

Lab 6/7- Sensory Physiology

Purpose:

The purpose of the study was to perform a series of exercises that measured the capabilities of our sensory systems. The three basic components of the nervous system are Receptors, that generate impulses in response to environmental stimuli, Sensory neurons, relay messages through the pathways of CNS, and interpretation centers of the cerebral cortex that translate these impulses into sensation.

Procedure:

6/7-A: Tests of cutaneous sensationA-1: Two-point discrimination.

The ability to distinguish two distinct points on the skin surface will be recorded.

Procedure1. 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 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. back of hand. fingertips. outer edge of the lips. back of neck. Have your partner repeat this experiment on your skin. 6. Interpret the results you have obtained.

A-2: Accommodation of thermoreceptors.

Accommodation, or sensory adaptation, occurs when receptors generate fewer impulses during constant stimulation. Accommodation of cutaneous thermoreceptors will be recorded.

Procedure1. Place your left fingers in 15°C water and your right fingers in warm water (37°C) and record the sensation of each. Keep hands immersed for 2 minutes. 2. After two minutes, describe the sensation in each hand. 3. Remove hands and promptly place them both in 25°C water. Describe the immediate sensation in each hand.

6/7-B: Olfactory adaptation.

The adaptation of olfactory chemoreceptors will be timed.

Procedure1. Block your left nostril. Uncork and hold the bottle of camphor oil under your nose until you can no longer detect the camphor. Do not consciously sniff the contents of the vial! Record the adaptation time. 2. Remove the camphor and place the bottles of cloves, then peppermint oil under your nose. Distinguish the smells of cloves and peppermint oil. 3. Uncork and hold the bottle of camphor under your nose again until the smell is no longer recognized. Record this second adaptation time. 4. Unblock your left nostril to determine if the camphor is detected. 5. Interpret these results.

6/7-C: Auditory measurements

Sound is measured in terms of amplitude (decibels –dB) and frequency (Hertz –Hz). Tuning fork tests and an audiometer will be used to evaluate auditory function. C-1: Tuning fork tests utilize the principle of bone conduction to directly vibrate the cochlear hair cells. They should be done in a quiet room for most reliable results.

1. Rinne's test (checks for middle ear damage) Procedure
 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.
 4. Reappearance of the sound indicates no middle ear damage.
 5. Repeat the test with your left ear.
 6. Record the results for each ear.

E-4: Color-blindness test

Color blindness is a genetic abnormality that is carried by the X chromosome. (See page 45.) The most common form is red-green color blindness, wherein one or the other pigment or sometimes both from the respective cone is in small amounts or lacking altogether. Several versions of the test for color blindness are available. In this laboratory, you will be using the Ichikawa color blindness charts Procedure
 1. Obtain the Ichikawa color blindness charts.
 2. Attempt to read the numbers of each pattern on the test panels. (There are some "practice" panels before the actual test panels begin.)
 3. After the first 10 test panels, if your score indicates color blindness, continue with the next five test panels to determine which color deficiency exists.
 4. Record your results on the worksheet on page 46.

E-5: Perimetry

The arrangement of rods and cones in the retina is not random. Using objects of different colors, you will map the locations of the cones in your retina for one eye.

Procedure
 1. Seat yourself before the perimeter board with your right eye at the edge of the semicircle. Cover your left eye. Stare at the center line.
 2. Your lab partner will introduce several different colored blocks into your field of vision. Identify these blocks by color. Do not take your eye from the center of the chart or uncover your left eye.
 3. Your partner will record the degree at which the colors were discriminated on the perimetry score sheet on page 47.
 4. Repeat these procedures for each block for both the horizontal and vertical perimetry charts. Record the data and connect the same-colored dots to form an outline of cone placement of your right eye on your data sheet.
 5. Explain these results in regard to cone placement in your retina.

Results:

A-1: Two-Point discrimination:

Area of Skin	Mm in which two-point is discerned
a. Palm of hand	13mm
b. Back of hand	18mm
c. fingertip	1 mm
d. back of neck	36mm

A-2: Accommodation of Thermoreceptors:

	Right hand	Left hand	Both hands
Water Temp	37° C	15° C	25° C
Time Elapsed	2 min	2 min	2min
Sensation	warm	Cold	Right hand was cold, Left hand was warm

6/7- B: Olfactory Adaption:

Essential oil	Time chemoreceptors adapted to scent
Camphor oil	50 sec
Camphor oil + Peppermint Oil	20 Sec

C-1: Tuning fork Test:

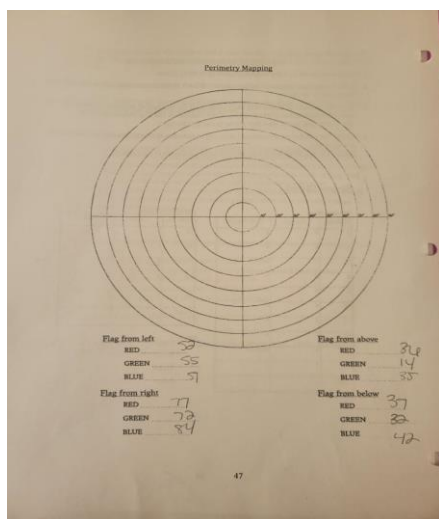
The results and the interpretation of this experiment were that neither I nor my partner have middle ear damage. We both heard the reappearance of the sound.

E-4: Color Blind Test

1. 12
2. 8
3. 6
4. 29
5. 57
6. 5
7. 3
8. 15
9. 74
10. 2
11. 6
12. 97
13. 45
14. 5
15. 7
16. 16
17. 73

18. No numeral
19. No numeral
20. No numeral
21. No numeral
22. 26
23. 42
24. 35
25. 96
26. Easy to follow
27. Easy to follow
28. Unable to trace
29. Unable to trace
30. Easy to follow
31. Easy to follow
32. Easy to follow
33. Easy to follow
34. Easy to follow
35. Easy to follow
36. Easy to follow
37. Easy to follow
38. Easy to follow

E-5: Perimetry



Discussion: I think this was one of the most exciting labs we have done in the class. There was such a huge variety of exercises that we were able to choose from. It was also interesting to see how our sensory physiology worked in real life.

Conclusion: Based on the data and the tests that were conducted, we can conclude the importance of sensory information and how it effects our daily lives. In this study we were able to really see how Receptors, Sensory Neurons, and Interpretation centers function.