

UNMASKING SKIN

A

If you took off your skin and laid it flat, it would cover an area of about twenty-one square feet, making it by far the body's largest organ. Draped in place over our bodies, skin forms the barrier between what's inside us and what's outside. It protects us from a multitude of external forces. It serves as an avenue to our most intimate physical and psychological selves.

B

This impervious yet permeable barrier, less than a millimetre thick in places, is composed of three layers. The outermost layer is the bloodless epidermis. The dermis includes collagen, elastin, and nerve endings. The innermost layer, subcutaneous fat, contains tissue that acts as an energy source, cushion and insulator for the body.

C

From these familiar characteristics of skin emerge the profound mysteries of touch, arguably our most essential source of sensory stimulation. We can live without seeing or hearing – in fact, without any of our other senses. But babies born without effective nerve connections between skin and brain can fail to thrive and may even die.

D

Laboratory experiments decades ago, now considered unethical and inhumane, kept baby monkeys from being touched by their mothers. It made no difference that the babies could see, hear and smell their mothers; without touching, the babies became apathetic, and failed to progress.

E

For humans, insufficient touching in early years can have lifelong results. "In touching cultures, adult aggression is low, whereas, in cultures where touch is limited, adult aggression is high," writes Tiffany Field, director of the Touch Research Institutes at the University of Miami School of Medicine. Studies of a variety of cultures show a correspondence between high rates of physical affection in childhood and low rates of adult physical violence.

F

While the effects of touching are easy to understand, the mechanics of it are less so. "Your skin has millions of nerve cells of various shapes at different depths," explains Stanley Bolanowski, a neuroscientist and associate director of the Institute for Sensory Research at Syracuse University. "When the nerve cells are stimulated, physical energy is transformed into energy used by the nervous system and passed from the skin to the spinal cord and brain. It's called transduction, and no one knows exactly how it takes place." Suffice it to say that the process involves the intricate, split-second operation of a complex system of signals between neurons in the skin and brain.

G

This is starting to sound very confusing until Bolanowski says: "In simple terms, people perceive three basic things via skin: pressure, temperature, and pain." And then I'm sure he's wrong. "When I get wet, my skin feels wet," I protest. "Close your eyes and lean back," says Bolanowski.

H

Something cold and wet is on my forehead – so wet, in fact, that I wait for water to start dripping down my cheeks. "Open your eyes." Bolanowski says, showing me that the sensation comes from a chilled, but dry, metal cylinder. The combination of pressure and cold, he explains, is what makes my skin perceive wetness. He gives me a surgical glove to put on and has me put a finger in a glass of cold water. My finger feels wet, even though I have visual proof that it's not touching water. My skin, which seemed so reliable, has been deceiving me my entire life. When I shower or wash my hands, I now realize, my skin feels pressure and temperature. It's my brain that says I feel wet.

I

Perceptions of pressure, temperature and pain manifest themselves in many different ways. Gentle stimulation of pressure receptors can result in ticklishness; gentle stimulation of pain receptors, in itching. Both sensations arise from a neurological transmission, not from something that physically exists.

Skin, I'm realizing, is under constant assault, both from within the body and from forces outside. Repairs occur with varying success.

J

Take the spot where I nicked myself with a knife while slicing fruit. I have a crusty scab surrounded by pink tissue about a quarter inch long on my right palm. Under the scab, epidermal cells are migrating into the wound to close it up. When the process is complete, the scab will fall off to reveal new epidermis. It's only been a few days, but my little self-repair is almost complete. Likewise, we recover quickly from slight burns. If you ever happen to touch a hot burner, just put your finger in cold water. The chances are you will have no blister, little pain and no scar. Severe burns, though, are a different matter.

Questions 1-4

The passage has 10 paragraphs A–J. Which paragraph contains the following information?

Answer the questions below by writing the correct letters, A-J, in boxes 1-4 on your answer sheet.

1. the features of human skin, on and below the surface
2. an experiment in which the writer can see what is happening
3. advice on how you can avoid damage to the skin

4. cruel research methods used in the past

Questions 5 and 6

Choose the correct letter, A, B, C or D from the following questions and write your answers in boxes 5 and 6 on your answer sheet.

5. How does a lack of affectionate touching affect children?

A It makes them apathetic.

B They are more likely to become violent adults.

C They will be less aggressive when they grow up.

D We do not really know.

6. After the 'wetness' experiments, the writer says that

A his skin is not normal.

B his skin was wet when it felt wet.

C he knew why it felt wet when it was dry.

D the experiments taught him nothing new.

Questions 7–11

Complete each sentence with the correct ending A–I from the box below. Write the correct letter A–I in boxes 7–11 on your answer sheet.

7. Touch is unique among the five senses

8. A substance may feel wet

9. Something may tickle

10. The skin may itch

11. A small cut heals up quickly

- A because it is both cold and painful.
- B because the outer layer of the skin can mend itself.
- C because it can be extremely thin.
- D because there is light pressure on the skin.
- E because we do not need the others to survive.
- F because there is a good blood supply to the skin.
- G because of a small amount of pain.
- H because there is a low temperature and pressure.
- I because it is hurting a lot.
- J because all humans are capable of experiencing it.

Questions 12-14

Do the following statements agree with the information given in Reading Passage 107?

In boxes 12-14 on your answer sheet, write:

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

12. Even scientists have difficulty understanding how our sense of touch works.

13. The skin is more sensitive to pressure than to temperature or pain.

14. The human skin is always good at repairing itself.

ANSWER
1. B 2. H 3. J 4. D 5. B 6. C 7. E 8. H 9. D 10. G 11. B 12. TRUE 13. NOT GIVEN 14. FALSE