

MSS MODULE 2023

HISTOLOGY

SKIN HISTOLOGY

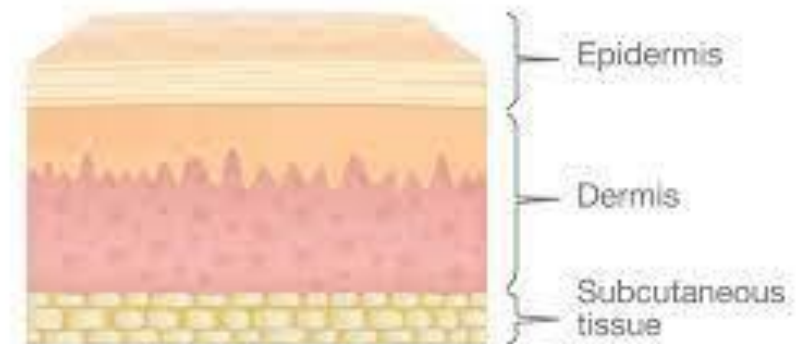
Dr AMAL ALBTOOSH

و ما نيل المطالب بالتمني...
ولكن تؤخذ الدنيا غلابا...
**you don't get what you
wish for. You get what
you work for.**

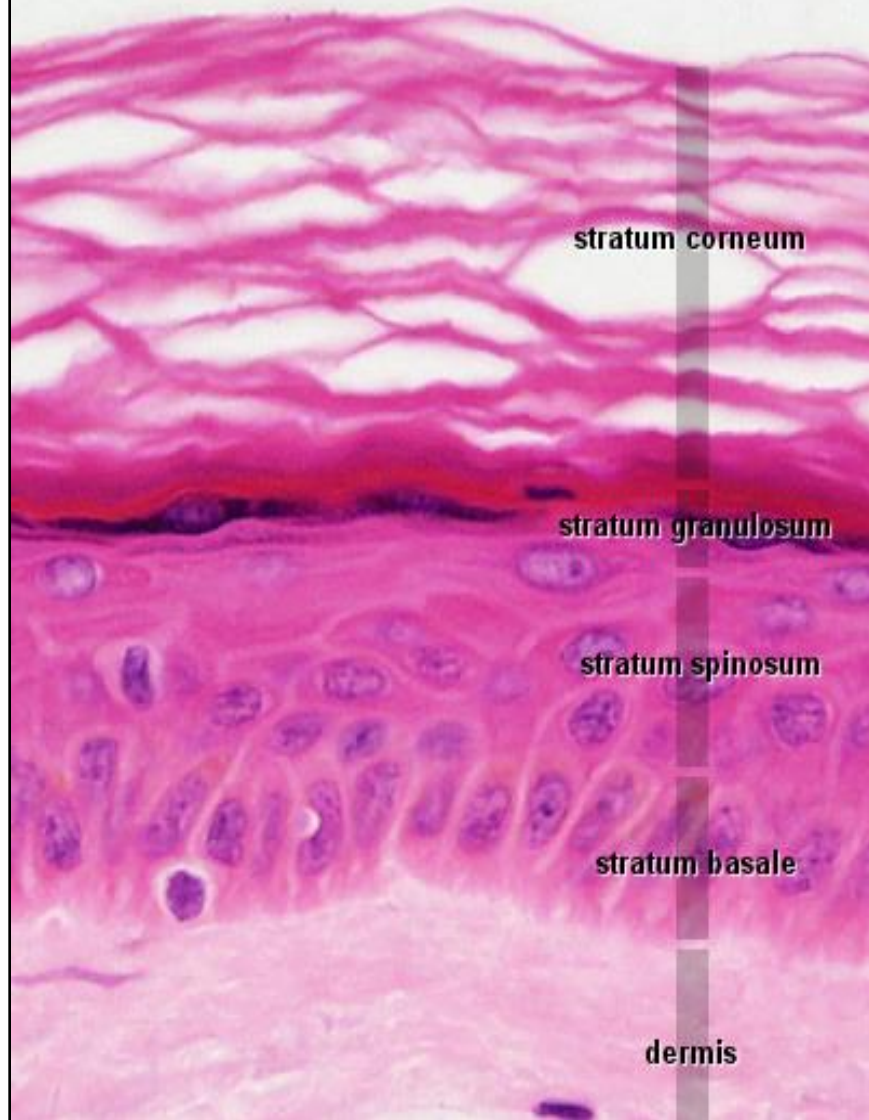
Skin structure

- Skin is composed of TWO primary layers
 - Epidermis which provides waterproofing and serves as a barrier to infection
 - Dermis appendages of the skin
- ❖ NOTE: Hypodermis /(superficial fascia) /subcutaneous adipose layer (THIRD LAYER FROM ANATOMICAL POINT OF VIEW)
- The thickness of the skin varies from less than 1mm to more than 5mm.
- ✓ **Thick skin** (hairless skin) contains **THICK EPIDERMIS** e.g palms of hands soles of feet. It has sweat glands, no hair follicles and no sebaceous glands.
- ✓ **Thin skin** (thin epidermis) contains hair follicles, sweat glands and sebaceous glands.

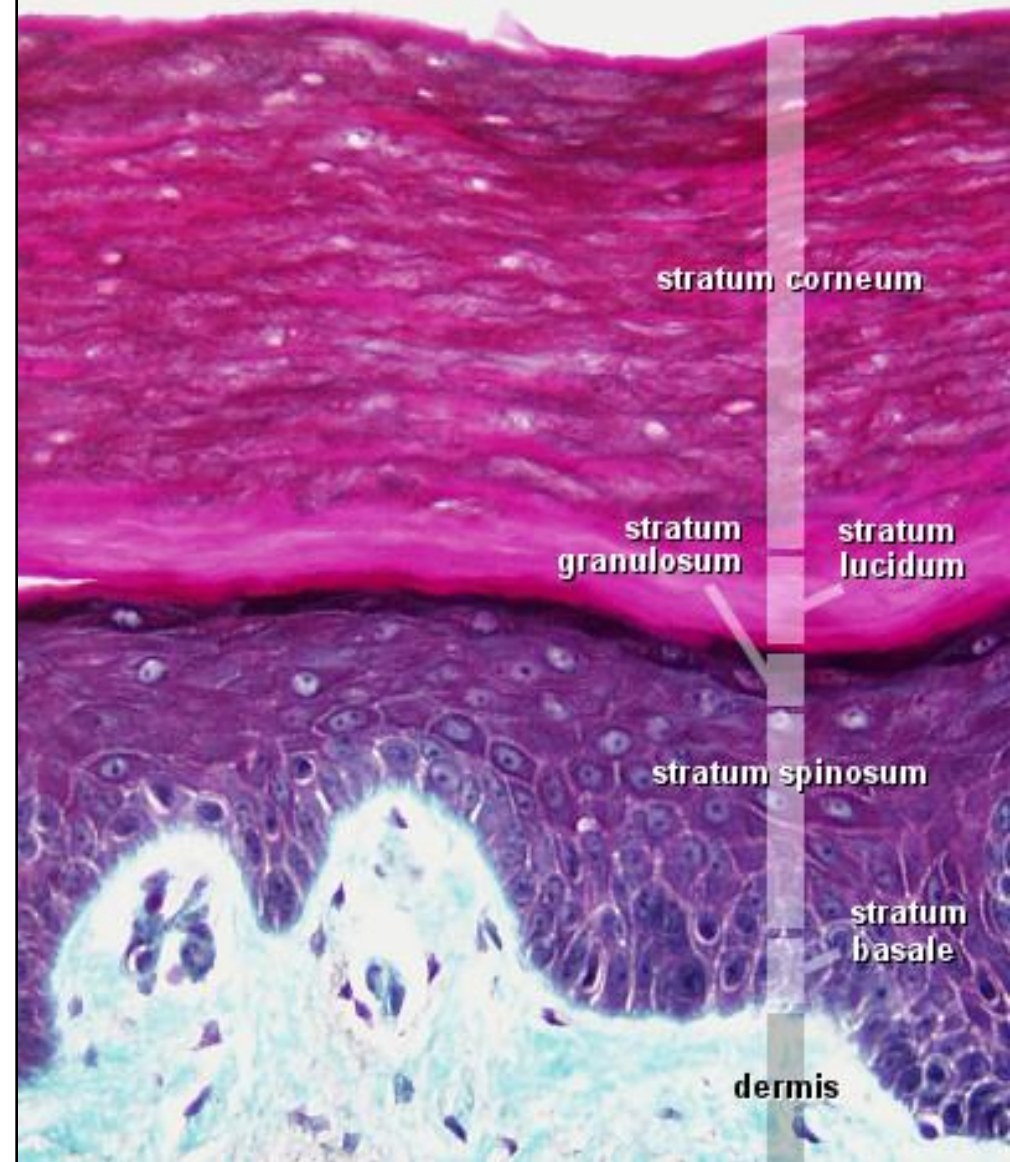
The Layers of Skin



Skin, thin H&E



Skin, thick trichrome



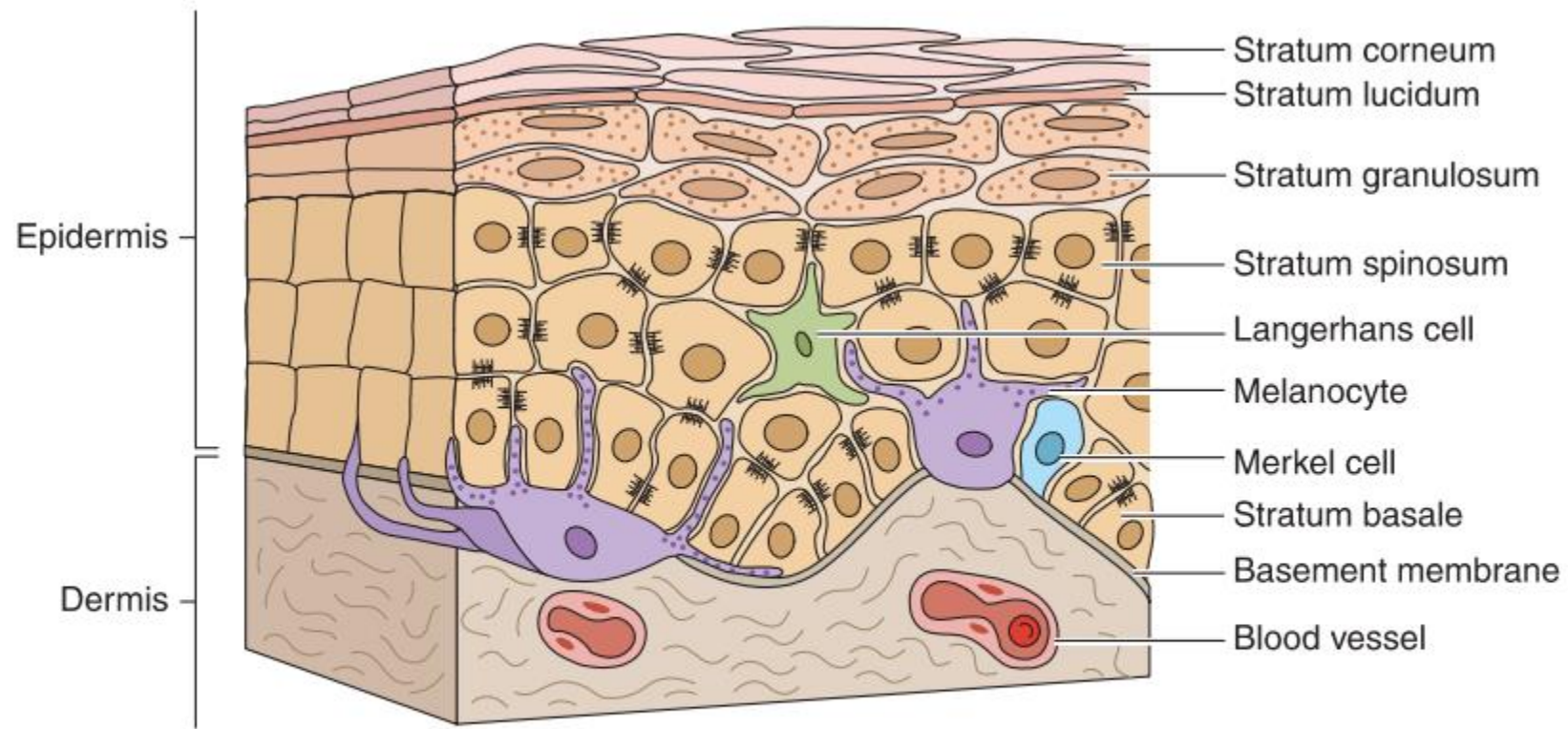


FIGURE 12.1. Layers of epidermis. The stratum lucidum is present only in thick skin and is best observed in skin from the palms of the hands and the soles of the feet. Melanocytes lie between keratinocytes in the stratum basale. (Adapted with permission from Ham AH, Cormack DH. *Histology*. 8th ed. Philadelphia, PA: Lippincott; 1979:625.)

Epidermis

Consists of a keratinized stratified squamous epithelium.

layers of **keratinocytes** differentiate and become filled with keratin migrates upward through layers (keratinization)

Divisions	Layers	Characteristics
Epidermis*	Stratum corneum	The most superficial layer of epidermis Many flattened dead "cells" called squames, packed with keratin filaments Surface cells are sloughed
	Stratum lucidum	Indistinct homogeneous layer of keratinocytes; present only in thick skin Cells lack nuclei and organelles Cytoplasm is packed with keratin filaments and eleidin
	Stratum granulosum	Flattened nucleated keratinocytes arranged in 3–5 layers Cells contain many coarse keratohyalin granules associated with tonofilaments Membrane-coating (waterproofing) granules occasionally present Present only in thick skin
	Stratum spinosum	Several layers of keratinocytes, called prickle cells because they appear spiny Desmosomes, associated with tonofilaments, connect cells between processes (intercellular bridges) Keratinocytes contain membrane-coating (waterproofing) granules Keratinocytes are mitotically active, especially in deeper layers Langerhans cells are also present in this layer
	Stratum basale (stratum germinativum)	Deepest layer of epidermis, composed of a single layer of tall cuboidal keratinocytes Keratinocytes are mitotically active Melanocytes and Merkel cells are also present in this layer

Other cells of the epidermis include

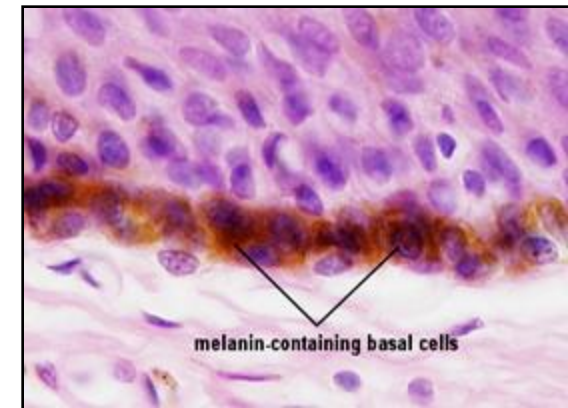
1. Melanocytes

2. Langerhans cells

3. Merckle cells

Melanocytes

- melanin gives the brown colour component of the skin (**melanin**)
- ectodermal in origin, neural crest
- dendritic cells with **no desmosomes** with keratinocytes
- melanosomes for melanogenesis
- mainly in the epidermis basal layer, could not be identified in LM
- found in skin, eye and hair
- melanogenesis under the effect of
 - race
 - exposure to light
 - hormones
 - age



Langerhans' cells

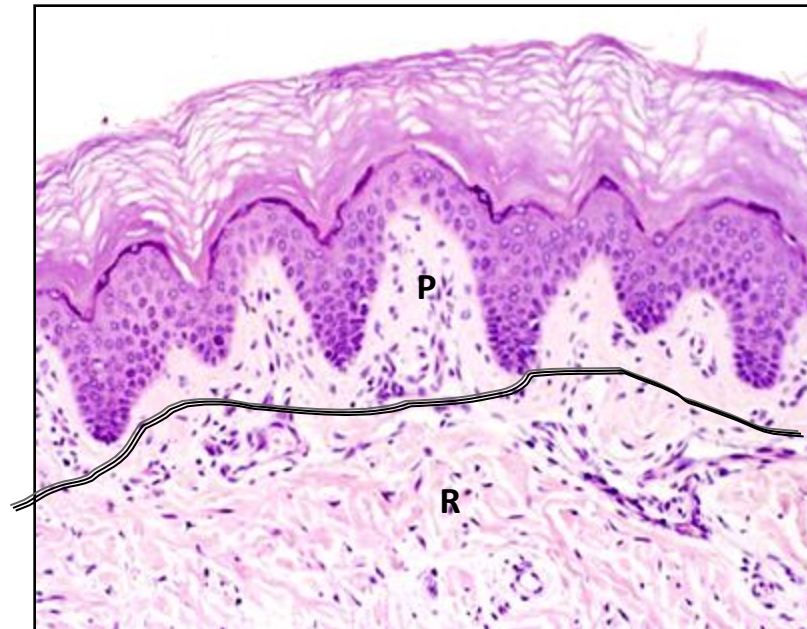
- dendritic cells
- contain large granules called Birbeck granules
- important in immune reactions of the epidermis/ macrophages (antigen-presenting cells)
- no desmosomes

Merkel cells

large oval cells
numerous cytoplasmic granules
commonly associated with free nerve endings
sensory mechanoreceptors / neuroendocrine cells

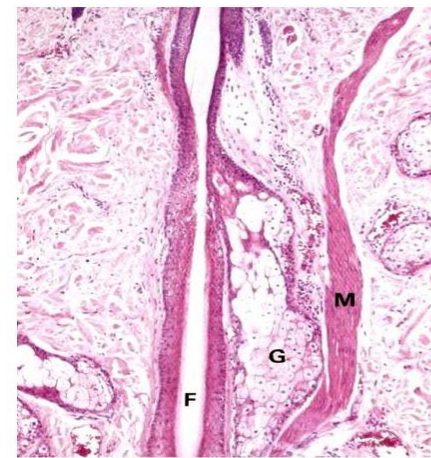
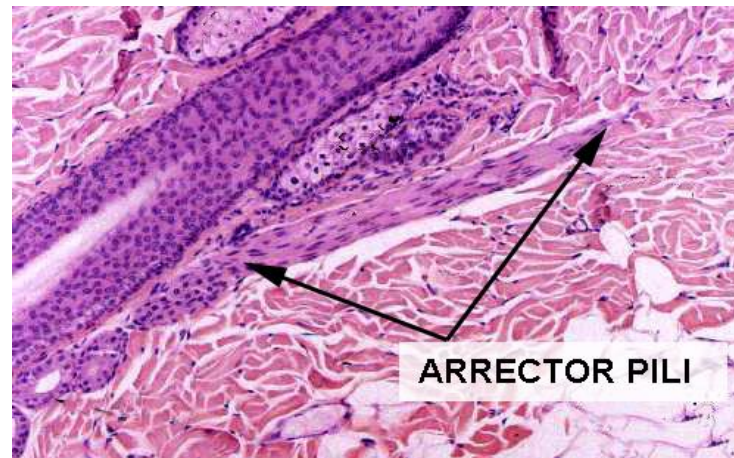
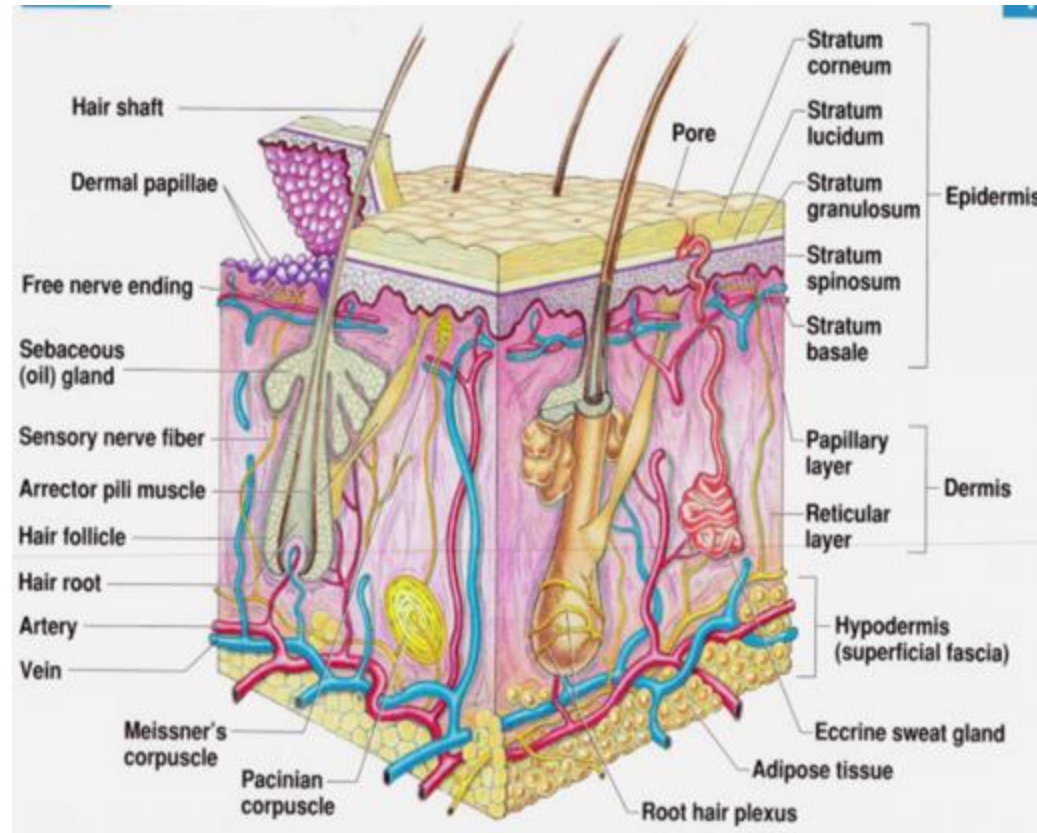
Cell	Location	Derivation	% of Epidermal Cells	Function
Melanocyte	Stratum basale	Neural crest cells	2-3	Synthesis of melanin
Langerhans cell	Stratum spinosum	Bone marrow	2-4	Antigen presentation
Merkel cell	Stratum basale	Neural crest cells; perhaps epidermis	1-5	Mechanoreceptors

Dermist	Papillary layer	Superficial thin layer of connective tissue that interdigitates with epidermal ridges of the epidermis Forms dermal papillae where Meissner corpuscles and capillary loops may be found Contains delicate collagen (type I and type III) fibers Contains anchoring fibrils (type VII collagen), microfibrils (fibrillin), and elastic fibers
	Reticular layer	Extensive part of the dermis, lying deep to the papillary layer Contains thick bundles of collagen (type I) fibers and elastic fibers Arteries, veins, and lymphatics are present Location of sweat glands and their ducts, Pacinian corpuscles, and nerves In thin skin, contains hair follicles, sebaceous glands, and arrector pili muscles



Sebaceous glands

- dermal exocrine glands associated with hairs
- holocrine secretion
- secrete an oily substance (sebum) for hair flexibility
- the sebum secretion is influenced by sex hormones/ adolescence acne



F= hair follicle
G= sebaceous gland
M= arrector pili muscle

Sweat glands (Sudoriferous glands)

- **Eccrine sweat glands** (Merocrine sweat glands)

all over the body.

coiled tubular glands

body temperature regulation.

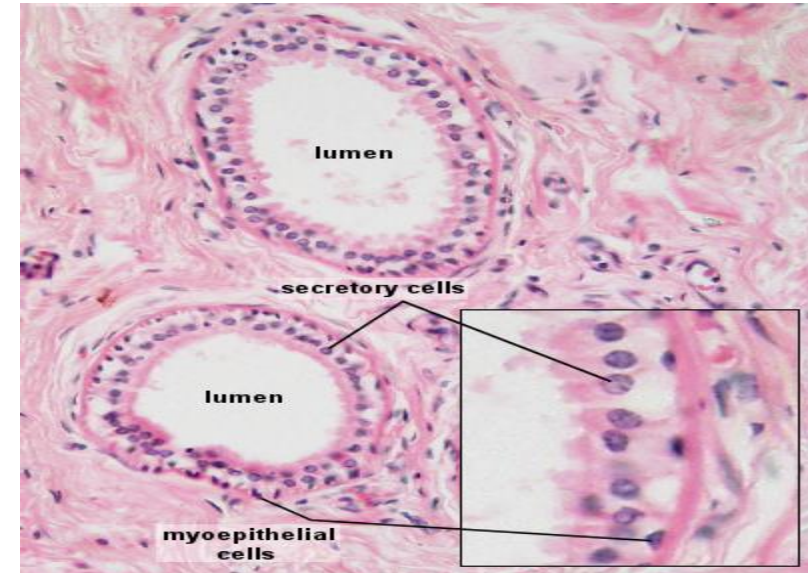
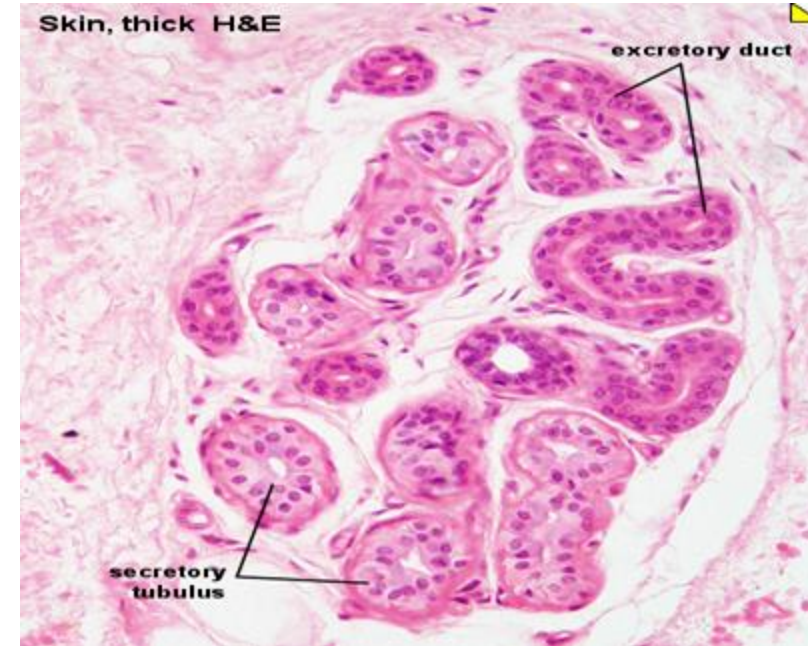
cholinergic innervations/ respond to heat.

- **Apocrine sweat glands**

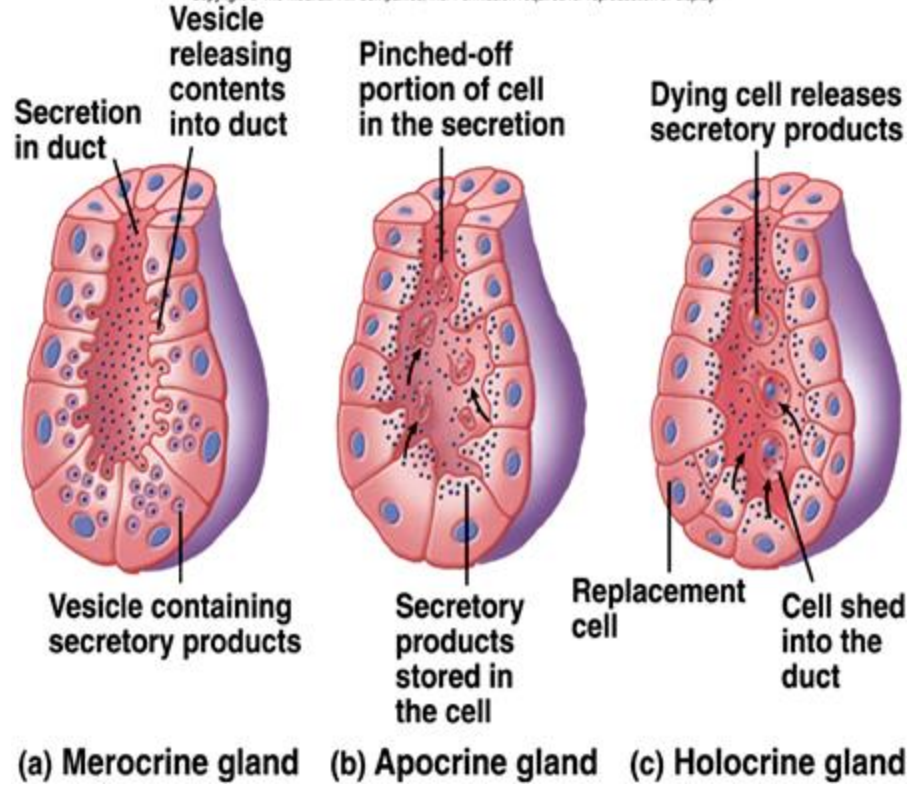
large /axilla /external genitalia and anus

functional at puberty

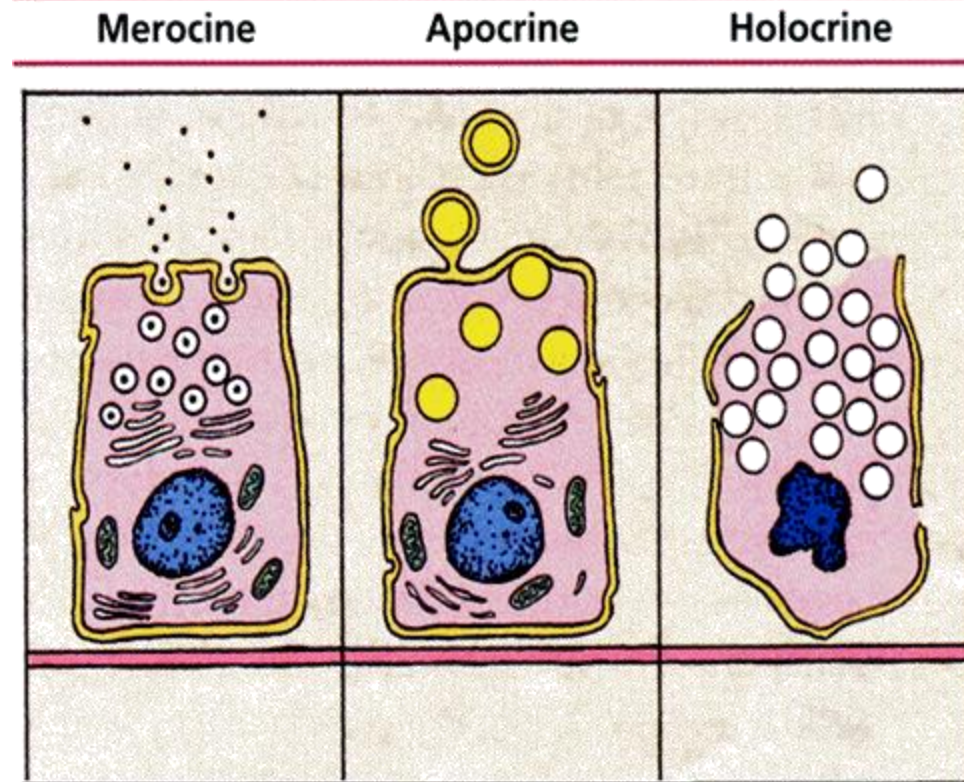
adrenergic innervation/ respond to emotional and sensory stimuli



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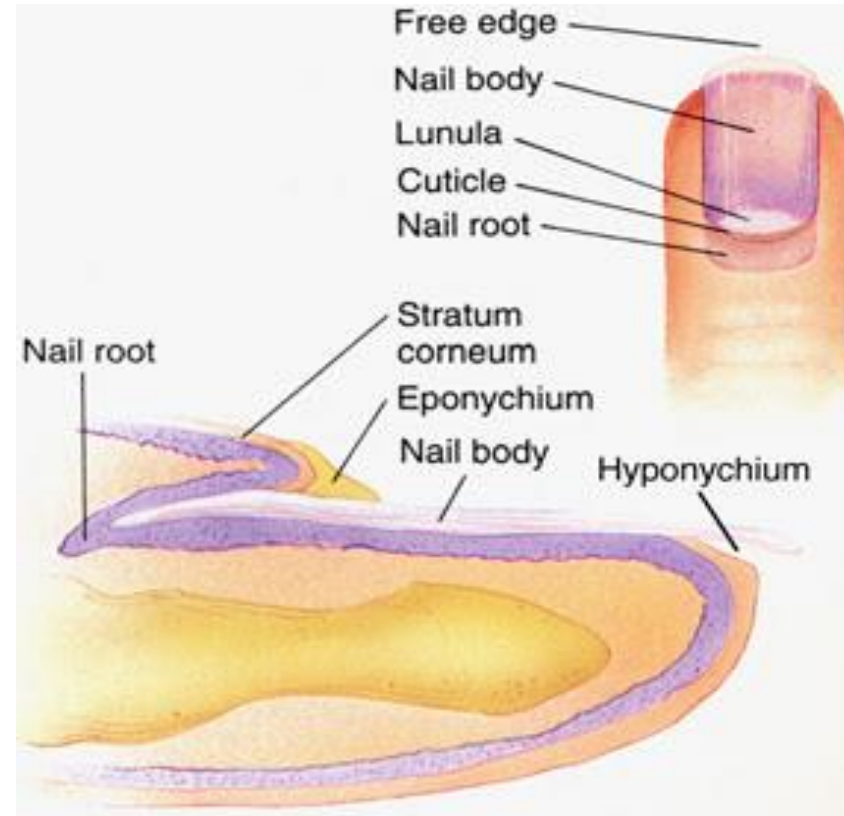
Exocrine Glands



Nails

plates of keratin

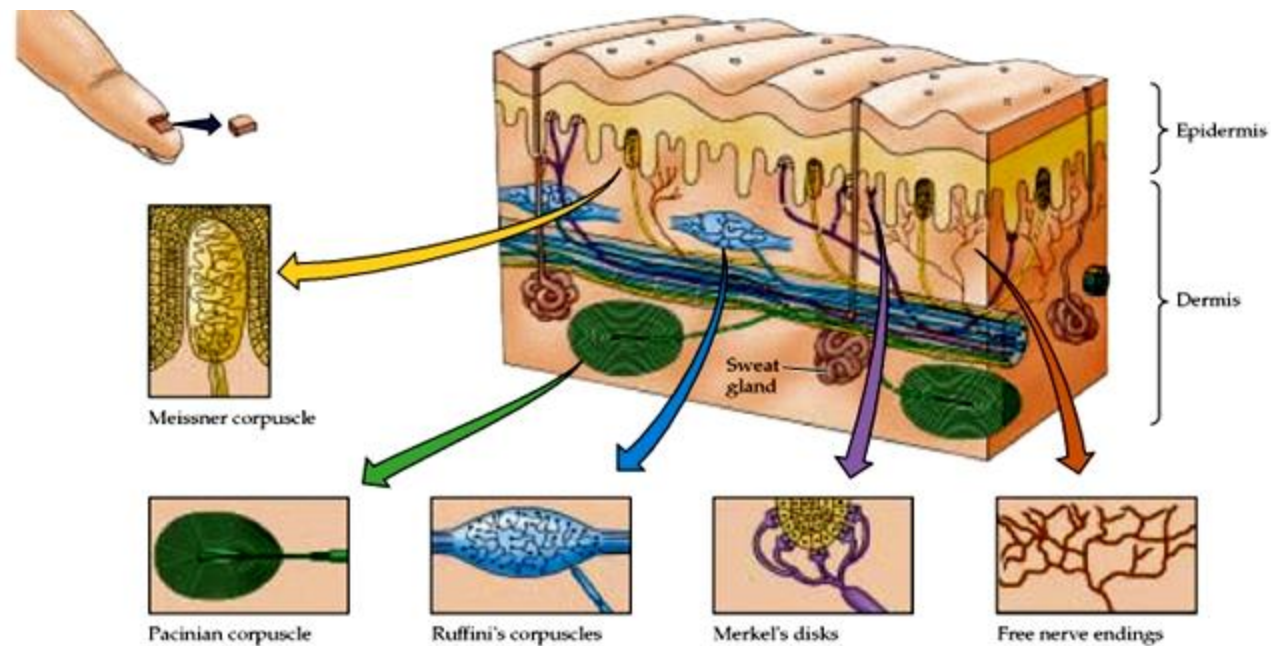
nail plate, nail bed, nail groove, nail root, dorsal and ventral matrix, lunula eponychium or cuticle, hyponychium



Nerve supply

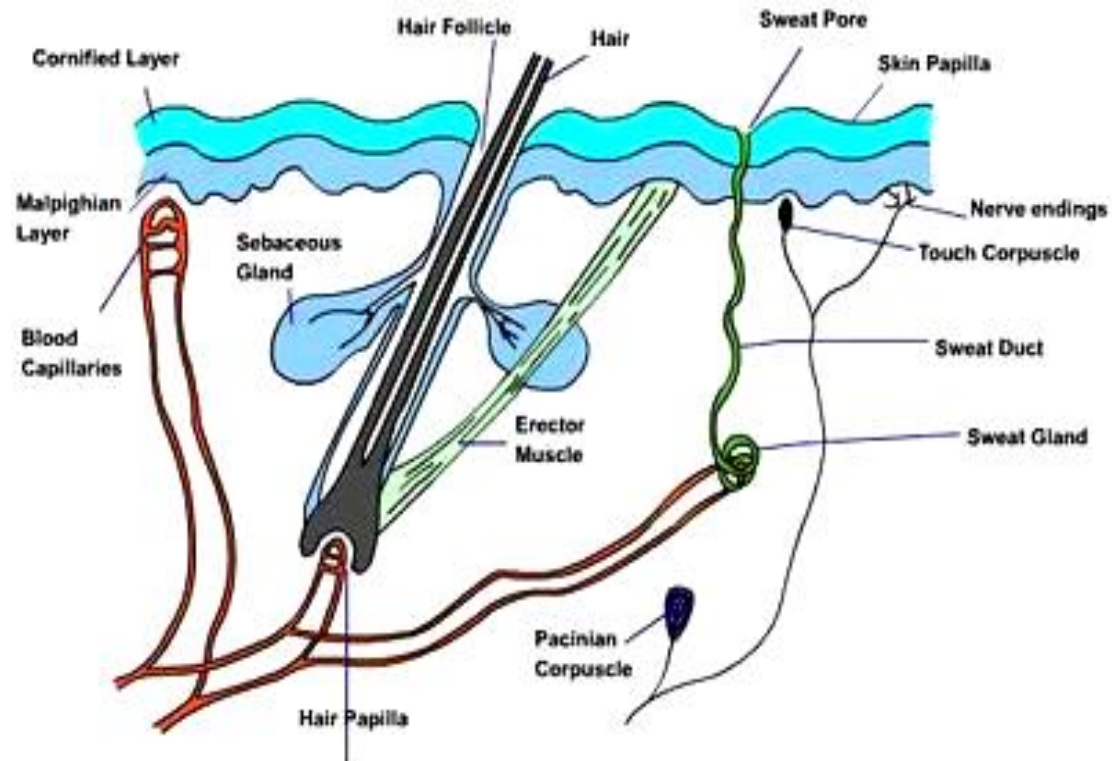
-Free such as **free endings**, **Merkel's disc** and **hair follicle receptors**.

- **Encapsulated terminals** such as **tactile (Meissner's) corpuscles**, **bulboid corpuscles (Krause's end bulb)**, **lamellar (Pacinian) corpuscles**, and **Ruffini's corpuscles**



▪ Free nerve endings

no complex sensory structures/ **non-encapsulated**/epidermis/ sense **pain and temperature**.

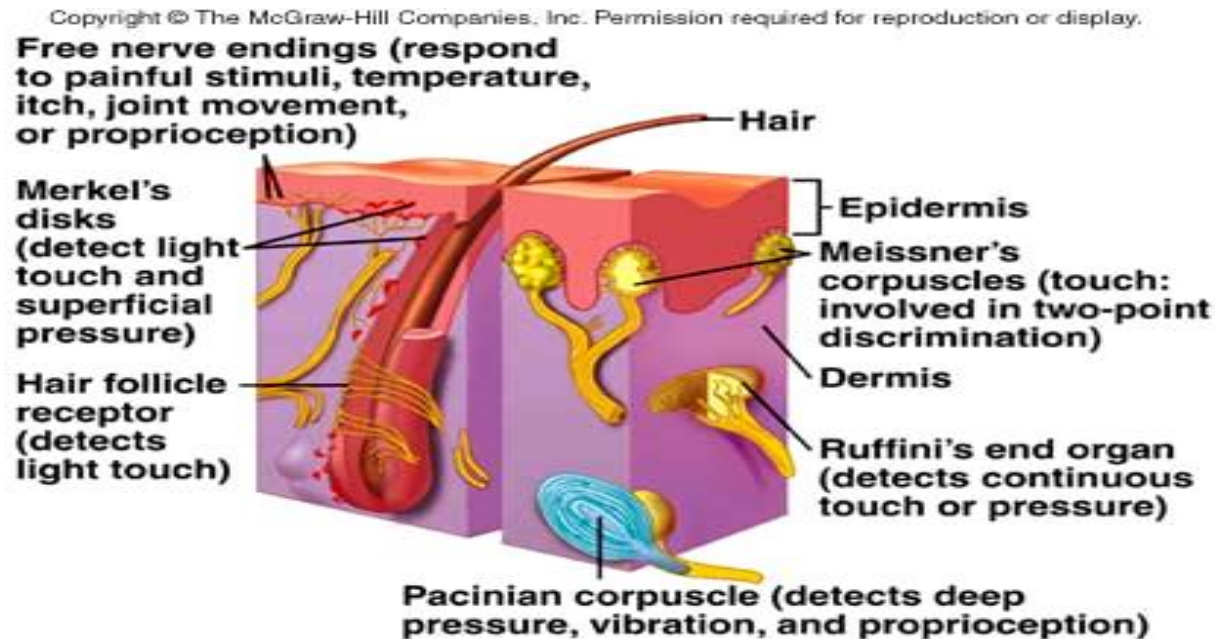


- **Merkel disk receptor**

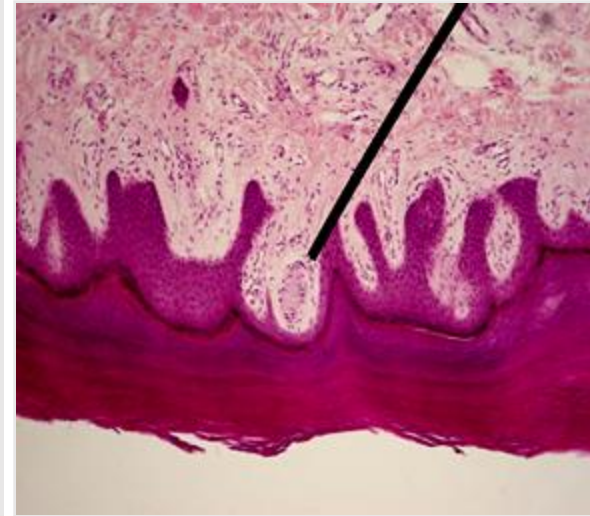
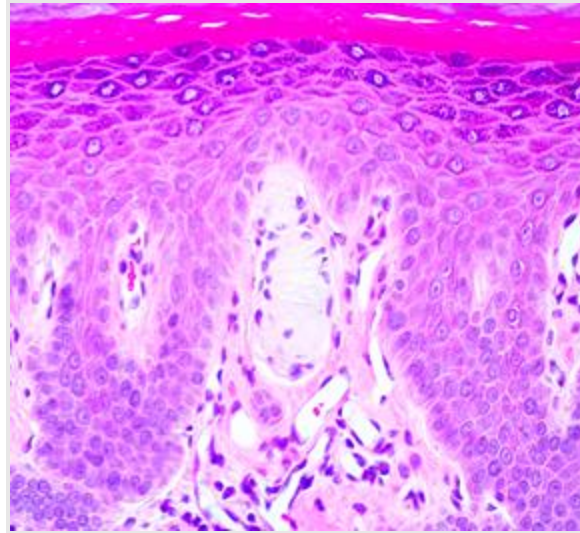
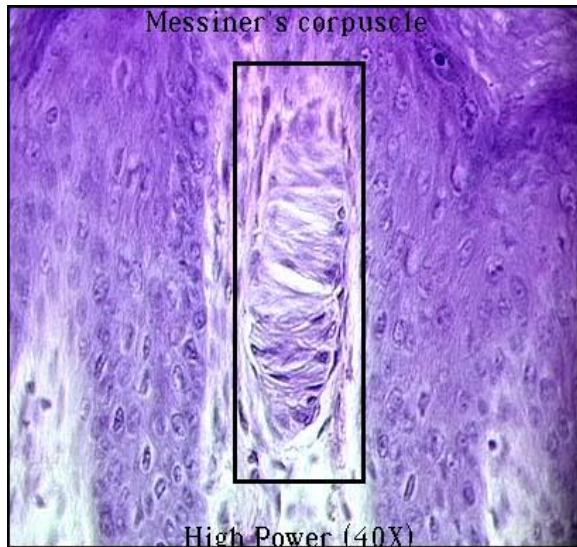
- **non-encapsulated** mechanoreceptors/ surrounding hair follicles/ **touch/ basal layer/ the most sensitive** of the main types of mechanoreceptors to **vibrations at low frequencies**

- **Hair follicle receptors**

- these mechanoreceptors sense the **presence and direction of hair displacement**.



- **Meissner's corpuscles (or tactile corpuscles)** **encapsulated** mechanoreceptors present in the dermal papilla / sensitivity to **light touch** (sensitive to **low frequency** stimuli) / **do not** detect pain/ their number drops with age



- **Pacinian corpuscles** dermis of thick skin of fingers /respond to **pressure and vibration**. large **receptive field** on the skin's surface with an especially sensitive center. **larger and fewer than others**

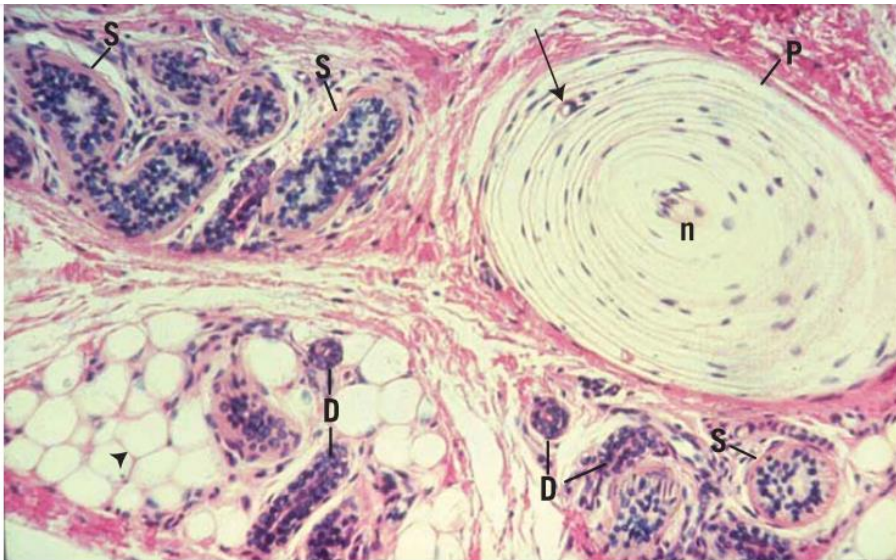
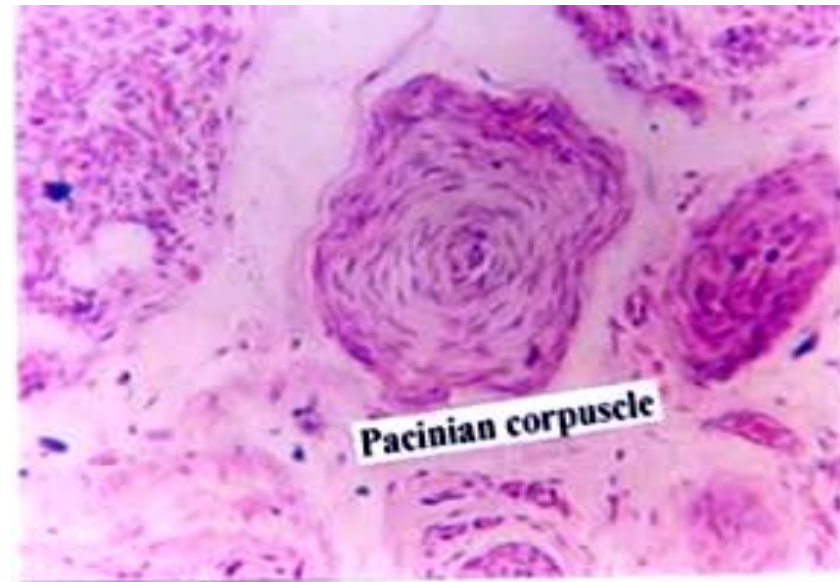
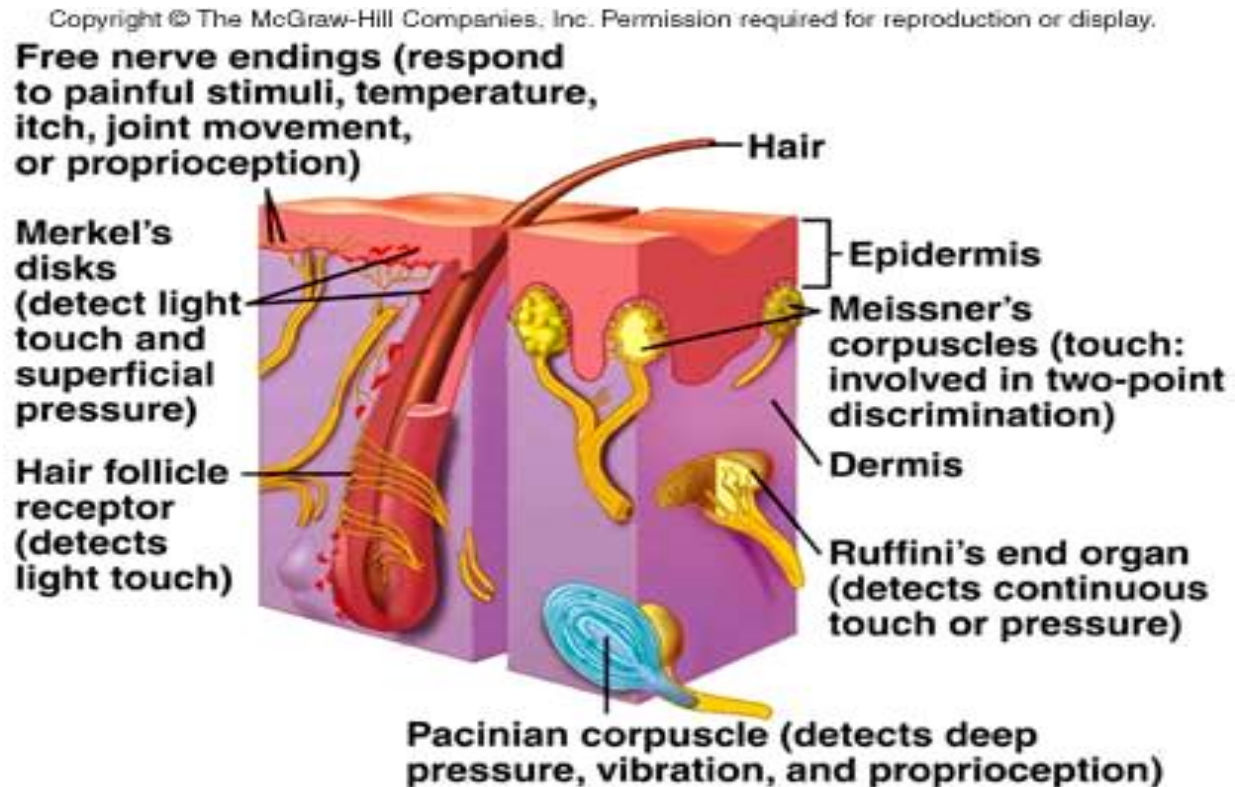


FIGURE 12.4. A light micrograph of eccrine sweat glands and a Pacinian corpuscle in the dermis of the skin. Sweat glands are also present in the hypodermis among adipose cells (*arrowhead*). The secretory units (S) of the sweat glands are wrapped by fingerlike processes of myoepithelial cells and stain more lightly than the ducts (D) that are lined by a stratified cuboidal epithelium. This Pacinian corpuscle (P) lies deep in the dermis and is composed of a centrally located nerve (n) surrounded by concentric layers of connective tissue. The nuclei of fibroblasts are seen, and so is a capillary (*arrow*).



(20) Pacinian Corpuscle (HP)

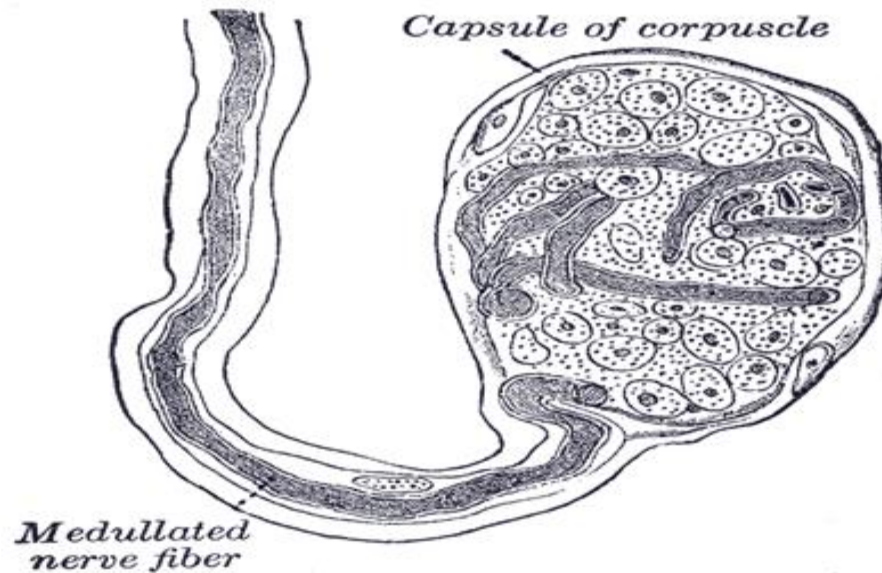
Ruffini's corpuscles – are encapsulated mechanoreceptors /deep in the **reticular layer** where they respond to **distortion or stretching** of the skin (sustained or **continuous stress**)

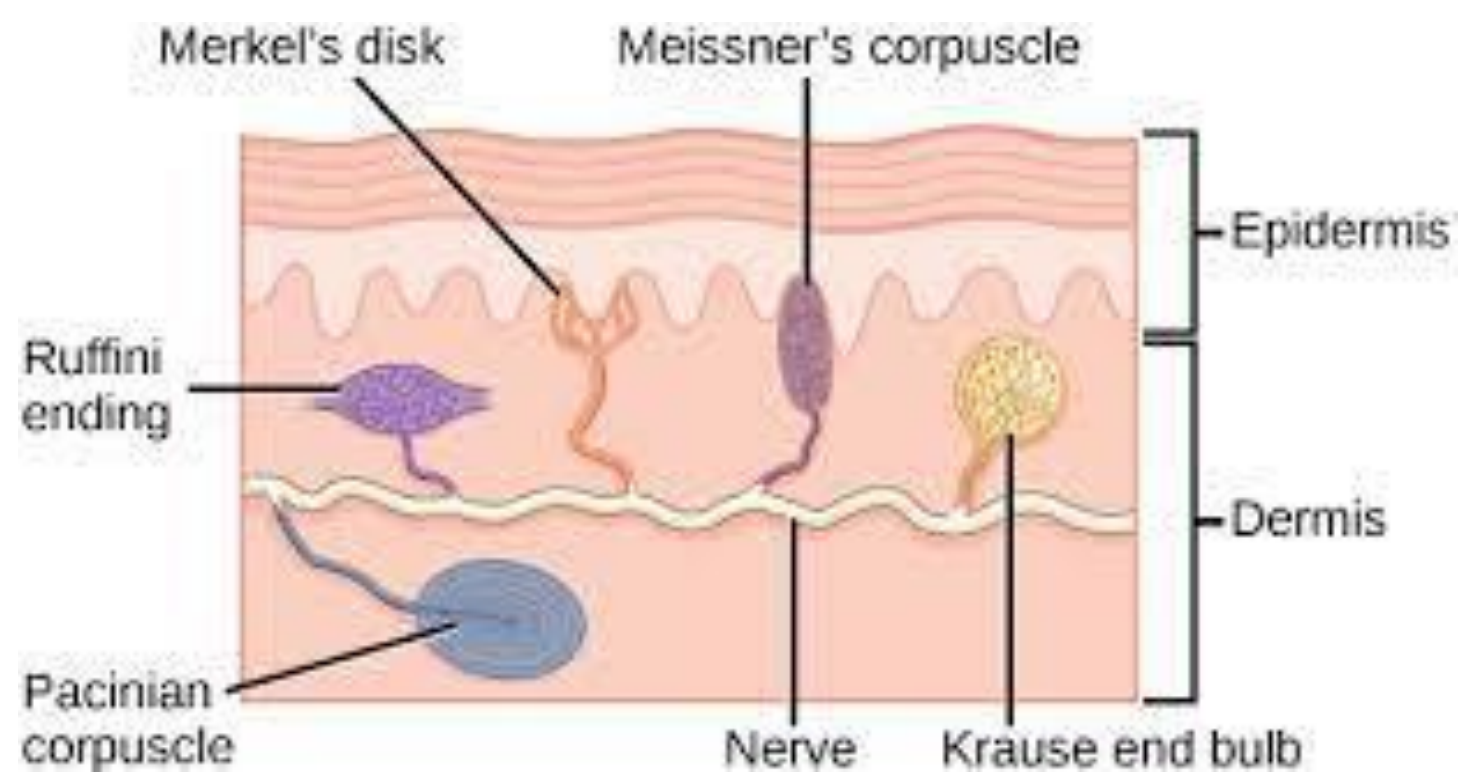


● **Krause end bulbs (bulboid corpuscles)**
encapsulated Thermo-mechanoreceptors in:

● the papillary layer **dermis**

● oral mucosa of the oral cavity and tongue / respond
to **cold** and low-frequency **vibration**





- عالم الأَدب -

إِن مِّنَ الْبَيَانِ لَسِحْرًا

وَمَا نِيلَ الْمَطَالِبِ بِالْتَمَنِي

وَلَكِن تُوْخِذُ الدُّنْيَا غَلَابًا

وَمَا اسْتَعْصَى عَلَى قَوْمٍ مِّنَالِ

إِذَا الْإِقْدَامُ كَانَ لَهُمْ رِكَابًا



أحمد شوقي