

Tactile Sensation: How The Human Body Senses Touch Neuroscience Teaching Team

Introduction

In this lab, students will be introduced to the somatosensory system, the sense of touch, and the sensory homunculus using the 2-point discrimination test.

Materials

Quantities provided are per 2 students/demonstration.

Pair of calipers

Ruler

Pencil and paper

Methods/Protocol

1. Ask students to get in pairs. One student in each pairing should roll up their sleeves, if they are not already wearing short sleeves, so that their forearms are exposed.
2. The other student in the pairing will take a pair of calipers and spread the tips far apart. Lightly touch both tips of the caliper to the other student's forearm simultaneously. Ask if the student feels two distinct points on their skin.
3. Next, the student with their sleeves rolled up will close their eyes and the student holding the calipers will perform the same task again, asking if the other student can still feel two distinct points.
4. Decrease the distance between the caliper tips until the student with their sleeves up says they can no longer discriminate between the two points. Have the student write down the caliper distance at which only one point is detected on their worksheet.
5. Try this on other parts of the body, such as fingers, back, neck, cheek, or leg. Write down the one-point detection distance for each body region on the worksheet, then switch partners.
6. Once everyone has completed the activity, calculate the classroom's average minimum distance for each body part.

Discussion Questions

1. Were there differences in the one-point detection distances you recorded between you and your partner? Why might this be?
2. What does the sensitivity of the skin have to do with the brain? Can this sensitivity change?
3. Based on what you learned in this lab, what areas of our bodies are most sensitive to touch?



The Young Scientist Program Teaching Teams Manual

Division of Biology & Biomedical Sciences
Washington University in St. Louis

Student Worksheet: Two-Point Discrimination

1. Measure and record the minimum distance between pins for each body region where you can distinguish two separate points while blindfolded

Body Area	Your Minimum Distance (in mm)	Class Minimum Distance (in mm)
Fingers		
Back		
Neck		
Cheek		
Palm		
Leg		

2. Does the threshold distance differ from one region to another? If so, why might this occur?

3. Are there differences in sensitivity between people? If so, how might this occur?

4. What could cause one person's sense of touch to be decreased?

5. What is a receptive field and how does it relate to the representation of a body area in the brain?

6. Why would different body regions have larger or smaller representations in the brain?