動物生理学 III　Handout No. 13

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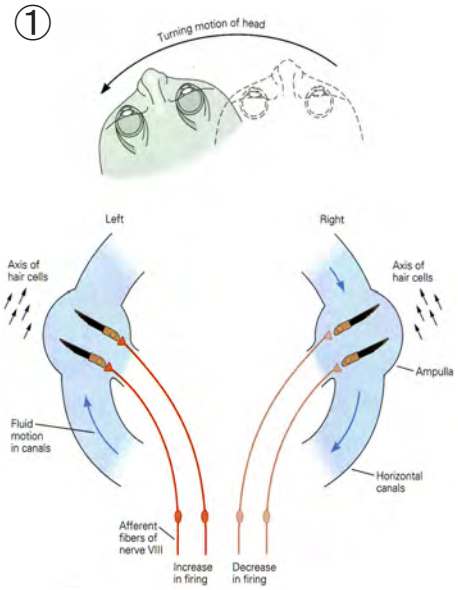

Figure 40-7 This view of the horizontal semicircular canals from above shows how the paired canals work together to signal head movement. Because of inertia, rotation of the head in a counterclockwise direction causes endolymph to move clockwise with respect to the canals.This reflects the stereocilia in the left canal in the excitatory direction, thereby exciting the afferent fibers on this side. In the right canal the hair cells are hyperpolarized and afferent firing there decreases.

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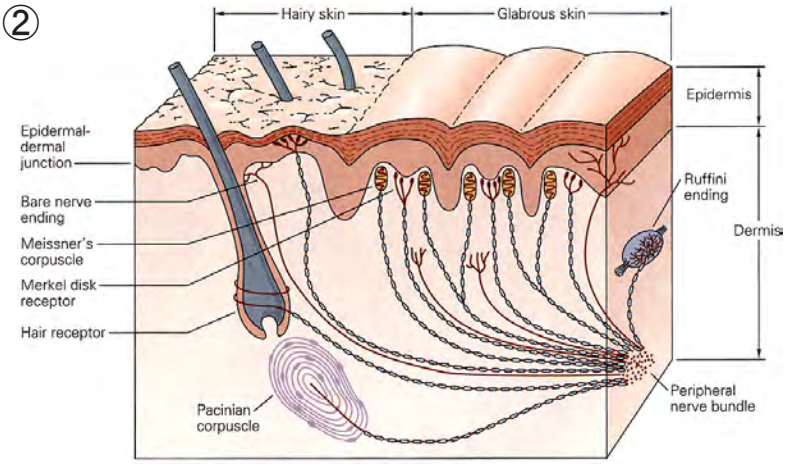

Figure 22-2 **The location and morphology of mechanoreceptors in hairy and hairless (glabrous) skin of the human hand.** Receptors are located in the superficial skin, at the junction of the dermis and epidermis, and more deeply in the dermis and subcutaneous tissue. The receptors of the glabrous skin are Meissner's corpuscles, located in the dermal papillae. Merkel disk receptors, located between the dermal papillae and bare nerve endings. The receptors of the hairy skin are hair receptors, Merkel's receptors (having a slightly different organization than their counterparts in the glabrous skin), and bare nerve endings. Subcutaneous receptors, beneath both glabrous and hairy skin, include Pacinian corpuscles and Ruffini endings. Nerve fibers that terminate in the superficial layers of the skin are branched at their distal terminals, innervating several nearby receptor organs; nerve fibers in the subcutaneous layer innervate only a single receptor organ. The structure of the receptor organ determines its physiological function.

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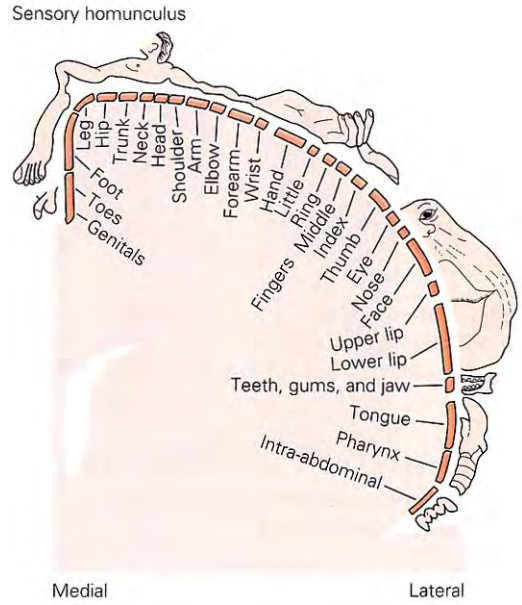

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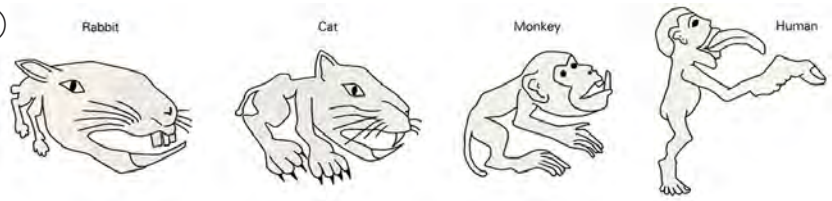

Figure 20-5 **Different species rely on different parts of the body for adaptive somatosensory information.** These drawings show the relative importance of body regions in the somatic sensibilities of four species, based on studies of evoked potentials in the thalamus and cortex.

Figure 20-4 **Somatic sensory and motor projections from and to the body surface and muscle are arranged in an orderly way in the cortex.** The sensory map illustrated here is for Brodmann's area 1 in the postcentral gyrus of the parietal cortex. Each area within the somatosensory cortex (areas 3a, 3b, 1, and 2) contains a full representation of the body (see Figure 20-5). Parts of the body that are important for tactile discrimination, such as the tip of the tongue, the fingers, and the hand, have disproportionately large representations reflecting greater degrees of innervation. (Adapted from Penfield and Rasmussen 1950.)

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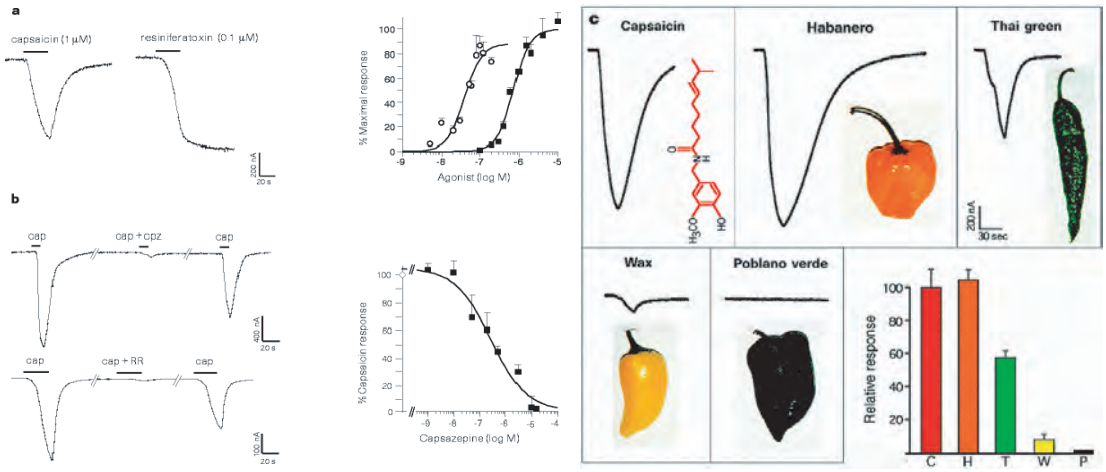

Figure 2 **VR1 responds to purified vanilloids and pepper extracts**. **a,** Activation of VR1 by capsaicin and resinferatoxin. Left, agonists were applied sequentially to the same Xenopus oocyte expressing VR1. Membrane currents were recorded in the whole-cell voltage-clamp configuration. Bars denote duration of agonist application. Right, concentration-response curve for capsaicin (filled squares) and resiniferatoxin (open circles). Membrane currents were normalized in each oocyte to a response obtained with 1 μM capsaicin and expressed as a percent of maximal response to capsaicin. Each point represents mean values (±s.e.m.) from five independent oocytes. The Hill equation was used to fit the response data. **b,** Antagonism by capsazepine (cpz) and ruthenium red (RR). Current tracing at top left shows reversible block of capsaicin (cap; 0.6 μM) response by capsazepine (cpz; 10 μM) after 2 min pretreatment. Slash marks represent washout periods of 2 and 3min, respectively (n = 3). A capsazepine inhibition curve is shown to the right fn = 4 independent oocytes for each point). Current responses were normalized to that elicited by capsaicin alone in each oocyte. (0.6 μM, open diamond). Current tracing at bottom left shows reversible block of a capsaicin (0.6 μM)-evoked response by ruthenium red (RR; 10 μM). Slash marks denote washout periods of 2 and 12 min, respectively (n = 3). **c,** Responses to capsaicin (10 μM) and extracts derived from four varieties of peppers in oocytes expressing VR 1(30 s application). Bottom right, relative potencies of each pepper extract are plotted (mean ± s.e.m., n = 3). Values were normalized in each cell to responses obtained with capsaicin (10 μM). Extracts evoked no responses in water-injected cells. Reported pungencies for pepper varieties (in Scoville units) are: Habanero (H), 100,000-300,000; Thai green (T), 50,000-100,000; wax (W), 5,000-10,000; and Poblano verde (P), 1,000-1,500 (ref. 23). Capsaicin (C) is rated as 16 x 10^6 units.