

The Little Man Inside of Your Brain

Purpose:

To make kids aware of the existence and importance of sensory receptors and their nerve connections to the brain. To demonstrate the level of sensitivity in a region of skin is proportional to the density of these receptors. To show that the density of receptors in a particular part of the body dictates the amount of area in the somatosensory cortex that is devoted to this region of the body.

Materials:

5-6 different grades of sandpaper, stopwatch, 4 bandanas, 1 thin cotton glove, 1 latex glove, lego blocks, cardboard, hot glue gun and glue, poster board with homunculus picture, simple diagram of sensory receptor connection to the brain.

Procedure:

To begin the demonstration, we will give a brief introduction to sensory receptors and the role they play in our sense of touch. We will discuss where these receptors are located and, using our simple diagram of the relay pathway from receptor to the brain, show how they are connected to the brain. We will then explain that the level of sensitivity in different parts of our body is determined by the number of receptors in the area.

The setup for the first exercise will include 4 sets of 6 different graded sandpaper samples each measuring about 2in. X 2in. We will divide the kids into 3 groups. Each group will be asked to place the samples in order of increasing coarseness using a designated part of their body (ie. Fingertips, forearm, and leg). The time it takes each group to correctly order the samples will be recorded, compared and discussed.

For the second exercise, we will use pieces of cardboard with lego-blocks glued in random orders to their surfaces. All children involved in this portion of the demonstration will be blindfolded. One child will be asked to identify how many bumps he can feel, using his bare hand. A second child will be asked to perform the same task but will be wearing a latex glove. A third child will also perform the task while wearing a thin cotton glove. The number of bumps reported by each will be recorded, compared, and discussed.

Issues:

For this demonstration, we will explain sensory receptor connections to the brain as simple pathways. The pathways are more complex than this. The somatosensory cortex has other functions besides receiving sensory input, but this information will be withheld from the children in to prevent us from confusing them. There are different types of sensory receptors (ie. Pacinian corpuscles, Merkel's Disks, etc.) but we will group all receptors into a general classification.

Lesson Plan:

Children will learn different parts of their bodies have a higher density of receptors than others therefore increasing sensitivity to touch in these areas. In turn, more sensory information is sent to the brain from these regions. Also, when sensory receptors are blocked, it is harder for the receptors to work optimally. We will conclude the demonstration with a question and answer period. The children will be assessed by asking things like "Are there more receptors in your hand, arm, or leg?" and "Which of these regions sends more information to the brain?" Finally, we will show a poster with a picture of the homunculus to confirm their hypotheses.