
- Parasympathetic innervation: vagus nerve

- **Hepatoduodenal ligament:** the portal triad lies within this ligament (common bile duct, hepatic artery proper, and portal vein)
- **Gastrosplenic ligament** contains the short gastric and right gastroepiploic vessels

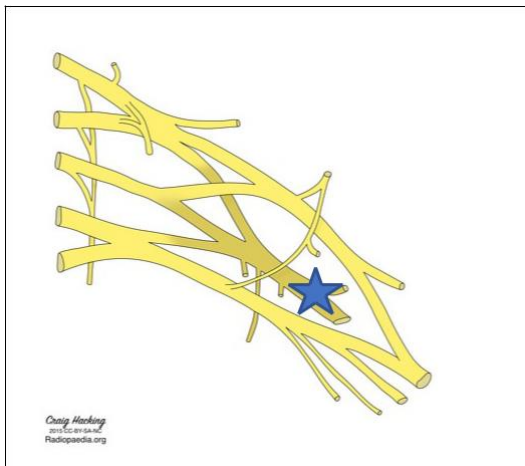


### Final Knowledge Checkpoint:

1. In this superior view of the skull, can you label all the foramina along with the nerve(s) each transmits? *This image is a screenshot from Complete Anatomy.*



2. You are testing the extraocular muscles and their innervation in a patient who periodically experiences double vision. When you ask him to turn his right eye inward toward his nose and look downward, he is able to look inward, but not down. Which nerve is most likely involved?
  - a. Abducens
  - b. Nasociliary
  - c. Oculomotor
  - d. Trochlear
3. If a patient suffers nerve damage to the C7 spinal nerve level, which movement will be affected? Which area, if palpitated, will they be unlikely to feel?
4. Which of the following muscles is LEAST likely to be affected in the presence of an ulnar nerve lesion?
  - a. Palmar interossei
  - b. Lateral two lumbricals
  - c. Dorsal interossei
  - d. Medial two lumbricals
  - e. Abductor digiti minimi
5. Identify the indicated nerve.



6. If a sympathetic neuron is traveling to the head, where will its pre-ganglionic neuron most likely synapse?
  - a. At the sympathetic ganglion at same level
  - b. At the sympathetic ganglion higher
  - c. At the sympathetic ganglion lower
  - d. Within the target organ
7. A patient expresses to you that he is concerned that he cannot taste anything on the anterior 2/3 of his tongue. What nerve innervates this portion of the tongue?
  - a. Chorda Tympani
  - b. Glossopharyngeal
  - c. Vagus
  - d. Mandibular
8. Which fetal structure allows blood to bypass the liver?
  - a. Ductus arteriosum
  - b. Ductus venosus
  - c. Ligamentum arteriosum
9. The brachiocephalic artery divides to form the right common carotid and the \_\_\_\_\_ artery.
  - a. Left subclavian
  - b. Left common carotid
  - c. Right subclavian
  - d. Right thoracic artery
10. Which nerve runs with the inferior laryngeal artery?
11. A patient was admitted with symptoms of an upper bowel obstruction. Upon CT examination, it was found that the third (transverse) portion of the duodenum was compressed by a large vessel causing the obstruction. The vessel involved is most likely to be the:
  - a. Inferior mesenteric artery
  - b. Inferior mesenteric vein
  - c. Portal vein
  - d. Superior mesenteric artery
12. What nerve(s) supply parasympathetic innervation to the midgut?
  - a. Pelvic splanchnics
  - b. Vagus
  - c. Lumbar splanchnics
  - d. Least splanchnics



**THANK YOU** for using these resources this semester! Best wishes on your final exam!

**Answers**

1. A = cribriform foramina; CN I – olfactory  
B = optic canal; CN II – optic  
C = superior orbital fissure; CN III – oculomotor, CN IV – trochlear, CN V<sub>1</sub> – ophthalmic, CN VI – abducens  
D = foramen rotundum; CN V<sub>2</sub> – maxillary  
E = foramen ovale; CN V<sub>3</sub> – mandibular  
F = foramen spinosum; middle meningeal artery  
G = internal acoustic meatus; CN VII – facial, CN VIII – vestibulocochlear  
H = jugular foramen; CN IX – glossopharyngeal, CN X – vagus, CN XI – accessory  
I = hypoglossal canal; CN XII – hypoglossal  
J = foramen magnum; spinal cord
2. d
3. Elbow extension; dorsal surface of digit 3
4. b
5. Radial
6. b
7. a
8. b
9. c
10. Recurrent laryngeal nerve
11. d
12. b