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BIO 125

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Laboratory 6/7: Sensory Physiology

Purpose:

The purpose of laboratory 6/7 Sensory Physiology was to perform a series of experiments that measure the capabilities of ones sensory systems. Cutaneous receptors (tactile and thermal receptors of the skin), Olfactory receptors (chemical receptors of the nose), Gustatory receptors (chemical receptors of the tongue), Phono receptors (mechanical receptors) of the ear. Proprioceptors (mechanical receptors of the ear and body).Photoreceptors (light receptors of the eye) these are the types of receptor cells that respond to a specific kind of environmental stimulus that we will see throughout the lab.

Procedure:

A-1: Two-point discrimination

- Apply two caliper pinpoints as close as possible on your partner's skin on the palm of their hand.
- Remove pins and move them 1 millimeter apart, reapply pins to partner's skin.
- Repeat until partner can distinguish two distinct points
- Repeat on partner's palm, back of hand, fingertip, and back of neck

Results:

Area:	Measurement:
Palm of hand	10 mm
Back of hand	21 mm
Fingertip	4 mm
Outer edge of the lips	8 mm
Back of neck	18 mm

Discussion:

A-2: Accommodation of thermoreceptors

- Place left fingers in 15 C water and right fingers in warm water and record sensations for each after 2 minutes.
- Take your hands out then place both in 25 C water and describe sensations.

Results:

Left hand was warm and right hand was cold. It's a phasic receptor cause it was sensitive to change of temperature.

Discussion: when the hands were swapped, the hand that went from hot to cold water created a more uncomfortable feeling almost like numbness. And my partners hand remained red for a bit even after being out of water for a while.

6/7-B: Olfactory adaptation

- Block left nostril and uncork bottle of camphor oil under nose until smell goes away. Record adaptation time.
- Remove the camphor and place bottle of cloves then peppermint oil under your nose. Distinguish the smells of cloves and peppermint oil.
- Uncork and hold camphor bottle under nose until the smell is no longer recognized.
- Unblock left nostril and determine if camphor is detected.
- Interpret results

Results:

Camphor oil:	10 sec
Peppermint oil:	4 sec
Cloves:	8 sec

Discussion: This experiment contained involvement of the olfactory chemical receptors and the quickest one it was able to adapt to was the peppermint oil and the one that took the longest was the camphor oil. It could be because the peppermint oil had a much more distinct and strong smell in my opinion.

C-1: Tuning fork tests

- Plug left ear with hand to test the right ear.
- Hold the handle of vibrating tuning fork to right mastoid process
- When sound disappears, move the form near external auditory canal.
- If sound reappears then there is no middle ear damage
- Repeat and record results for both ears

Results: For both of my ears there was no sign of middle ear damage for me nor my partner for each of our ears.

Discussion: Luckily in this experiment my partner and I showed no sign of ear damage however we were able to figure out that her ears were a lot more sensitive than mine. For her she couldn't stand the sound it made her body cringe meanwhile it wasn't a problem for me at all.

C-2: Audiometry

- Using an audiometer, each partner will take each other's audiogram.
- Record results.
- Analyze the audiograms the following way:
  - Average the values obtained for the frequencies of 500 Hz, 1000 Hz, and 2000 Hz
  - Subtract 26 dB from each average
  - If difference If greater than 26, multiply by 1.5%. This equals the percent impairment of each ear.

- Determine the percentage of biaural impairment.
- Record the results.

Results:

Discussion:

E-1: Demonstration of the blind spot

- Cover your left eye and focus the right eye on the center of cross.
- Bring the page closer to your eye slowly until the spot disappears.
- Have a partner measure distance from eye to page.
- This causes the image of the spot to be superimposed on the optic nerve. Explain lack of vision at this point.

Results: The distance from my eyes to the page was 13.3 cm.

Discussion: For the blind spot test it was difficult to figure out at first and to get an accurate measurement for the blind spot but then I was able to measure mine as 13.3 cm.

E-2: The Snellen test

- Stand 20ft away from the Snellen chart covering your left eye.
- Attempt to read the line at "20".
- If you can't read line 20, attempt 30, 40, 50, 70, 100 or 200 until line is legible. Preform attempts with your left eye, covering your right eye.
- The Snellen chart is analyzed the following way:
  - Visual acuity = Distance you rea the letters/Lowest line read clearly at 20 ft

Results: Person 1: 15ft/20ft Hyperopia Person 2: 20ft/20ft Normal

Discussion: In this experiment I had an outcome of normal results but my lab partner ended up having hyperopia, this may be due to me not needing glasses but my partner wears prescribed glasses.

E-3: Astigmatism

- Stand 8-10 inches away from the radial astigmatism eye chart so that it fills your field of vision. Cover left eye.
- Focus on the lines in vertical plane with your right eye.
- If a blur appears in the lateral lines or the lines converge into one, you have astigmatism in this plane of your eye.
- Record results and repeat with left eye.

Results: 8-4 the blurry lines were the cross over lines

E-5: Perimetry

- Seat before the perimeter board with your right eye at the edge of the semicircle. Cover left eye and stare at the center line.

- Your lab partner will introduce several different colored blocks into your left field of vison. Identify blocks by color.
- Your partner will record the degree for each block for both horizontal and vertical perimetry charts. Record the data.
- Explain results.

Results:

	Flag from left:	Flag from right:	Flag from above:	Flag from below:
Red:	70	70	60	40
Green:	70	70	60	40
Blue:	70	70	60	40

Discussion: Based on the results the color of the block didn't place a factor on what degree it took for us to see it what made a bigger impact was the direction the block was coming from.

Conclusion:

In conclusion, lab 6/7 Sensory Physiology introduced and demonstrated how the different capabilities of the sensory system work through various experiments that I would agree helped me understand the different receptors and why they are beneficial and important for one's everyday life.