

BIO 4432 – Human Anatomy*Resource #8*

The concepts this resource covers are the topics typically covered during this week of the semester. If you do not see the topics your particular section of class is learning this week, please take a look at other weekly resources listed on our website for additional topics throughout the semester.

We also invite you to look at the group tutoring chart on our website to see if this course has a group tutoring session offered this semester.

If you have any questions about these study guides, 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 or call our drop in center during open business hours. M-Th 9am-8pm on class days 254-710-4135.

Keywords: Parasympathetic pathways of CN III, VII, and IX, Anatomy of the heart, Great vessels, Fetal circulation, Posterior mediastinum, Heart defects

Topic #1 of the Week: Parasympathetic Pathways of Cranial Nerves

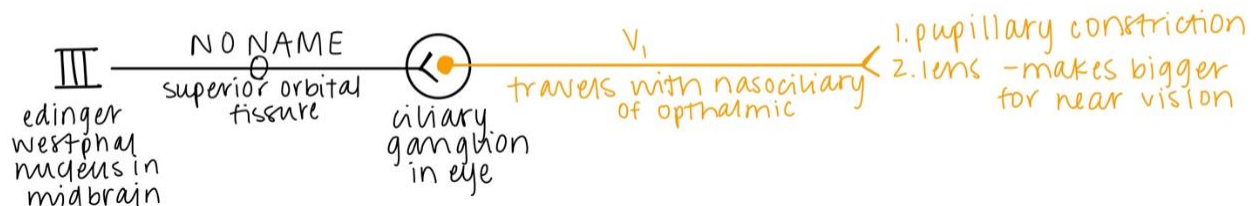
The three cranial nerves with parasympathetic pathways that we will cover are **CN III, CN VIII, and CN IX**.

*It's helpful to draw your own diagrams for each nerve and list their functions and clinical correlates! Below are the diagrams I drew to help me study based on Dr. Parizi's lectures.

The following diagrams include: the name of the preganglionic nerve (if applicable), where the preganglionic nerve travels through in the skull, the ganglion where the preganglionic synapses with the postganglionic, the nerve the postganglionic travels with, and where the postganglionic travels to.

CN III – oculomotor

● = preganglionic ● = postganglionic



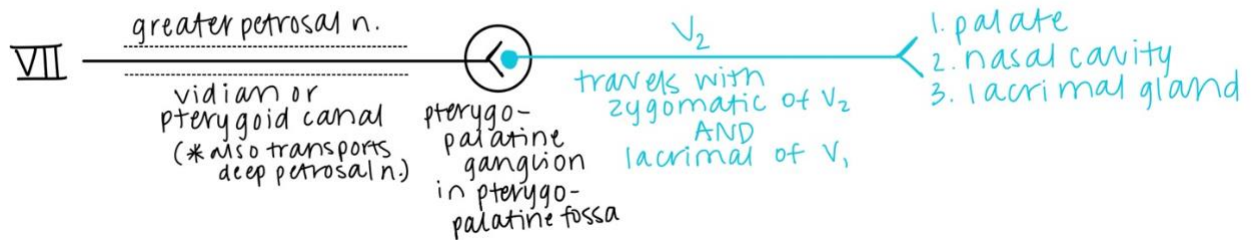
Functions:

- Innervates **pupillary sphincter** → constriction
- Innervates **ciliary muscle** → makes lens bigger

CN VIII – facial (2 nerve pathways)

Greater Petrosal

● = preganglionic ● = postganglionic

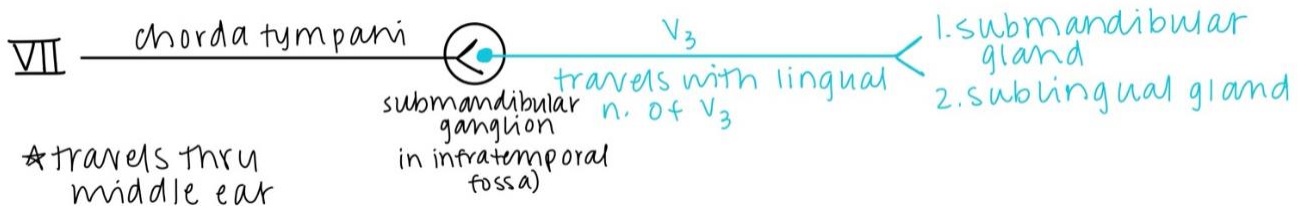


Functions:

- Taste from the palate
- Increases secretions of palatine, nasal, and lacrimal glands

Clinical correlates: loss of lacrimation and dry nasal cavity

Chorda Tympani



Functions:

- Increases secretions of submandibular and sublingual glands
- Taste from anterior 2/3 of the tongue

Clinical correlates: loss of taste and reduction in salivation

CN IX – glossopharyngeal

Lesser Petrosal

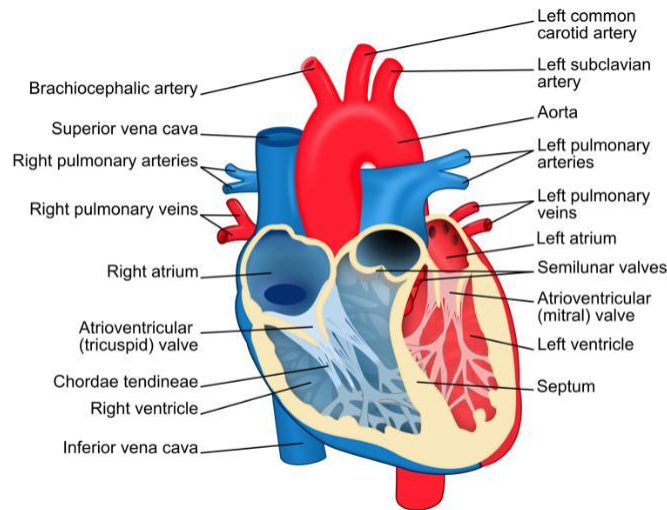
● = preganglionic ● = postganglionic



Functions:

- Increase secretions of the parotid gland

Topic #2 of the Week: The Heart



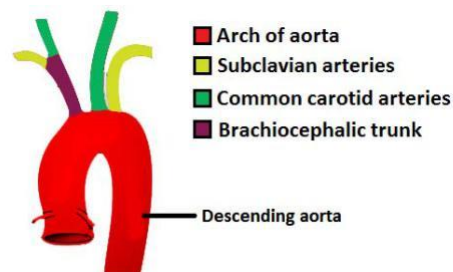
This image was taken from Wikipedia.

The arch of aorta takes **oxygen rich** blood from the left ventricle to the body.

Trifurcates into 3 vessels:

1. **Brachiocephalic trunk**
 - a. Right subclavian
 - b. Right common carotid
2. **Left common carotid**
3. **Left common carotid**

Found at the level of the **sternal angle** (T4/T5)



This image was taken from teachmeanatomy.com

Superior vena cava: takes **oxygen poor** blood from the head, neck, and upper limbs to the right atrium.

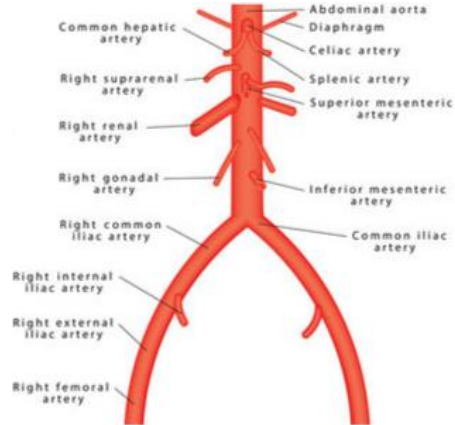
2 tributaries:

1. **Right brachiocephalic vein**
 - a. Internal jugular vein
 - b. External jugular vein
 - c. Right subclavian vein
2. **Left brachiocephalic vein**
 - a. Internal jugular vein
 - b. External jugular vein
 - c. Left subclavian vein

Pulmonary trunk: takes **oxygen poor** blood from the right ventricle to the lungs via right and left **pulmonary arteries**.

Pulmonary veins: take **oxygen rich** blood from the lungs to the **left atrium**.

Abdominal aorta:



Major arteries inferior to the heart

This image is from stock.adobe.com.

Common iliac arteries divide into **external and internal iliac arteries**.

- **External iliac** becomes the **femoral artery** once it passes under the inguinal ligament

3 unpaired branches of the abdominal aorta:

- **Celiac trunk**
- **Superior mesenteric artery**
- **Inferior mesenteric artery**

Coronary arteries:

These are the first arteries to branch off the aortic arch.

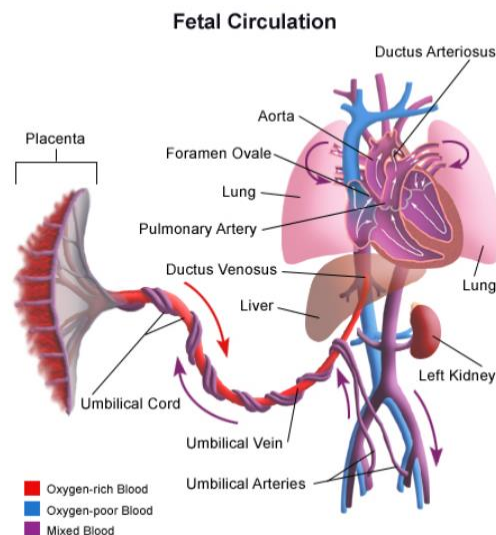
Right coronary artery branches: supply the right atrium, right ventricle, SA nodes, and AV nodes

- **Sinoatrial artery**
- **Right/acute marginal artery**
- **AV nodal artery**
- **Posterior descending artery**

Left coronary artery branches:

- **Left circumflex artery**
 - o Supplies the left atrium and left ventricle
- **Left anterior descending/interventricular artery**
 - o Supplies the interventricular septum, most of the left ventricle, and the apex of the heart
 - o Also called the “widowmaker”!
- **Left/obtuse marginal artery**

Highlight #1: Fetal Circulation



This image was taken from Stanford Children's Health.

1. The umbilical vein brings oxygenated blood to the fetus from the placenta.
 - Since the liver is not functioning in the fetus, the **ductus venosus** will help the blood bypass the liver and go straight into the inferior vena cava.
2. Blood will flow into the right atrium and then straight into the left atrium through **foramen ovale**. This is because the lungs are not functioning, so we do not want to send blood into the right ventricle to then go into the lungs via the pulmonary trunk.
 - Some blood may seep through the tricuspid valve (between right atrium and ventricle) and into the pulmonary trunk. To avoid blood going into the lungs, the blood will pass through **ductus arteriosus** straight into the aorta.
3. After the blood circulates through the fetus's body, it will return to the placenta via the umbilical arteries.

After birth:

- **Ductus venosus** → **ligamentum venosum**
- **Foramen ovale** → **fossa ovalis**
- **Ductus arteriosus** → **ligamentum arteriosum**

Highlight #2: Posterior mediastinum

Posterior mediastinum:

1. Descending aorta
2. Azygos and hemiazygos veins
3. Thoracic duct
4. Esophagus
5. Sympathetic chain/ganglia
6. Splanchnic nerves
7. Lower end of vagus

4 "birds" of the posterior mediastinum:

- **Esophagus** – esophagoose
- **Vagus** – vagoose
- **Azygos** – azygoose
- **Thoracic duct** – thoracic duck

Highlight #3: Heart Defects

Congenital defects – baby is born with

1. **Atrial septal defect** – hole in between atria
2. **Ventricular septal defect** – hole in between ventricles

Tetralogy of Fallot (PROV)

1. Pulmonary valve stenosis
2. Right ventricle hypertrophy
3. Over-riding aorta (due to VSD)
4. Ventricular septal defect

Week 11 Knowledge Checkpoint:

1. Which nerve increases secretions of the lacrimal gland?
 - a. Chorda tympani

- b. Lesser petrosal
 - c. Greater petrosal
 - d. Lingual
2. Which fetal structure allows blood to bypass the liver?
 - a. Ductus arteriosum
 - b. Ductus venosus
 - c. Ligamentum arteriosum
 3. Which artery is known as the “widowmaker” and why?
 4. If a patient loses taste in the anterior 2/3 of the tongue, which nerve is damaged?
 - a. Facial nerve proper
 - b. Chorda tympani
 - c. Greater petrosal
 - d. Oculomotor
-

THINGS YOU MAY STRUGGLE WITH!

1. ***Sympathetic pathways:*** It is super helpful to draw the diagrams and then write down what you know about each nerve. I suggest doing one nerve at a time that way you don't get overwhelmed with the volume of information!
2. ***Great vessels:*** Draw these out too if it helps! Look at different diagrams and cadaveric images. Acland's is always good for looking at real-life structures.
3. ***Images of the heart:*** Practice looking at these often. Watching videos was helpful for me to understand exactly how/where the images were taken.

CONGRATS: You made it to the end of the resource! Thanks for checking out these weekly resources! Don't forget to check out our website for group tutoring times, video tutorials and lots of other resources: www.baylor.edu/tutoring!

Answers

1. c
2. b
3. left anterior descending artery (LAD) – it supplies the left ventricle and can be deadly if blocked/damaged.
4. b