

The Sense of Touch

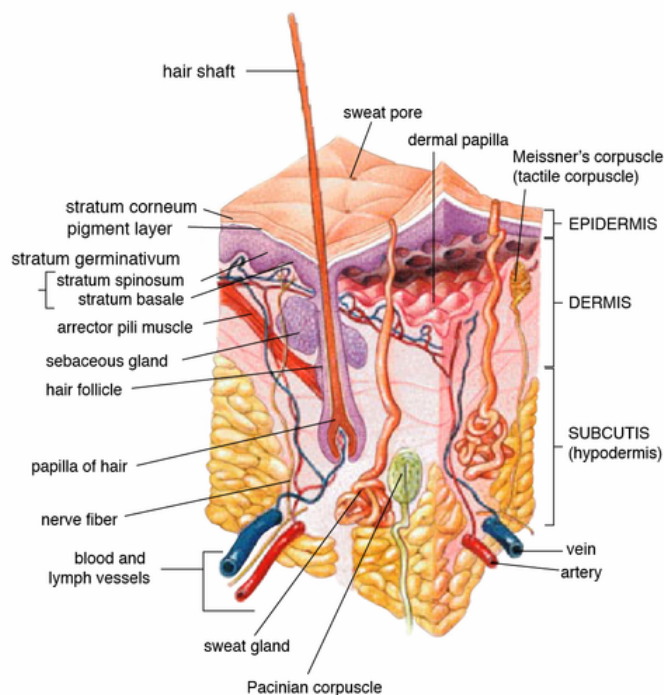
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Touch is one of the traditional five senses, along with hearing, sight, smell, and taste. Touch is one of the first senses developed and occurs across the whole body. A network of neural structures in the brain and body produces the sense of touch. It is activated when internal organs sense physical stimuli such as pressure on or contact with the skin. These signals are combined with feedback from muscles and tendons as we actively move and explore the world around us. Touch can produce a positive or negative reaction depending on the type of touching. The types of touch are many. It can be a soothing touch, a healing massage, an affectionate hug or embrace, a brush from a spider web, a mosquito bite, a violent punch, a burn, or a cut.

Skin, the body's largest organ, is the main organ involved in the sense of touch. It consists of three main layers of tissue: The outer epidermis, middle epidermis, and inner hypodermis.



Receptor Cells

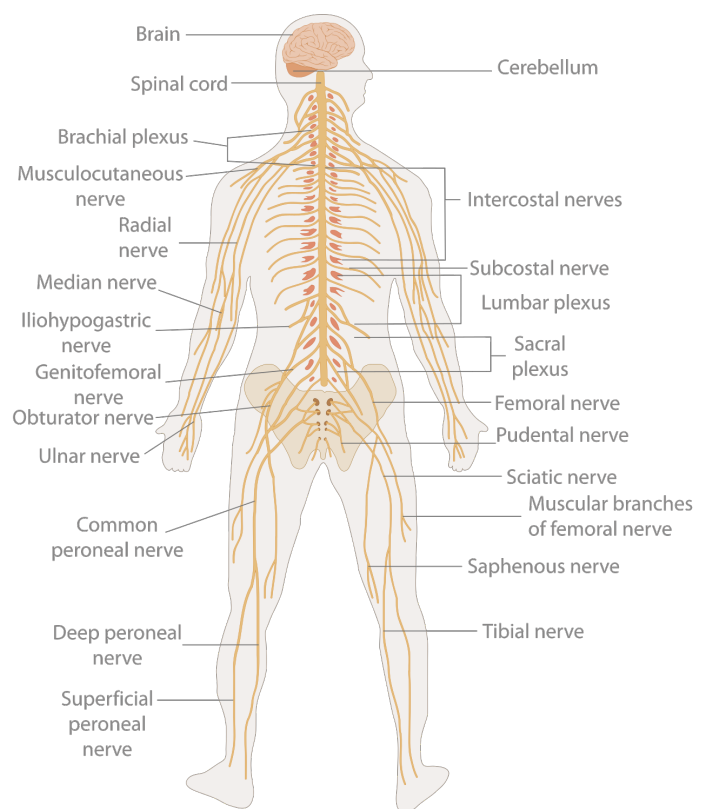
Within these three layers are specialized receptor cells that detect tactile sensations and relay signals through peripheral nerves toward the brain.

There are four mechanoreceptors in the skin that each respond to different stimuli for short or long periods. Each of the different types of receptors makes certain body parts more sensitive.

Merkel cells are in the lower/basal epidermis of lips, hands, fingertips, external genitalia, and hair follicles. They react to low vibrations (5-15 Hz)

Tactile corpuscles or Meissner corpuscles are in the upper dermal papillae of hairless skin, primarily in the fingertips, lips, nipples, and soles of feet. Both of these receptors detect touch, pressure, and vibration. They react to moderate vibration (10-50 Hz) and light touch. Unlike Merkel's nerve endings, they respond in quick action potentials. They are responsible for the ability to read Braille and feel gentle stimuli.

Pacinian corpuscles are larger and fewer in number than Meissner's corpuscles and are oval-cylindrical-shaped. They are on hair and hairless mammalian skin, viscera, joints, and the periosteum of bone. They are primarily responsible for sensitivity to vibration and pressure. Their endings of specialized nerves feel pain, itch, and tickle. They are wrapped by a layer of connective tissue and encapsulated with myelinated nerve endings, surrounded by Schwann cells. Its capsule consists of 20-60 concentric lamellae, including fibroblasts and fibrous connective tissue, separated by gelatinous material, more than 95% of which is water. It presents a whorled pattern on micrographs. Schwann cells are involved in many different peripheral nerve biology, such as the conduction of nerve development, regeneration, trophic support for neurons, production of the nerve, extracellular matrix, modulation of neuromuscular synaptic activity, and presentation of antigens of antigens to T-lymphocytes. Schwann cells form the myelin sheath and support nerve regeneration.



The vertebrate's nervous system relies on the myelin sheath for insulation and decreasing membrane capacitance in the axon. Pacinian corpuscles can even sense vibrations centimeters away. Their optimal sensitivity is 256 Hz.

Bulbous corpuscles or Ruffini endings/corpuscles are slow-adapting mechanoreceptors in the cutaneous tissue between the dermal papillae and the hypodermis. These spindle-shaped receptors are sensitive to skin stretch and contribute to the kinesthetic sense of and control of finger position and movement. Their highest density is around the fingernails, monitoring slippage of objects along the skin surface and allowing grip modulation of an object. Ruffini endings register mechanical deformation (angle change) within joints (up to 2.75 degrees) and act as thermo-receptors that respond for a long time. In deep burns, there is no pain as these receptors burn off.

Skin is not the only organ involved in touch experiences. Haptic touch involves receptors located in muscles, joints, and tendons. Proprioceptors process sensory

information from muscles and joints but work with the skin to coordinate movements.

Three Different Types of Touch

A Light touch is protective because it keeps us safe and responds immediately. Light touch can include tickling, a mosquito, or a spider web. It also can be something hot or something that hurts like a thorn. The light touch pathway responds immediately, but the information is not specific.

Discriminative touch provides specific and detailed information about what you are touching or where. This pathway will tell the brain what touched the skin and how it felt. From a previous experience, the brain could figure out what it was and what to do about it. This pathway is vital for accurate and precise fine motor skills and motor planning or praxis development.

Touch pressure, **or deep touch pressure** is a firmer touch or a squeeze and works alongside the discriminative touch pathway. A good example is when you receive a hug. The discriminative touch pathway identifies where you are touched and how hard you are squeezed. This sensation is called touch pressure. Another example is if you wear tight pants or cover yourself with a heavy blanket.

Touch Sensitivity

Some people can be very sensitive to touch, while others are the opposite and do not feel much pain. Much depends on how well-nourished a person is or was as a growing child.

Dyspraxia (difficulty in performing coordinated movements) is often associated with a neurodevelopmental condition in children (developmental coordination disorder). A deficiency or imbalance in the essential fatty acids, especially omega-3, is a major cause of poor neurodevelopment. Environmental toxins or vaccines are other causes.

Touch is Vital for Babies and Growing Children

Touch is vital for a baby's growth, nerve, brain, and motor development. The more a baby is soothed and pampered with touch, the better the child will grow and develop physically, mentally, and emotionally. In addition to growth and development, touching along with good nutrition is essential for a child's motor skills and learning (e.g., holding a pencil, opening lunch boxes, doing up buttons, cutting with scissors, playing sports, etc.). Stay-at-home mothers are better able to provide more affectionate touching for their babies and growing children. Children of working mothers are often deprived of the vital sense of touch and do not grow or develop very well. This deprivation is also common in large families or war-torn areas.

Adults Also Need the Sense of Touch

Who does not love or feel the benefits of a big hug, a romantic touch, or a nice massage? Hugs can indicate support, comfort, emotional warmth, joy or happiness, and affection beyond words. Hugging and touching have many benefits. Studies have shown that 20-second or longer hugs increase oxytocin and reduce blood pressure. Oxytocin can also help people withstand stress, increase emotional empathy, and enhance communication among individuals. Perhaps, hugging or

cuddling is a healthier way to lower blood pressure. Hugging and touch also reduces the release of the stress hormone cortisol. Imagine the reduction in all the ill health and mental symptoms if doctors prescribed touch therapies instead of all the stress-related drugs with all their nasty side effects.

There are many different types of massage therapies. Each of them has their merit. When humans lovingly touch each other, it produces feelings of affection, gratitude, sympathy, or love. Holding hands, kissing, caressing, and sexual activity has many benefits. It reduces stress hormones. Touch can also arouse emotions which in turn, makes the body secrete hormones and fluids in preparation for sex.

Cuddling is more affectionate than hugging. It is a form of physical intimacy in which two people hold one another for an extended period. Cuddling can be with family members, friends, or lovers. Cuddling is two people lying down together in an intimate manner. Cuddling also makes the body release oxytocin, which has numerous beneficial effects. Perhaps cuddling should be prescribed for people with high blood pressure, depression, and anxiety. Could this competition (cuddling vs drugs) be why various medications cause a sense of touch and sex drive loss?

Seniors are particularly affected because many have lost their partners. Also, many are heavily medicated, which numbs the senses even more. If you are taking medication, find natural remedies for whatever ails you, and ask your doctor or health practitioner to help wean you off medications. All drugs have long-term side effects that weaken or destroy your senses.

Loneliness in isolation also numbs the senses. A report from Harvard researchers wrote that "...a culprit in a whole slew of problems, including depression, anxiety, substance abuse, heart disease, and domestic abuse—problems appeared more than ever during the pandemic."

Cuddle therapy and sessions are becoming more prevalent. But can interpersonal touch be therapeutic for everybody? [Anik Debrot, PhD](#), a psychotherapist and a professor at the University of Lausanne in Switzerland, tells Verywell that current research says yes—with conditions. "There's a lot of evidence showing a link between touch and well-being. Physical touch can lower stress and blood pressure and foster positive emotions, but usually when it comes from someone familiar." She adds, "Cuddle therapy could sometimes help victims of domestic violence reintegrate touch into their lives healthily and respectfully."

So, don't wait for Valentine's Day or a special occasion. Shower those you love with a big hug, a warm embrace, a nice massage, or a heart-warming cuddle. Couples would be happier and healthier if they set aside time each day or each week to enjoy and reap the benefits of the sense of touch. Happy couples usually live longer and are healthier into old age. If you don't have a suitable partner, treat yourself to a nice massage or yoga class, hug your friends, and learn how to stimulate and enjoy the sense of touch on your body.