Lab Report 6/7 : Sensory Physiology

Purpose: The lab investigates human sensory systems (touch, smell, taste, hearing, balance, and sight) and the neurological system's interpretation of external inputs as sensations. It entails activities that use precise measurements to help students learn sensory physiology principles such as graded potentials and intensity coding.

Procedures:

A-1: two-point discrimination

1. With your partner's eyes closed, apply two caliper pinpoints as closely together as possible on your partner's skin on the palm of his/her hand.
2. Remove the pins and move them 1 millimeter apart. Reapply the caliper points to your partner's skin. Repeat this procedure until your partner can discriminate between two distinct points.
3. Record this distance between pins at which your partner can discriminate two separate caliper points.
4. Compare results obtained from the following areas: a. palm of hand
   b. back of hand
   c. fingertip
   d. outer edge of the lips
   e. back of neck

A-2: Accommodation of thermoreceptors

1. Place your left fingers in 15C water and your right fingers in warm water (37 C) and record the sensation of each.
2. Keep hands immersed for 2 minutes.
3. After two minutes, describe the sensation in each hand.
4. Remove hands and promptly place them both in 25 C water. Describe the immediate sensation in each hand.

6/7-B: Olfactory adaptation

1. Block your left nostril. Uncork and hold the bottle of camphor oil under your nose until you can no longer detect the camphor.
2. Remove the camphor and place the bottles of cloves, then peppermint oil under your nose.
3. Distinguish the smells of cloves and peppermint oil.
4. Uncork and hold the bottle of camphor under your nose again until the smell is no longer recognized.
5. Record this second adaptation time
6. Unblock your left nostril determine if the camphor is detected.

C-1: Tuning fork tests

1. Plug your left ear with cotton or hold your hand over it and test the right ear.

2. Hold the handle of a vibrating tuning fork to the right mastoid process.
3. When the sound disappears, move the fork near the external auditory canal. Reappearance of the sound indicates no middle ear damage.
5. Repeat the test with your left ear

C-2: Audiometry

1. In a quiet room, the instructor will demonstrate the proper method of operating the audiometer.

2. Audiometry tests will be conducted in pairs. Each student will take his/her partner's audiogram.

3. Record your results on the worksheet on page 44.

4. Analyze the audiograms in the following way:
a. Average the values obtained for each ear for the frequencies of 500 Hz, 1000 Hz, and 2000 Hz.
b. Subtract 26 dB from each average.
c. If the difference is greater than 26, multiply this number by 1.5%. This equals

6/7-D: Equilibrium - Demonstration of Nystagmus

1. A student volunteer will be seated on a swivel stool with his/her head bent 30
   forward.
2. The instructor will spin the student rapidly to the right for 10 turns.
3. The instructor will suddenly stop turning the student and have the student look straight ahead.
4. Observe and note the subsequent movement of the student's eyes
5. Explain these eye movements in terms of direction of endolymph movement.
6. These procedures will be repeated with a second student spun to the left.

E-1: Demonstration of the blind spot

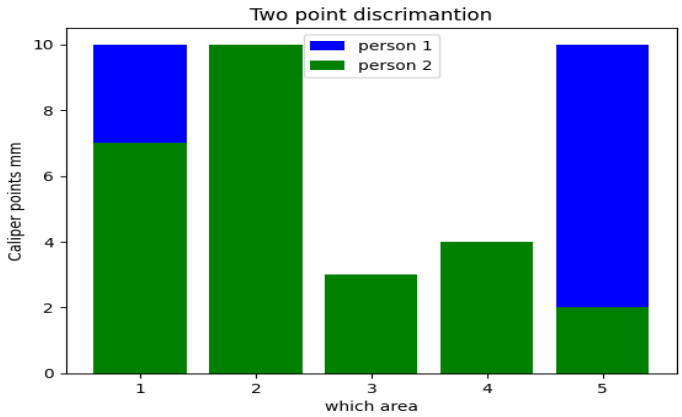
1. Cover your left eye and focus the right eye on the center of the cross below.
2. Slowly bring the page closer to your eye until the spot disappears.
3. Have your partner measure this distance from your eye to the page.
4. The image of the spot is now superimposed on the optic nerve.

E-2: The Snellen test

1. Stand 20 feet away from the Snellen chart. Cover your left eye.
2. Attempt to read the line designated "20".
3. If you cannot read line 20, attempt line 30, 40, 50, 70, 100 or 200 until a line is legible.
4. Perform these attempts with your left eye, covering your right eye.

Results:

A-1: two-point discrimination



A-2: Accommodation of thermoreceptors

WATER TEMPERATURE FOR 2 min	Rm.TEMPERATURE WATER FELT LIKE
HOT	COLD
COLD	HOT

6/7-B: Olfactory adaptation

SCENT	LOST SCENT sec.
CAMPHOR	18sec
PEPPERMINT OIL	20sec
CLOVES	10sec

C-1: Tuning fork tests

Reappearance in both Left and Right ear

C-2: Audiomety

Binaural impairment- 10.45

6/7-D: Equilibrium - Demonstration of Nystagmus

didn’t work

E-1: Demonstration of the blind spot

Blind spot for dot and cross: 16cm

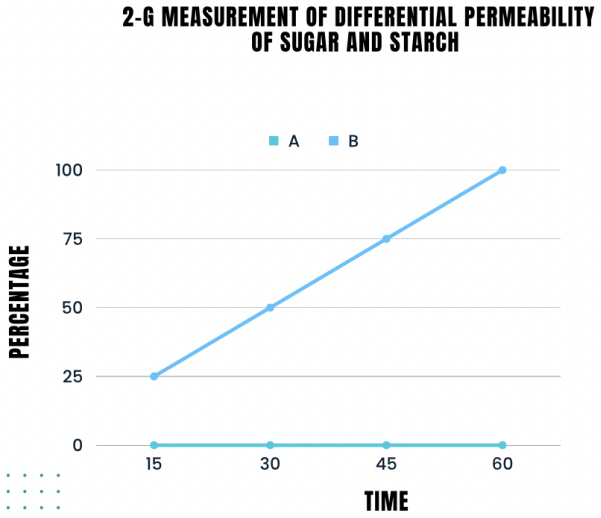
E-2 The Snellen test

20/30

Discussion: In the experiment, we did tests to see how our senses work. We checked how well we could feel two points on our skin (like feeling the difference between one or two pins). Most of us could do this pretty well. We also tested how we feel about hot and cold water. Everyone could tell the difference. We smelled different scents like camphor, peppermint oil, and cloves, and saw how long we could smell them. People had different abilities to smell these scents for a certain amount of time. We also checked our hearing. Some of us had a bit of trouble hearing certain sounds. When we tried to make our eyes move in a specific way during the equilibrium test, it didn't work for anyone. Lastly, we found a spot in our vision where we can't see well, called a blind spot, and also checked how clearly we can see, finding a slight difficulty for some.

Conclusion: After doing all the tests, we learned some important things. Our sense of touch works well, as we could tell two points apart on our skin. We can also tell if something is hot or cold, showing our skin senses work fine too. Smelling scents were different for each of us; some smells lasted longer for some people. Hearing was a bit hard for some of us, which means we might need to check our hearing more. Our sense of balance (equilibrium) didn't respond as expected during the test, which could mean something isn't quite right there. We have a spot in our vision where things aren't clear, but this is normal. Overall, these tests help us understand how our senses work and if we might need to take extra care of some of them.

2-G Measurement of differential permeability of sugar and starch



Discussion: In conclusion, the series of experiments delved into fundamental biological processes, yielding valuable insights. The investigation of diffusion through liquids unveiled the temperature's impact on diffusion rates, with a constructed graph illustrating the relationship. Diffusion through agar highlighted the role of molecular properties in varying diffusion rates. The filtration experiment underscored how solution thickness affects filtration dynamics. Osmosis experiments provided a comprehensive view of water movement across membranes, emphasizing osmotic equilibrium. Differential permeability insights elucidated membrane selectivity. Lastly, the tonicity experiment demonstrated cellular responses to different solutions. Collectively, these experiments contribute significantly to understanding diffusion, osmosis, filtration, and cellular behaviors under varying conditions, spanning implications across scientific, medical, and engineering domains.

Conclusion: In conclusion, the experiments delved into diffusion, osmosis, filtration, and tonicity. These investigations shed light on temperature's effect on diffusion, filtration dynamics, water movement in osmosis, and the impact of tonicity on red blood cells. Collectively, they provide valuable insights into fundamental biological processes and their underlying principles.