BIO 4432 – Human Anatomy  
Week 10 – Week of 03/21/2022

It’s test week!! But that doesn’t mean the material stops! On Thursday, Dr. Parizi will be covering the functions of the cranial nerves. Next week she will be covering the parasympathetic pathways, so think of this week’s resource as a primer for next week. Be sure to stay on top of the material so you do not fall behind for next week’s lecture. Keep up the good work!

Remember: The tutoring center offers free individual and group tutoring for this course. Our group tutoring session will be Thursdays from 6:45-7:45 PM in the basement of Sid Rich, room 74. You can reserve your spot at https://baylor.edu/tutoring. Hope to see you there!

**Keywords:** Functions of cranial nerves, Reflexes involving cranial nerves

**Topic of the Week: Functions of Cranial Nerves**

The cranial nerves originate from the brainstem in a segmental pattern:

- **Midbrain:** CN III, CN IV
- **Pons:** CN V, CN VI, CN VII, CN VIII
- **Medulla:** CN IX, CN X, CN XI, CN XII

The purely afferent cranial nerves are:

- CN I – olfactory
- CN II – optic
- CN VIII – vestibulocochlear

The purely efferent cranial nerves are:

- CN IV – trochlear
- CN VI – abducens
- CN XI – accessory
- CN XII – hypoglossal

Note: not all cranial nerves and their functions will be covered in this resource. I’ve included the most complicated ones and the ones Dr. Parizi covers the most.

**Cranial nerve III – Oculomotor:** innervates the pupillary sphincter and the ciliary muscle.

**Cranial nerve V – Trigeminal**

\[ V_1 \] – Ophthalmic
- Only afferent functions.
- 3 branches: nasociliary, frontal, and lacrimal (NFL)

\[ V_2 \] – Maxillary
- Only afferent functions.
- 6 branches: zygomatic, nasopalatine, superior alveolar,
infraorbital, lesser palatine, greater palatine (Zebras Never, Stay, In, Large, Groups) Shoutout to Gabriel Andino!

V₃ – Mandibular
- **Sensory** innervation to the lower part of the face and **motor** innervation to the muscles of mastication and tensor tympani.
- 3 branches: auriculotemporal, inferior alveolar, lingual (AIL)
  - The auriculotemporal branch of mandibular nerve runs near the middle meningeal artery.

CN VII – Facial
**Facial nerve proper:** motor innervation of the muscles of facial expression.
- Branches: temporal, zygomatic, buccal, marginal mandibular, and cervical (Ten Zebras Bit My Clavicle)

Chorda Tympani:
- **Visceral motor** innervation of the submandibular and sublingual glands.
- **Sensory** innervation: taste from the anterior 2/3 of the tongue.

Greater Petrosal:
- **Motor** innervation of palatine, nasal, and lacrimal glands.
- **Sensory** innervation: taste from the palate.

CN IX – Glossopharyngeal
- **Motor** innervation to the stylopharyngeus muscle (pharynx)
- **Sensory** innervation to tympanic membrane and taste and general sensation from the posterior 1/3 of the tongue.

### Highlight #1: Reflexes

There are 3 important reflexes:

1. **Corneal reflex:** blinking
   - Afferent nerve involved: nasociliary branch of ophthalmic (V₁)
   - Efferent nerves involved: temporal and zygomatic branches of facial nerve proper
2. **Pupillary reflex:** pupil constriction due to light exposure
   - Afferent nerve involved: optic nerve
   - Efferent nerves involved: oculomotor
3. **Gag reflex**
   - Afferent nerve involved: glossopharyngeal nerve
   - Efferent nerves involved: vagus nerve

### Week 9 Knowledge Checkpoint:

1. Bell’s Palsy is a condition in which the facial muscles are weakened or paralyzed. What cranial nerve may be injured in this condition?
2. Which cranial nerve is involved in lacrimation (tear production)?
   A. Oculomotor
   B. Ophthalmic
   C. Optic
   D. Facial

3. List the cranial nerves that are ONLY sensory.

4. 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

**THINGS YOU MAY STRUGGLE WITH!**

1. **Branches:** There are many different branches to remember for this section. I’ve provided some mnemonics for y’all to study with, but feel free to come up with your own!
2. **Functions of each nerve:** This will (hopefully) become easier to remember once Dr. Parizi covers the parasympathetic pathways. Knowing where each nerve travels will be helpful in remembering their functions.
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Answers
1. D
2. B
3. I, II, VIII
4. A