



SKIN (INTEGUMENT) LECTURE 6



Curriculum: Phase 1/ Semester2/ TOB/ Session 3

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SELECTED REFERENCES



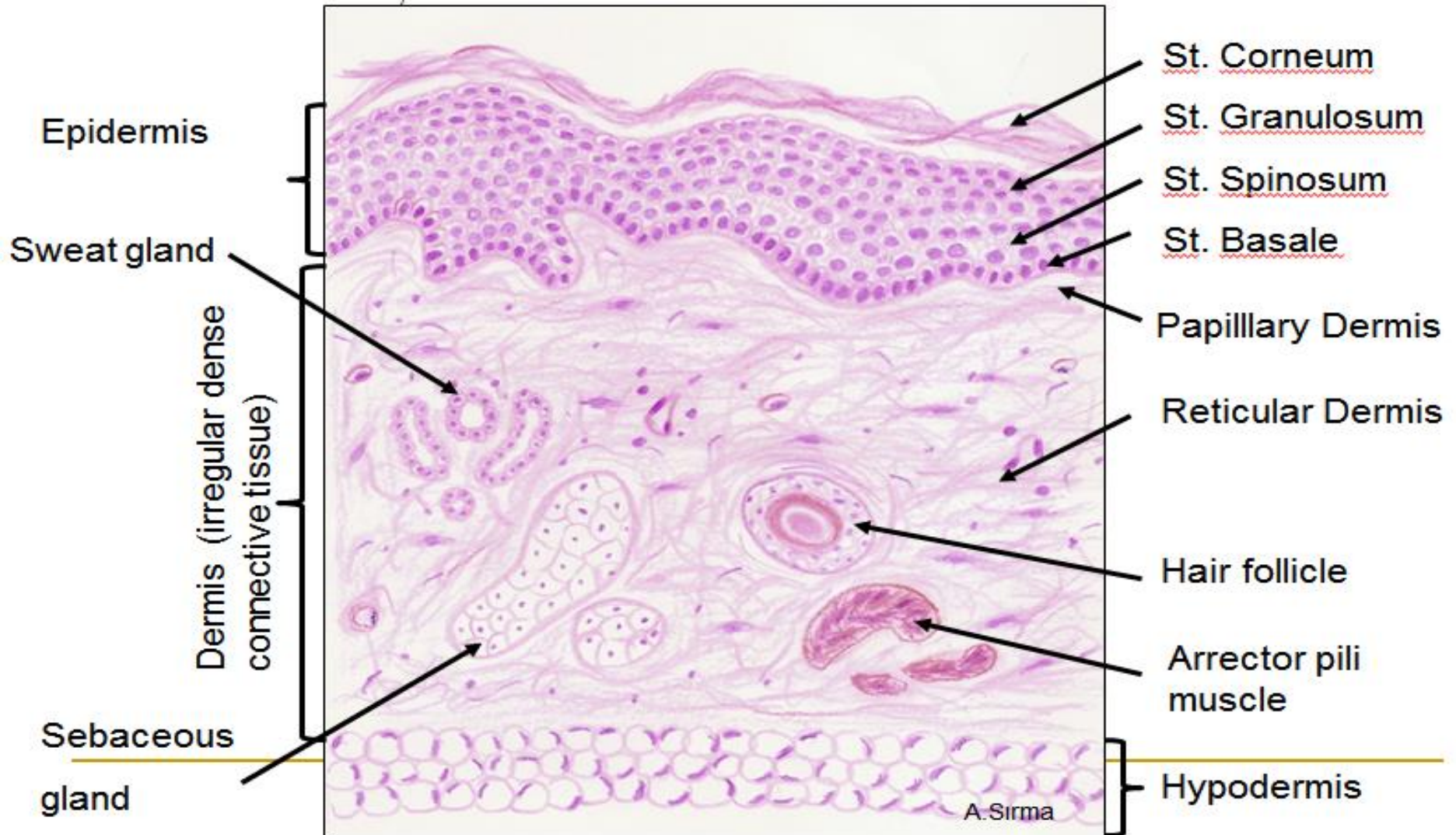
- **Histology Textbooks ‘Basic Histology’, Junqueira, 13 th Edition.**
- **‘Colour Atlas of Histology’ Gartner and Hiatt**



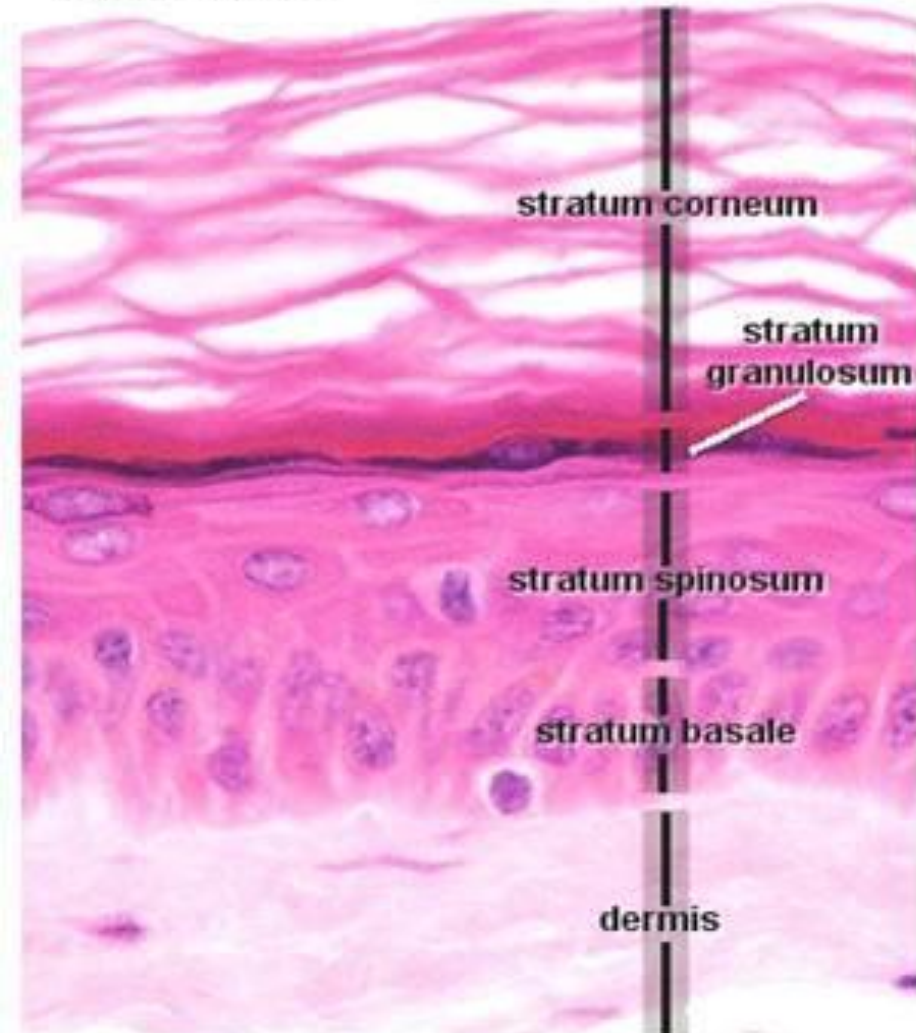
LECTURE OBJECTIVES

- ☐ describe the macroscopic structure of human skin (ie as determined by the naked eye) and how this large and highly visible organ varies with site, sex, age, ethnicity and exogenous influence.
- ☐ describe how some of these variations influence the susceptibility to and/or the manifestations of skin disease.
- ☐ describe the microscopic and molecular structure of human skin including:
 - skin appendages: hair follicles, sebaceous glands sweat glands and nails.
 - the immediate subcutaneous fat (adipose tissue)
- ☐ describe the main functions of the skin
 - barrier function
 - sensation
 - thermoregulation
 - sociosexual communication

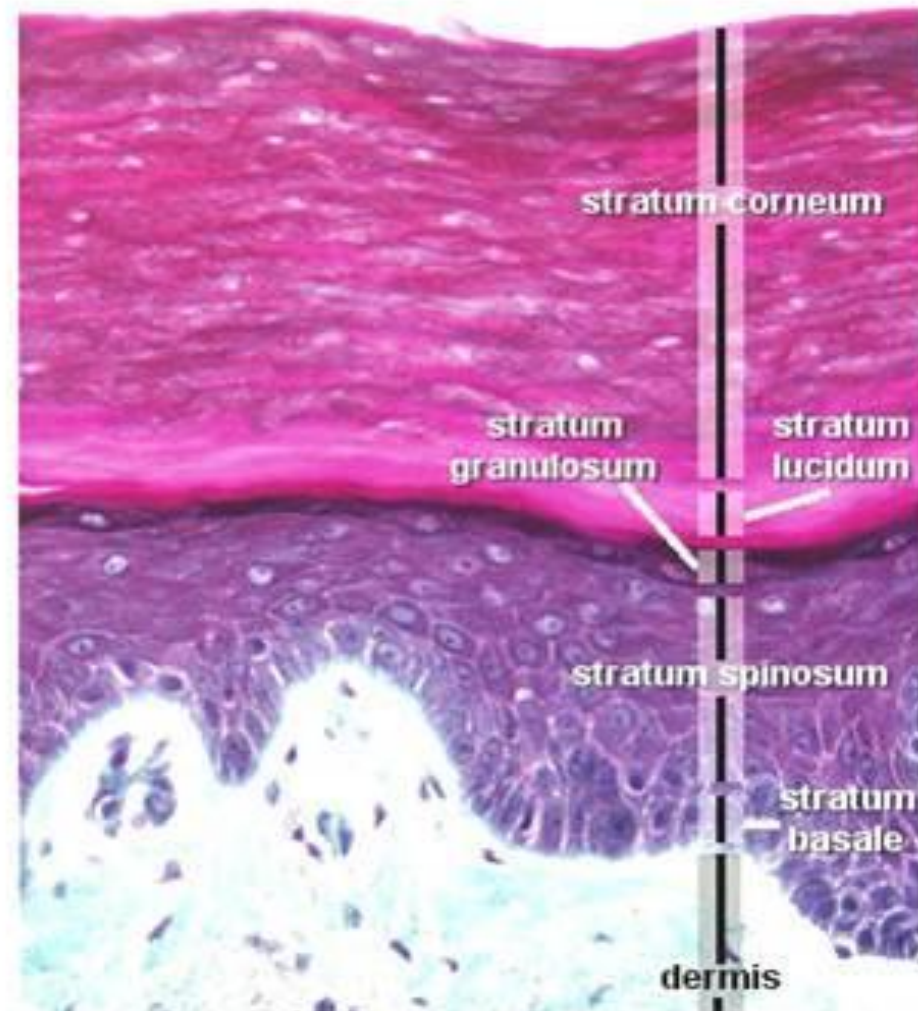
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Thin Skin



Thick Skin



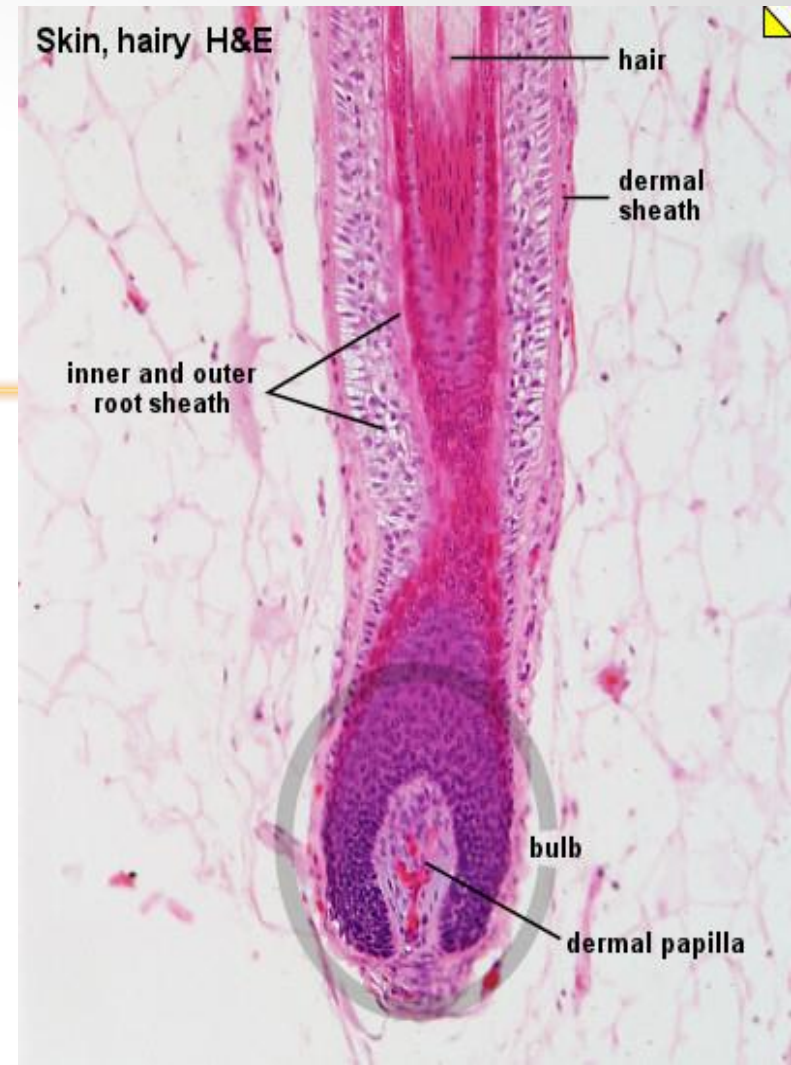


Hair



1. Hairs are elongated keratinized structures derived from invaginations of the epidermal epithelium called hair follicles .
2. The color, size, shape and texture of hairs vary according to age, genetic background, and region of the body.
3. All skin has at least minimal hair except that of the palms, soles, lips, glans penis, clitoris, and labia minora.
4. The face has about 600 hairs/cm² and the remainder of the body has about 60/cm².

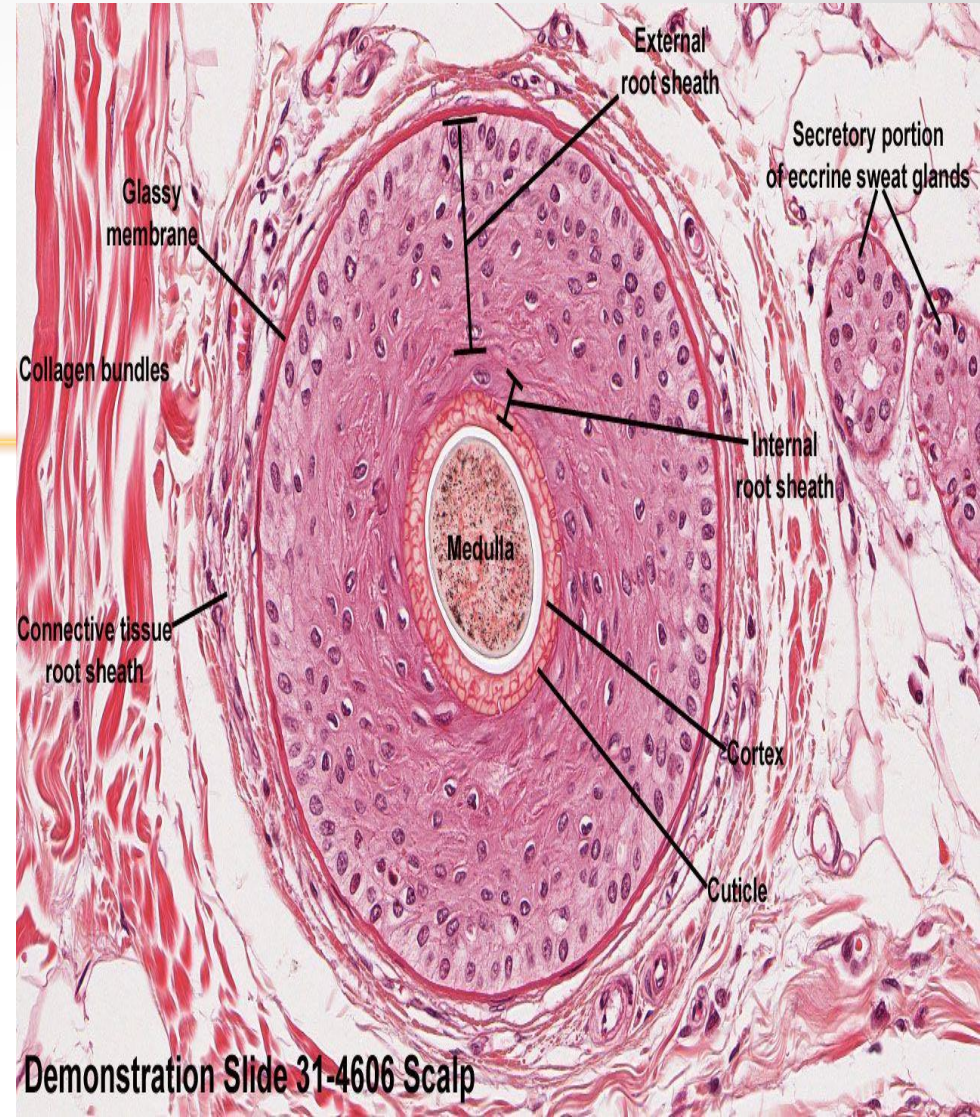
1. The hair follicle has a terminal dilatation called a hair bulb.
2. A dermal papilla inserts into the base of the hair bulb and contains a capillary network required to sustain the hair follicle. Loss of this blood flow results in death of the follicle.
3. The epidermal cells covering this dermal papilla form the hair root that produces and is continuous with the hair shaft protruding beyond the skin surface



Layers of a hair

Layers of hair consists of

- 1.The medulla, cortex , and cuticle .**
- 2.The internal root sheath and external root sheath. Both of these layers are in turn continuous with the stratified epidermis.**
- 3.Just outside the external root sheath is the glassy membrane which is continuous with the basement membrane of the epidermis.**
- 4.The surrounding connective tissue sheath .**

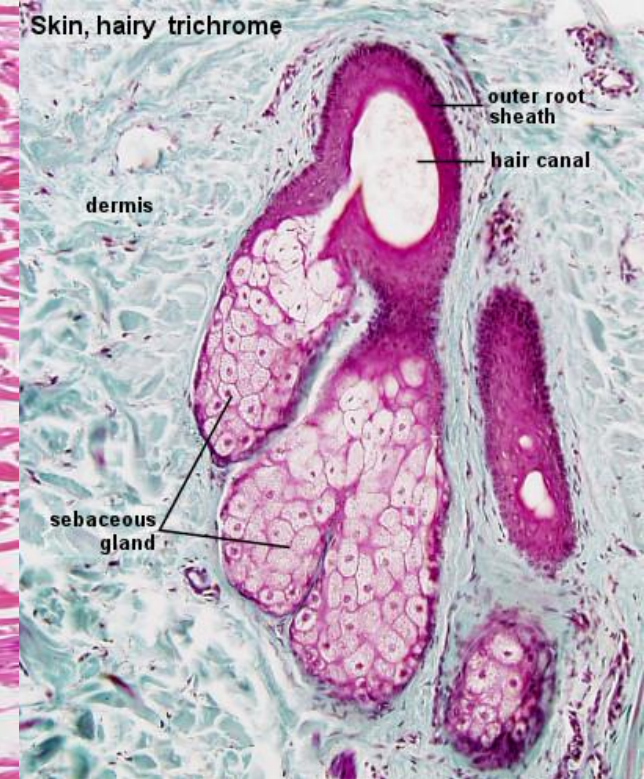
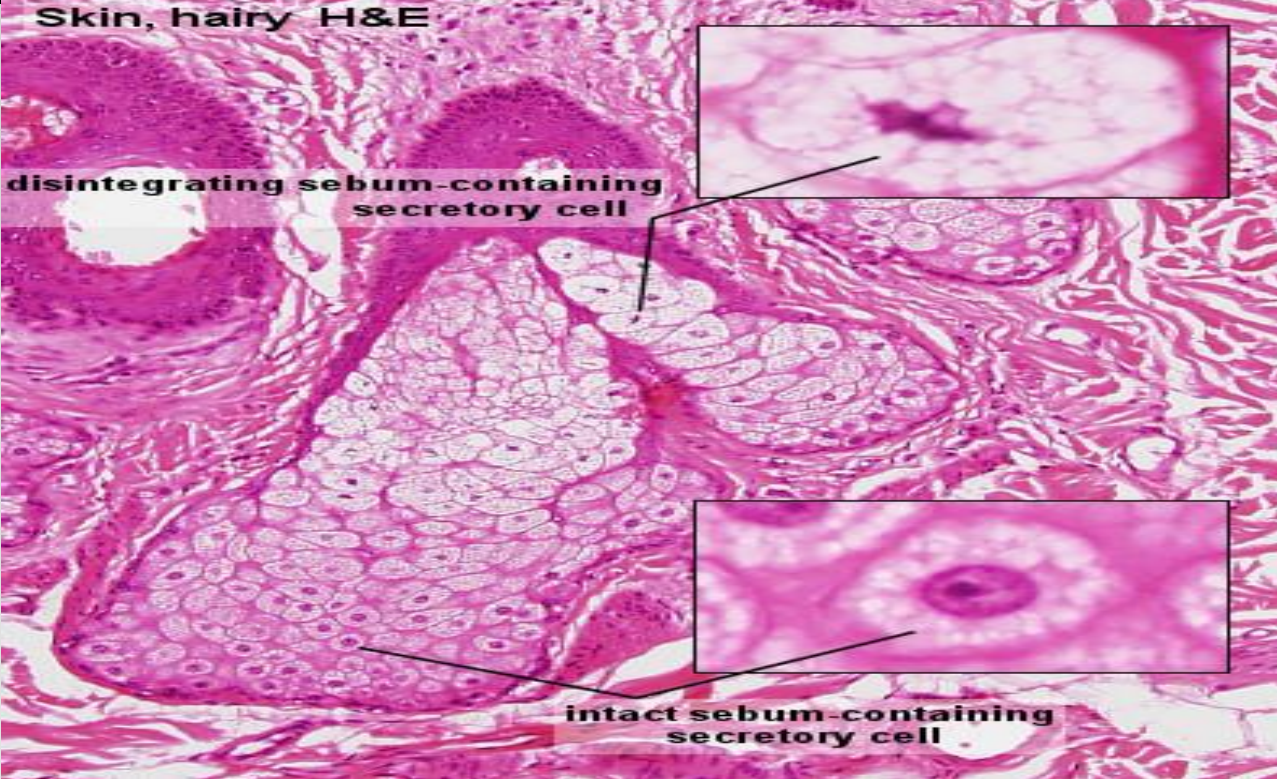


Demonstration Slide 31-4606 Scalp

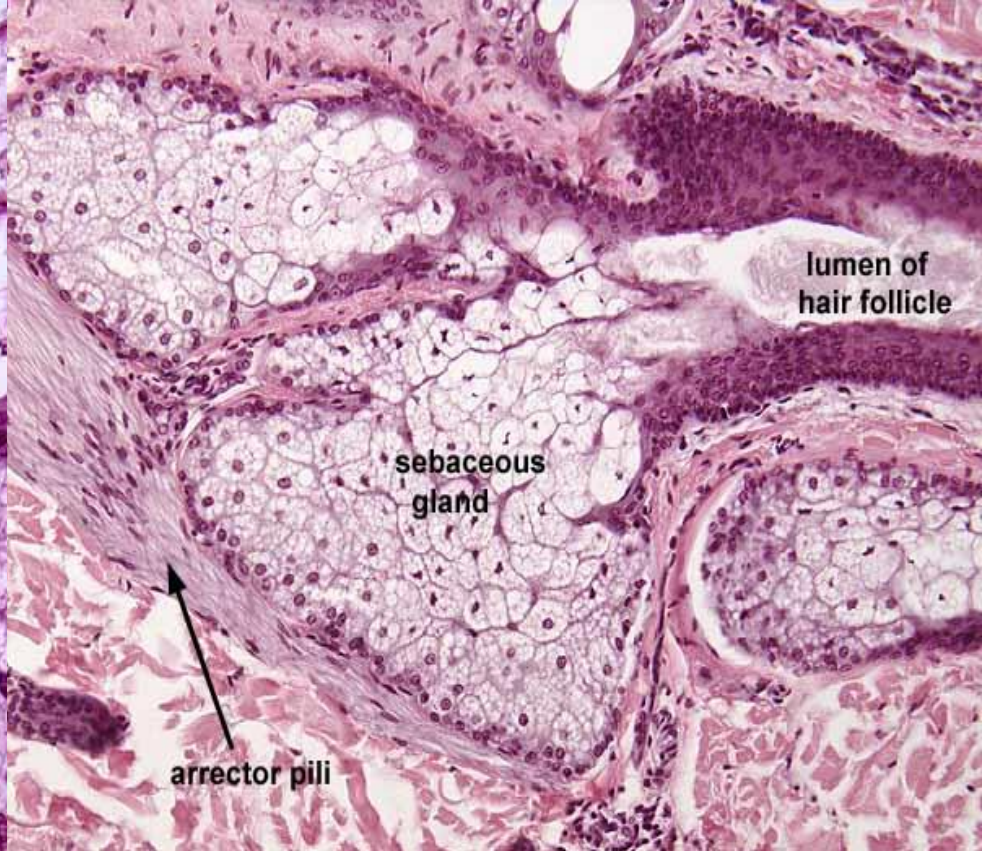
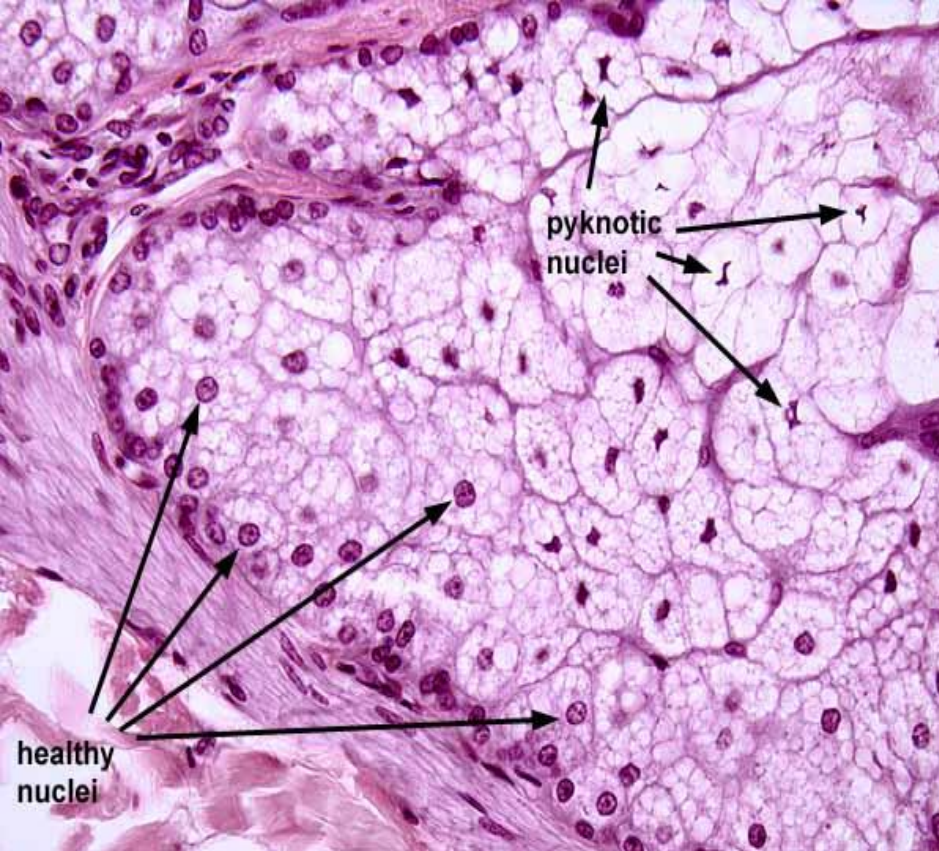


Alopecia Totalis and areata are an autoimmune disorders against hair follicles





1. The acini consist of a basal layer of undifferentiated flattened epithelial cells on the basal lamina.
2. These cells proliferate and are displaced toward the middle of the acinus, undergoing terminal differentiation as distinctly large, lipid-producing sebocytes which have their cytoplasm filled with small fat droplets
3. Their nuclei shrink and undergo autophagy along with other organelles and near the duct the cells disintegrate and release the lipids.
4. The product of this process is sebum, which is gradually moved to the surface of the skin along the hair follicle or duct.



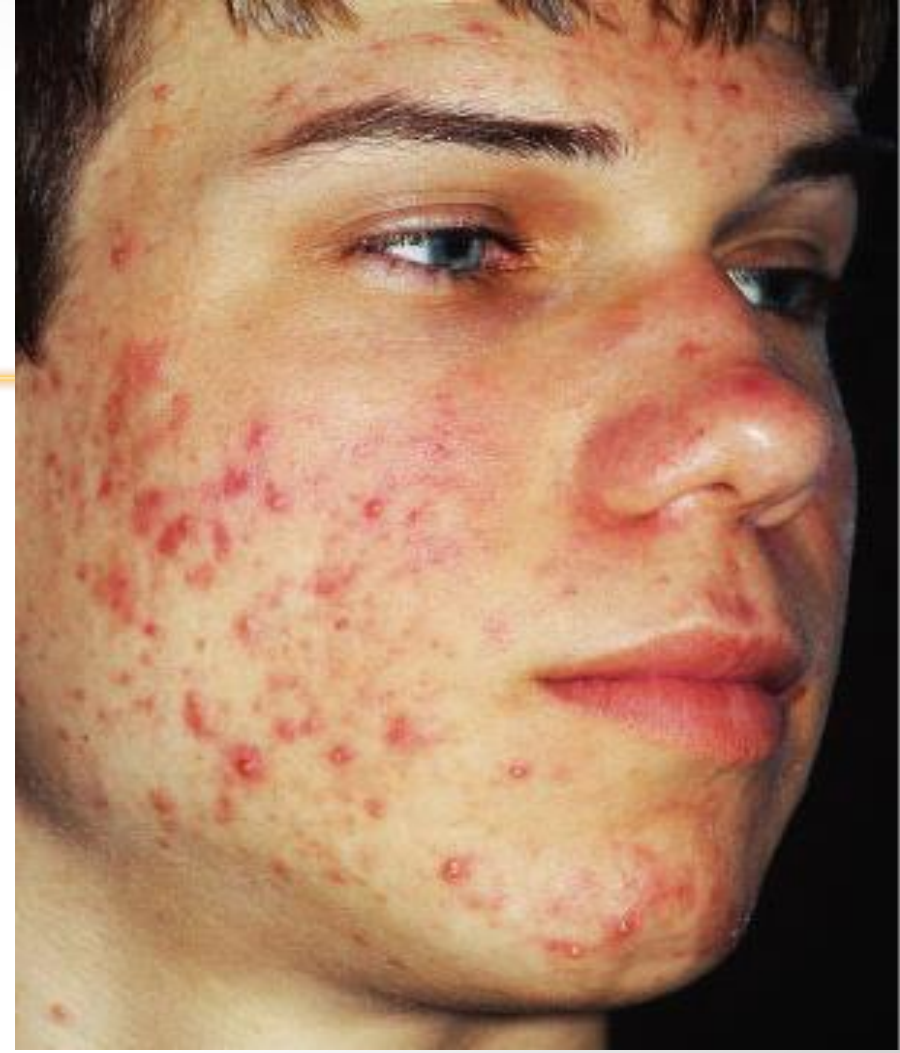
1. Secretion from sebaceous glands greatly increases at puberty, stimulated primarily by testosterone in men and by ovarian and adrenal androgens in women.
2. Specific functions of sebum appear to include helping maintain the stratum corneum and hair, as well as exerting weak antibacterial and antifungal properties on the skin surface.

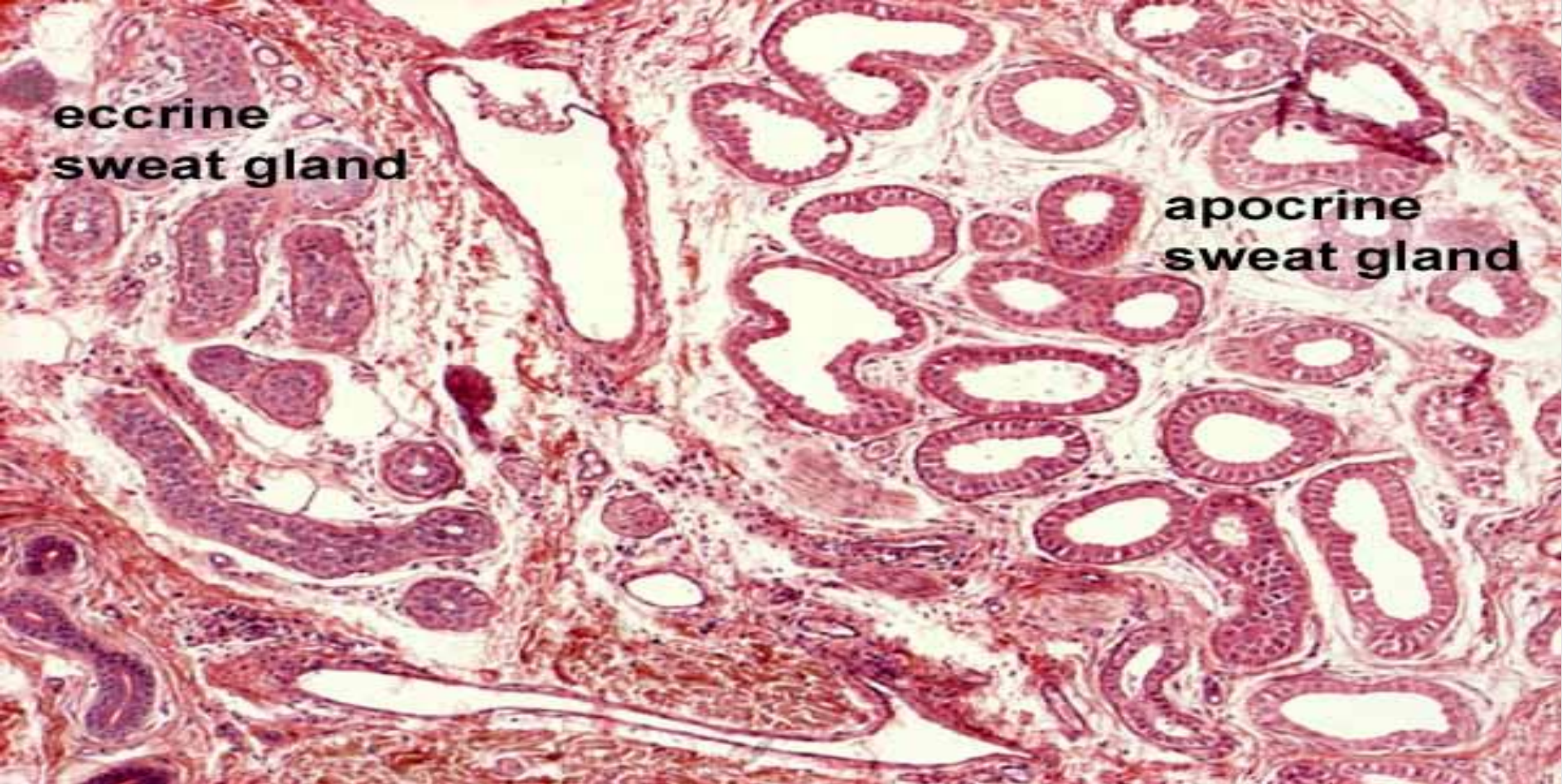


acne



A chronic inflammation of obstructed sebaceous glands due to disturbance in the normal secretion and flow of sebum





Sweat glands

Sweat glands are epithelial (epidermal) derivatives embedded in the dermis

1. Eccrine which open to the skin surface
2. Apocrine which open into hair follicles.

Sweat glands have different distributions, functions, and structural details

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ECCRINE SWEAT GLANDS



1. Both the secretory portions and ducts of eccrine sweat glands are simple coiled tubular and have small lumens.
2. widely distributed in the skin and are most numerous on the soles of the feet (620/cm²).
3. Collectively the 3 million eccrine sweat glands of the average person roughly equal the mass of a kidney and can produce as much as 10 L/day.
4. Sweating is the physiological response to increased body temperature during physical exercise or thermal stress and in humans the most effective means of temperature regulation.



Eccrine sweat glands

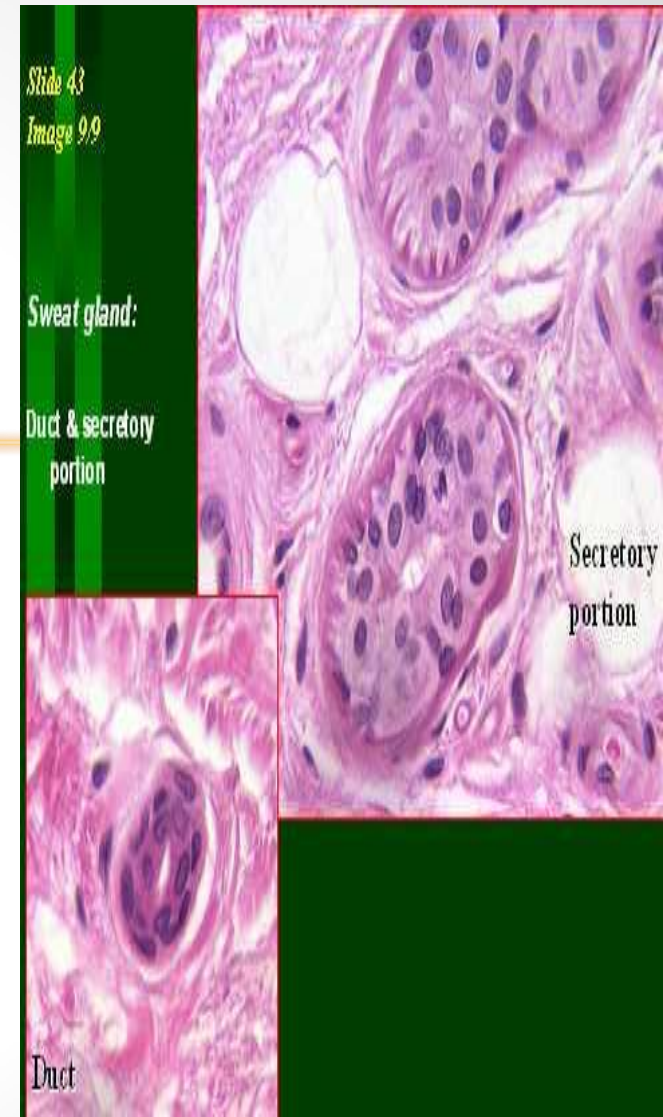
The secretory part is generally more pale-staining than the ducts and has stratified cuboidal epithelium consisting of three cell types .

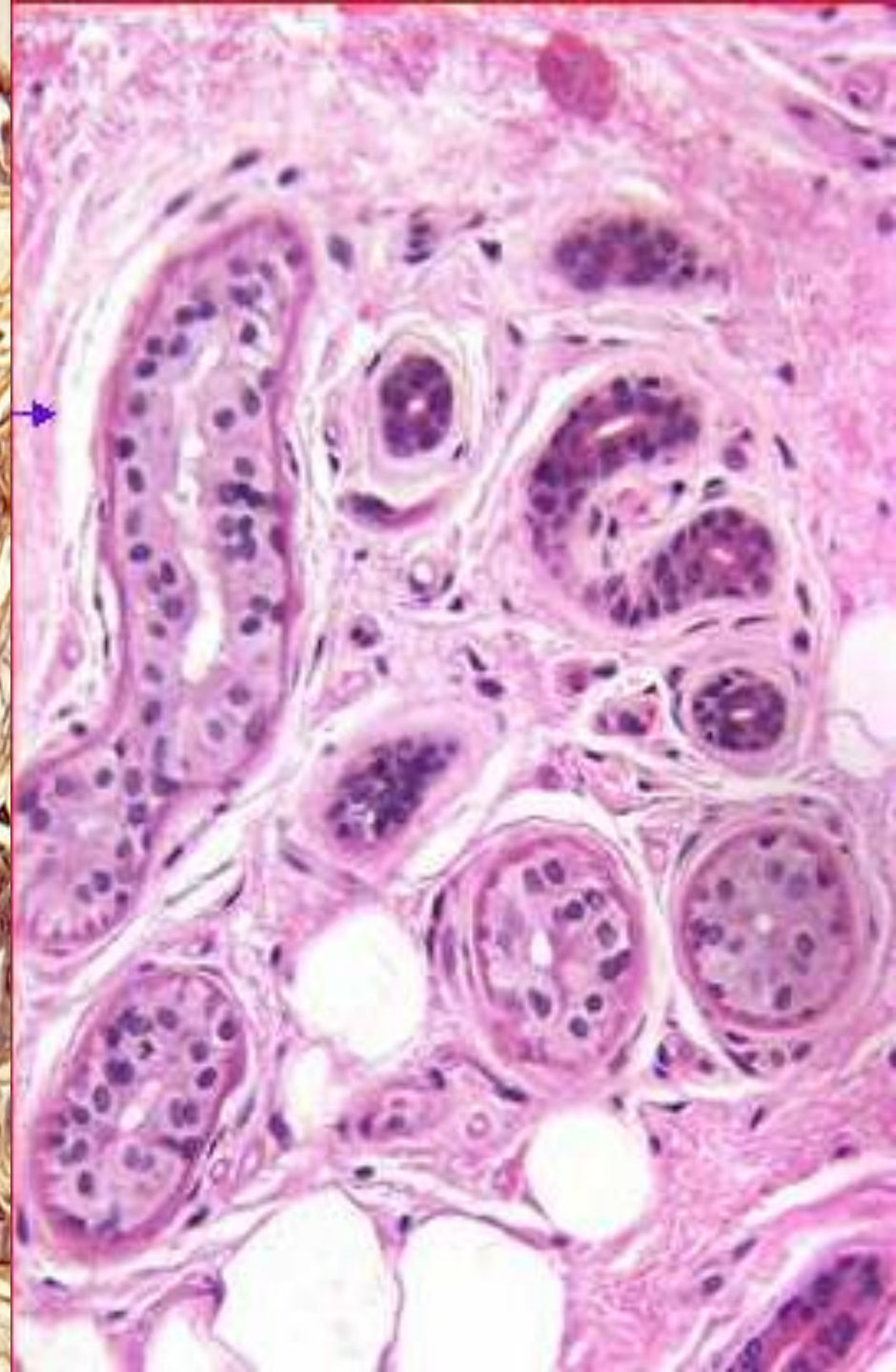
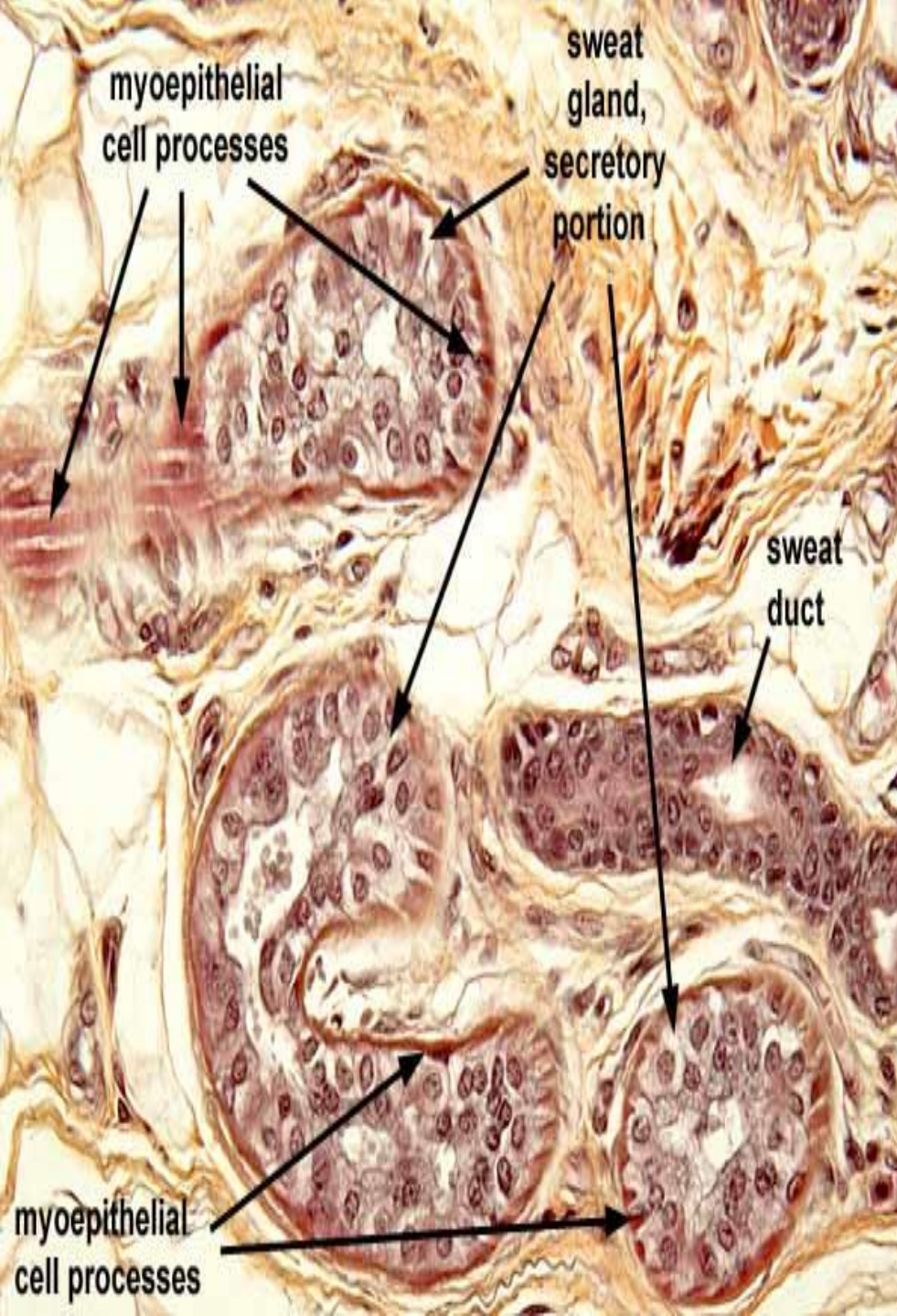
1.Clear cells, Pale pyramidal or columnar produce the sweat, having abundant mitochondria and microvilli to provide large surface areas.

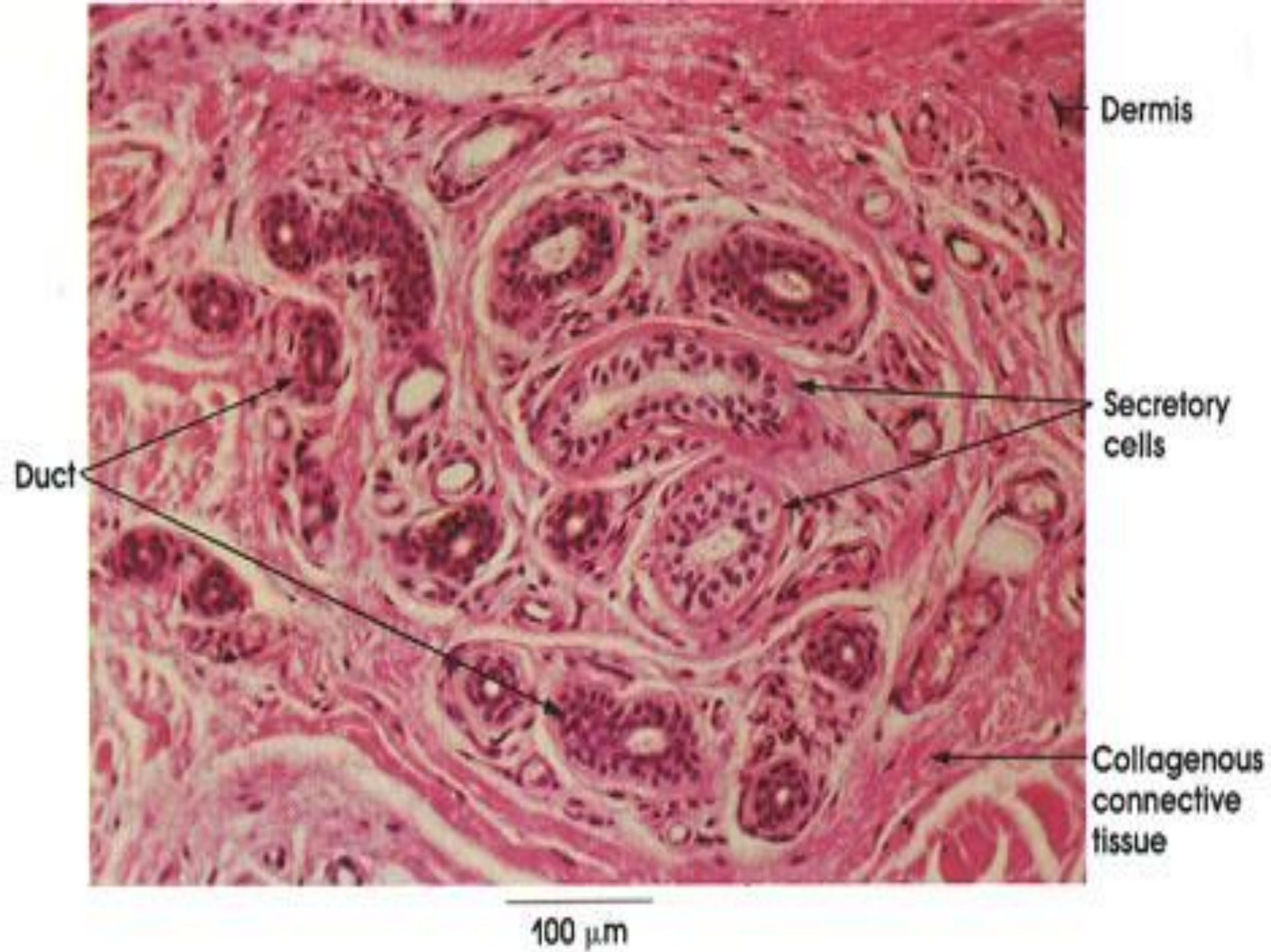
2.Dark cells are pyramidal which line most of the luminal surface and do not touch the basal lamina are mucoid whose functions are not well-understood but include components of innate immunity with bactericidal activity.

3.Myoepithelial cells on the basal lamina produce contractions that help discharge secretion into the duct.

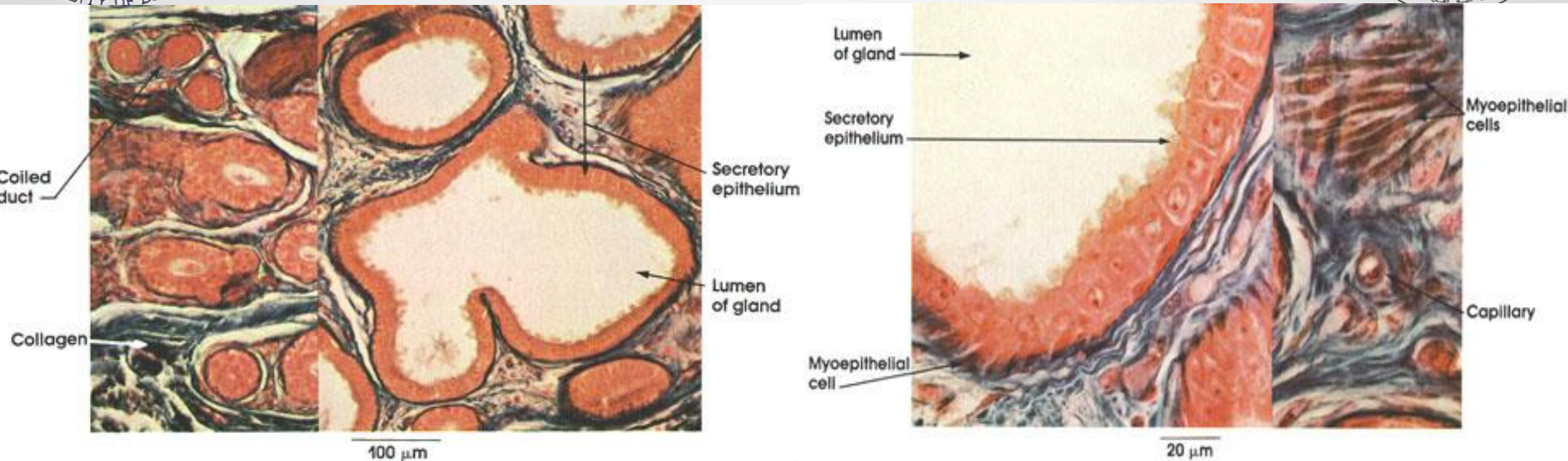
4.The ducts of eccrine sweat glands consist of two layers (stratified cuboidal) of more acidophilic epithelial cells filled with mitochondria







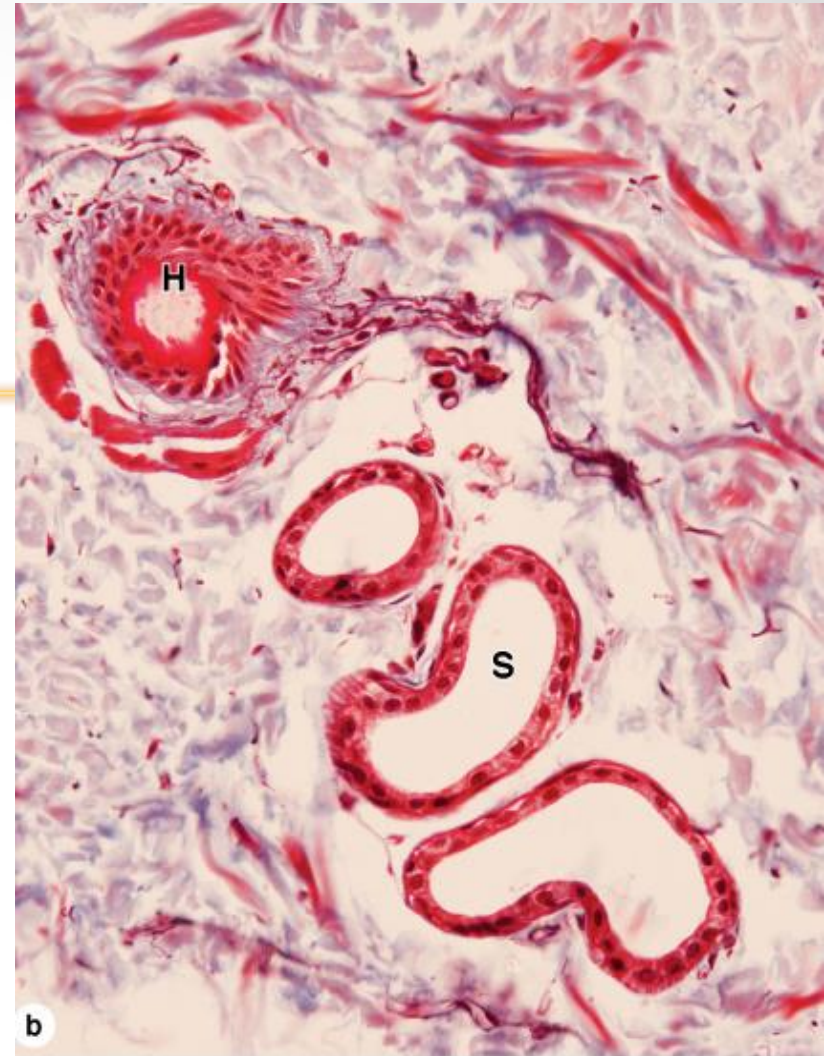
APOCRINE SWEAT GLANDS



1. Are largely confined to skin of the axillary and perineal regions.
2. The most obvious histological difference between the two kinds of sweat glands is the much larger lumen of apocrine glands.
3. The secretory portions of apocrine sweat glands consist of simple cuboidal, eosinophilic cells.
4. The wall of the ducts is similar to that of the eccrine glands.
5. The slightly viscous secretion is initially odorless but may acquire a distinctive odor as a result of bacterial activity..

APOCRINE SWEAT GLANDS


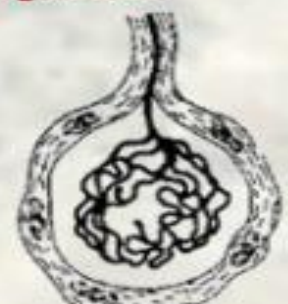
- ❑ Are restricted mainly to the axillae and perineum and produce a more protein-rich secretion.
- ❑ The lumens of apocrine gland secretory portion (S) are much larger than those of eccrine glands and their ducts open into hair follicles (H) rather than to the epidermal surface.







The Skin Receptors

- The skin is the richest organ in sensory receptors which receive information from the outside environment.
- The sensory receptors of the skin are concerned with several senses such as: pain, temperature, touch, and pressure.

	Description	Function	Location
Ruffini Endings (corpuscles) 	<p>These are expanded axon terminals filled with a number of mitochondria and terminal or lamellar Schwann cells</p>	<p>Slowly adapting mechanoreceptor (respond to pressure and stretching).</p>	<p>Deep in the dermis in variable amount. In the periodontal ligament of teeth.</p>
Krause Corpuscle 	<p>Simple encapsulated nerve endings</p>	<p>Respond to tactile stimuli, functioning as mechanoreceptors (respond to pressure).</p>	<p>Lips, tongue, and genitals, and in other skin areas but in variable amount.</p>

Pacinian corpuscle (Vater–Pacini corpuscles)	Description	Function	Location
	<p>Large encapsulated endings that have an onion-like capsule in which the inner core of membrane lamellae is separated from an outer lamella by a fluid-filled space.</p>	<p>Fine touch and vibration. May act as mechanoreceptors in the deeper organs.</p>	<p>Deep layers of dermis in both hairy and glabrous skin. Located in the subcutaneous tissue In the connective tissue of deep organs.</p>

Meissner Corpuscle	Description	Function	Location
	<p>Elongated receptors formed by a connective tissue capsule that comprises several lamellae of Schwann cells.</p> <p>The center of the capsule contains one or more afferent nerve fibers that generate rapidly adapting action potentials following minimal skin depression.</p>	<p>The most common mechanoreceptors in thick skin.</p>	<p>Lie between the dermal papillae just beneath the epidermis of the fingers, palms, and soles.</p> <p>They represent about 40% of the sensory innervation of the human hand.</p>