EEOB 3520
Lab 7 – Integumentary System and Oral Cavity

A bit about the skin or integument

- principal layers
  epidermis: surface epithelium
  dermis or corium: underlying connective tissue
  hypodermis: loose connective tissue beneath dermis;
    technically not a part of the skin but minimizes skin
    injuries by allowing it to move over underlying structures

Epidermis includes 4 or 5 layers of keratinocytes

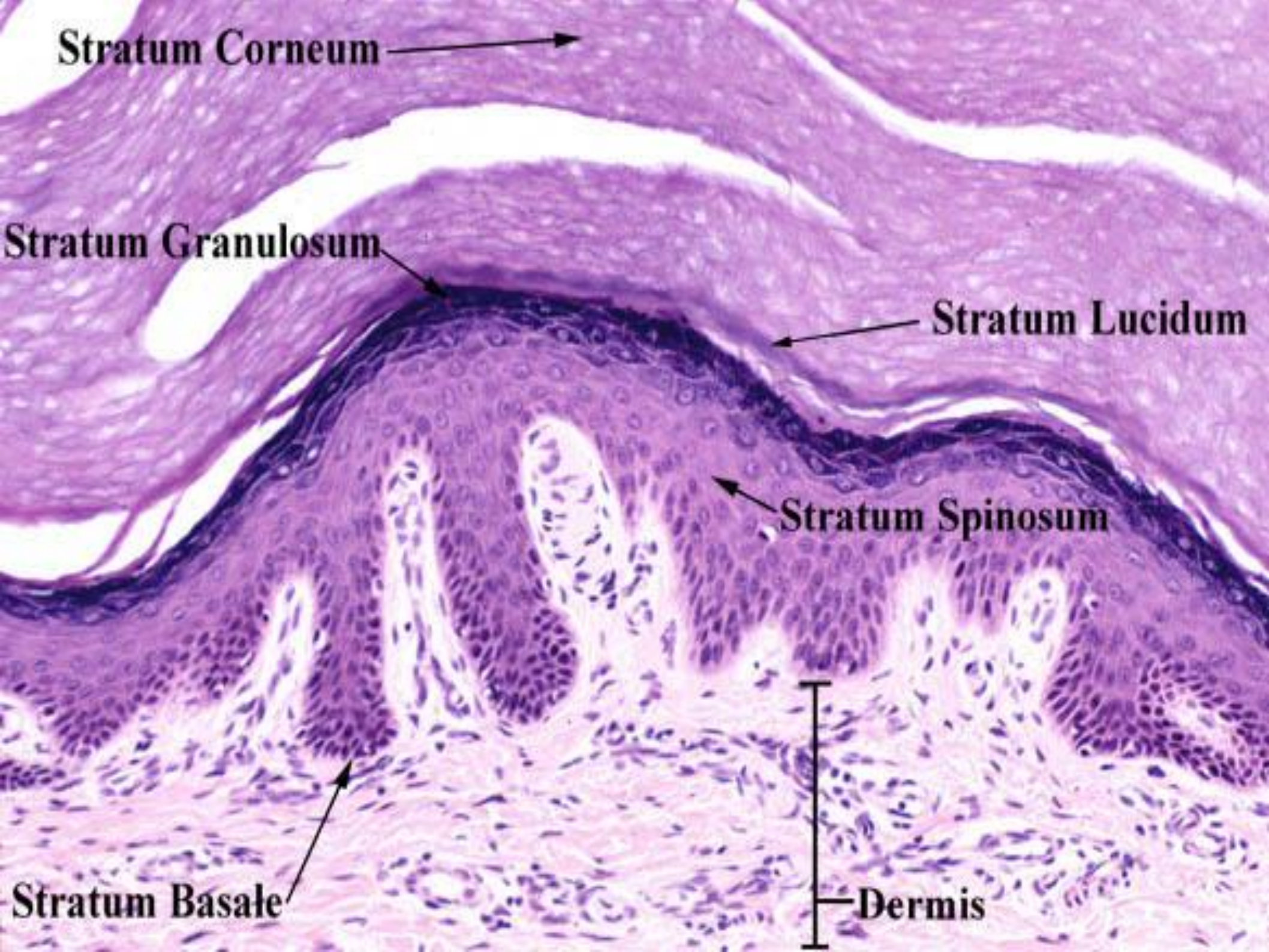
- **stratum basale**:
  - single layer of cells resting on the ***basal lamina***;
  - cells are ***cuboidal***, with a large nucleus, and ***basophilic cytoplasm***
  - cells in mitosis are common

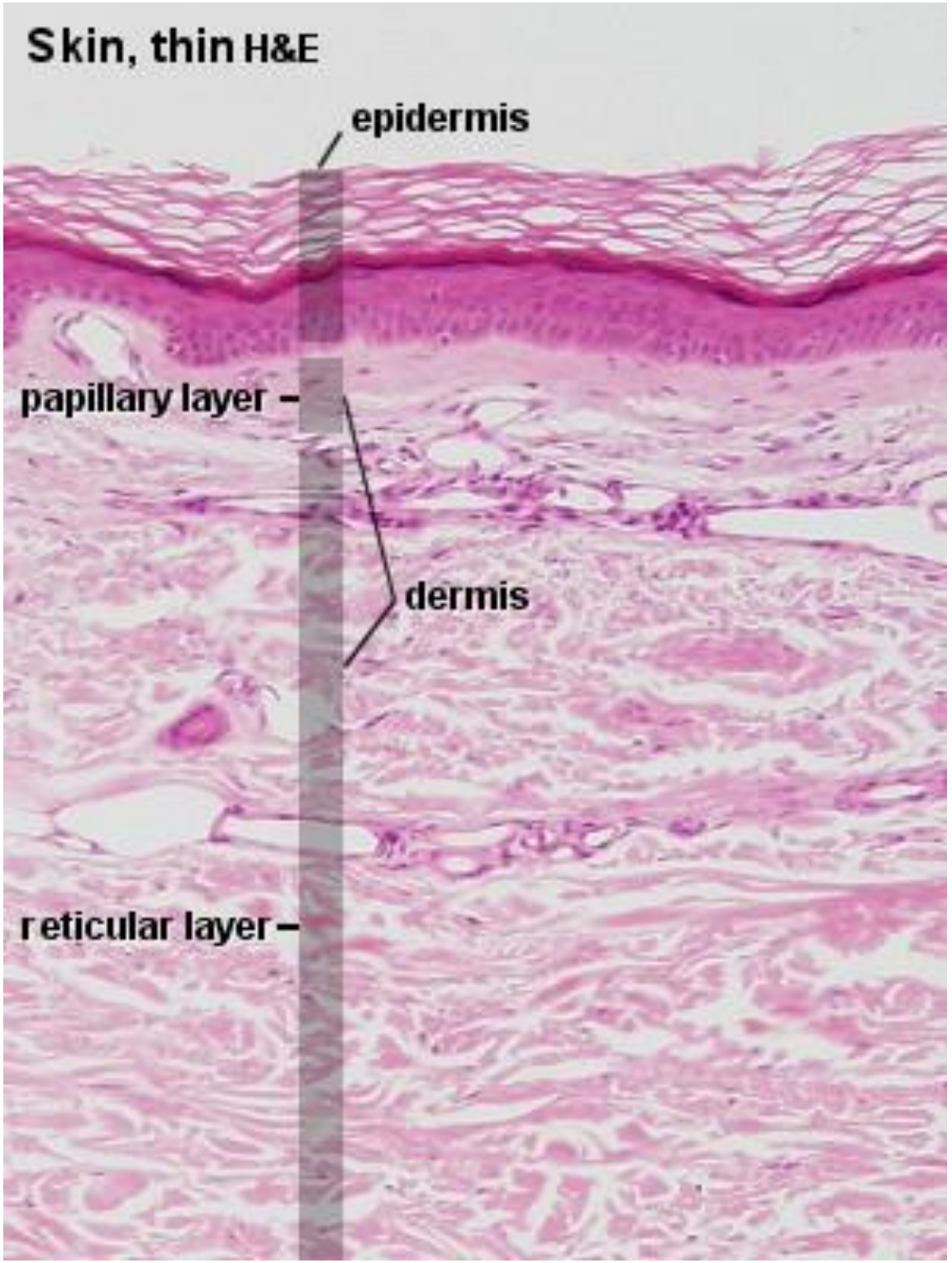
- **stratum spinosum**:
  - 4 to 6 rows of cells that are flatter, polyhedral, with the long axis parallel to the surface, and less basophilic cytoplasm;
  - present bundles of keratin radiating from the perinuclear region and end along the boundary between adjacent cells

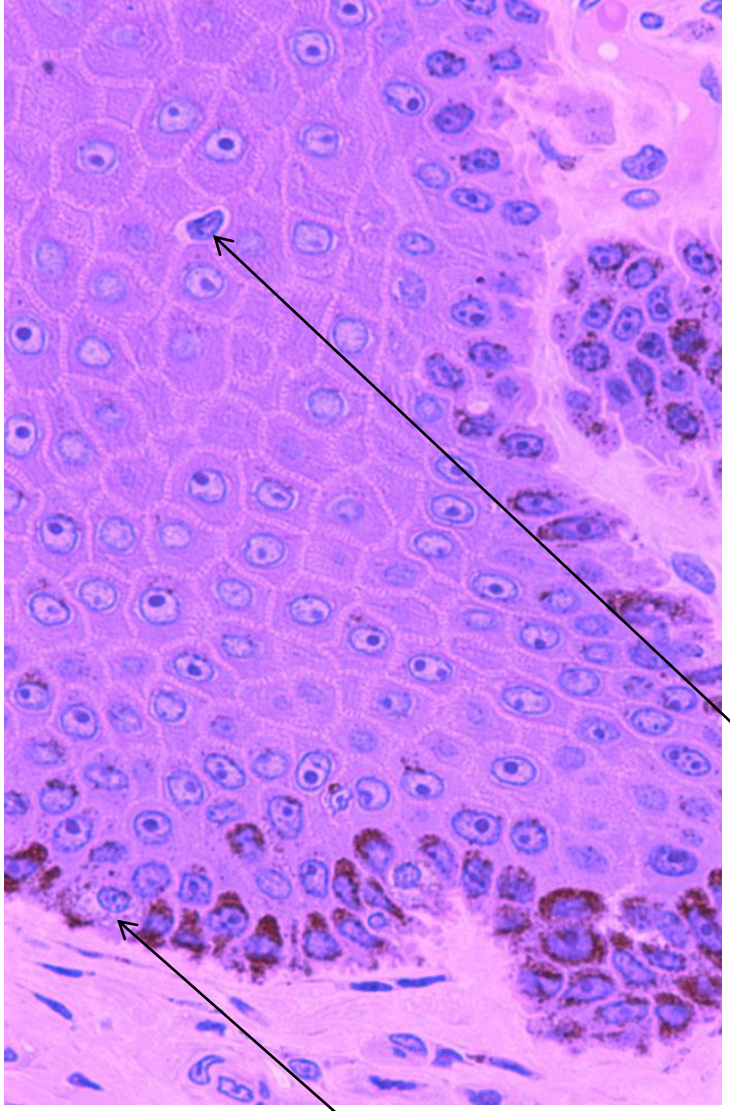
- **stratum granulosum**:
  - 3 to 5 layers of cells considerably flatter and with keratohyalin granules in their cytoplasm, which are basophilic and do not have a limiting membrane (*nothing clearly separating granulosum from other layers*)

- **stratum corneum**:
  - multiple rows of very flat, dead cells, with no nucleus or organelles, and the cytoplasm completely filled with keratin; inner layer of cells still continuous with each other, but outer row cells break loose from one another

- **stratum lucidum**: is present between s.granulosum and s.corneum in thick skin (palms of hands & soles of feet); 1 or 2 rows of flat, translucent keratinocytes

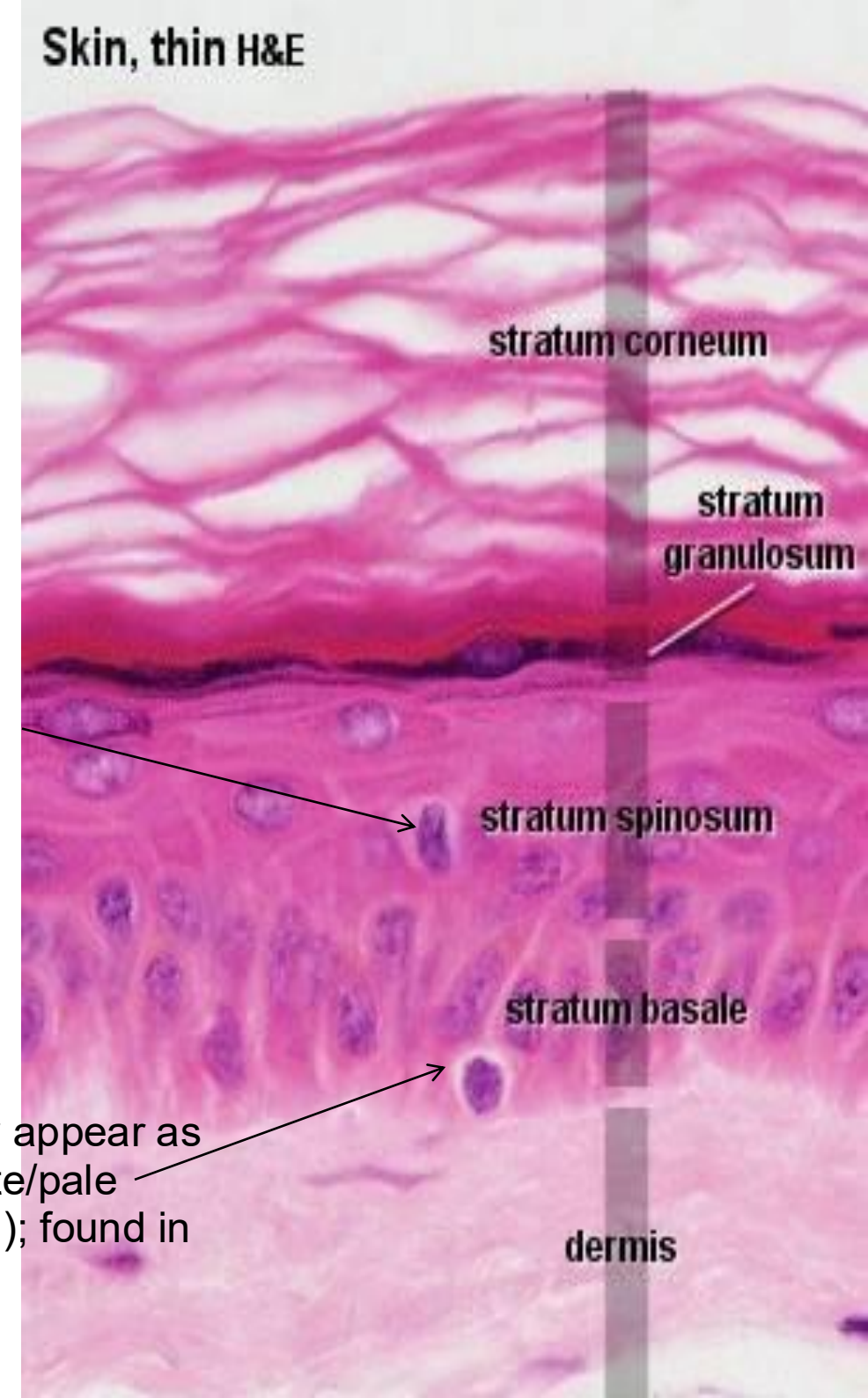

Stratum Corneum
Stratum Granulosum
Stratum Lucidum
Stratum Spinosum
Stratum Basale
Dermis


Skin, thin H&E
epidermis
papillary layer
dermis
reticular layer



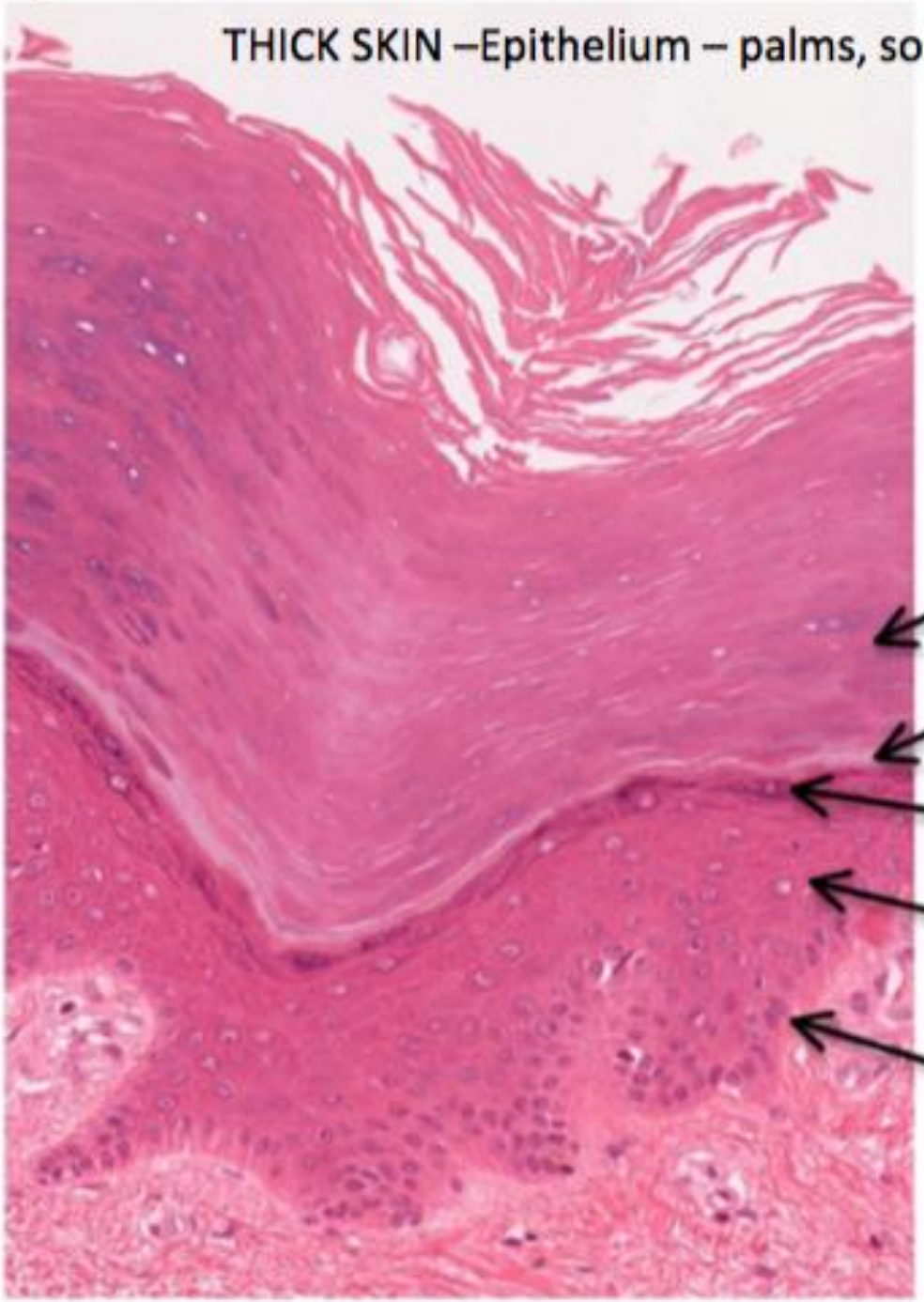
Langerhans cell – resident macrophage or antigen-presenting cell; found in stratum spinosum

melanocyte – typically appear as dark nucleus with white/pale cytoplasm (not brown!); found in stratum basale



Epidermis

THICK SKIN –Epithelium – palms, soles feet (where there is most abrasion)



Stratified squamous keratinised epithelium

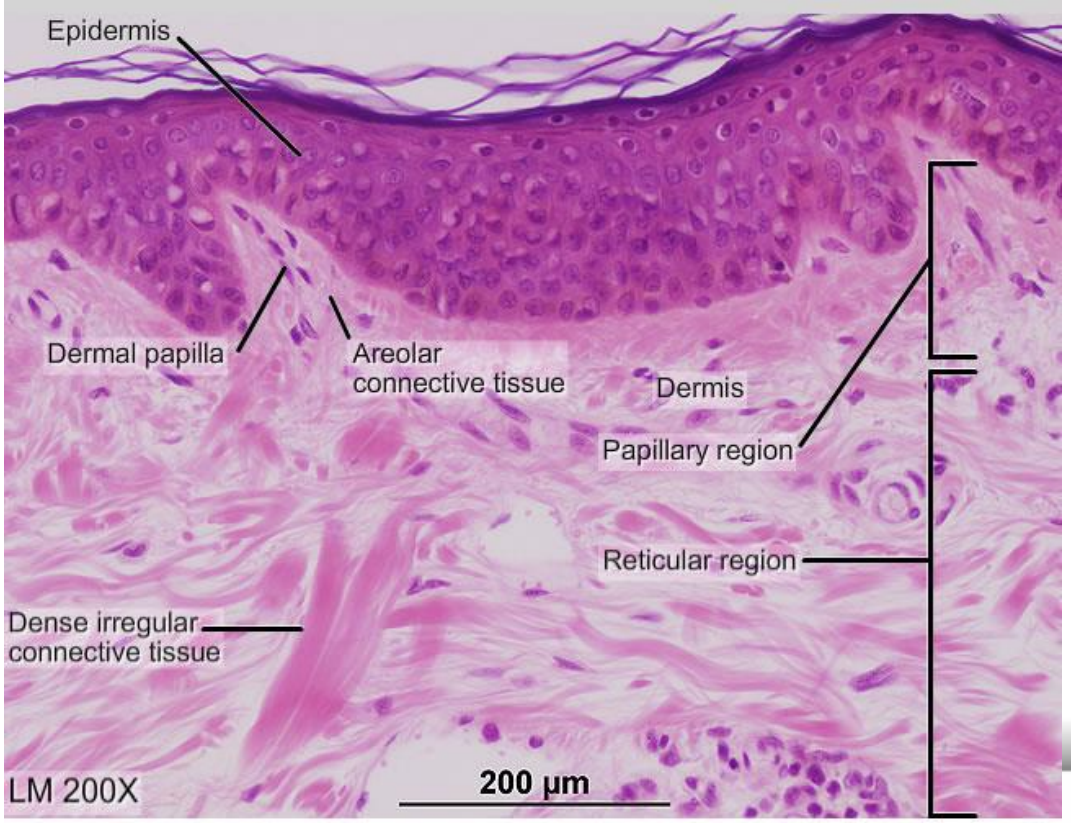
(Not present in thin skin
majority of body skin)

The dermis is the layer of connective tissue beneath the epidermis

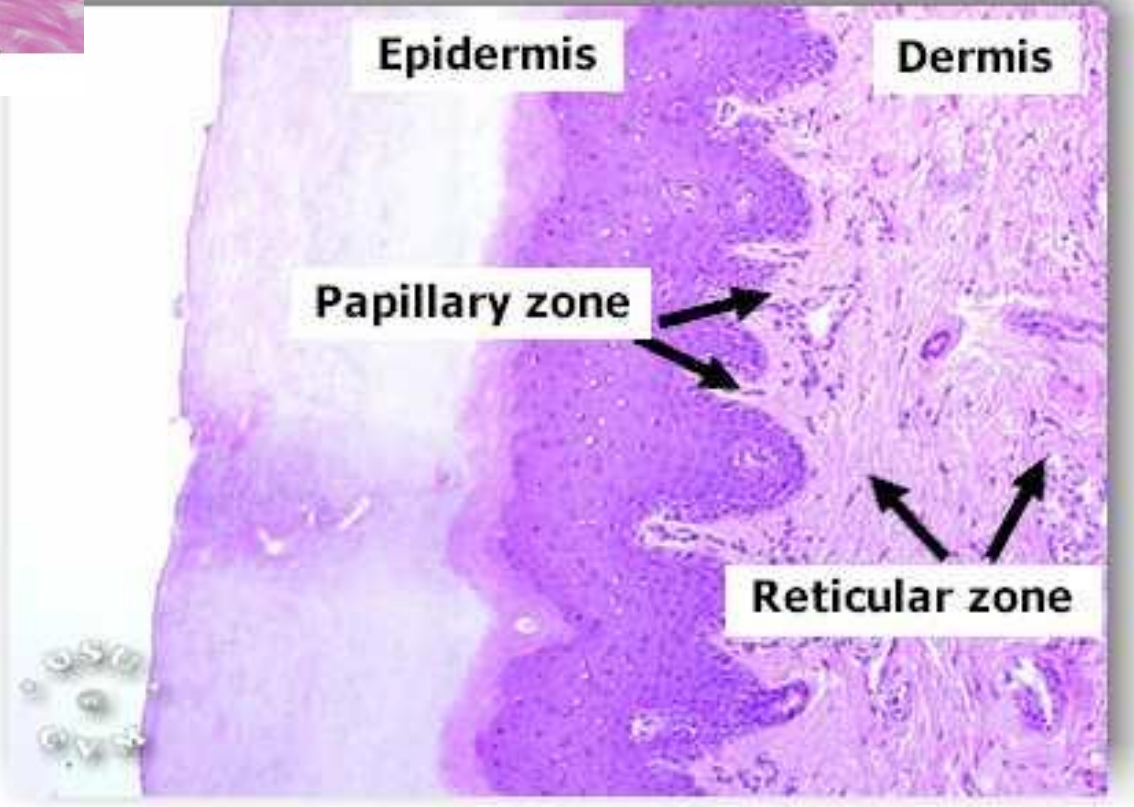
Dermis includes two layers

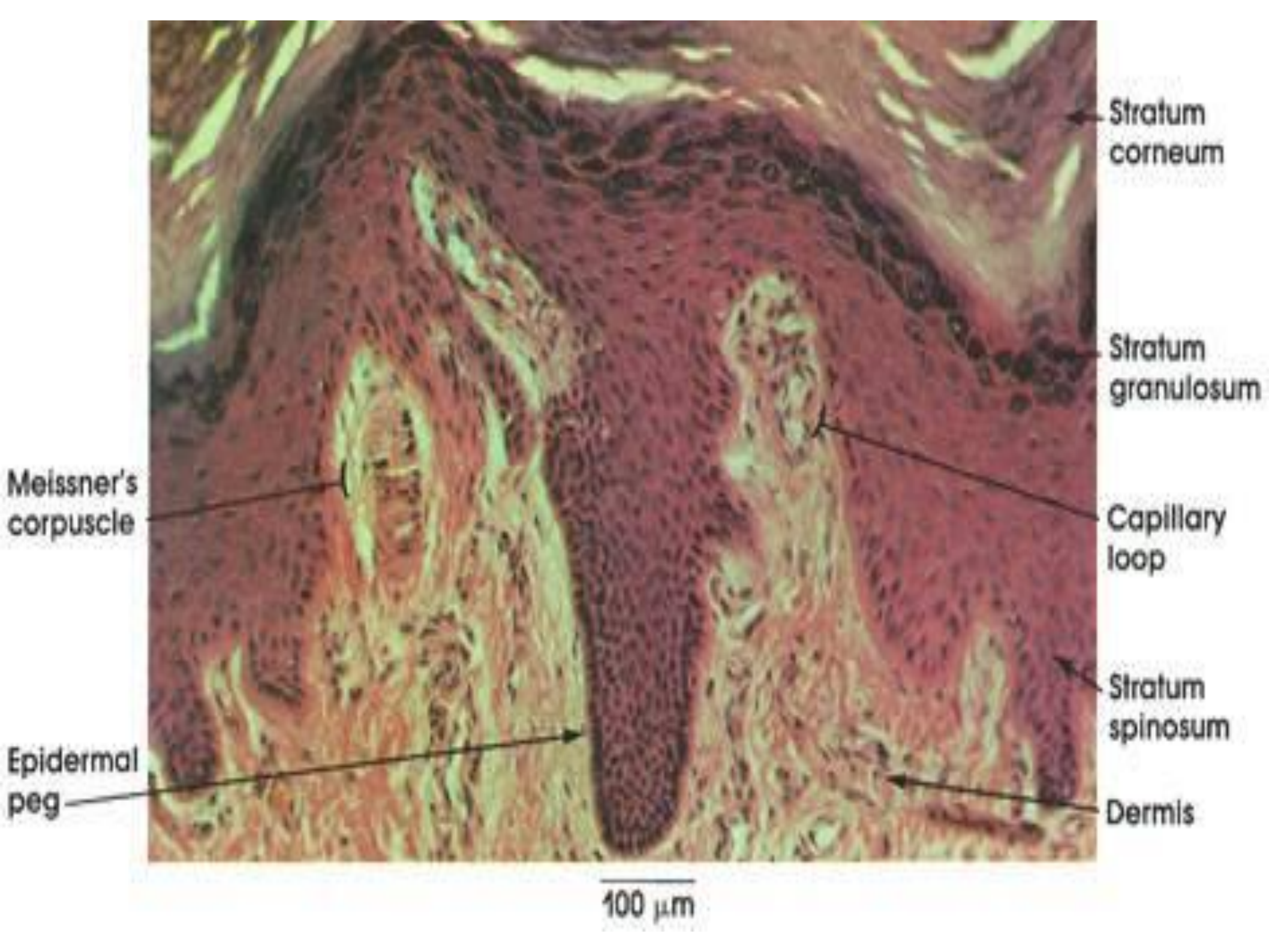
- **<u>papillary layer</u>**
  - conical dermal papillae project upwards into the epidermis; in thick skin, papillae grouped within a dermal ridge
  - **fibroblasts** widely distributed among interlacing thin bundles of **collagen fibers** (III), and a loose network of **elastic fibers**;
  - many capillaries present
  - **Meissner's corpuscles** found in papillae of hairless/thick skin

- **<u>reticular layer</u>**
  - thicker, made up of closely packed , coarser bundles of **collagen fibers** (II);
  - spaces between bundles occupied by amorphous extracellular matrix;
  - **fibroblasts**, **macrophages**, **lymphocytes**, and **mast cells** present
  - note: NOT reticular tissue!



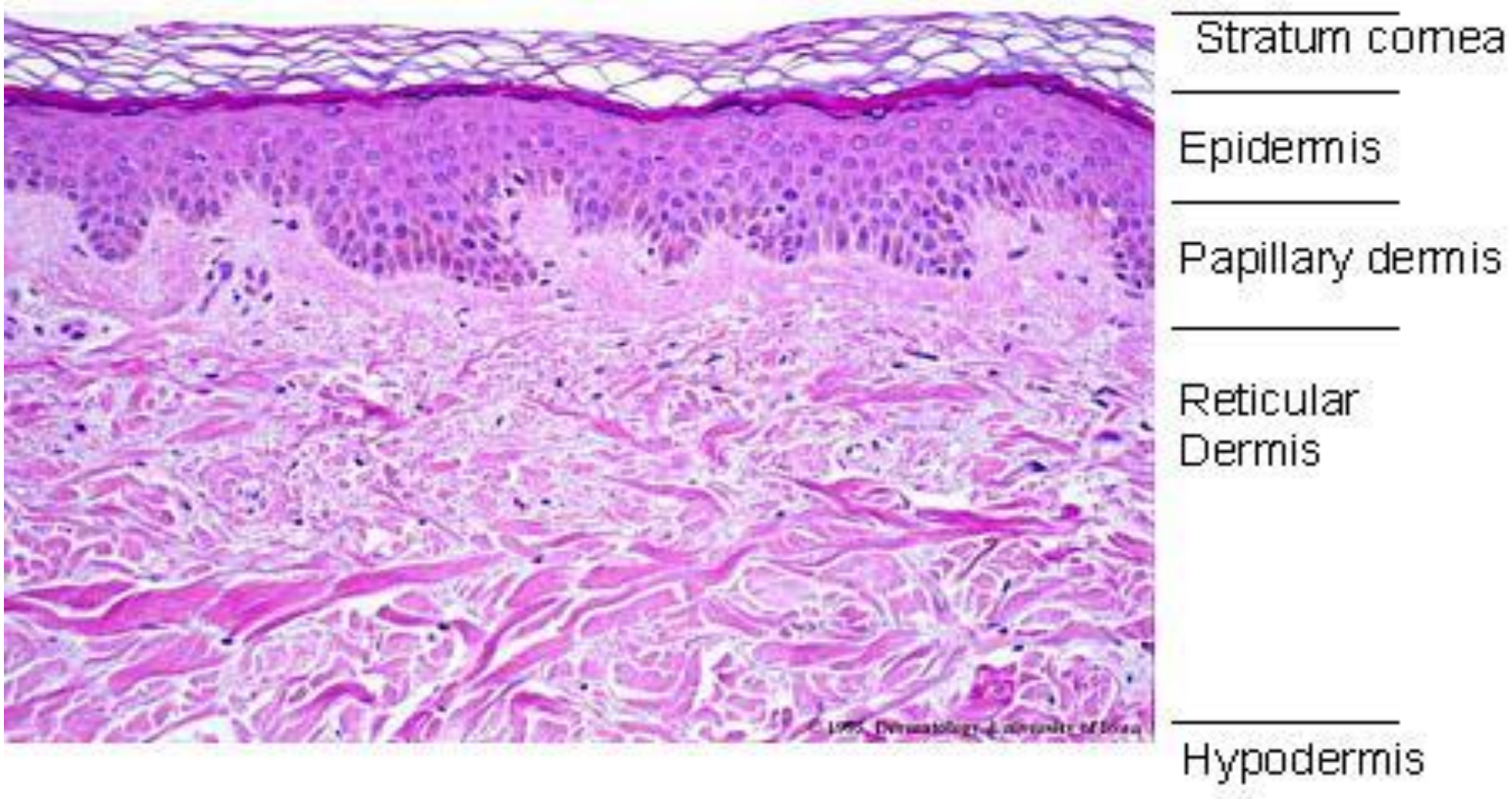
Light micrograph of skin.

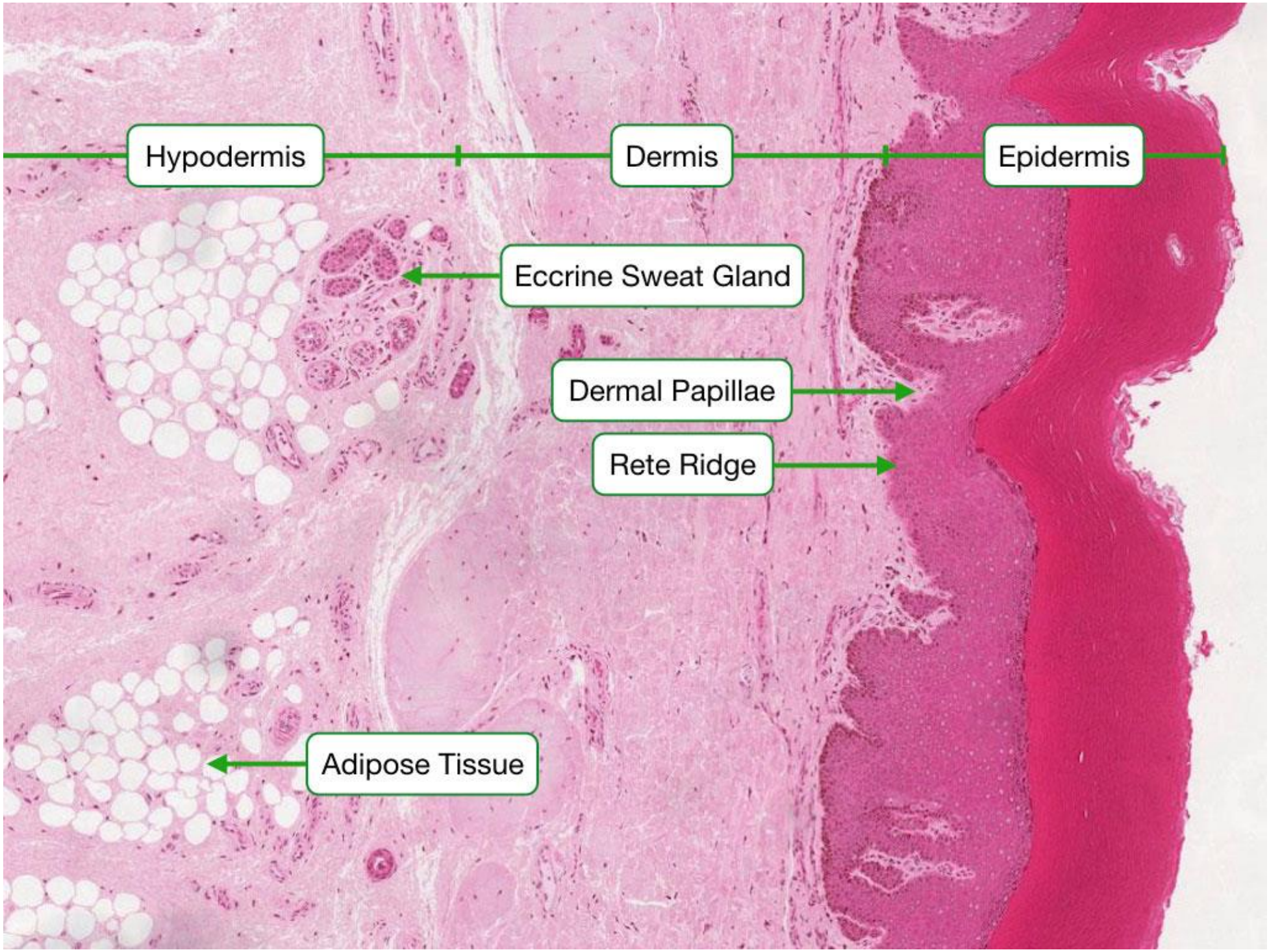



Stratum corneum
Stratum granulosum
Meissner's corpuscle
Capillary loop
Stratum spinosum
Epidermal peg
Dermis
100 μm

Hypodermis

•loose connective tissue, with bundles of **collagen fibers** parallel to the surface of the skin
•can allow some mobility of the skin or anchor it
•**adipose cells** can form a layer (panniculus adiposus)




Hypodermis
Dermis
Epidermis
Eccrine Sweat Gland
Dermal Papillae
Rete Ridge
Adipose Tissue

Skin appendages

HAIR

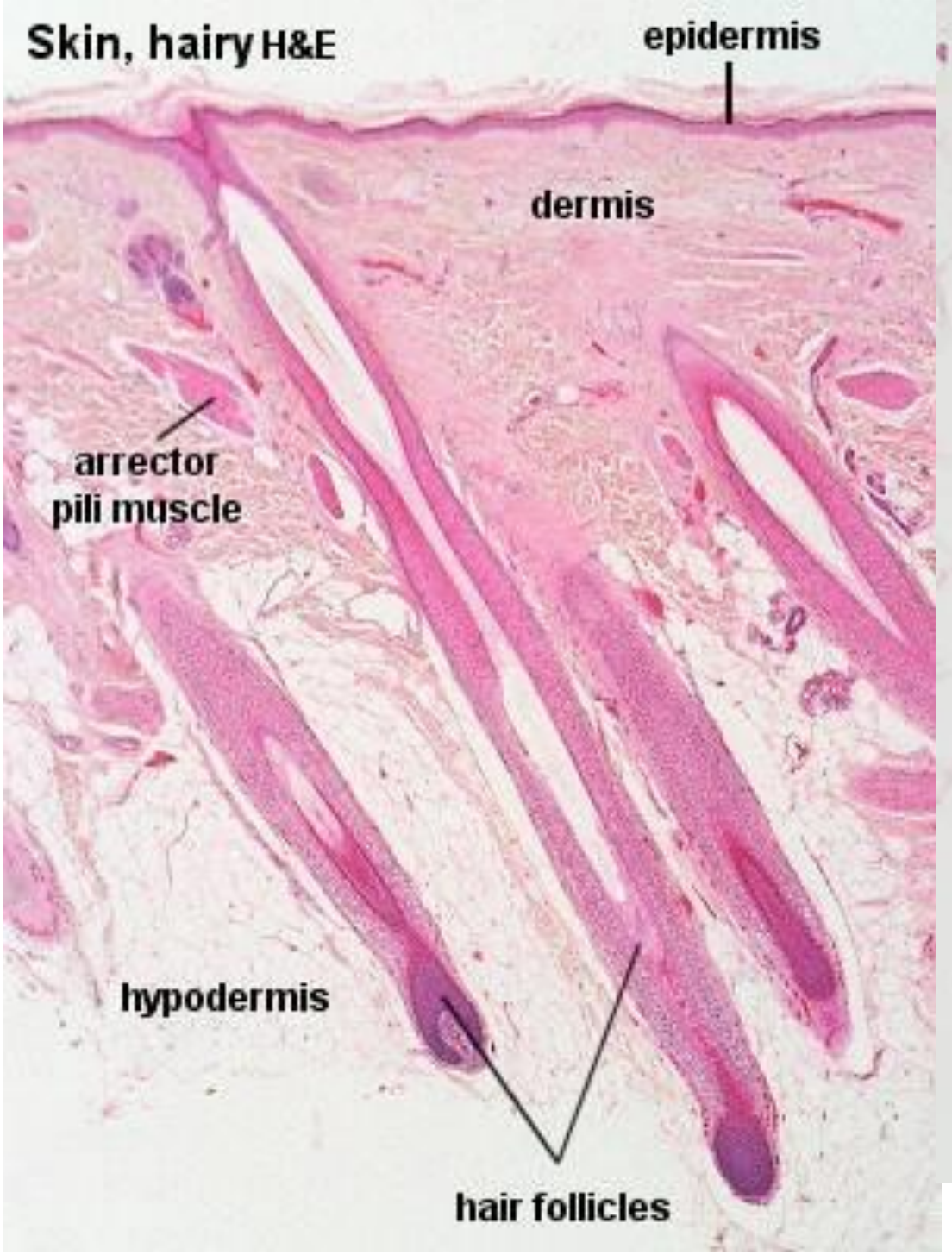
- develops in deep invaginations of the epidermis (follicles) which extend downwards into the dermis and sometimes into the subcutaneuos tissue

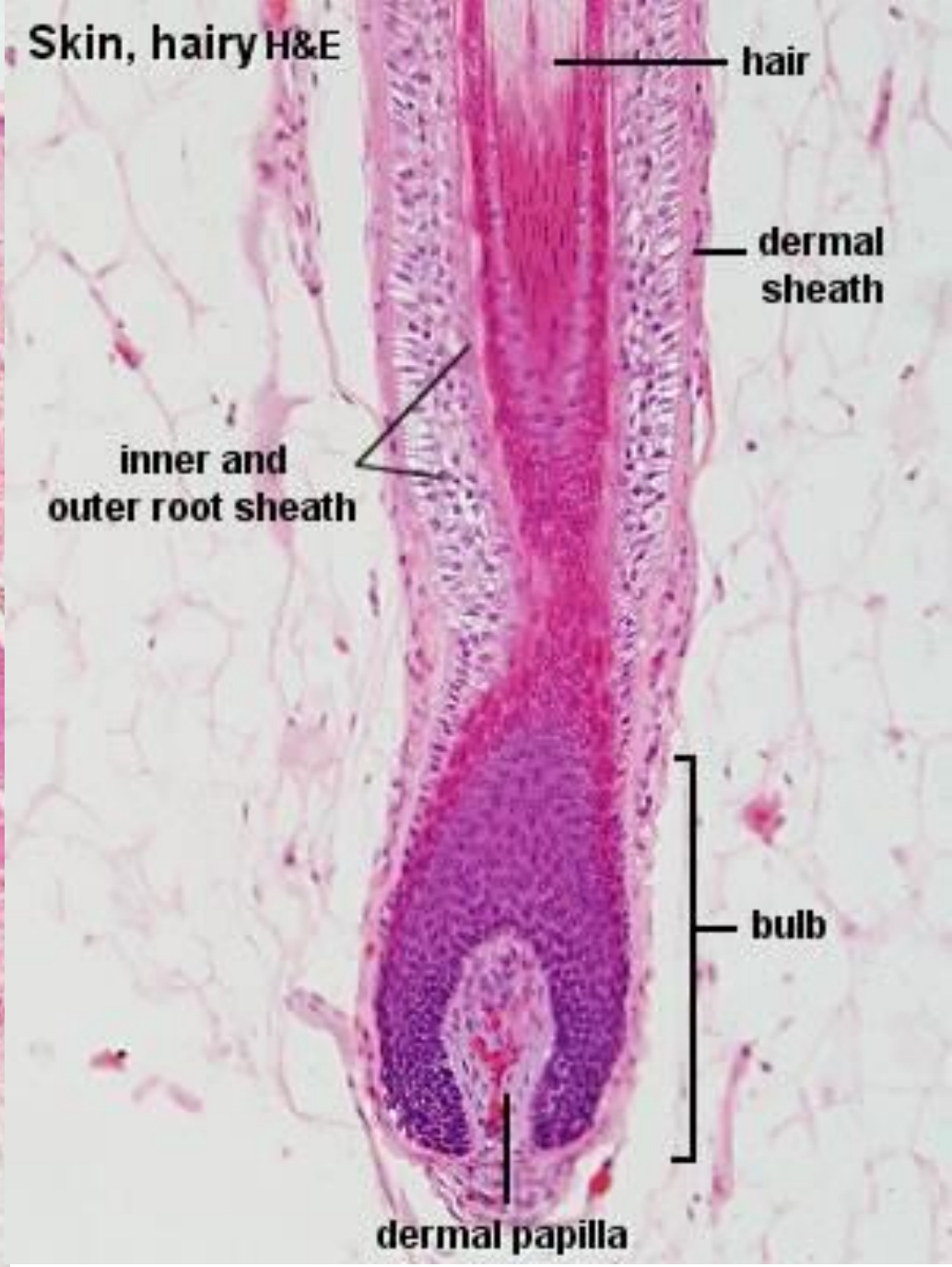
- active hair follicles have a **terminal expansion** (hair bulb)
  - on their underside there is a **papilla of dermal connective tissue** (nutrients to the hair diffuse from the papilla)

- epithelial cells of the hair bulb around the papilla proliferate and differentiate to form the hair
    - cells right above the papilla give origin to those forming the **medulla**
    - cells lateral to these form heavily keratinized cells that make up the **cortex**
    - lateral to these are the cells that form the **cuticle**
    - cell close to the periphery of the bulb form an **internal root sheath**;
    - the outermost layer of cells in the bulb form the **external root sheath**, which is continuous with the stratum basale of the epidermis

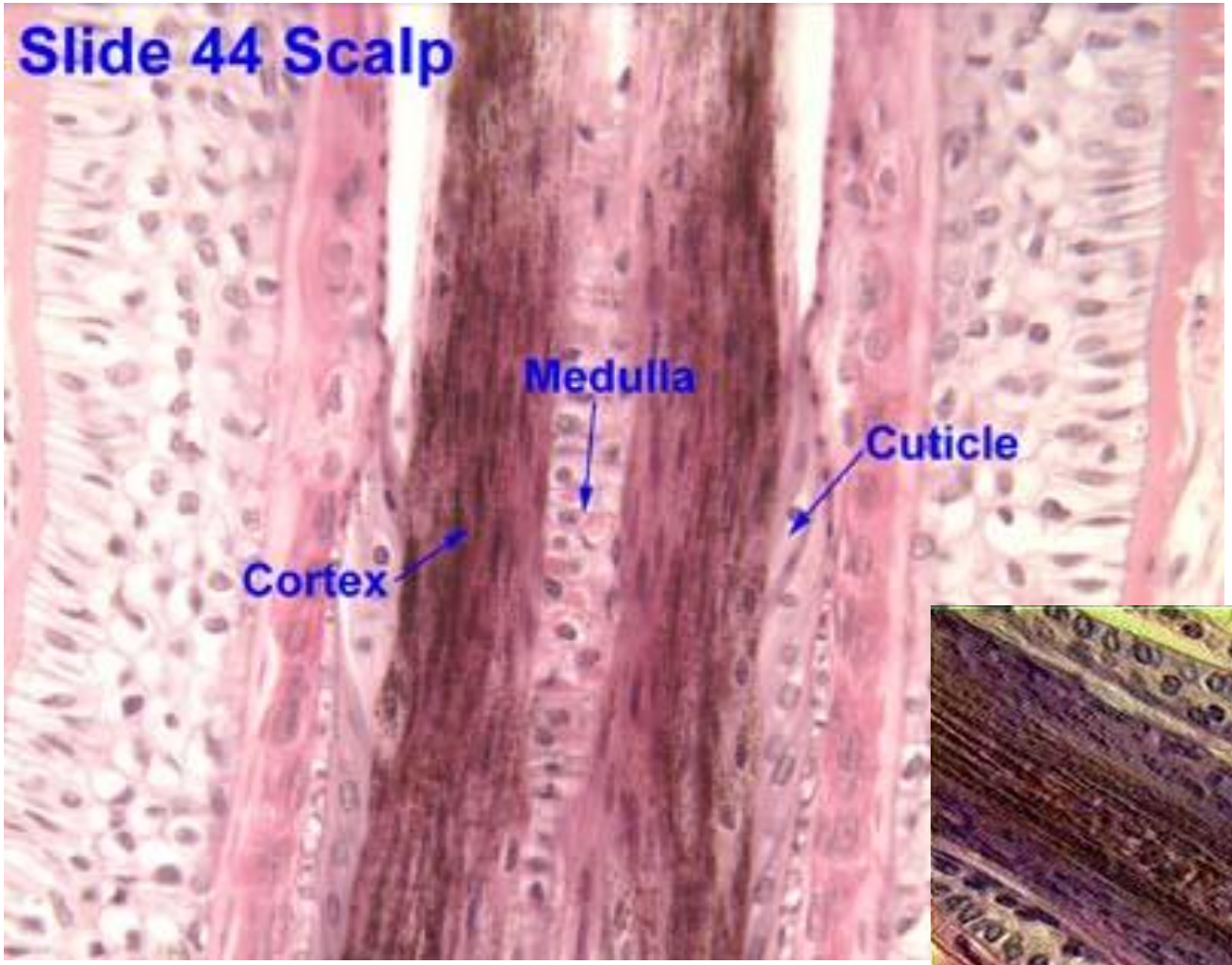
- the follicle is surrounded by a condensation of fibrous components of the dermis

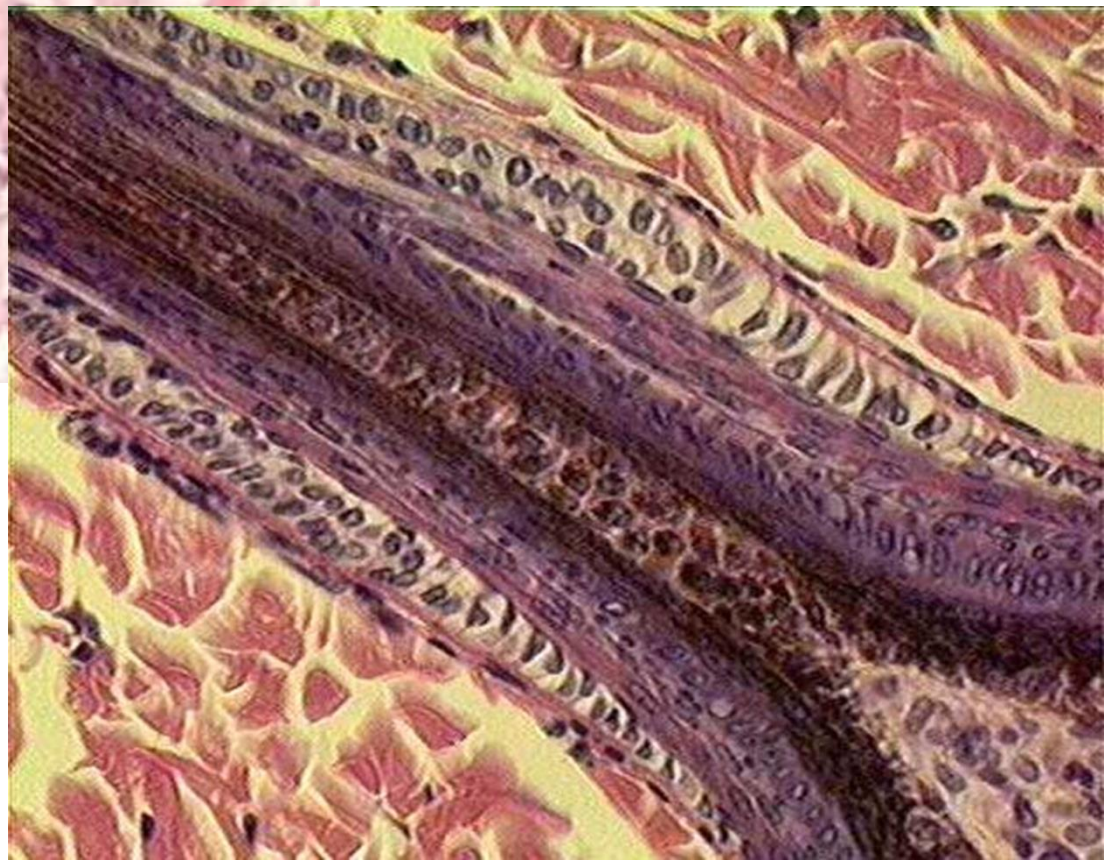
- An arrector pili muscle is associated with each follicle; small smooth muscle attaching to understide of epidermis





Stratum basale divide forming the hair follicle.


Slide 44 Scalp
Medulla
Cuticle
Cortex



Skin appendages

NAILS

- plates of closely **compacted hard keratin**
- formed by proliferation and keratinization of epithelial cells in a nail matrix

SEBACEOUS GLANDS

- appendages of the hair follicles, but some exist on hairless skin (e.g. lips)
- ducts open into the follicular canal around the hair shaft
- **secrete sebum** - lipid/oily substance released by holocrine secretion
- acini without lumen: production of sebum involves loss of whole cells and their content;





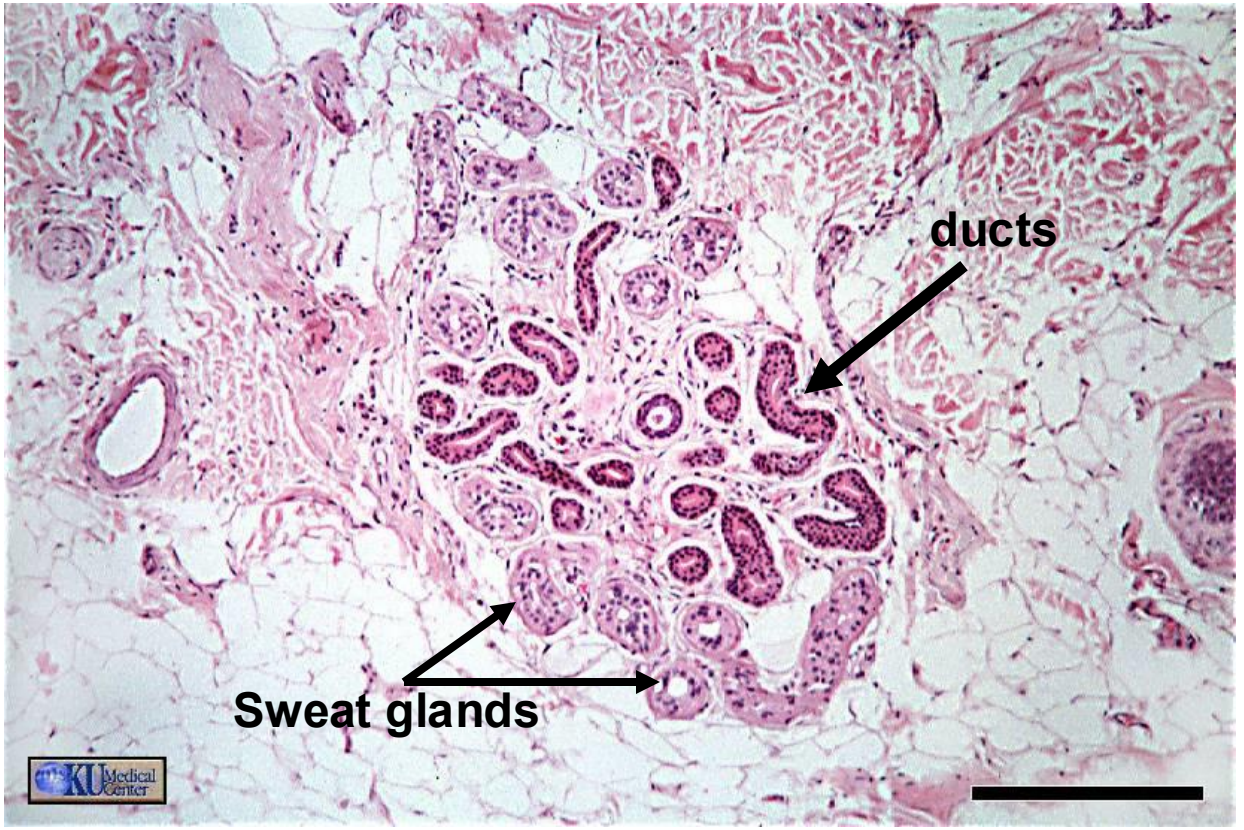

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Skin appendages

Sweat glands – two types

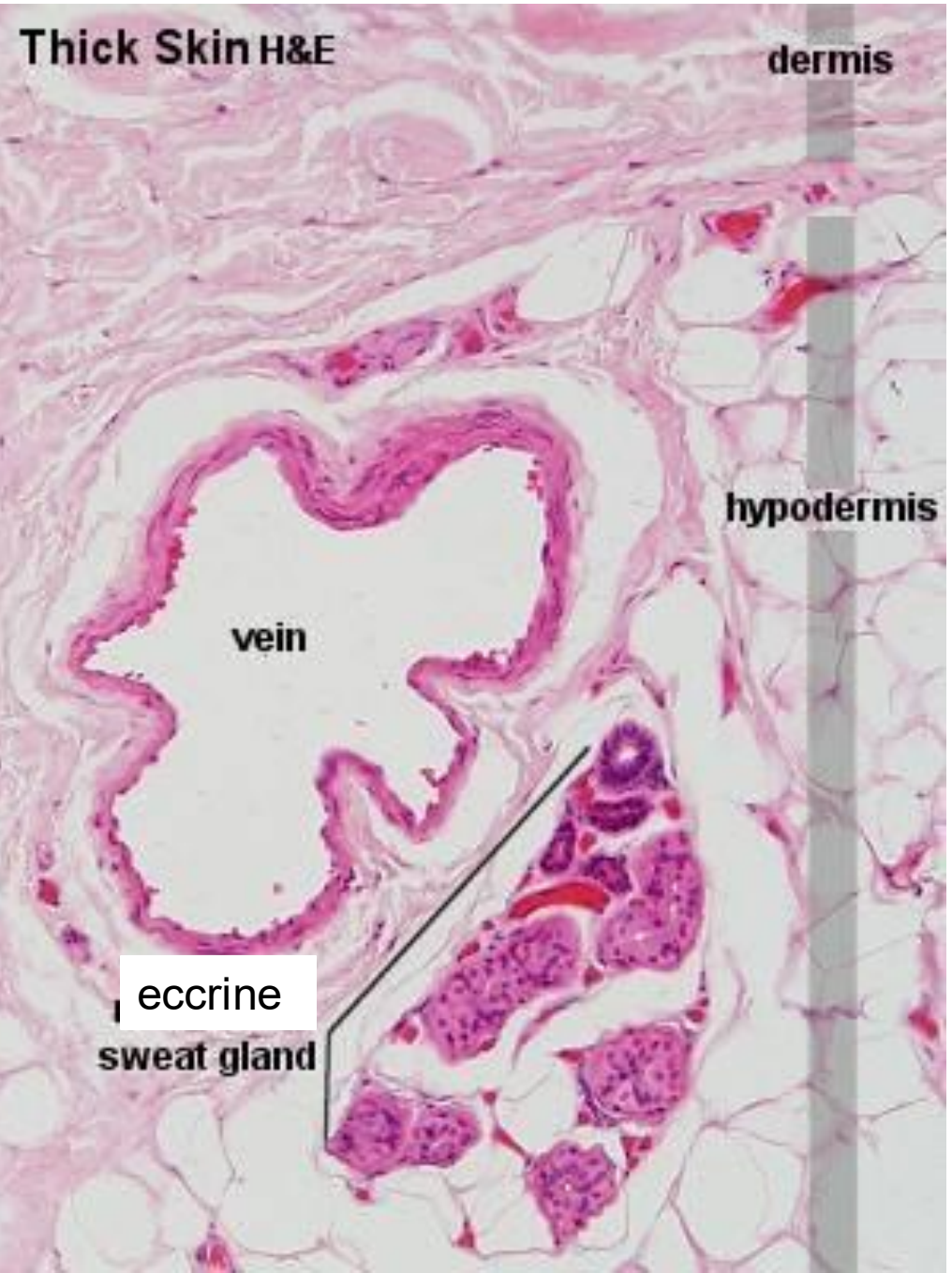
- **Eccrine** (merocrine): coiled, tubular; secretory portion in dermis or hypodermis; open into a sweat pore in the skin surface

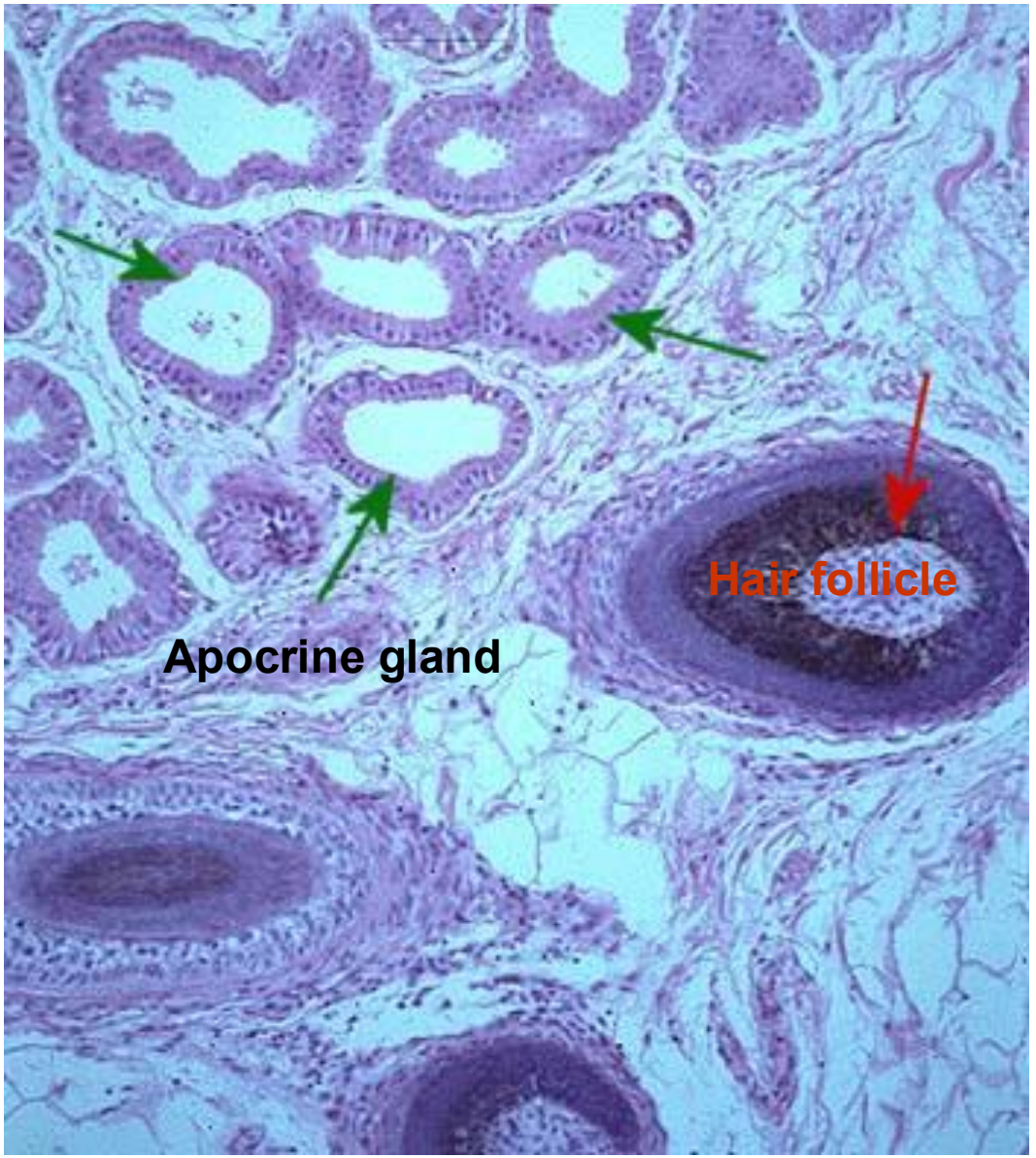
- **apocrine** : located deep in the dermis; larger than eccrine; ducts open in the canal of hair follicle



Ducts are stained darker than sweat glands

Sweat Glands



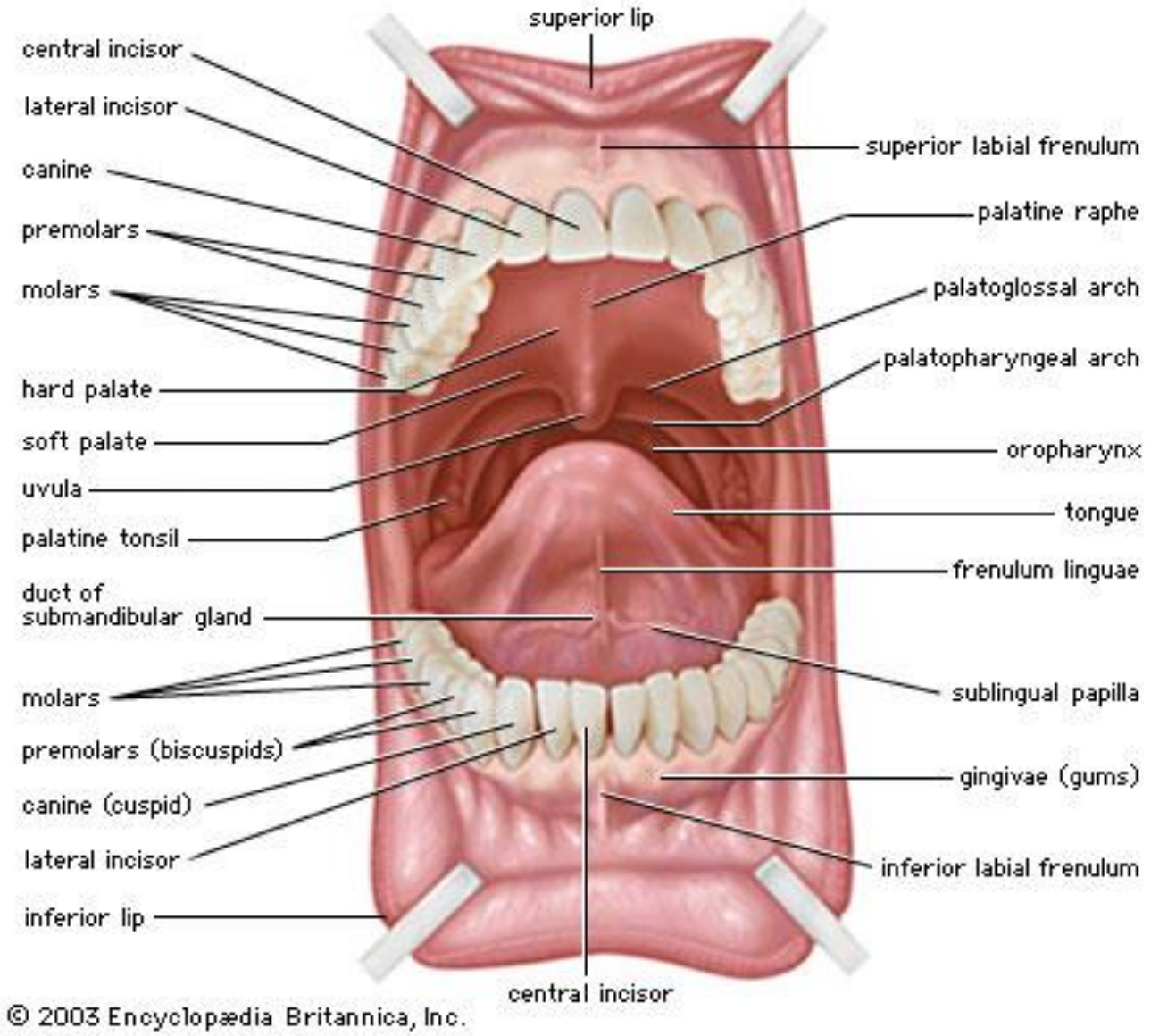


Oral Cavity

Food is mechanically fragmented by teeth, chemically modified by secretions of the salivary glands, and lubricated for its passage through the esophagus to the stomach

Oral cavity is limited above/dorsally by soft and hard palate, laterally by the cheeks, and below/ventrally by the tongue and floor of the mouth

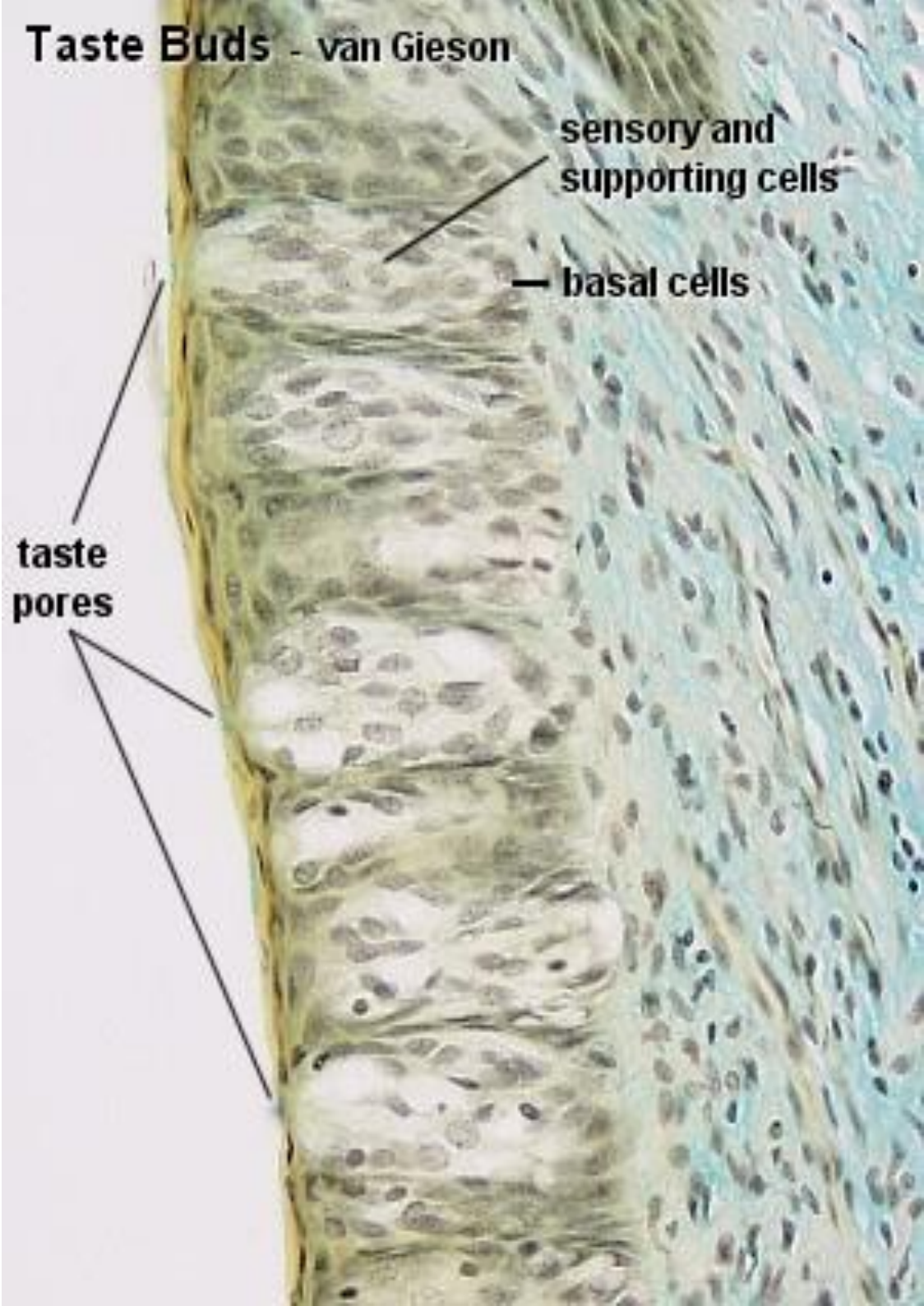
Oral cavity is lined by stratified squamous epithelium throughout, but thickness and degree of keratinization varies from region to region.



Tongue

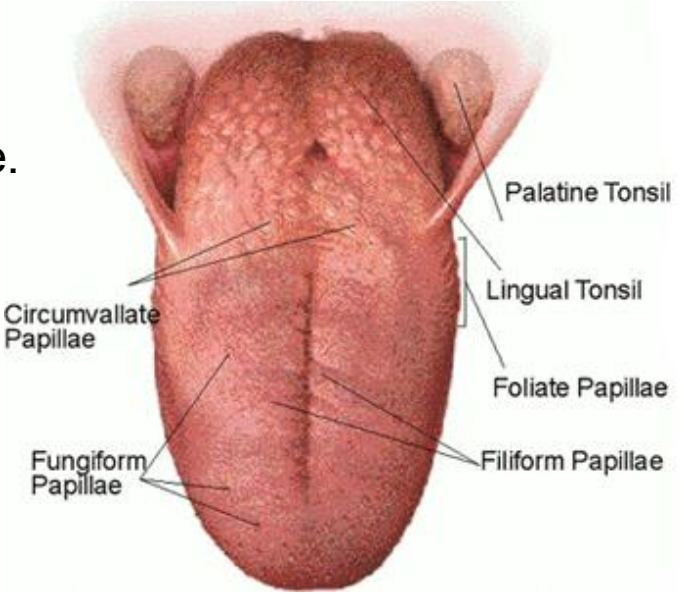
Taste buds:

- small **neurosensory bodies** in the epithelium of certain papillae;
- pale, ovoid bodies of about 50-75 cells with tapering apices converging on small depression in the surface of the epithelium which is the taste pore



Tongue

Longitudinal, horizontal, and vertical bundles of skeletal muscle make up most of the tissue of the tongue. The epithelium on the upper surface is covered by projections known as lingual papillae.



filiform papillae:

- slender, conical projections of the epithelium, with their tips towards the back of the tongue; most numerous but lack taste buds

fungiform papillae:

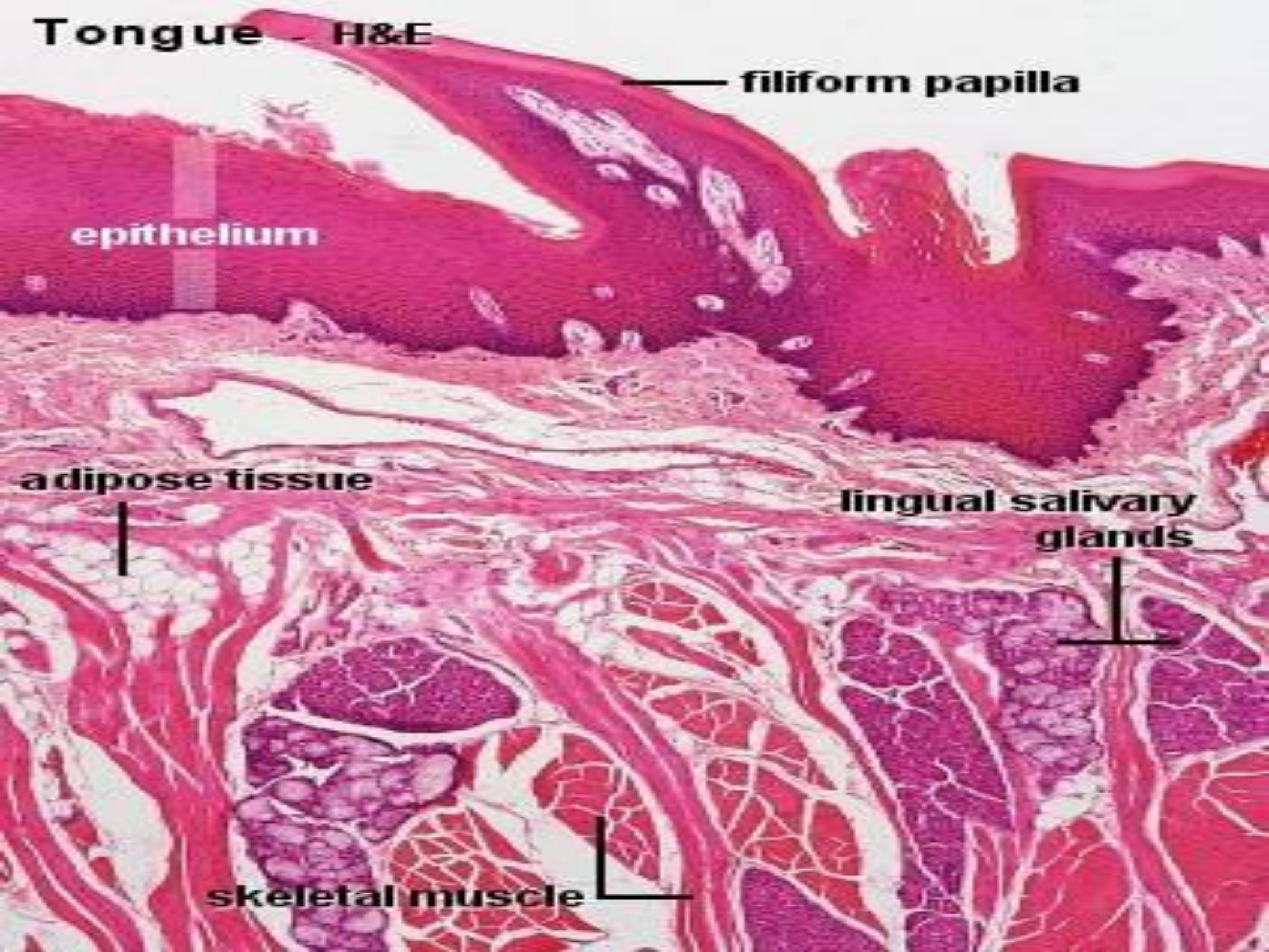
- widely scattered; have a connective tissue core
- relatively narrow base and hemispherical upper portion with taste buds in the epithelium

circumvallate papillae:

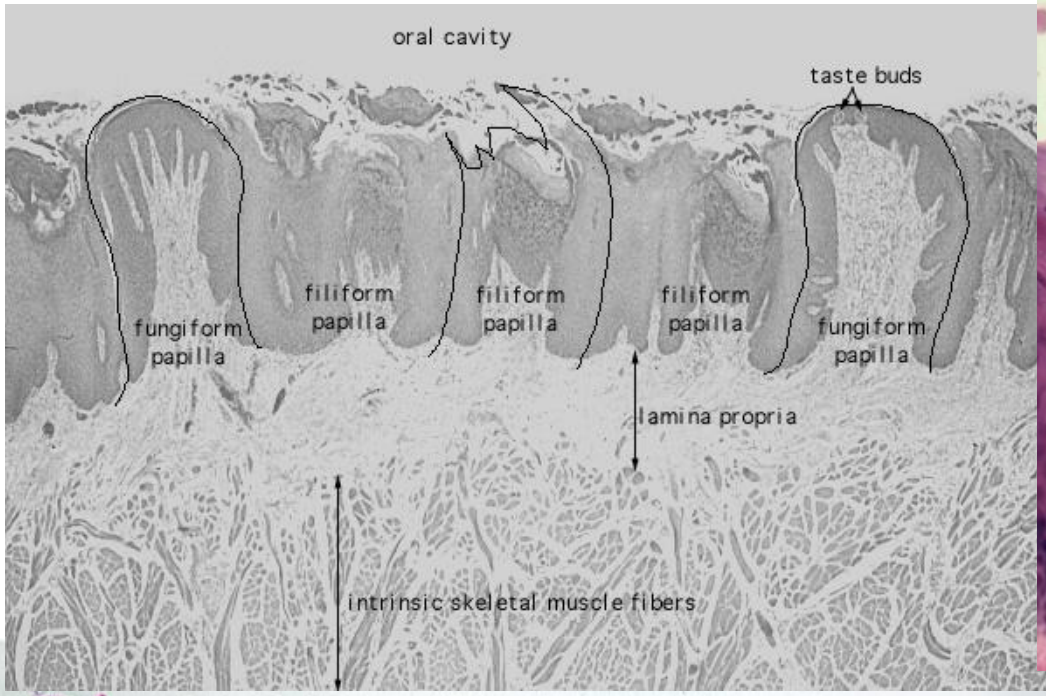
- confined to the posterior portion of the tongue
- **surrounded by a circular furrow (sulcus)**
- on their surface, the squamous epithelium is smooth and unspecialized
- taste buds in the epithelium on the sides
- **ducts of glands of von Ebner** (serous glands in submucosa) open into the sulcus

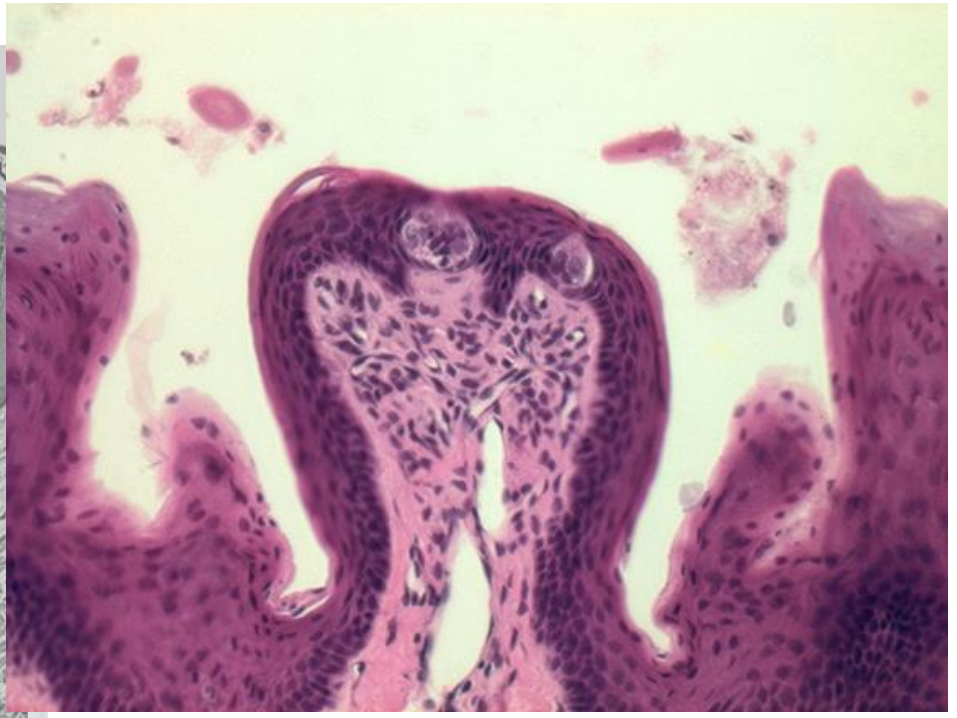
folliate papillae:

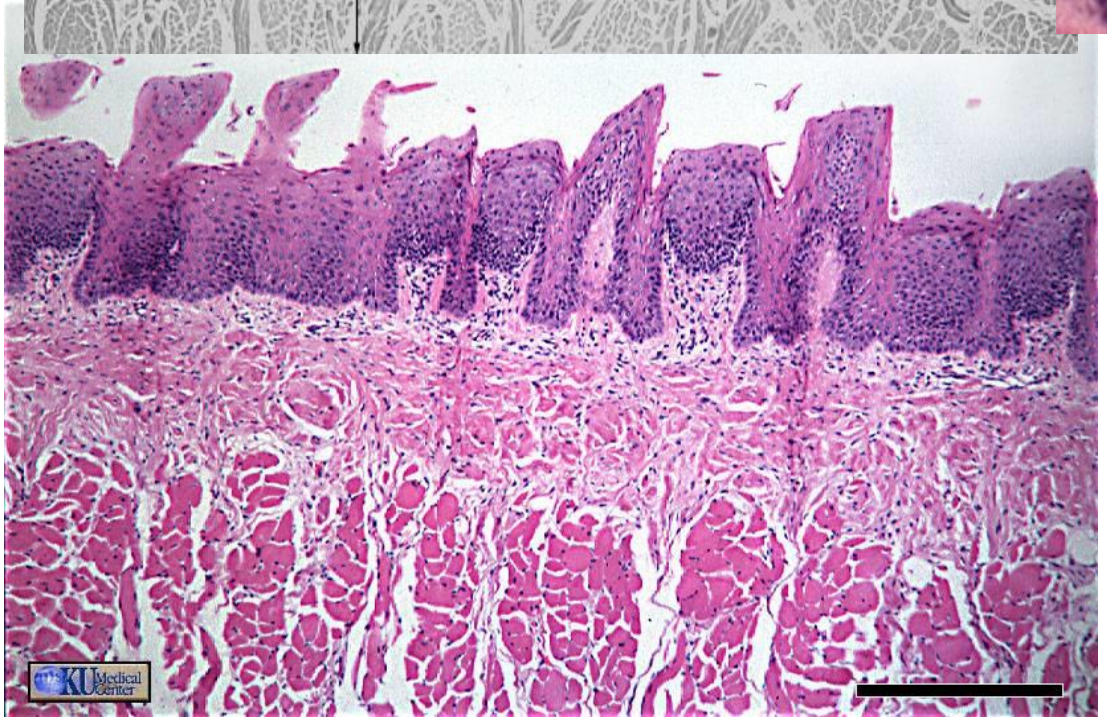
- rudimentary in humans; located on sides of the tongue
- consist of several parallel ridges separated by intervening clefts, where small serous glands open; taste buds on the sides of the ridges


Tongue - H&E
filiform papilla
epithelium
adipose tissue
lingual salivary glands
skeletal muscle

Tongue: filiform and fungiform papillae









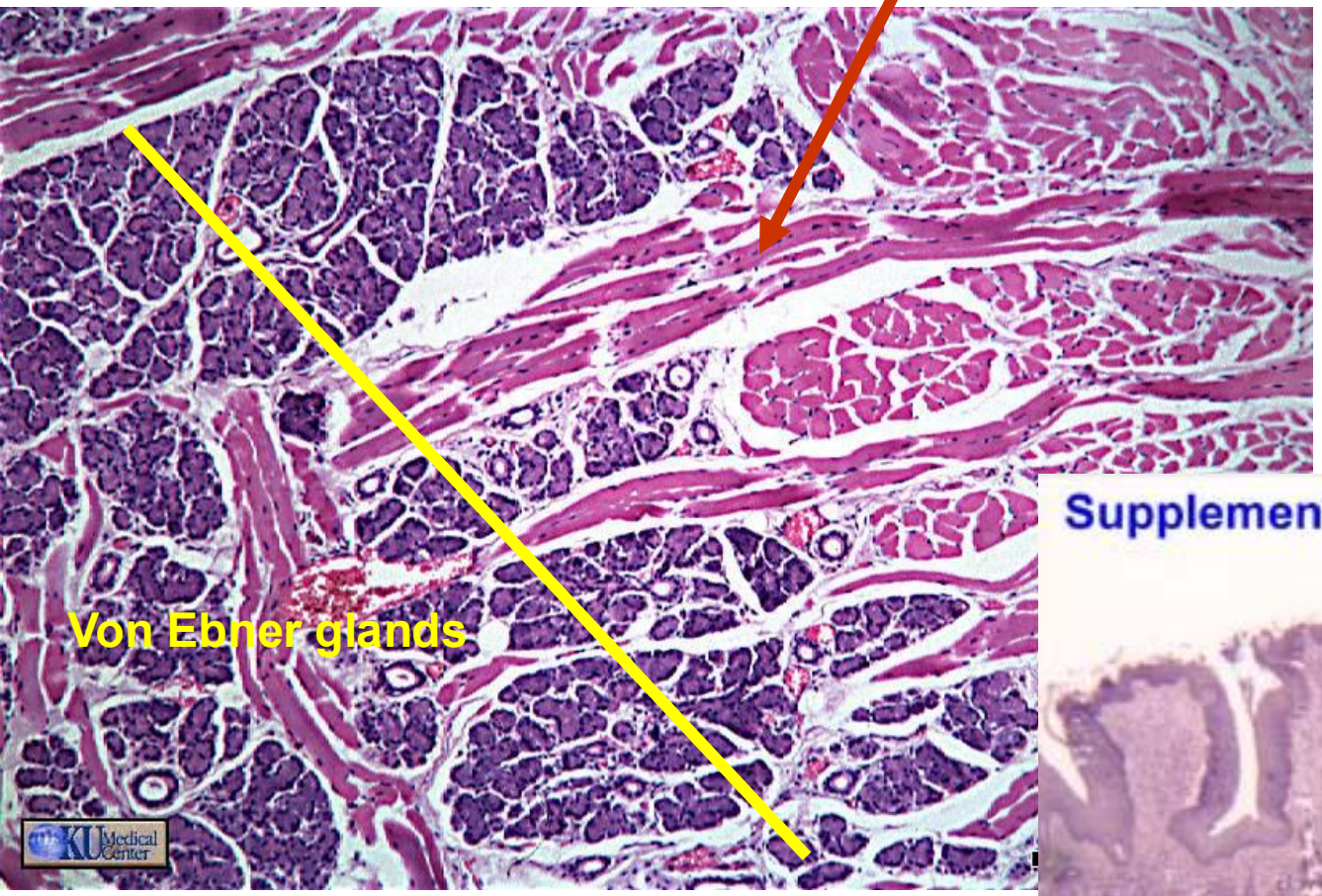
Folliate papilla

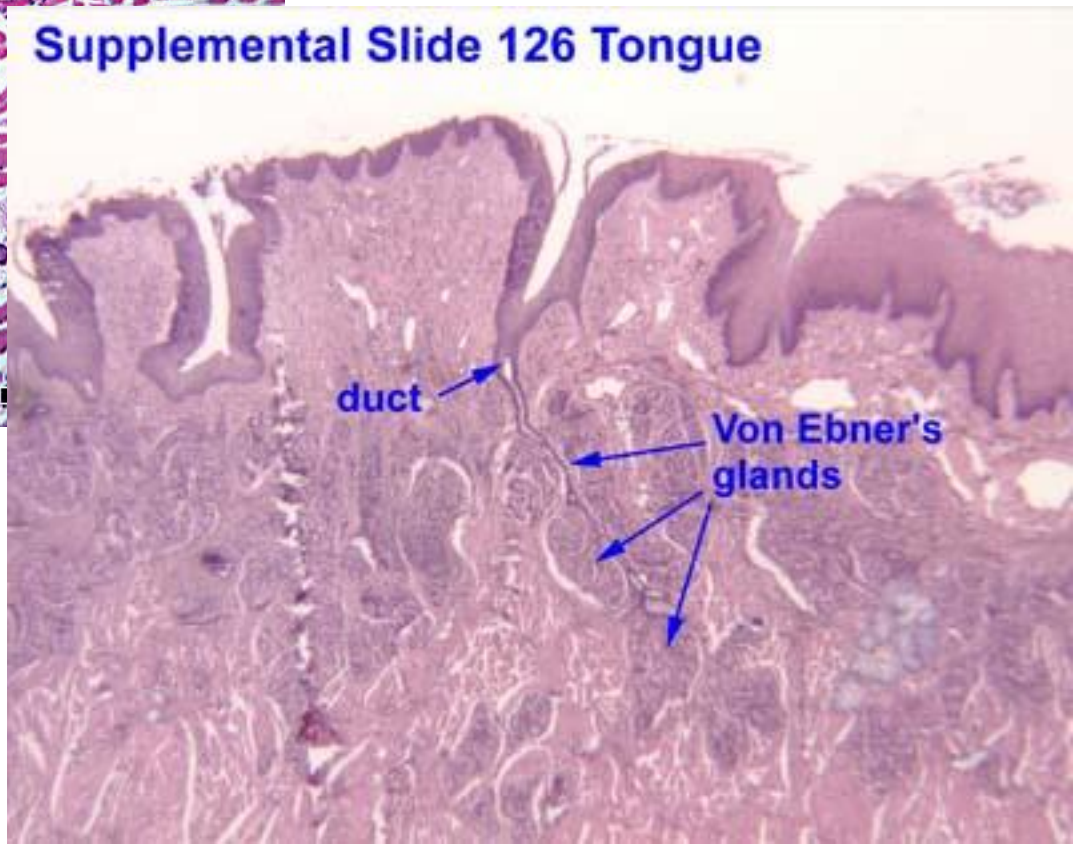
Tongue: circumvallate papillae

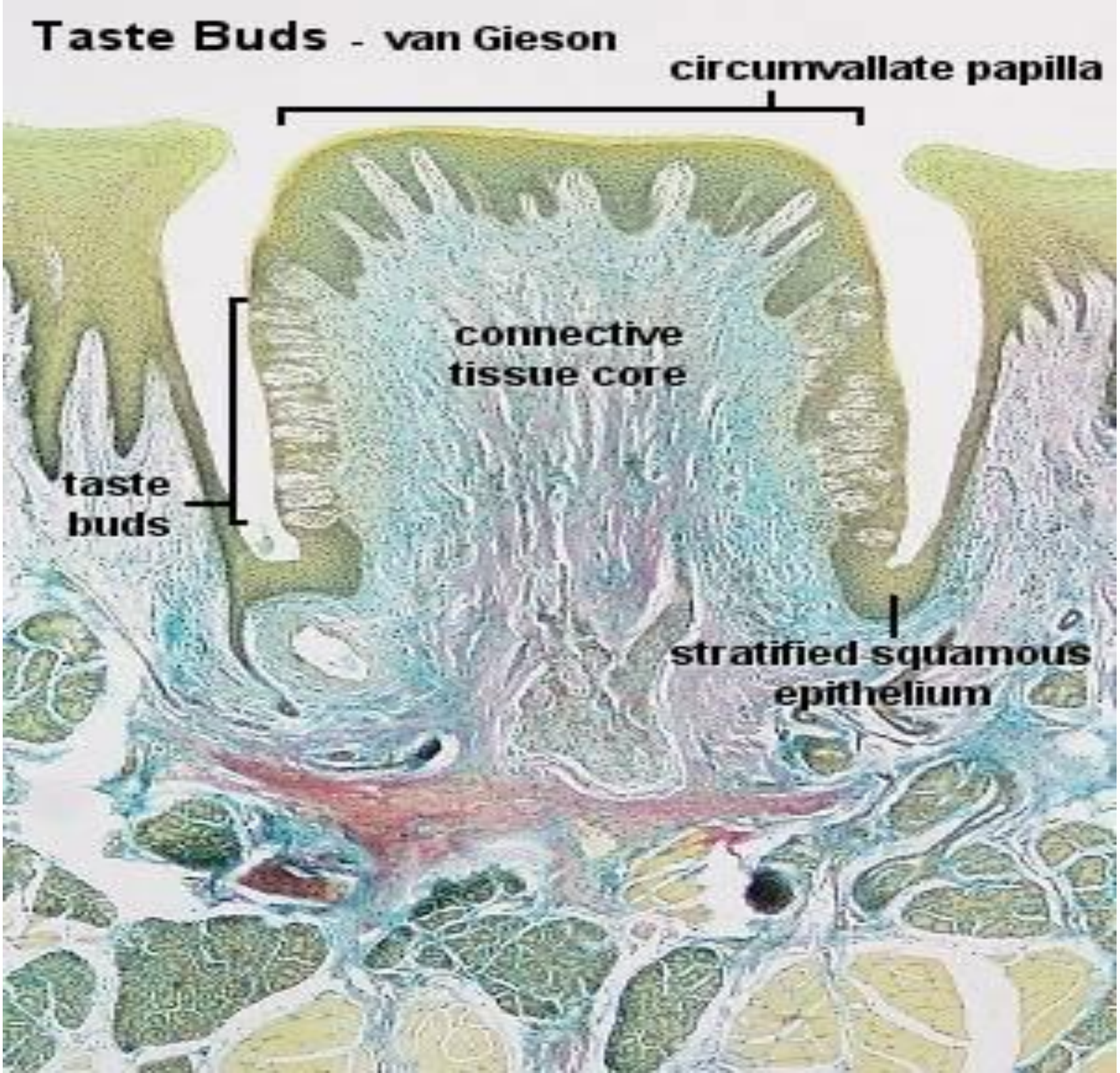




Tongue: von Ebner glands






Taste Buds - van Gieson
circumvallate papilla
connective tissue core
taste buds
stratified squamous epithelium

Credits

http://www.med.uiuc.edu/histo/small/index.htm

http://www.anatomyatlases.org/MicroscopicAnatomy/MicroscopicAnatomy.shtm

http://www.lab.anhb.uwa.edu.au/mb140/

http://www.kumc.edu/instruction/medicine/anatomy/histoweb/index.htm

http://www.siumed.edu/~dking2/advice.htm

http://casweb.cas.ou.edu/pbell/Histology/Outline/contents.html

http://biology.clc.uc.edu/fankhauser/Labs/Anatomy_&_Physiology/A&P202/Endocrine_System/histology_jpgs/pituitary_40x_P2252250lbd.JPG

http://w3.uokhsc.edu/histology/Glass%20slides/38_08.jpg

http://www.usc.edu/hsc/dental/ghisto/end/index.html

http://www.unomaha.edu/hpa/endocrinehistology.html