Canine Tactile Hairs

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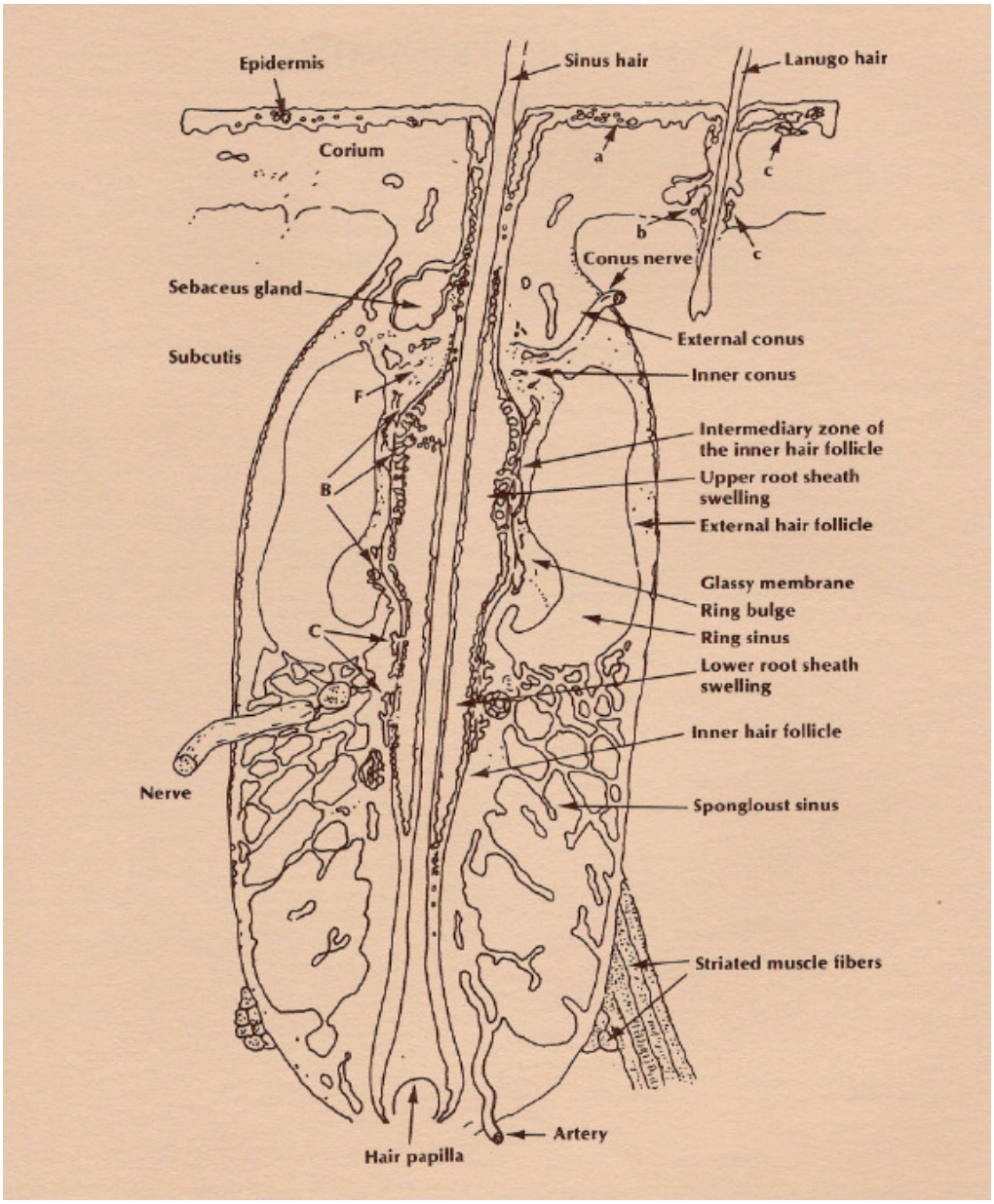
Tactile hairs, also called sinus hairs and vibrissae but better known as whiskers, are long, thick, broadly spaced hairs on the muzzle and forehead of dogs and many other animals. They are different from the other hairs on a dog's body. For one, they are stiffer and implanted more deeply—three times deeper than ordinary hairs. And two, the tactile hairs are more sensitive to touch and vibrations. [1] In fact "vibrissa" derives from the Latin word, *vibrio*, meaning "to vibrate." But it is not the hair itself that feels the sensation.

When the whisker senses a nearby object, the vibrations from it travel down the hair to the follicle. [2] The tactile hair follicle has a blood-filled cavity between the outer and the inner layers of the follicle lining, or dermal sheath. While the upper portion of the sinus contains only blood and is not composed of connective tissue, the lower portion contains trabeculae, which are strands of connective tissue that bridge the cavity to constitute part of its framework. Many nerves pierce the external dermal sheath and branch into the trabeculae and inner dermal sheath. Vibrations picked up by the hair are then magnified by the blood filled sinus and transferred by the nerves to provide the brain with specific information about the dog's surroundings.[3]

Because of these vibrissae, dogs do not even have to make physical contact with surfaces to know where they are. The vibrissae serve as an early warning device that helps prevent colliding with walls and objects, and keep approaching objects from damaging the dog's face and eyes.[4] Vibrissae are sensitive to vibrations in air currents, as well. As air moves around the dog, the vibrissae vibrate. These vibrations are translated by the dog's brains into an awareness of the presence, size and shape of nearby objects without having even touched them. [5]

Studies have observed how a dog's brain responds to its sense of feeling. Of the areas of the brain that register touch, nearly 40 percent of that area is solely touch information from the face. Of that 40 percent, an extremely large part comes from the upper jaw, where the vibrissae are located. Further, it has been recorded that each one of the individual vibrissae can be mapped to a specific location in the dog's brain, suggesting the importance of the sensory information being received from these hairs.

Dogs have frequently had their vibrissae cut for show performance over the years to give their heads a smoother look. But cutting these hairs reduces the dogs' ability to fully observe their close surroundings.[6] There have been several reports of show dogs repeatedly encountering eye and facial injuries upon having their vibrissae cut, only to have no more incidents upon the hairs' regrowth.[7] Removal itself, though, is not painful to the dog, since the hair's nerve endings are far below the surface of the skin. Presently, some breed standards are changing the practice of cutting dogs' tactile hair and are even prohibiting the practice as it falls out of favor. [8]



The sinus hair (left) is a vibrissae; the Lanugo hair (right) is a normal body hair. Note the size of the sensory nerve entering the vibrissa root to the left, plus the second nerve entering the top right. Reprinted from Andres, K. H., and von During, M. "Morphology of Cutaneous Receptors" in Handbook of Sensory Physiology, Vol. 2, p. 24: Springer-Veriag, New York, 1973.[9]

Endnotes

[1]Wells, Virginia. "Structure and Function of the Whiskers in Dogs - Page 1." Pet Place - Pet Care - Pet Names - Pet Health. http://www.petplace.com/dogs/structure-and-function-of-the-whiskers-in-dogs/page1.aspx (accessed March 19, 2013).

[2]Fuller, Mary. "Why Do Pets Have Whiskers?." Pet Health | The Internet's Premier Pet Health Resource | Find a Veterinarian. http://www.vetstreet.com/our-pet-experts/whats-the-deal-with-whiskers (accessed March 16, 2013).

[3]Kwan, Paul. "136 Histology, Full Year Course 2004-2005 - Tufts OpenCourseWare." Index - Tufts OpenCourseWare. http://ocw.tufts.edu/Content/4/imagegallery/221105/221119 (accessed March 19, 2013).)

[4]Coren, Stanley. "Why Do Dogs Have Whiskers." *Psychology Today*. http://www.psychologytoday.com/blog/canine-corner/201109/why-do-dogs-have-whiskers (accessed March 16, 2013).

[5] Wells

[6] Coren

[7] McGill, Thomas. "Whisker" Trimming in Show Dogs: a harmless cosmetic procedure or mutilation of a sensory system." Win'Weim Weimeraners. www.winweim.com/images/whiskers.pdf (accessed March 12, 2013).

[8] Chester, Jo. "What Happens to Dogs When They Have Their Whiskers Snipped? | Dog Care - The Daily Puppy." Dog Care - The Daily Puppy. http://dogcare.dailypuppy.com/happens-dogs-whiskers-snipped-1921.html (accessed April 23, 2013).

[9] McGill