Special Senses Lab

Dr. J. Lim

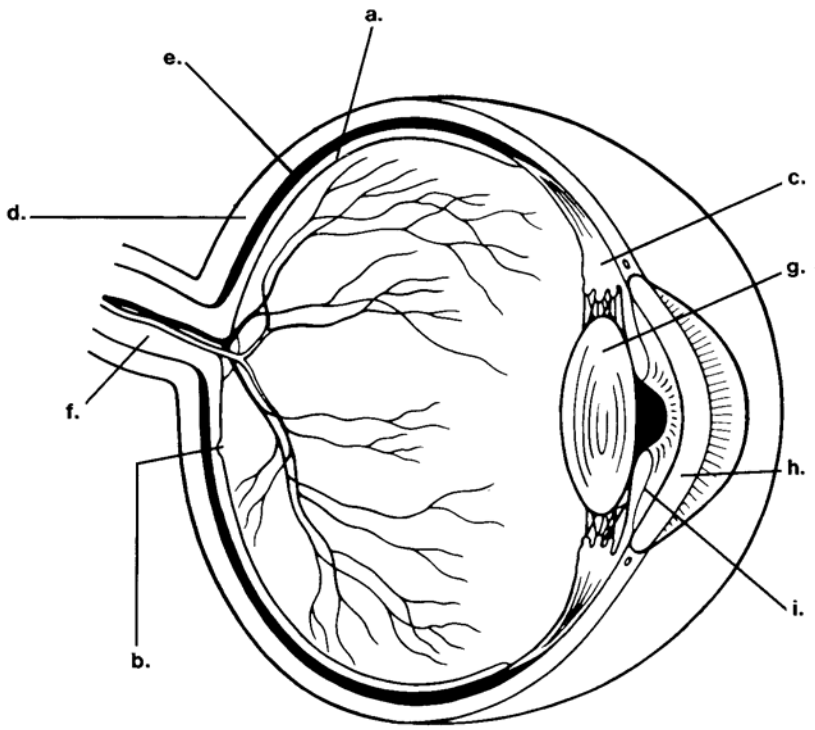
The Eye

1. Anatomy of the Eye

Use your notes/textbook and the provided models to complete the following:

In the following diagram, label the parts of the eye using the following alphabetized list of terms. Using the answer blanks provided, state the name and function of each part of the eye indicated in the illustration.

- choroid
- ciliary body
- cornea
- fovea centralis
- iris
- lens
- optic nerve
- retina
- sclera



	Structure	Function
a.	_____	_____
b.	_____	_____
c.	_____	_____
d.	_____	_____
e.	_____	_____
f.	_____	_____
g.	_____	_____
h.	_____	_____
i.	_____	_____

2. Dominant Eye

Hold your arm straight out in front of you. Form a hole of about one-inch in diameter using both outstretched hands. With both eyes open, view a small object across the room such as the wall clock through the hole between your hands. Alternately close each eye to determine the one being used to view the target.

Which is your dominant eye? _____ Are you right or left handed? _____

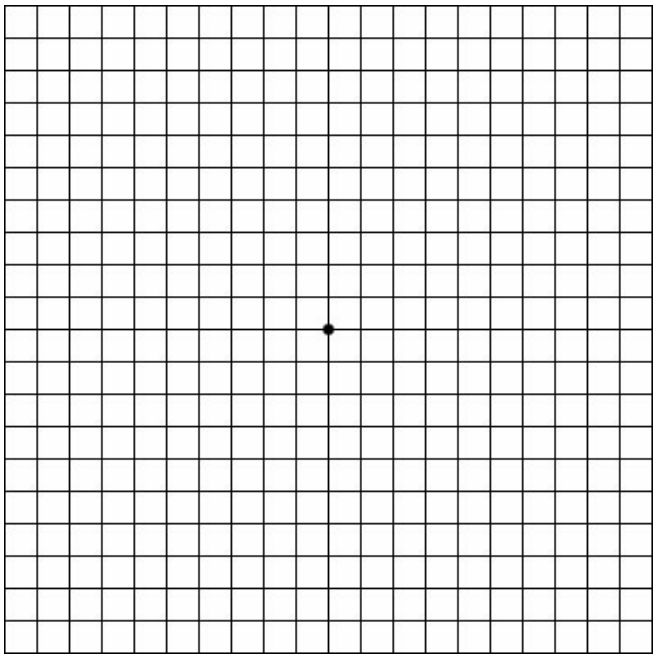
3. Demonstrating the Blind Spot

- blind spot testing card

Take one of the cards with a circle and X on it. Close your left eye, hold the card about a foot in front of your right eye with the X on the left and focus on the X. Although you are concentrating on the X, the circle will also be within your range of vision. Now move the card towards your face and right eye and find the spot where the circle disappears. (If it doesn't disappear, concentrate harder on the X).

Explain your results in terms of retinal anatomy. _____

Repeat the test for the left eye. This time close the right eye and focus the left eye on the dot.



4. Amsler Grid

The Amsler Grid (left) is used to test macular integrity.
Test each eye separately by covering the eye that you are not using.
Keep the grid about 14 inches from your face.
Look directly at the dot in the center of the grid.
If you normally wear glasses, do so while looking at the grid.
While maintaining fixation on the central dot, do you see any wavy lines and dark or blank spots?
Yes/No
If yes, describe _____
_____

5. Testing Visual Acuity (VA)

Have your partner stand 20 feet from the posted Snellen eye chart and cover one eye with a hand. As your partner reads each consecutive line aloud, check for accuracy. If this individual wears glasses, give the test twice – first with glasses off and then with glasses on.

Record the number of the line with the smallest-sized letters to read. If it is 20/20, the person's vision for that eye is normal. If it is 20/40, or any ratio with a value less than one, he or she has less than normal visual acuity (VA). (Such an individual is myopic, so a person with 20/40 vision is seeing objects clearly at 20 feet that a person with normal vision sees clearly at 40 feet.)
Repeat this process for each eye.

VA of right eye 20/___

VA of left eye 20/___

6. Testing for Astigmatism

The astigmatism chart tests for defects in the refracting surface of the lens and/or cornea.
View the chart first with one eye and then with the other, focusing on the center of the chart. If all the radiating lines appear equally dark and distinct, your refracting surfaces are not distorted. If some of the lines are blurred or appear less dark than others, you have at least some degree of astigmatism.

Astigmatism in right eye? Y/N

Astigmatism in left eye? Y/N

7. Color Blindness

Ishihara's color blindness plates are designed to test for deficiencies in the cones or color photoreceptor cells. There are three cone types – absorbing red, blue, and green wavelengths respectively. Interpretation of the intermediate colors of the visible light spectrum is a result of simultaneous input from more than one cone type.

Any color vision defects revealed? _____ If defect revealed, explain. _____

8. Pupillary Reflexes

- Close your eyes and cover them with your hands for ten seconds. Your partner should now position a flashlight at chin level in front of you and shine the light into the area of your covered eyes. Next uncover and open your eyes while your partner closely watches your pupils.
  What happens? _____
  What is the value of this reflex?_____
- Shine a flashlight into the pupil of your partner's left eye along the visual axis. Note the constriction of the left pupil in response to the light. While again shining the light into your partner's left eye, note that the right pupil responds consensually even though it has not received direct illumination.
  Pupil response normal? ____ If not, explain._____

9. Depth Perception – Part 1: Test Tube

- Obtain a test tube rack with a single test tube
- Sit at arm's length to the test tube in its rack
- Close both eyes and allow your partner to move the test tube rack slightly
  - the rack should remain within arm's reach
- Open one eye and quickly insert a pen/pencil into the test tube
- Close both eyes and repeat the process with the just the contralateral eye open
- Repeat again with both eyes open
- Record results

	Right Eye Closed	**Left Eye Closed**	**Both Eyes Open**
Results			

10. Binocular Vision

Hold your forefinger about eight inches from your nose. Close first one eye, then the other eye, while watching your finger. Repeat rapidly several times.

- What happens? _____
- Why? _____

11. Sheep Eye Dissection

Designate a reader to direct the primary dissector(s). Follow the directions below and be sure to locate the **bold** structures.

- Obtain a sheep eye, gloves, dissection tray/instruments from the cart
- Carefully make an incision in the **sclera** with a scalpel about ¼ inch away from the edge of the **cornea** (watch for squirting aqueous)
- Starting with the hole made by the scalpel, use scissors to cut a circle around the cornea, leaving a ¼ inch border of white sclera
- Remove the cornea and border. This separates the eye into two pieces: a posterior 2/3 and an anterior 1/3.
- From the inside, slowly remove the **lens** and observe the **suspensory ligaments** stretch and break. Note the firmness of the lens and how it delaminates upon rubbing due to its layered onion-like construction.
- Note the two round dark structures – the smoother, more anterior **iris** and the ridged, more posterior **ciliary body**.

- Carefully peel back the cream-colored **retina** (it may have already detached during dissection), and observe the dark **choroid** coat. Note that one portion of the retina stays firmly attached. This is the **optic disc**, where the **optic nerve** (made of **ganglion cell axons**) exits the eye.
    - A lighter blue area on the otherwise dark choroid is the tapedum lucidum, which allows for the reflection of light back through the retina a second time, thereby enhancing night vision. Humans do not have this structure.
- Use a forceps to separate the choroids from the sclera
- After viewing the cornea and noting its placement, use scissors to remove the cornea so that the **iris** and **pupil** can be observed from the anterior side
- Dispose of all dissection materials in the appropriate receptacles. Return instrumentation and tray to the cart.
- **Clean your table and wash your hands before leaving the lab.**

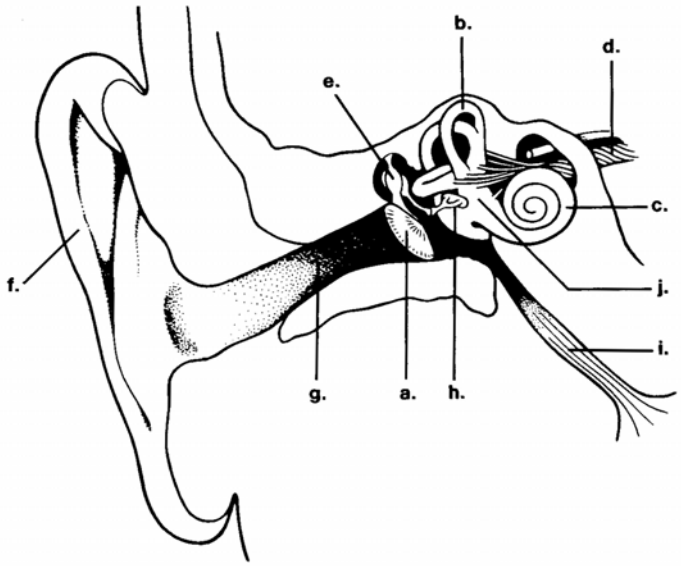
The Ear and Hearing and Balance

12. Anatomy of the Ear

Use your notes/textbook and the provided models to complete the following:

Using the following alphabetized list of terms, label the parts of the ear. Using the answer blanks provided, state the name and function of each part of the ear indicated in the illustration.

auditory canal
auditory tube
cochlea
cochlear nerve
malleus (hammer)
pinna
semicircular canal
stapes (stirrup)
tympanic membrane
vestibule



Structure/Function	Structure/Function
a. _____	b. _____
c. _____	d. _____
e. _____	f. _____
g. _____	h. _____
i. _____	j. _____

13. Field Sobriety Test

See separate handout

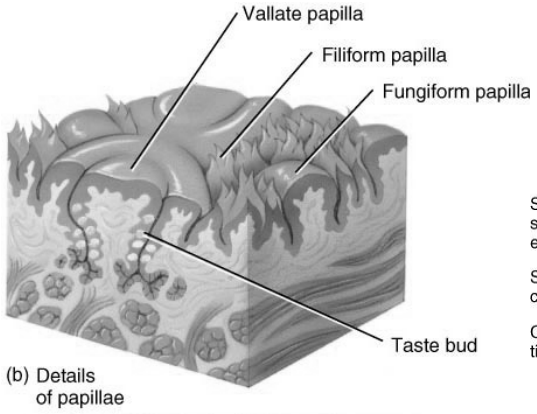
Ataxia: People with ataxia have problems with coordination because parts of the nervous system that control movement and balance are affected. Ataxia may affect the fingers, hands, arms, legs, body, speech, and eye movements. The word ataxia is often used to describe a symptom of incoordination which can be associated with infections, injuries, other diseases, or degenerative changes in the central nervous system.

- Ataxia can result from a dysfunction of which part of the brain _____
- A common exogenous cause of ataxia is ethanol (booze), which has a depressant effect on the central nervous system.

Perform the three tasks on the "Field Sobriety Test" handout.
Describe your performance _____
_____

- Next, with your forehead a yardstick, take ten rapid revolutions around the yardstick to induce some ataxic symptoms and repeat the "Field Sobriety Test."
    - Describe your performance _____
      _____

Taste



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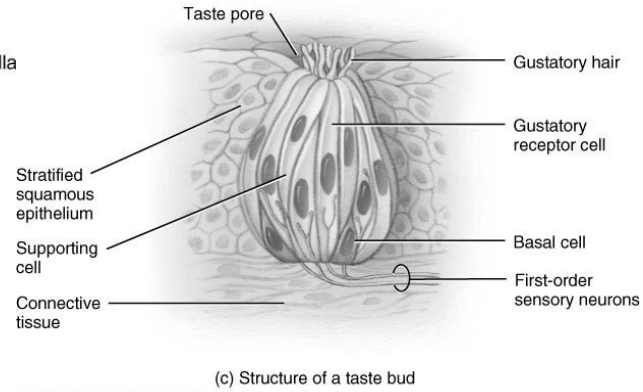

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14. Taste Zones on the Tongue

Draw a tongue and demarcate the zones most responsible for tasting sweet, salty, bitter, and sour.

15. Chemoreceptor Function - Taste

- With a paper towel or Kimwipe, dry the superior surface of your tongue.
- Place a few sugar crystals onto the tip of your dried tongue. Do not close your mouth.
  How many seconds before you can taste the sugar? _____
  Why couldn't you taste the sugar immediately? _____

16. Taste Areas of the Tongue

- Dry the superior surface of your tongue with a paper towel or Kimwipe
- Have your partner dip a cotton-tipped applicator in the sugar solution and remove any excess liquid by touching the cotton to the inner rim of the flask.
- Touch the applicator to the tip, middle, sides and rear of your tongue
- Signal when you can detect the sweet taste and report its location _____
- Rinse the mouth, dry the tongue and use a clean applicator for each of the test solutions:
    - sweet (sugar), salty (salt), bitter (quinine) and sour (vinegar)
    - do the locations coincide with your previous sketch? (#14) _____
        - if not, explain _____

17. Interdependence of Taste and Smell

- cut food samples and toothpicks

Name That Food

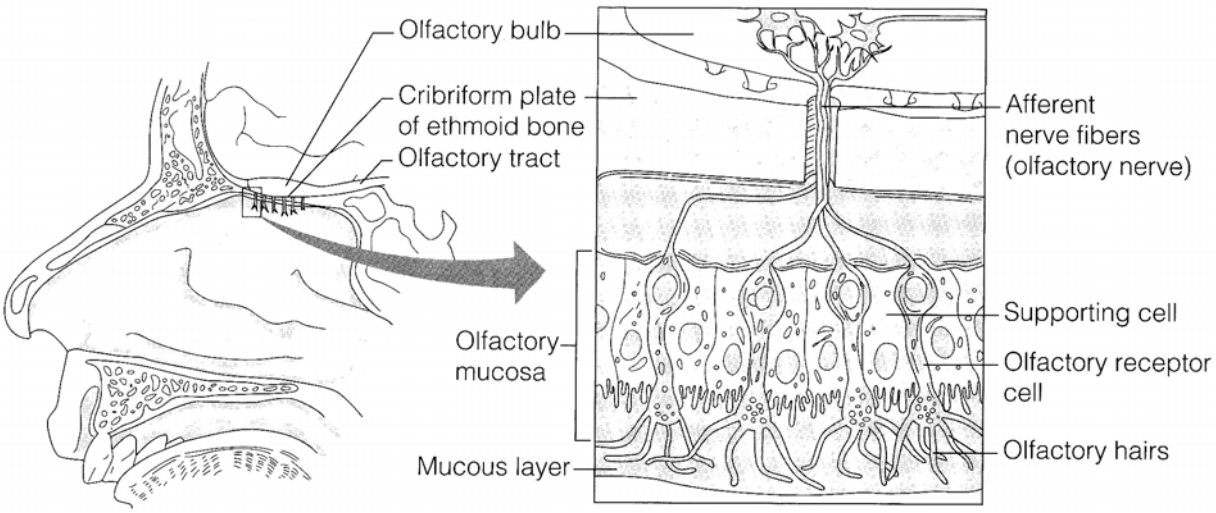
- Tester should wash their hands and use a paper towel placemat and toothpicks with the food samples
- FIRST: **Subject closes eyes, holds nose and sticks out tongue**
  - Tester spears food samples on toothpicks and places them one at a time on the subject's extended tongue
    - food cube should remain on tongue for only about five seconds
  - Record results for (for your tongue) on the data chart.
  - Use a '+' for correct ID and '-' for incorrect ID
- SECOND: With nose still pinched, chew the food and try to identify. Record results.
- THIRD: If positive ID is not made, the subject may release their nostrils with continue chewing to see if positive ID can be made. Record results.

	Onion	Potato	Apple	Carrot
Tongue out				
Chewing/Pinching				
Chewing/NoPinch				

Olfaction

18. Smell

Utilizing a skull, locate where the olfactory nerve gains entry into the nasal cavity through the floor of the cranium. You can see the olfactory bulbs by viewing the antero-inferior aspect of a model brain.

Name the bony passageway taken by the olfactory nerve through the floor of the cranium. This structure has many holes like a sieve or colander. _____

- Name the cranial bone where this structure is found _____
- Olfactory receptor cells are which type of sensory receptor? _____
- Name the lobe of the cerebrum responsible for olfactory association _____