

Special Senses: Taste & Smell

A nervous system lab activity using
Visible Body's Anatomy & Physiology

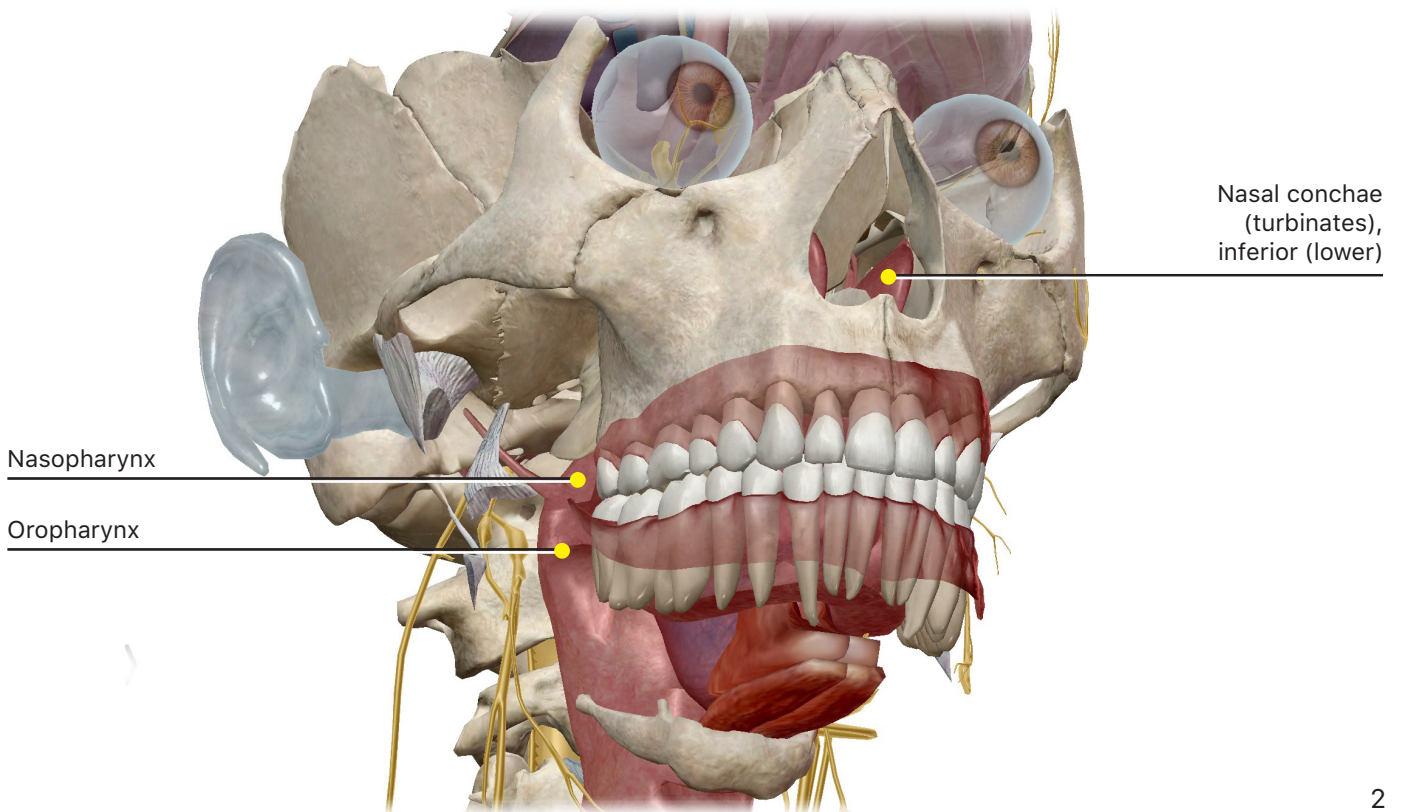
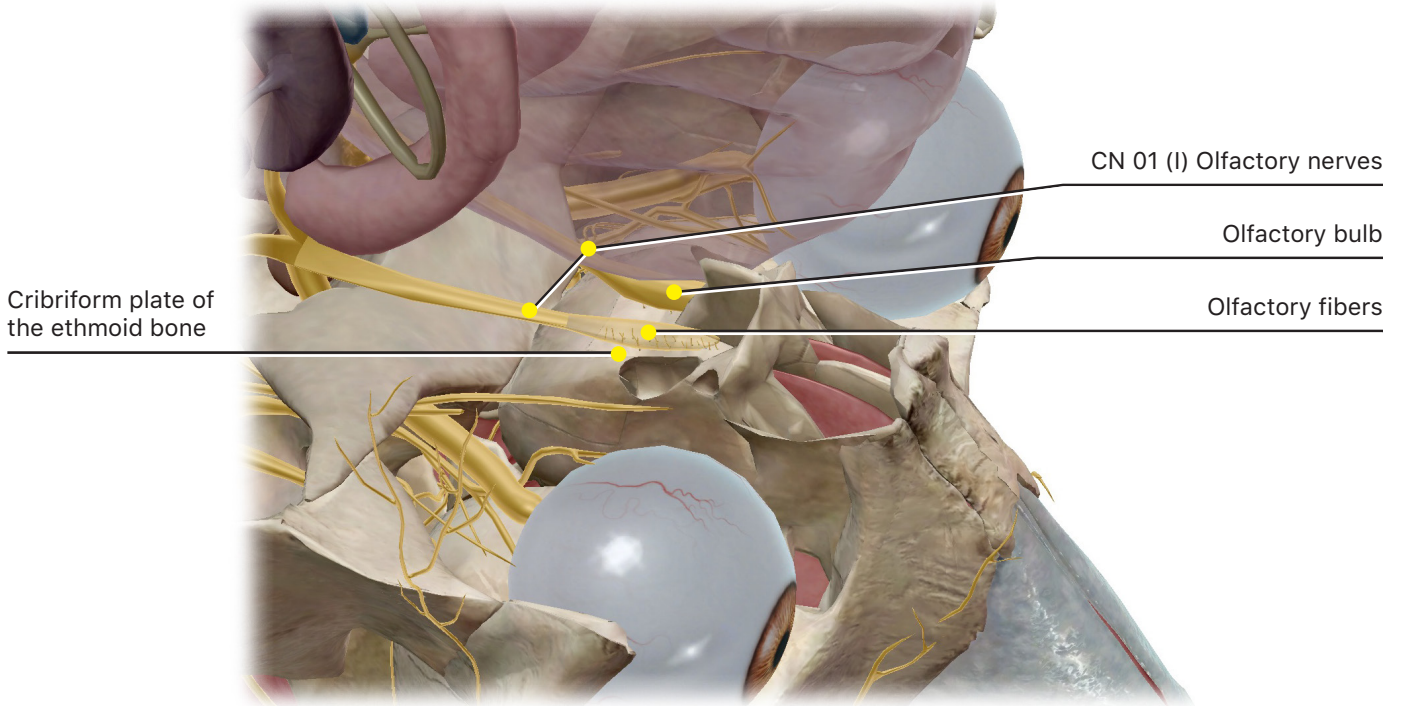
**Cynthia Harley, Assistant Professor of
Biology, Metropolitan State University**

PRE-LAB EXERCISE

Use the modules to guide your exploration of the anatomy and physiology of taste and smell. Be sure to use the book icon to learn more about the structures you are exploring.

You are responsible for the identification of **all bold terms**.

A. Select Module 17.6 Special Sensory Organs.



IN-LAB EXERCISES

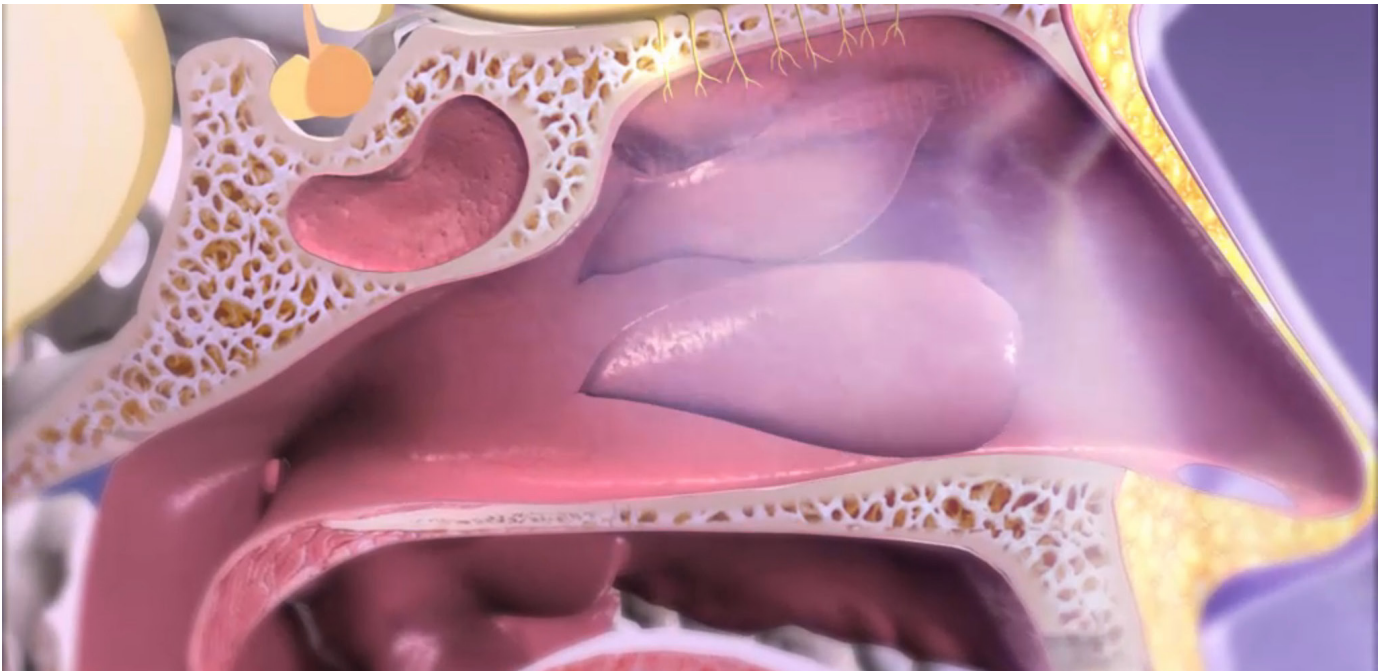
Use the modules to guide your exploration of the anatomy and physiology involved in olfaction (smelling) and gustation (taste). Be sure to use the book icon to learn more about the features you are exploring.

You are responsible for the identification of **all bold terms**.

PART 1: Olfaction

The goal of your olfactory system is to take chemical information from the air and transduce that information into a neural signal.

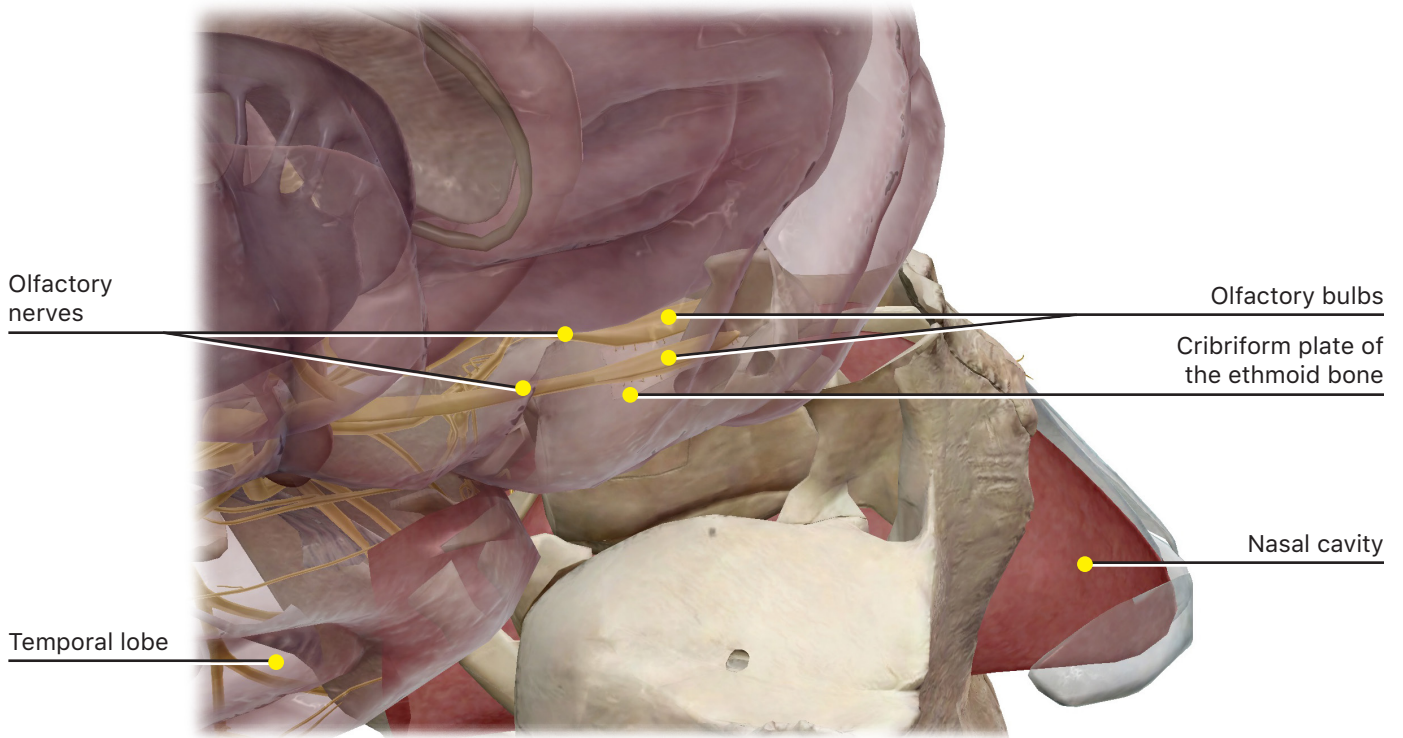
A. Watch the video in Module 21.6 Olfaction and make the following observations.



1. Place the following items below in order, with 1 as the first item and 6 as the last.

- _____ signal travels along CN1 to the olfactory area of the **cerebral cortex**
- _____ signal carried by neurons through the **ethmoid bone**
- _____ air enters the **nasal cavity**
- _____ signal transfers to first order neurons connected to **epithelial cells**
- _____ chemicals bind to receptors on the cilia of **olfactory epithelium cells**
- _____ signal reaches the **olfactory bulb** of the brain

B. Explore Module 21.5 Olfactory Nerves.



1. Identify the following structures within the olfactory pathway.

a. **Olfactory nerves**

b. **Nasal cavity**

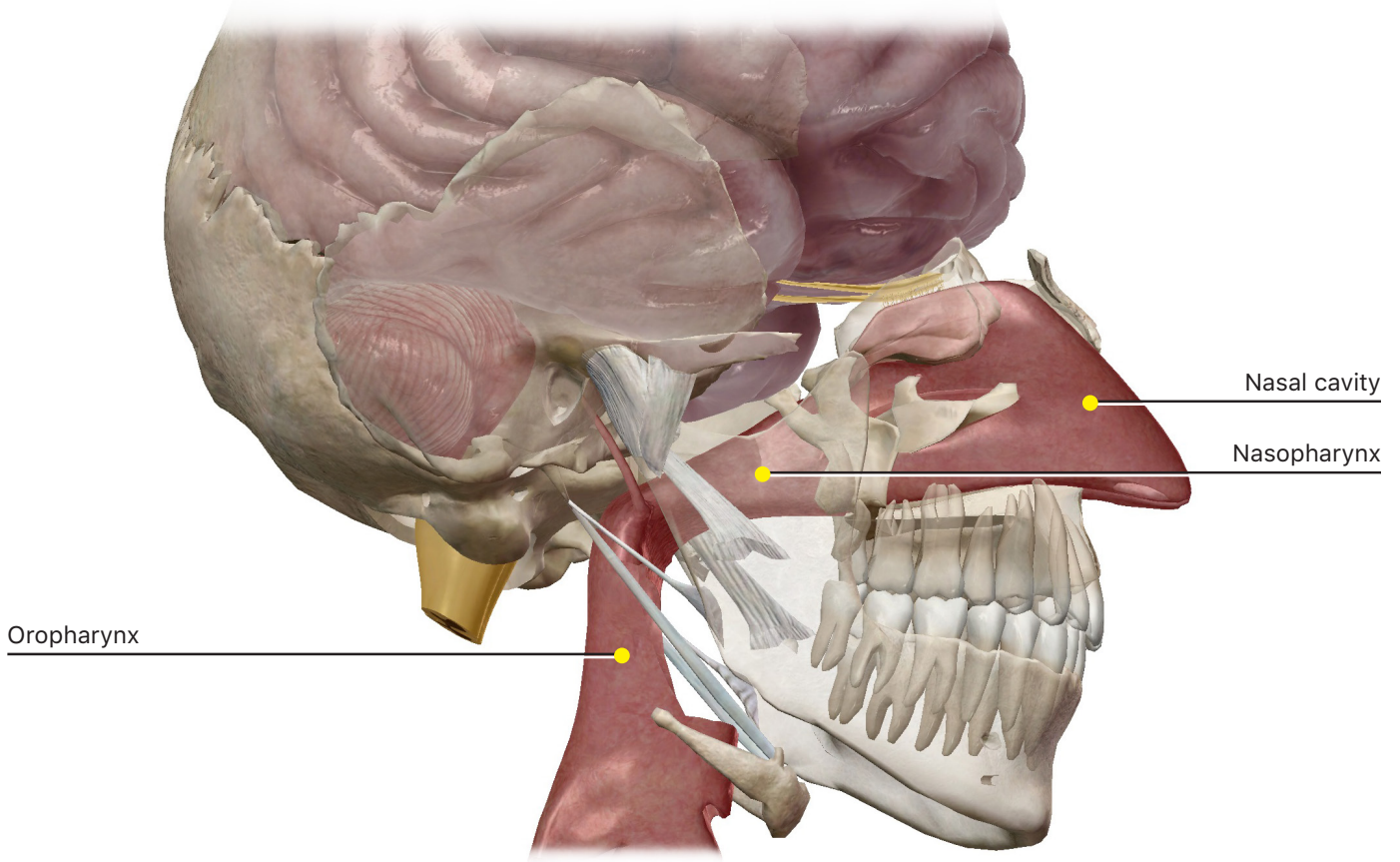
c. **Cribriform plate**

i. Hide the olfactory nerve and notice how there are holes through this part of the skull so that the nerve roots can travel.

d. **Olfactory bulbs**

2. What lobe of the brain does the olfactory nerve project to?

C. Explore Module 23.3 Olfactory Pathway.



1. Trace the pathway of olfaction into the brain.

2. Select the nasal cavity and rotate your image. Note that the nasal cavity connects to the **nasopharynx**, and thus has a connection to the mouth. This connection is important to your sense of taste. Food particles that are chewed become volatile and enter the nasopharynx and nasal cavity, binding to olfactory receptors. When those receptors are covered with a thick layer of mucus, as they are when you have a cold, the odorants cannot reach those receptors and this connection is temporarily lost.

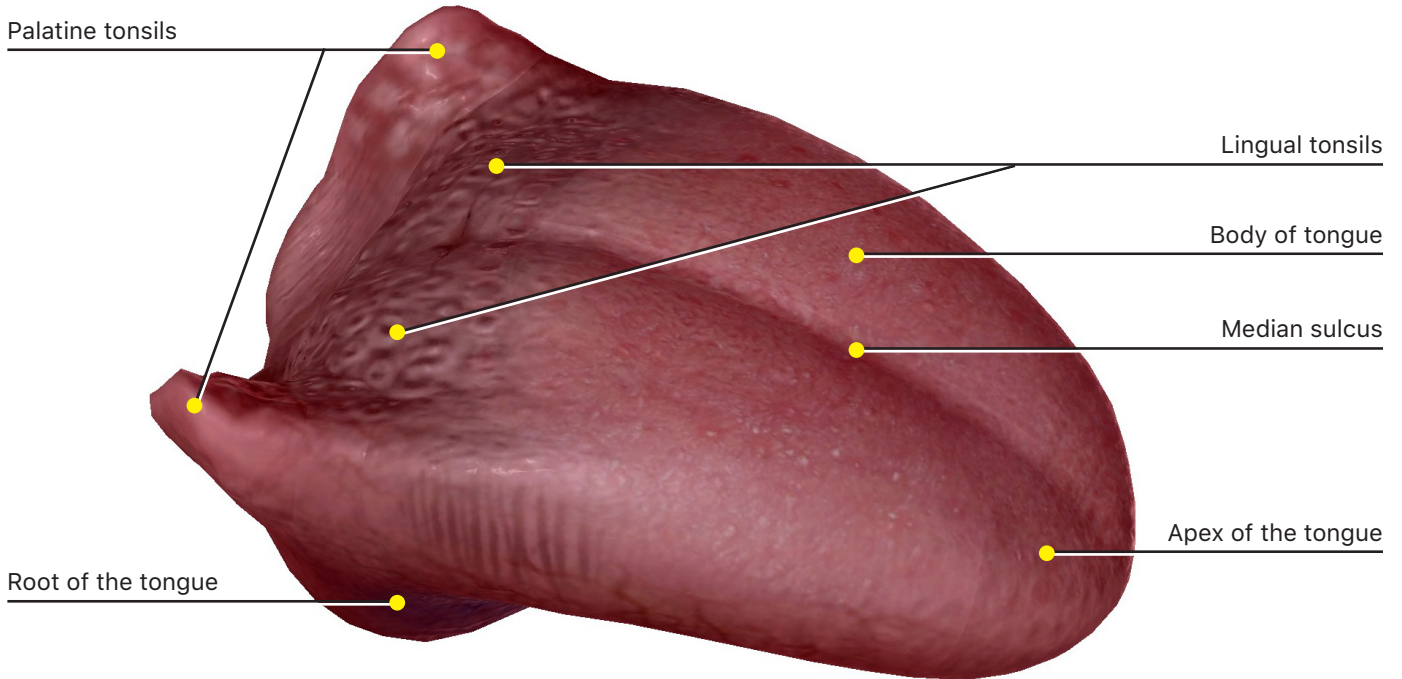
Thought question

1. Why is your sense of taste affected when you have a cold?

PART 2: Taste

The goal of your tongue is to take chemical information from your food and transduce it into a neural signal.

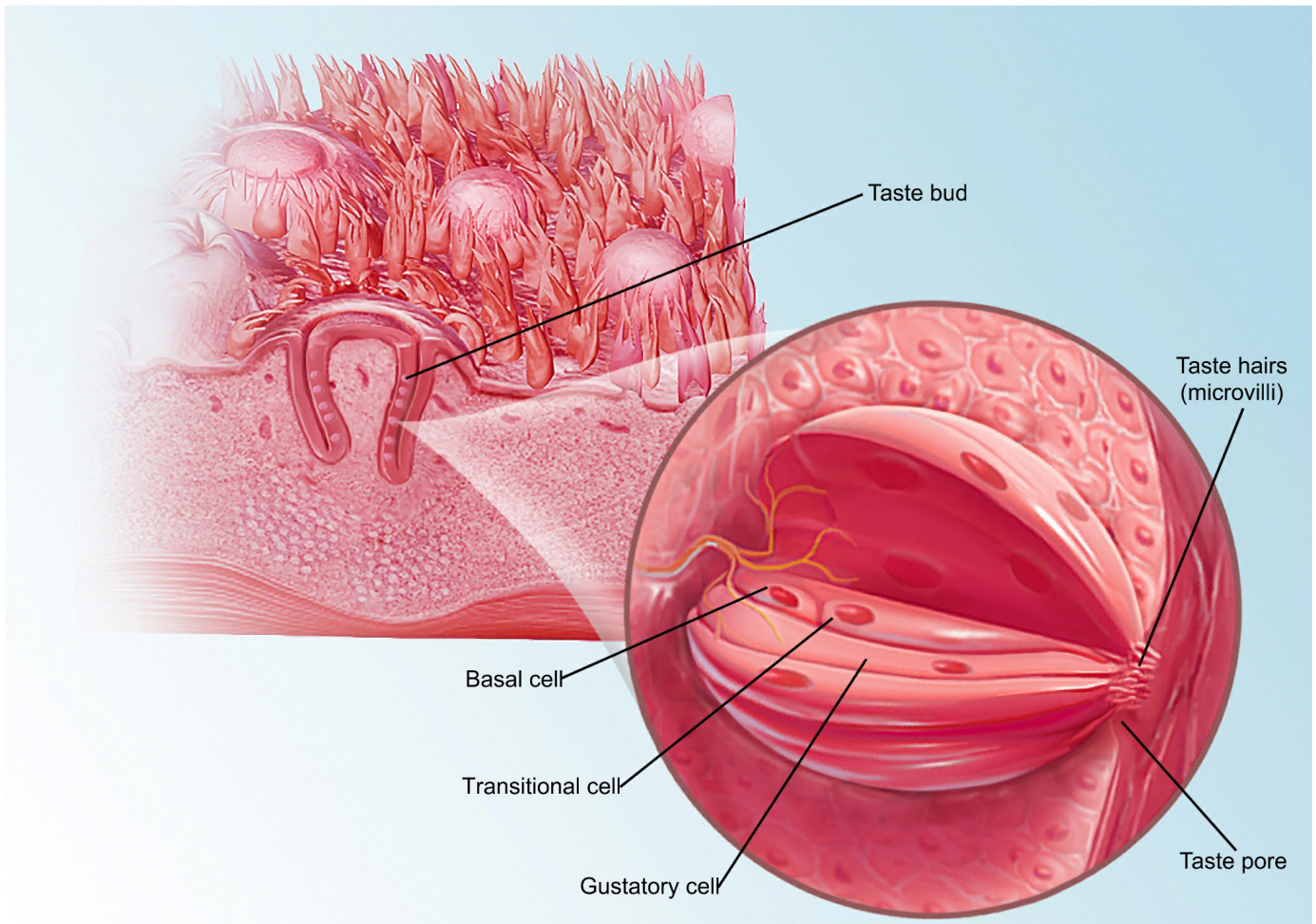
A. Explore Module 23.4 Tongue



1. Locate the following structures on the tongue

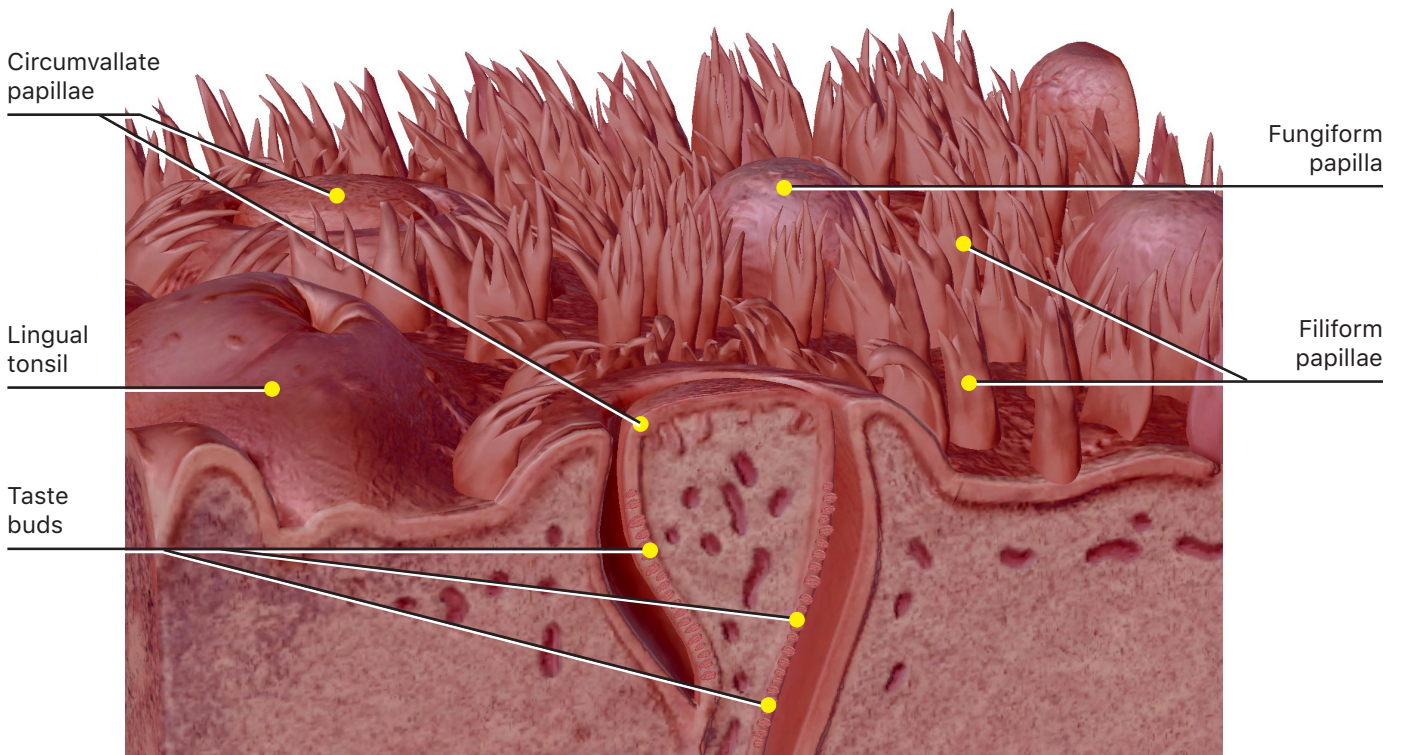
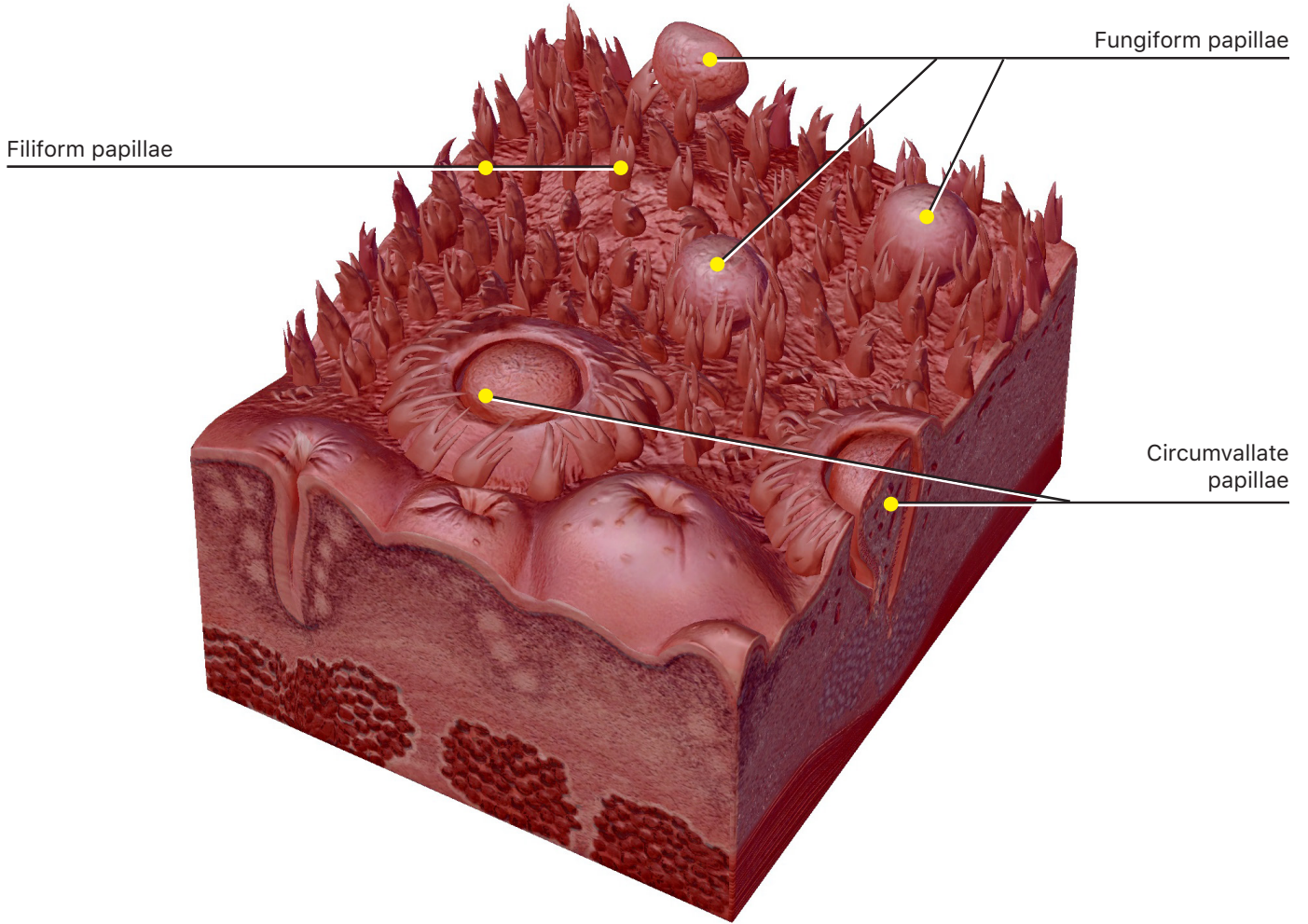
- a. **Body of the tongue**
- b. **Apex of the tongue**
- c. **Root of the tongue**
- d. **Median sulcus**
- e. **Frenulum**
- f. **Lingual tonsils**
- g. **Palatine tonsils**

B. Explore Module 23.5 Taste Buds



1. The sense of taste is also known as _____.
2. Chemicals that stimulate receptors in the oral cavity are known as _____.
3. There are 5 major tastes. List them below.
 - a.
 - b.
 - c.
 - d.
 - e.

C. Explore Module 23.6 Papillae



1. Name the three types of **papillae**.

a.

b.

c.

2. Describe the role that each of the papillae types has in the process of eating.

3. Choose "Taste buds" from the list of structures on the left.

a. What part of the tongue are you looking at?

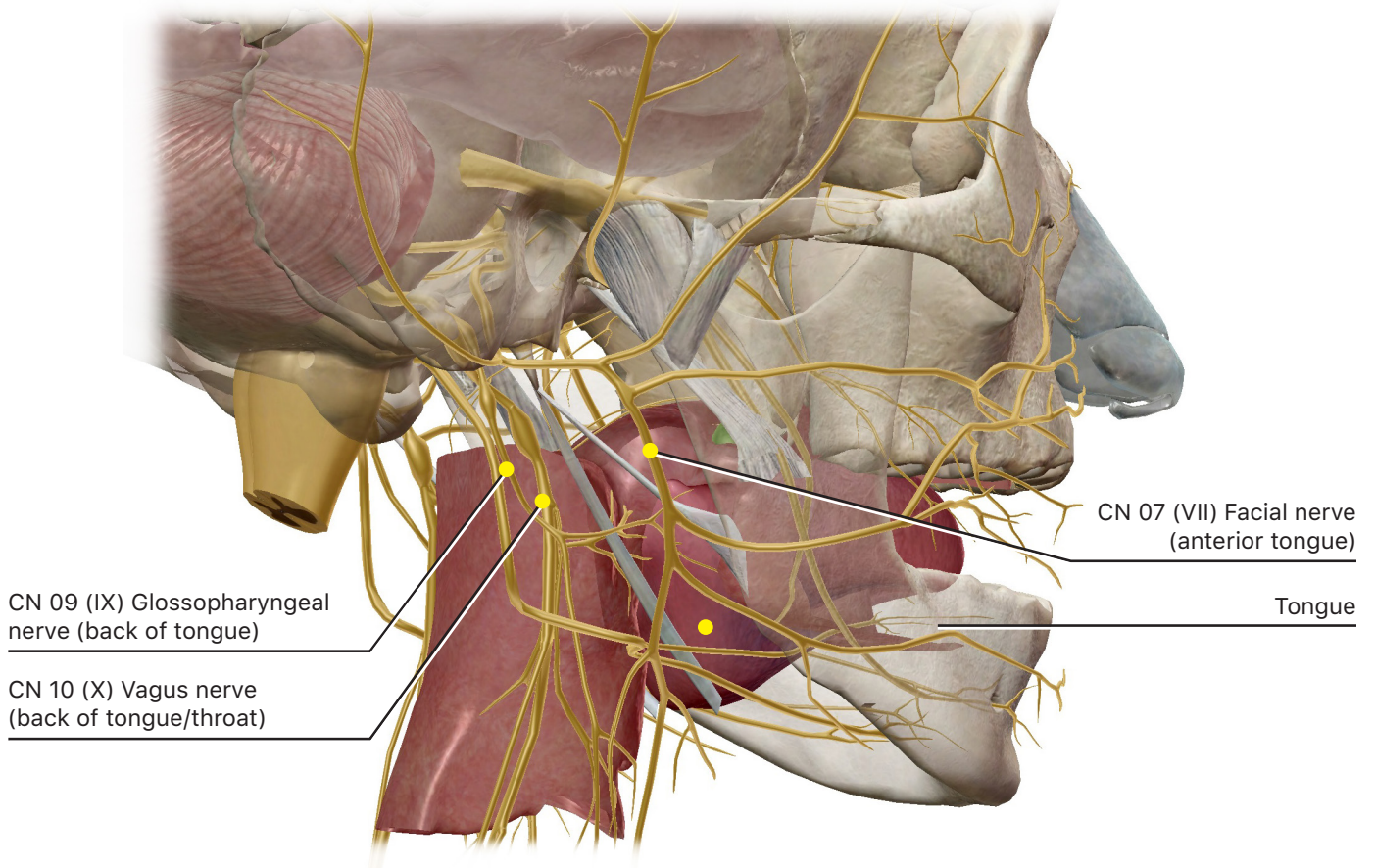
b. What kind of papilla are you looking at?

c. Is there a single taste bud, or are there many per papilla?

d. Zoom into the taste buds. Is each taste bud made of a single cell, or are there many cells per bud?

e. What are the types of cells involved?

D. Explore Module 23.7 Taste Pathway



1. Hide the **mandible** and examine the **tongue**. Which nerves receive taste information from the tongue?
2. Do they receive their sensory information from the same parts of the tongue?
3. Draw a diagram below of the taste pathway

Thought question

Some people are regarded as super tasters. These people have a heightened sense of taste. What anatomical differences do you think would be present in these individuals?

TIME TO PRACTICE!

TAKE QUIZZES 23.E TONGUE DISSECTION AND 23.F PAPILLAE DISSECTION.

PUTTING IT ALL TOGETHER

1. Watch the video for **Module 23.2 Olfaction**.

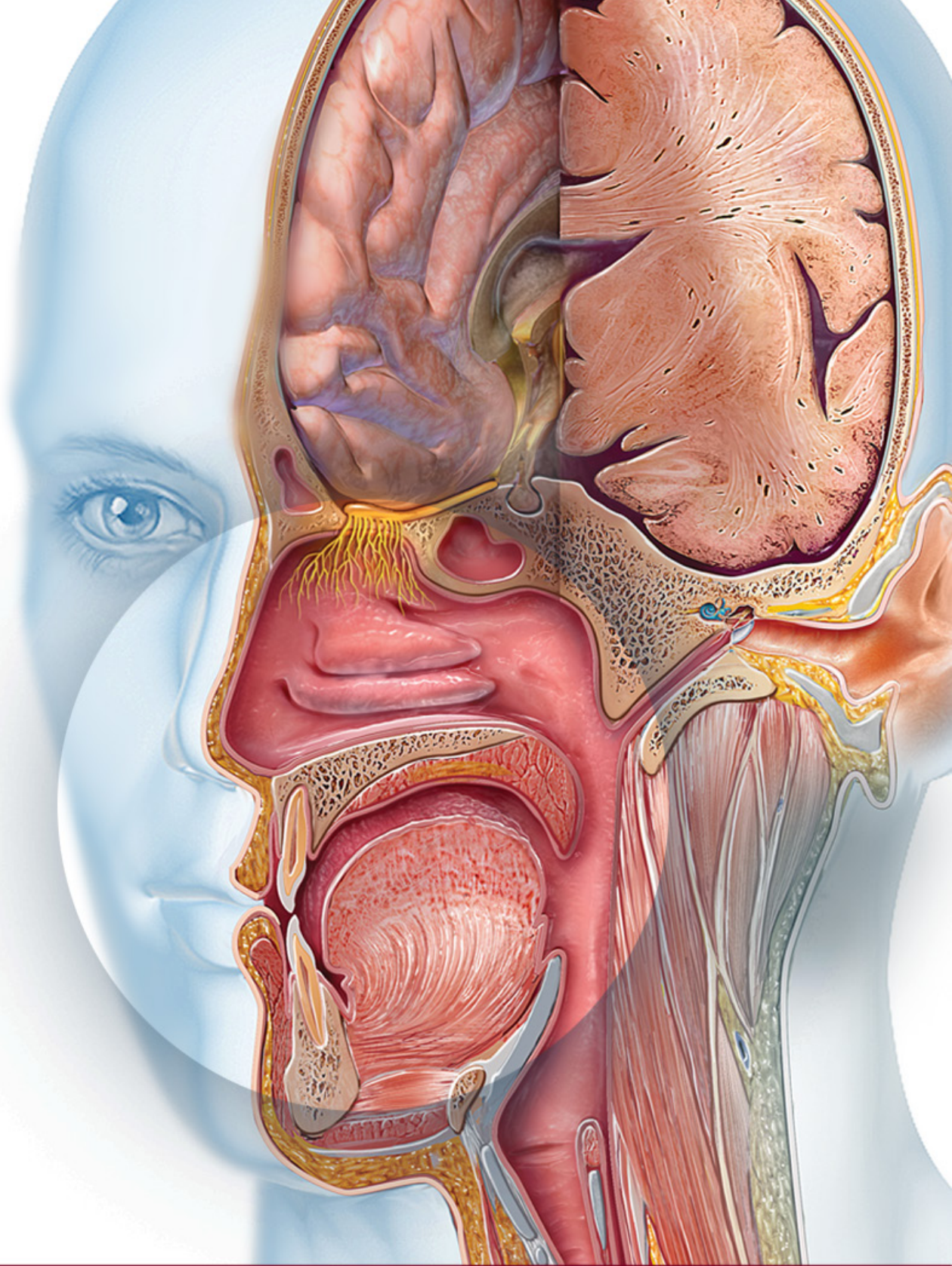
- a. State how olfactory information is transduced into a neural signal.

- b. Describe the path that olfactory information takes to enter the brain.

2. Refer to **Module 23.5 Taste Buds** and **Module 23.7 Taste Pathway**.

- a. State how gustatory information is transduced into a neural signal.

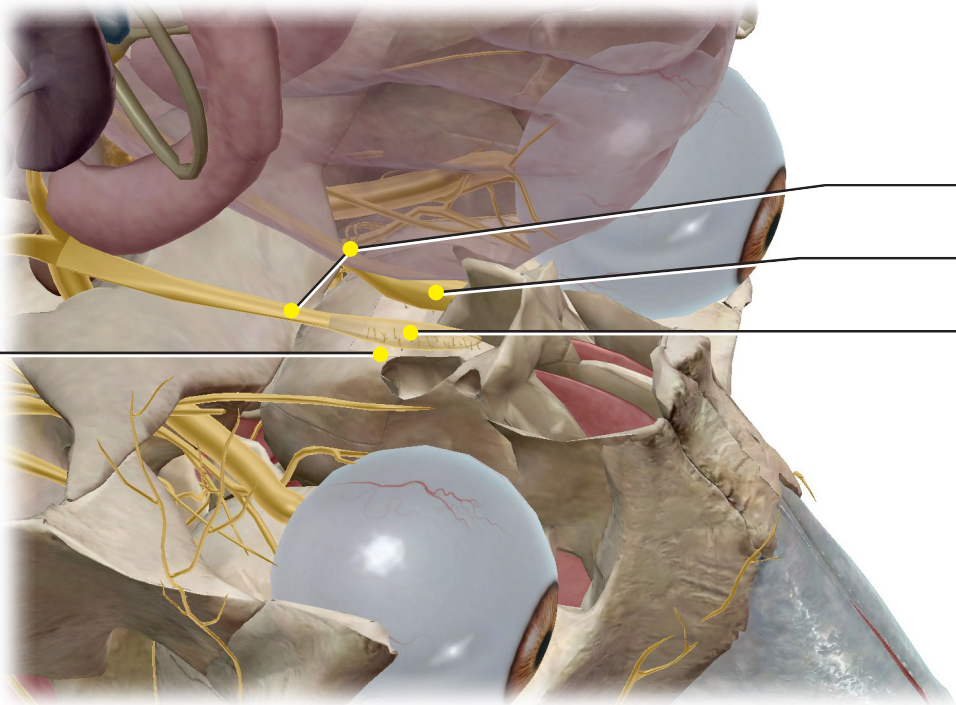
- b. Describe the path that gustatory information takes to enter the brain.



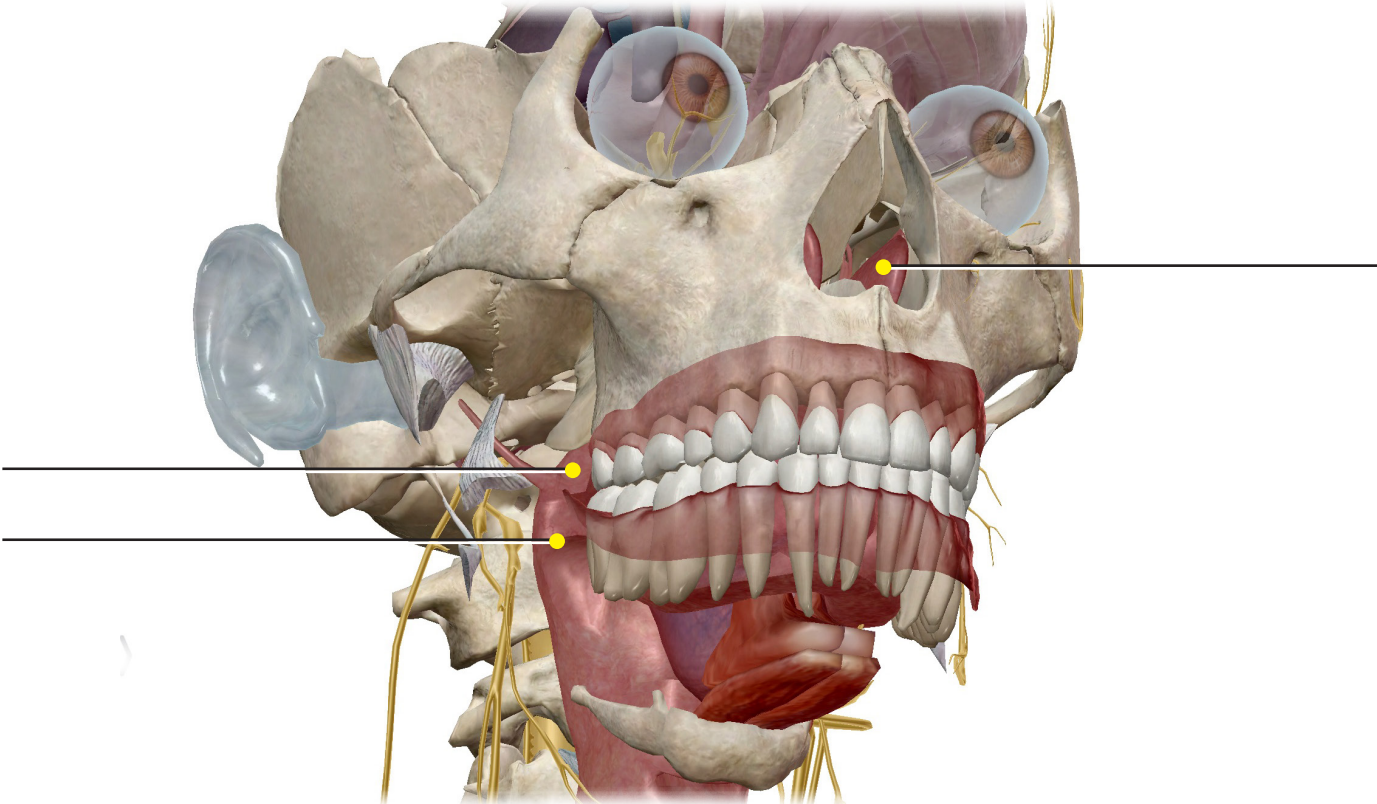
Student Practice

Label the structures in the following figures.

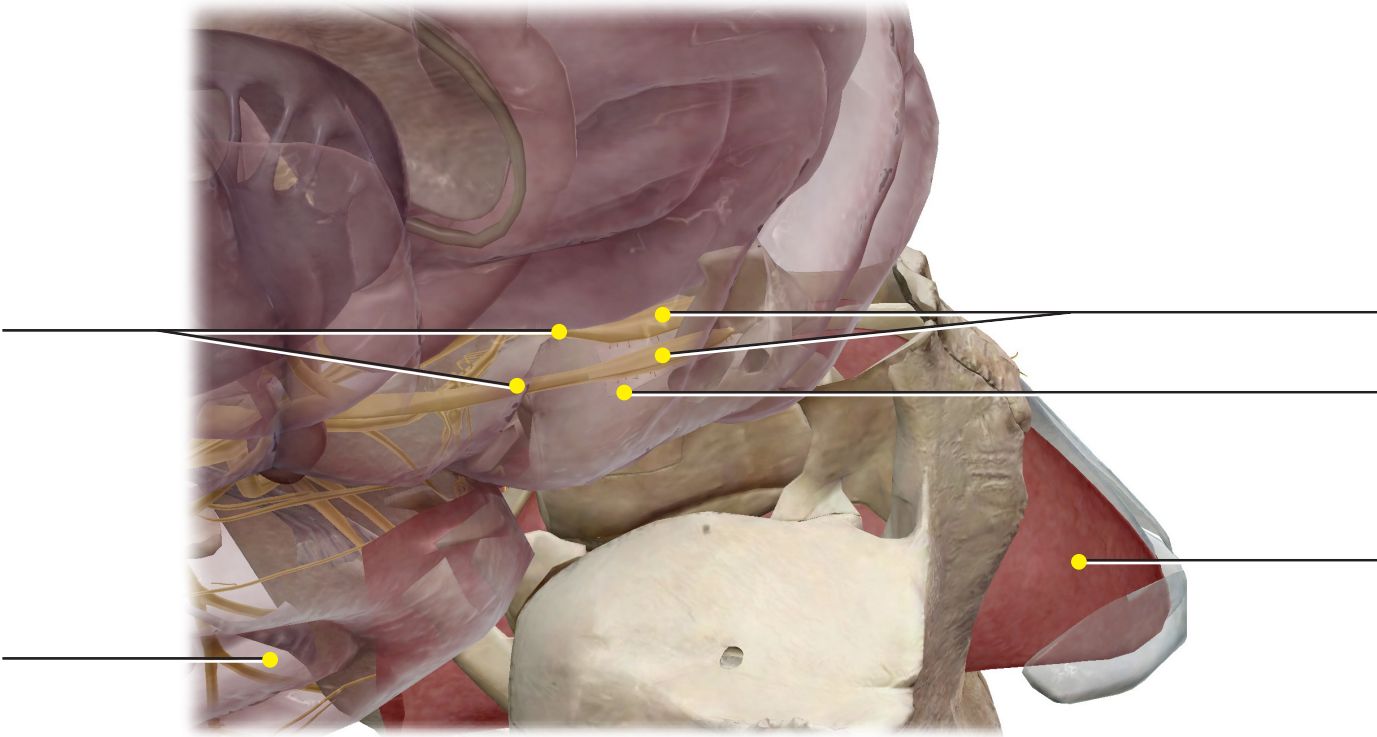
Module 17.6 Special Sensory Organs (Part 1)



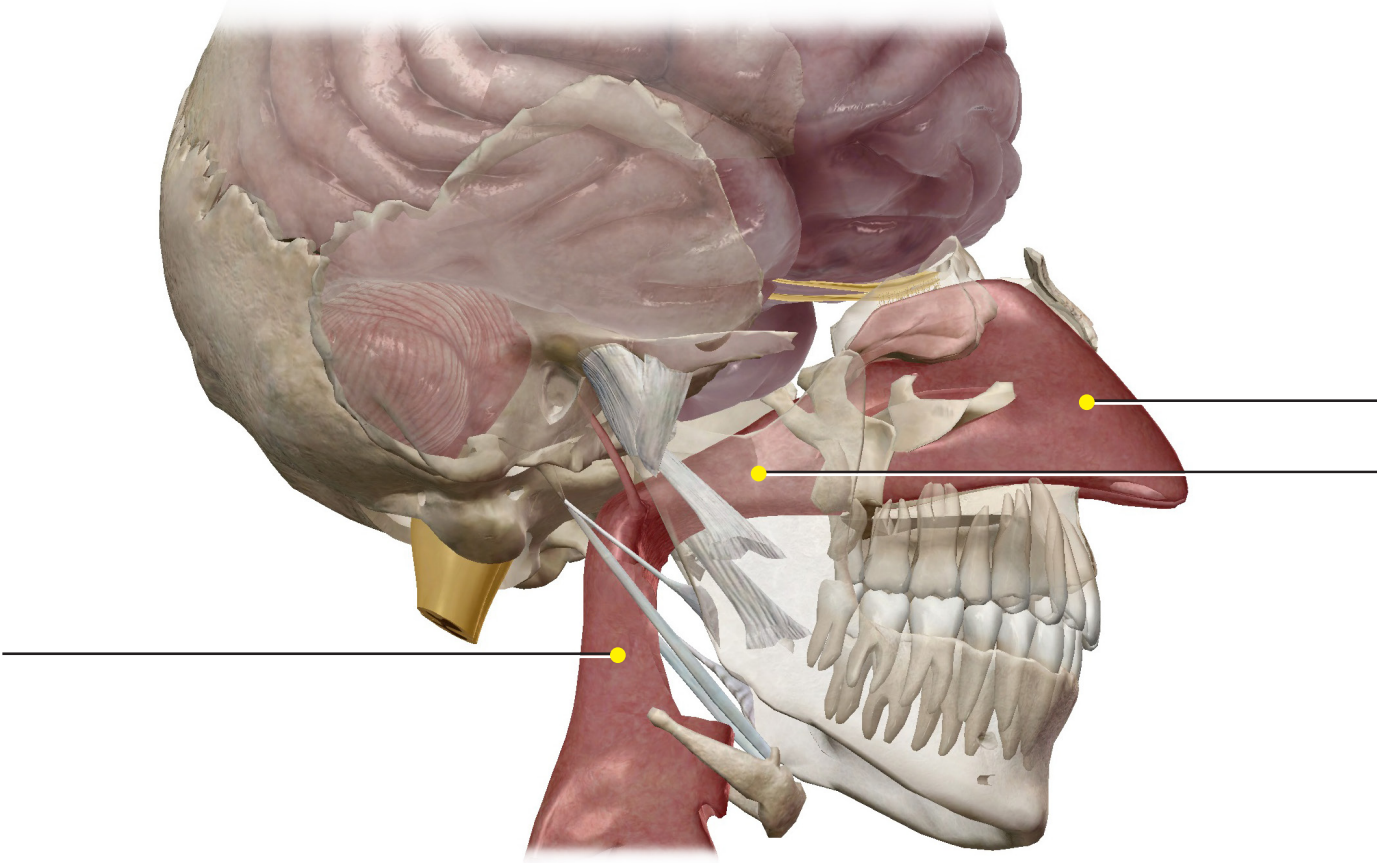
Module 17.6 Special Sensory Organs (Part 2)



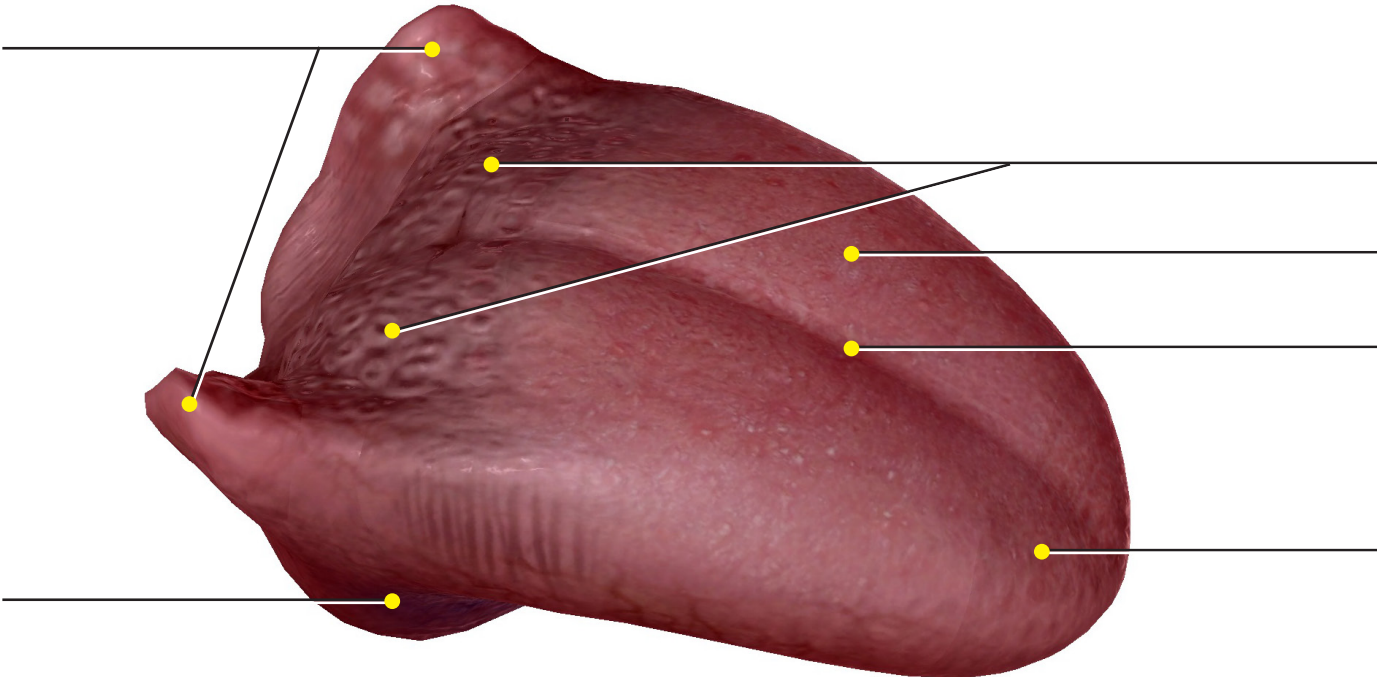
Module 21.5 Olfactory Nerves



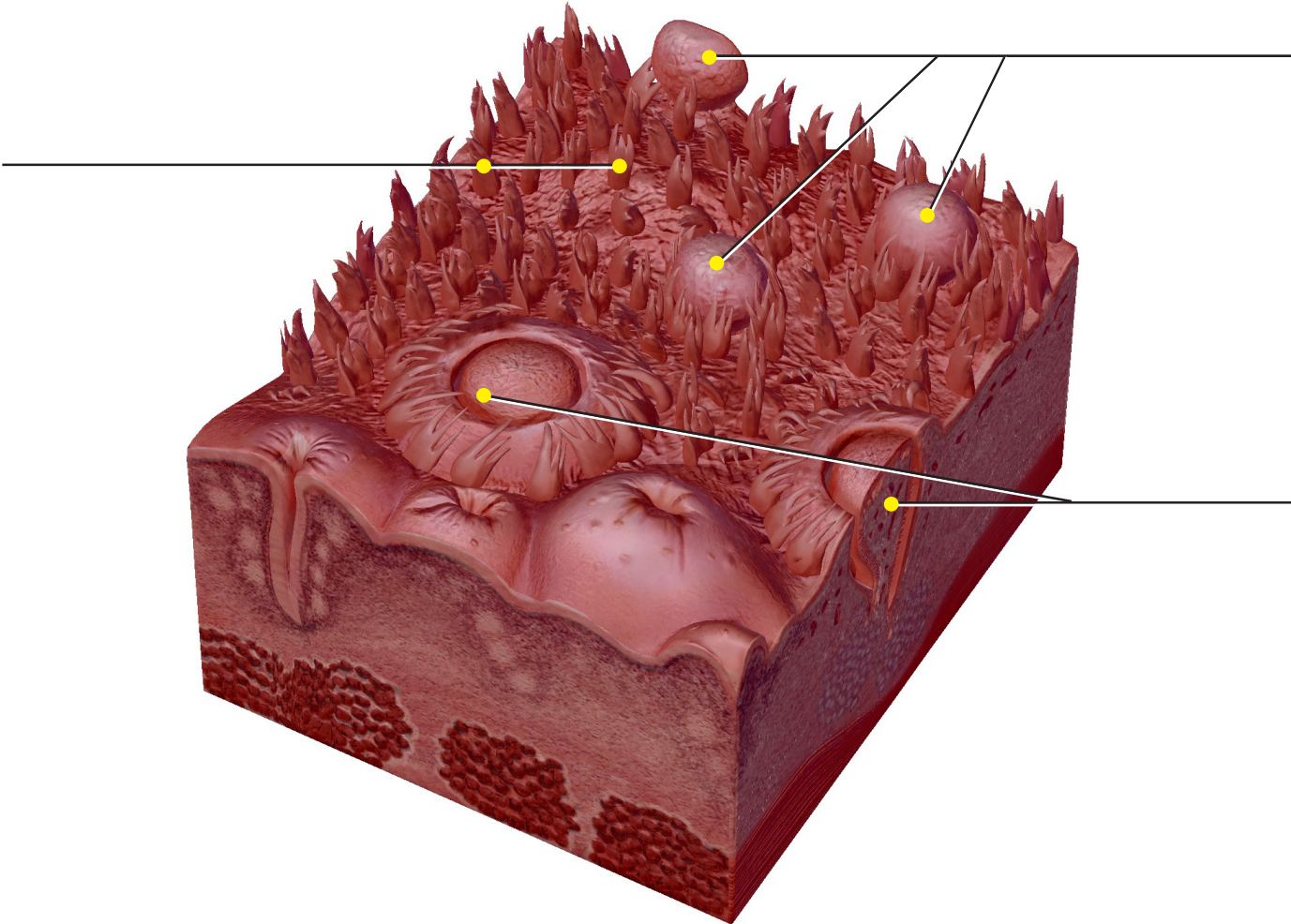
Module 23.3 Olfactory Pathway



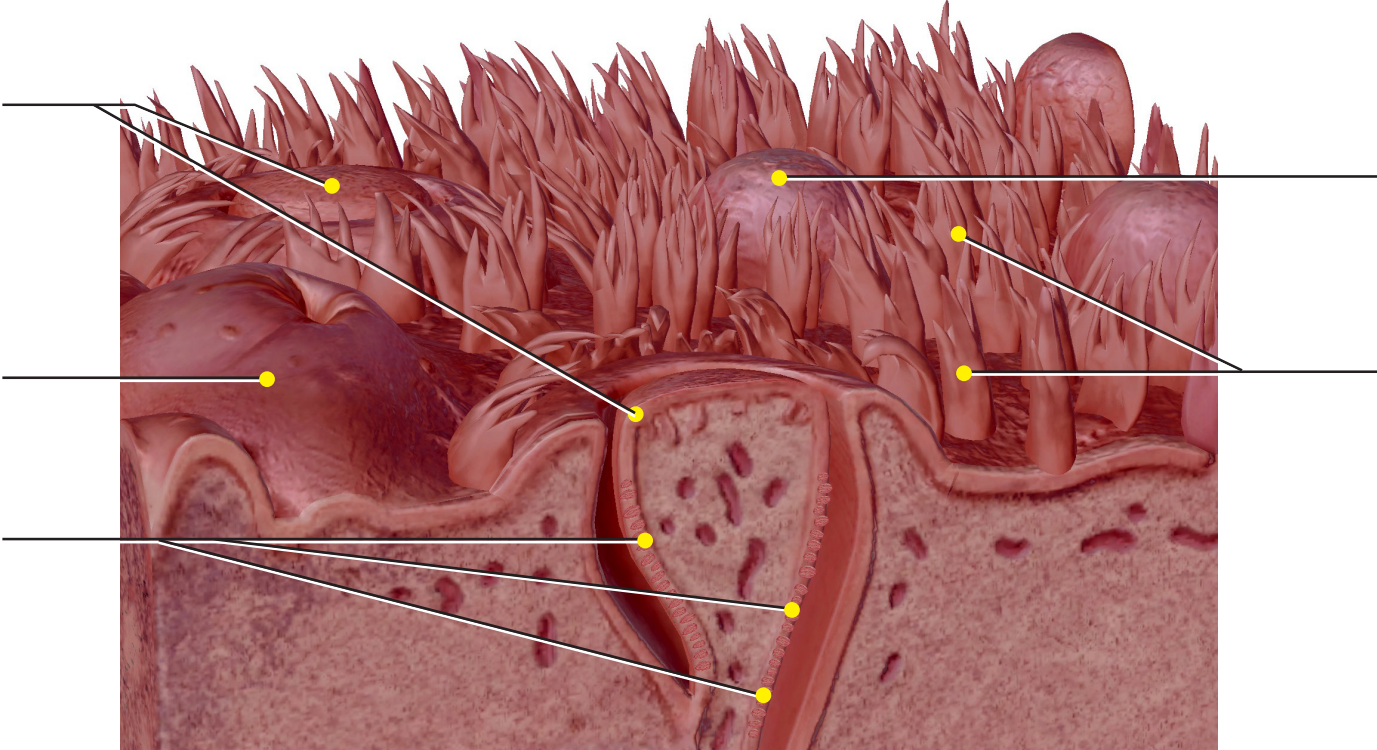
Module 23.4 Tongue



Module 23.6 Papillae (Part 1)



Module 23.6 Papillae (Part 2)



Module 23.7 Taste Pathway

