Sensory receptors

Unencapsulated receptors

Don't have connective tissue capsule

Encapsulated receptors

Have connective tissue capsule

Edited by : Mohammad Alsayed

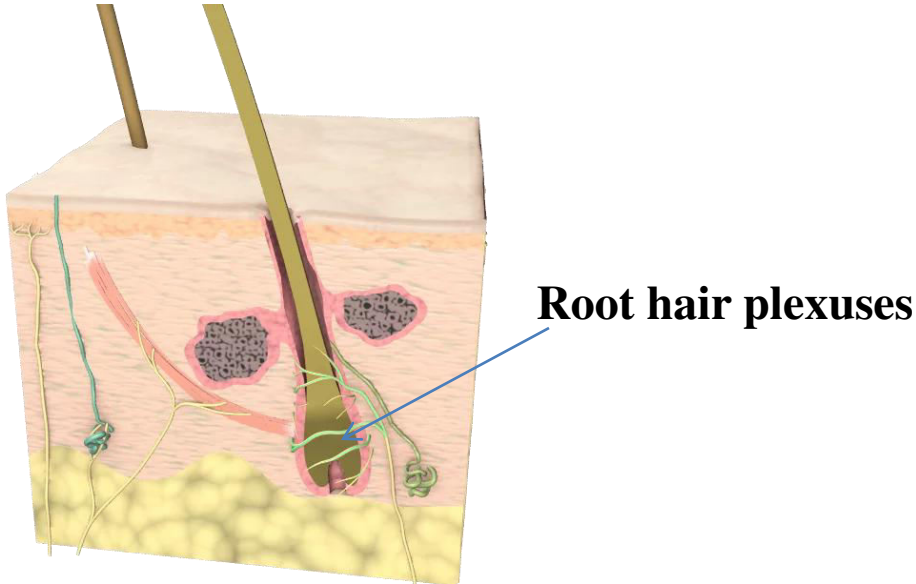
2nd lecture

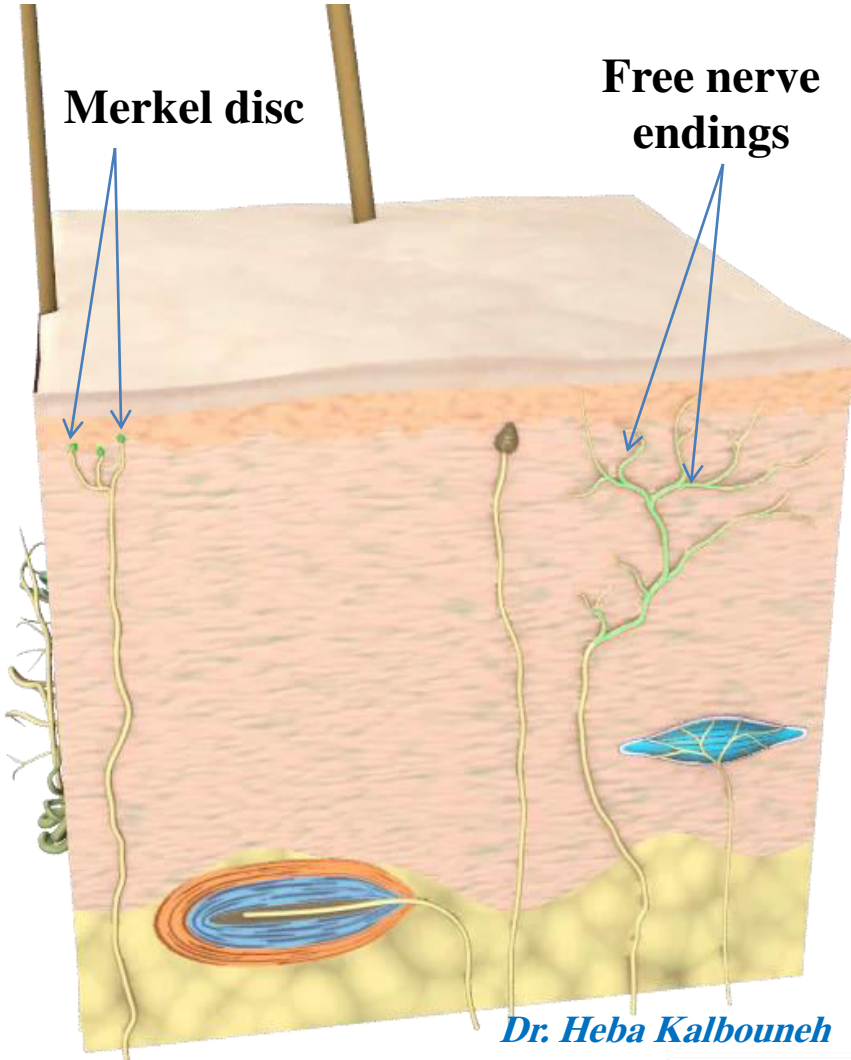
Unencapsulated nerve receptors

1- Merkel disc
- for light touch and sensing an object texture
- expanded nerve endings associated with merkel cell

2- Free nerve endings
- In papillary dermis
- Temperature, pain, itching, tactile sensation

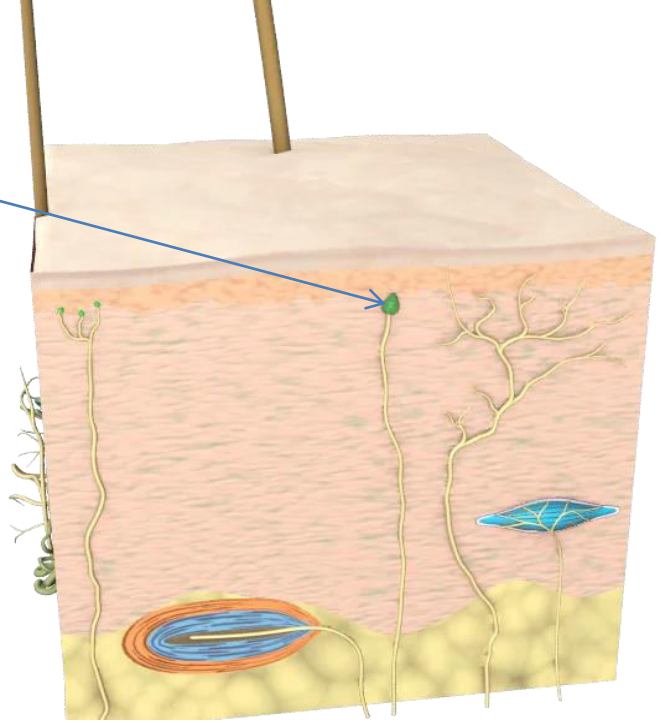
3- Root hair plexuses
- Surround the bases of hair follicles in reticular dermis
- Detect movements of hair





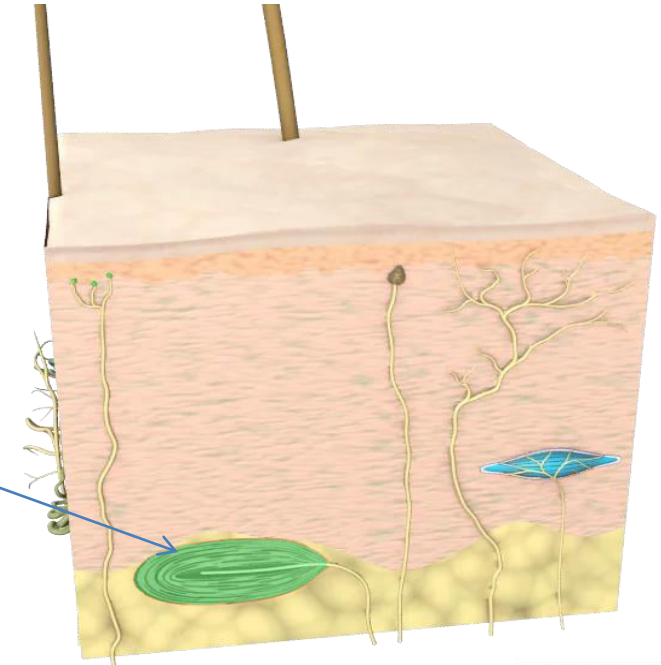
Meissner corpuscles:

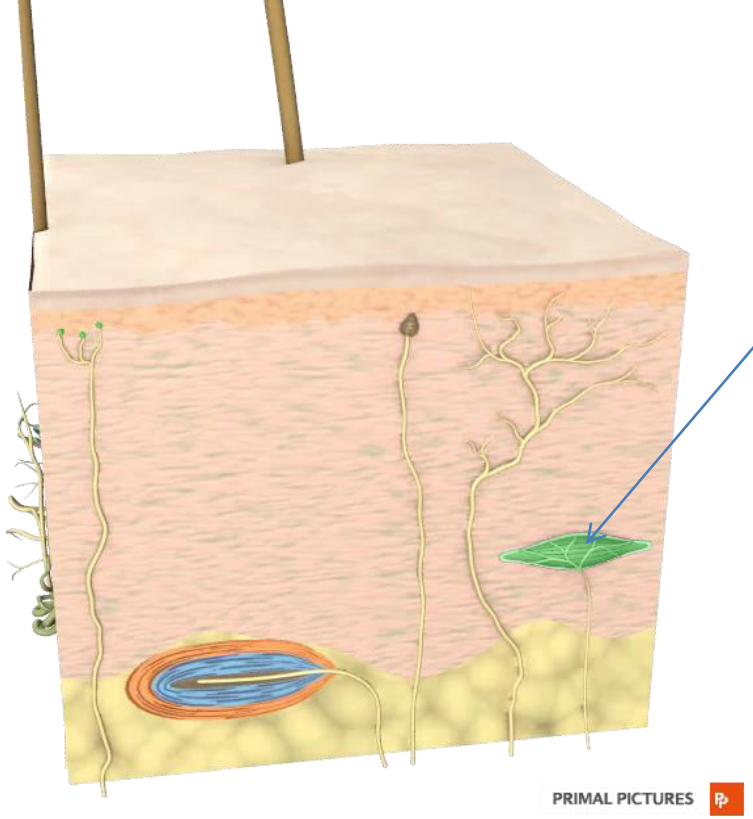
- Encapsulated
- In the dermal papilla
- Light touch
- Are numerous in fingertips, palms and soles
- Decline in number with aging



Pacinian corpuscles

- Encapsulated
- Found deep in reticular dermis and hypodermis
- Coarse touch, pressure (sustained touch) and vibrations





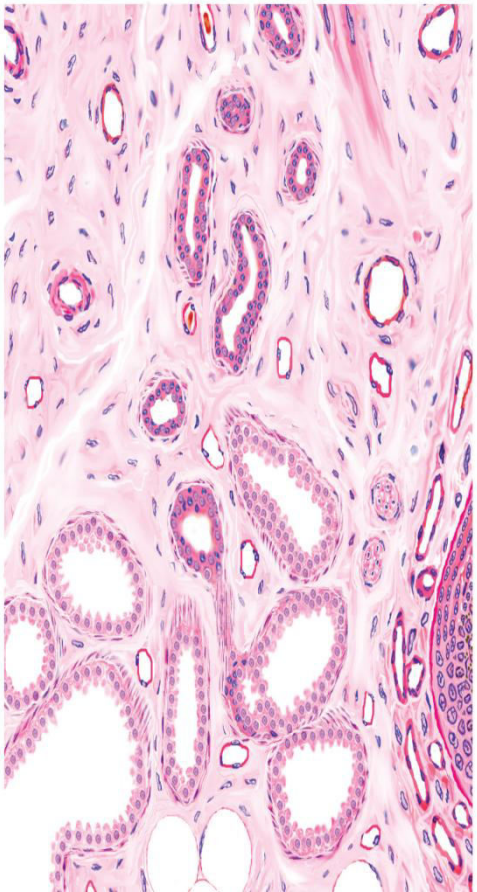
Ruffini corpuscles:

- Encapsulated
- Stretch (tension) and twisting (torque)

Skin Appendages

Hair Follicles and hair

Sweat glands



Sebaceous glands

Nails

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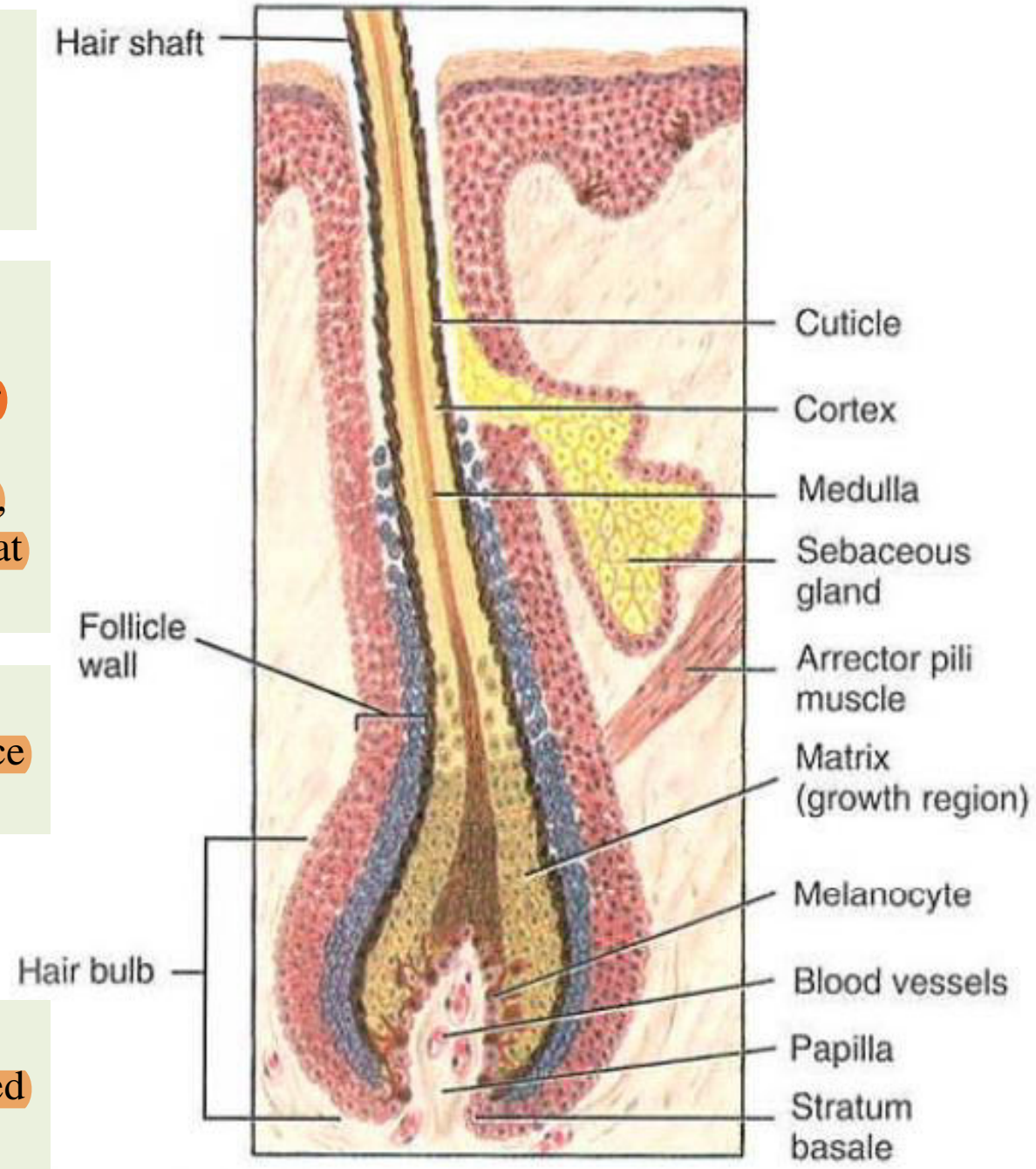
Hairs are elongated keratinized structures that form within epidermal invaginations (hair follicles)

Types of hair:
1- Lanugo: fetal hair
2- Down hair: light colored hair of child
3- Terminal (adult) hair: thicker, darker hair that begins to grow at puberty

Hair shaft: The part of a hair extending beyond the skin surface (visible part)
above the skin surface

Hair root: The part of a hair below the skin surface (embedded part)



Hair follicle is a tube of stratified squamous epithelium, invaginated into the dermis

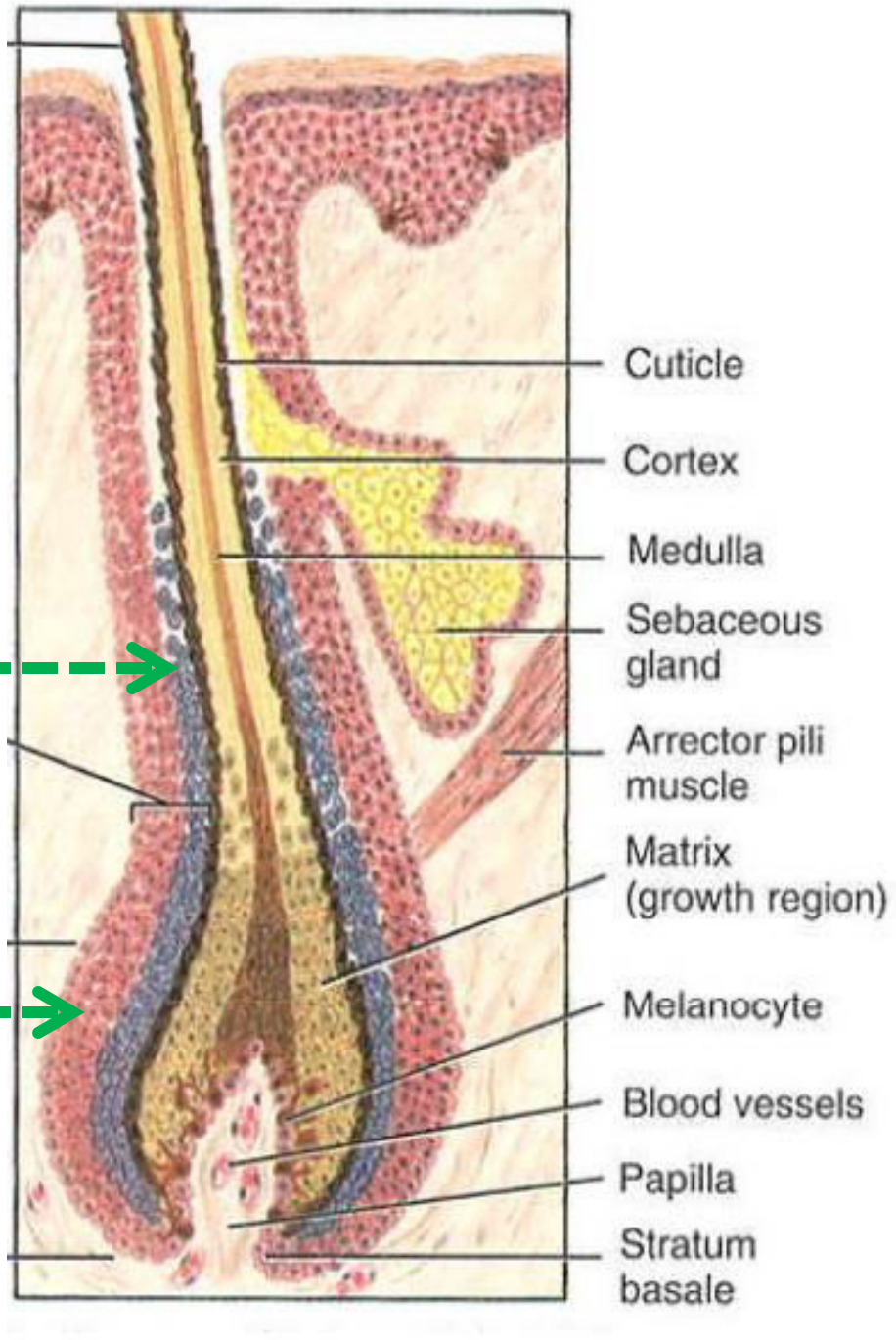
INNER ROOT SHEATH

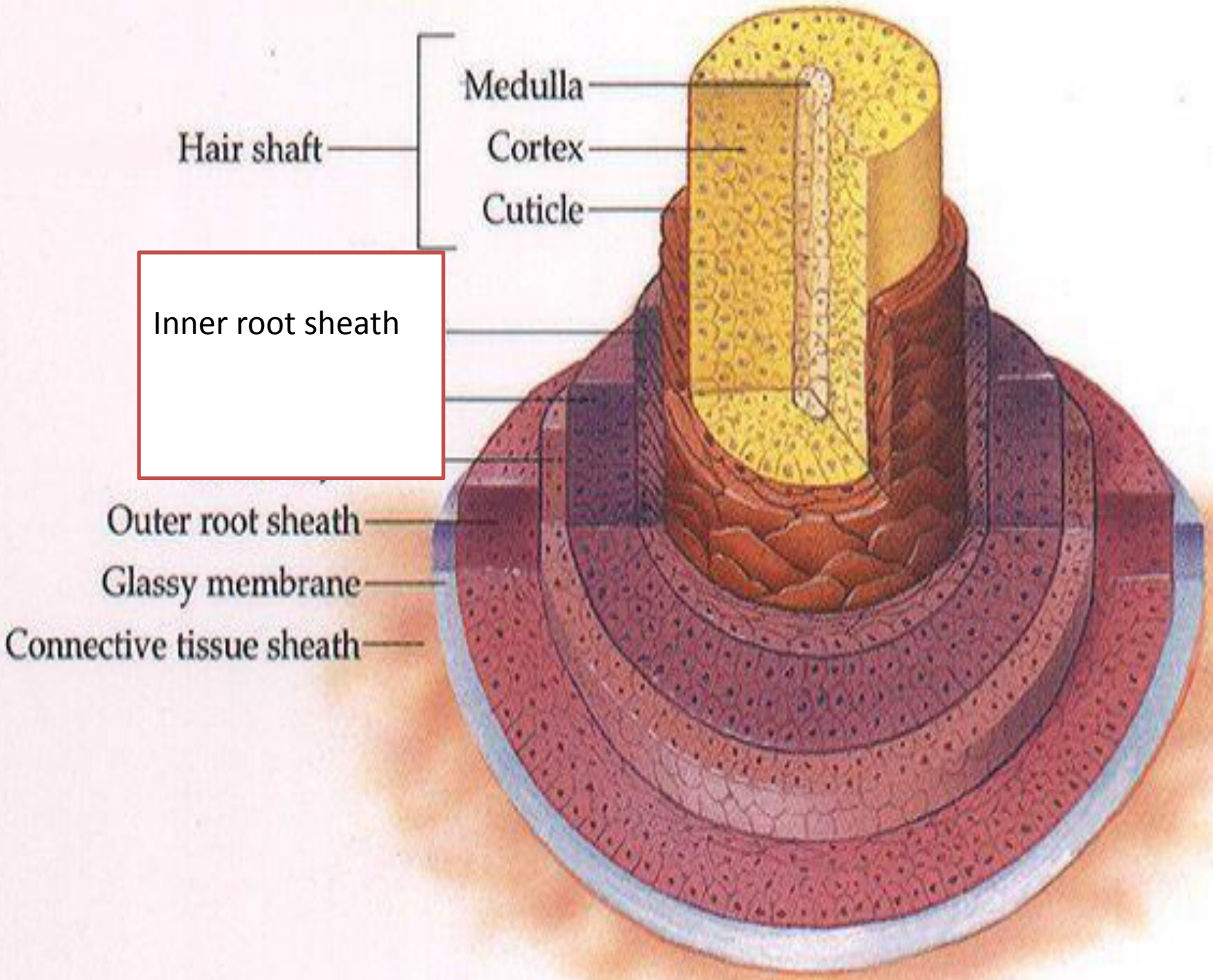
Disintegrates at the level of the sebaceous gland

Only stratum basale and stratum spinosum make invagination and form :

OUTER ROOT SHEATH

- Is continuous with the epidermis
- It does not take part in hair formation
- Surrounded by a glassy basement membrane
- Basement membrane is surrounded by a connective tissue sheath. or dermal sheath




Medulla
Hair shaft
Cortex
Cuticle
Inner root sheath
Outer root sheath
Glassy membrane
Connective tissue sheath

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Hair matrix

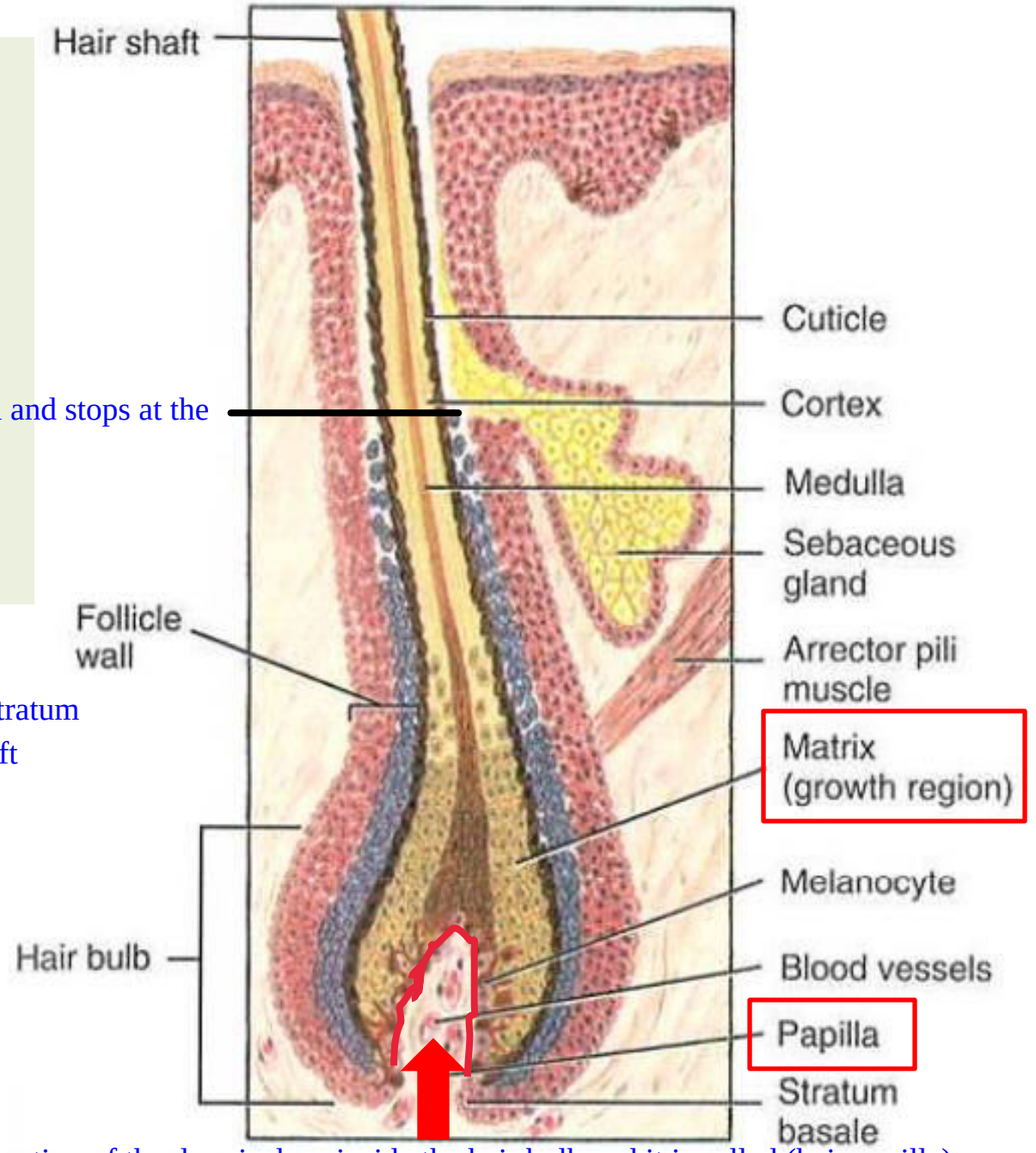
- Contains the proliferating cells that generate the hair and the internal root sheath
- Located just above the dermal papilla

Inner root sheath reach this level and stops at the opening of sebaceous gland .

- Melanocytes located in the matrix produce hair color.

Why the hair is very tough ?
because the keratin is hard type and highly compacted , while the keratin in the stratum corneum is softer than keratin in the hair shaft

The cells in the hair matrix proliferate and move upwards, gradually becoming keratinized to produce the hair.



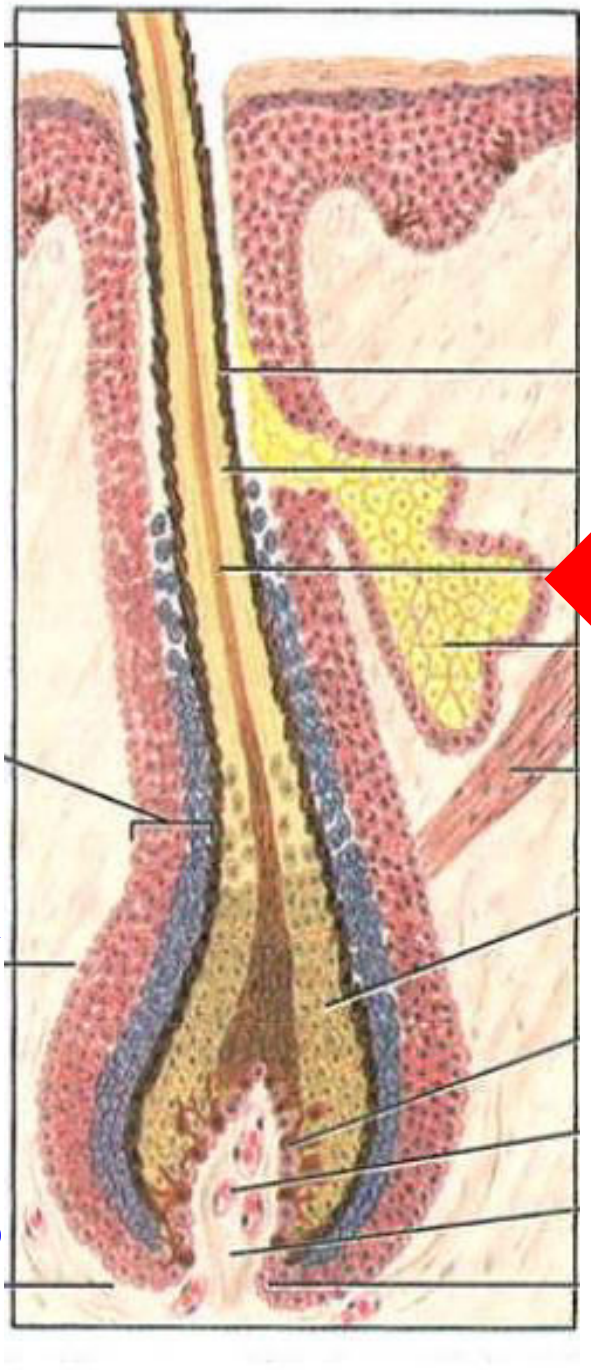
Invagination of the dermis deep inside the hair bulb and it is called (hair papilla)

Sebaceous glands

- secrete an oily or waxy matter, called **sebum**, to lubricate and waterproof the skin and hair

- Secrete by holocrine mode of secretion The whole cell is die and secrete the sebum

يعني كأنه هذول الخلايا بضحوا بحياتهم عشان يكون عندك بشرة ناعمة



Simple branched acinar gland

* In the last lecture we said that the thick skin in the soles and palms does not contain hair , so we do not have sebaceous gland Why ??

Simply , if we have sebaceous gland in the palms or soles , it would be very difficult for you to hold things and you can't walk or run as normal you do .

* The secretion of this gland is stimulated by :

Estrogen + Testosterone .

This takes place around puberty time , we start producing these hormones and the skin starts to be oily .

* Sometimes the opening (duct) of this gland is "blocked" due to excessive secretion , so the sebum collected below the level of epidermis producing (Comedo or blackheads)

See the next slide :)

Acne

Sometimes this sebum got infected by "Propionibacterium acne"
Remember microbiology :)
So acne is common during puberty time .

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انسداد

A **comedo** is a clogged hair follicle (pore) in the skin. Keratin combines with oil to block the follicle

Comedo (blackheads)

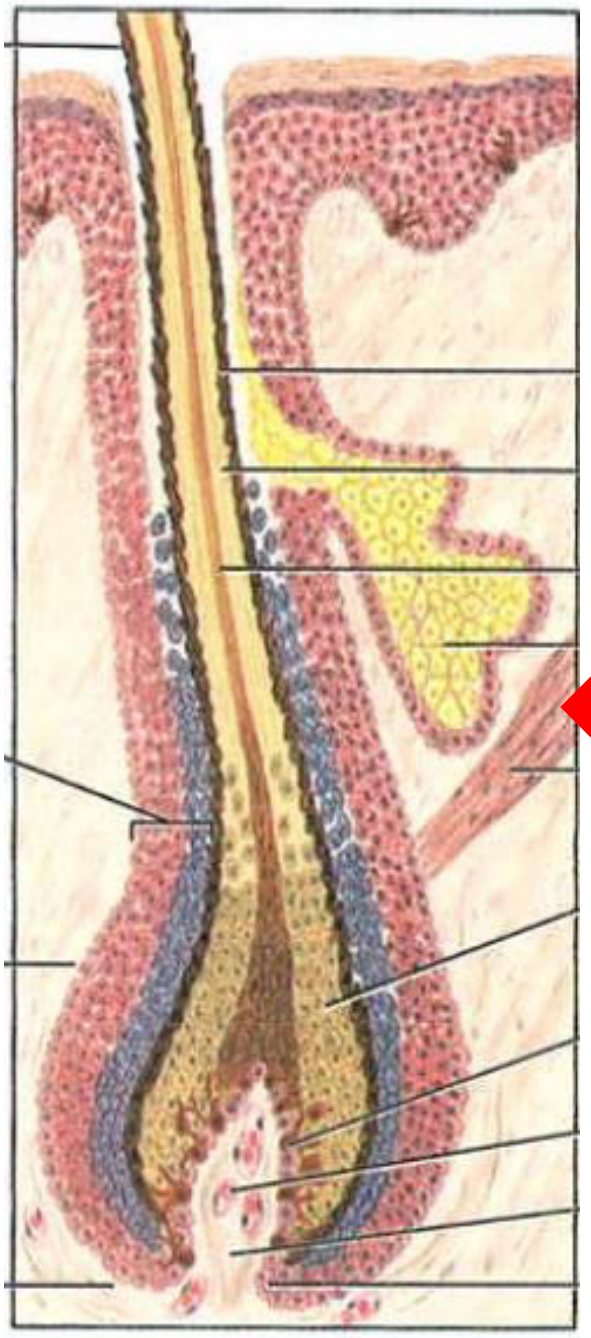
Pili = Hair

Arrector pili muscles are small muscles extend from hair follicles to the dermal papilla

- Contraction of these muscles causes the hairs to stand on end (goose bumps)

- Innervated by the autonomic nervous system (sympathetic) because it is smooth muscle

The process that the hair is removed is called (Depilatory) .



Depilatory

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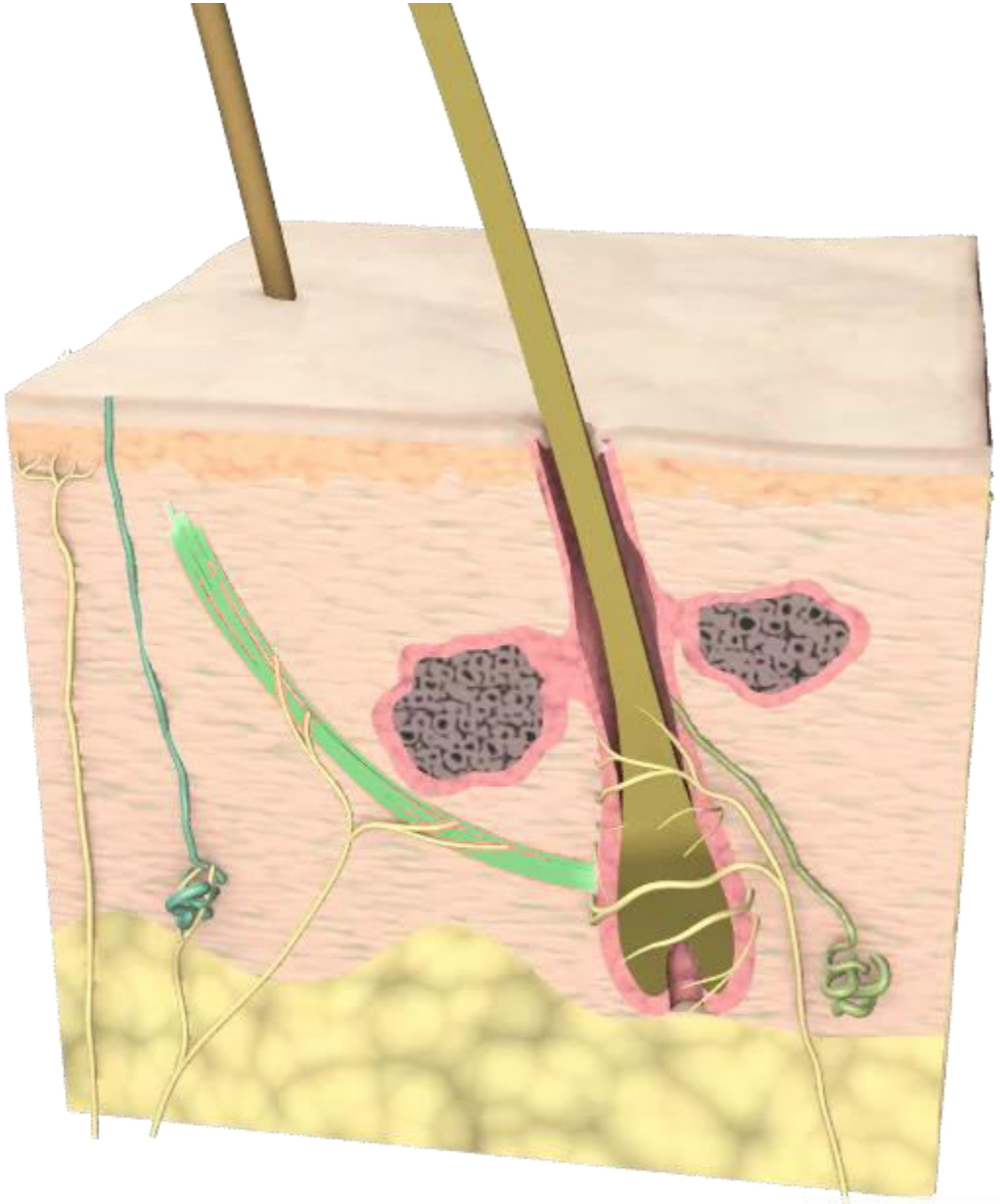
The attachments of these muscles to dermal papillae cause dimples seen in goosebumps



Pulls hairs upright when cold or frightened

The role of this muscle is more prominent in animals , because it reduces heat loss through the surface of their bodies

Structure of the hair shaft

النخاع

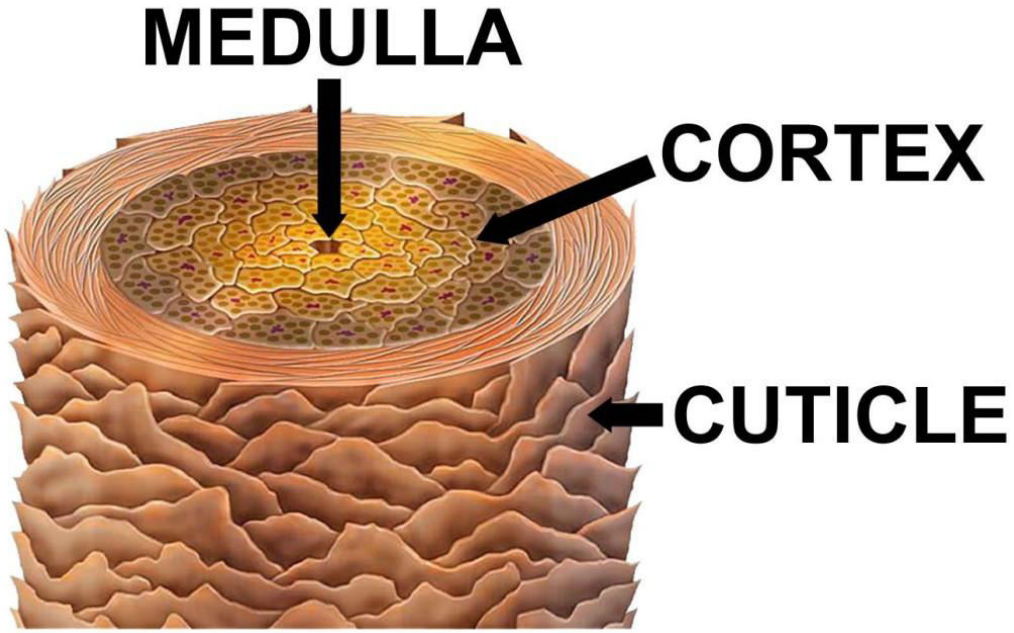
Medulla: large vacuolated and moderately keratinized cells

القشرة

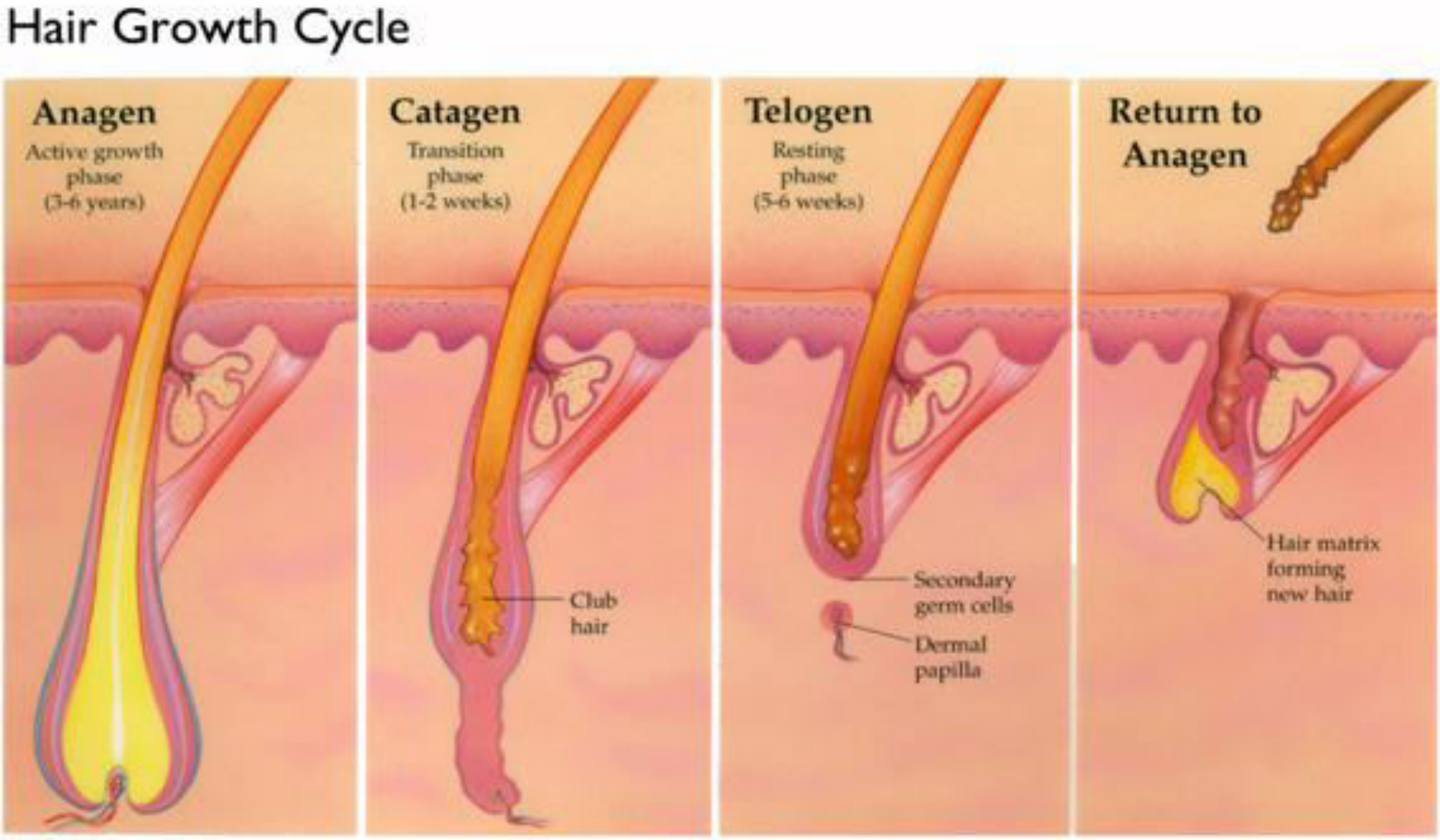
Cortex: heavily keratinized and densely packed cells and contains pigment melanin

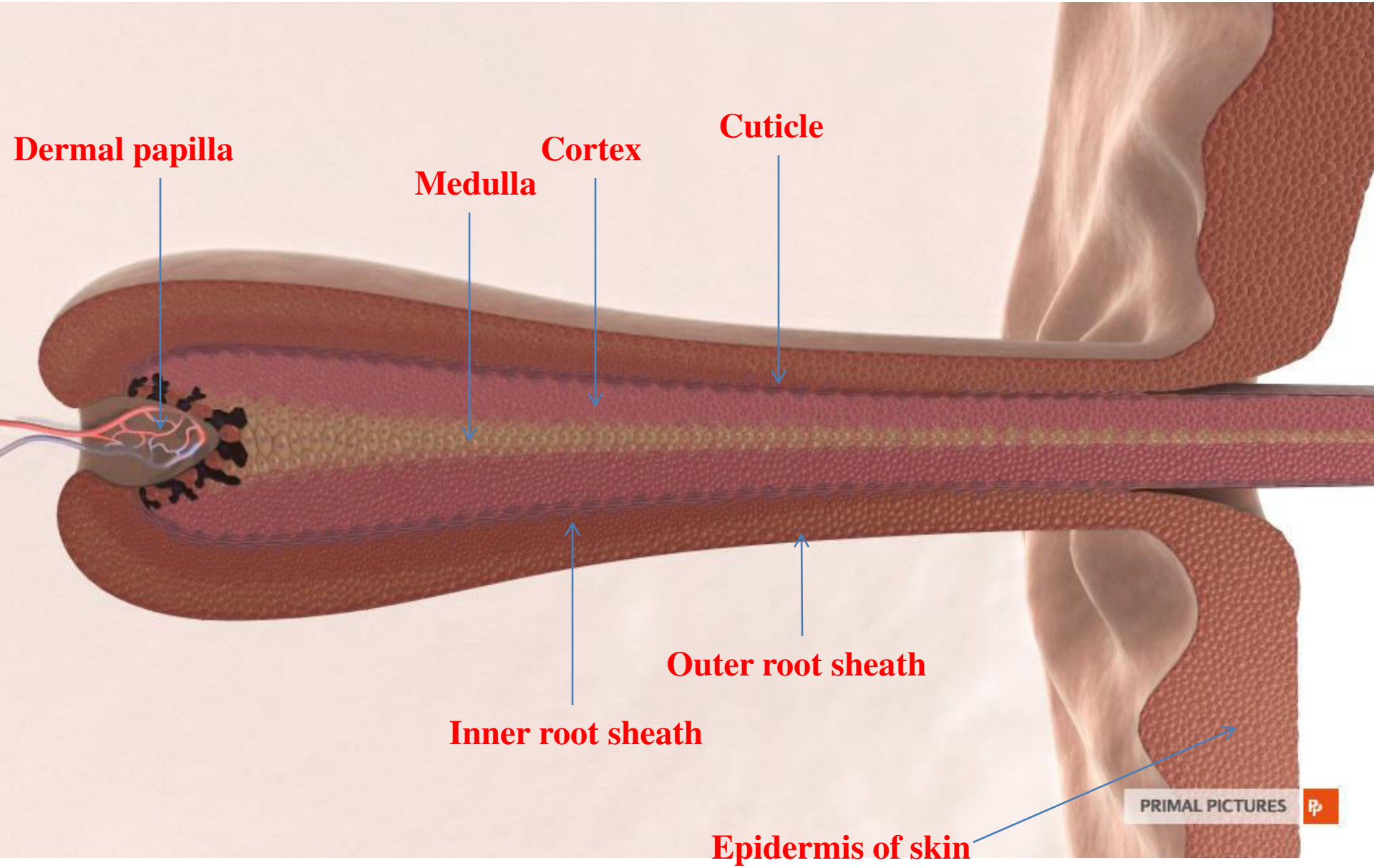
Cuticle: thin layer heavily keratinized squamous cells covering the cortex

very hard

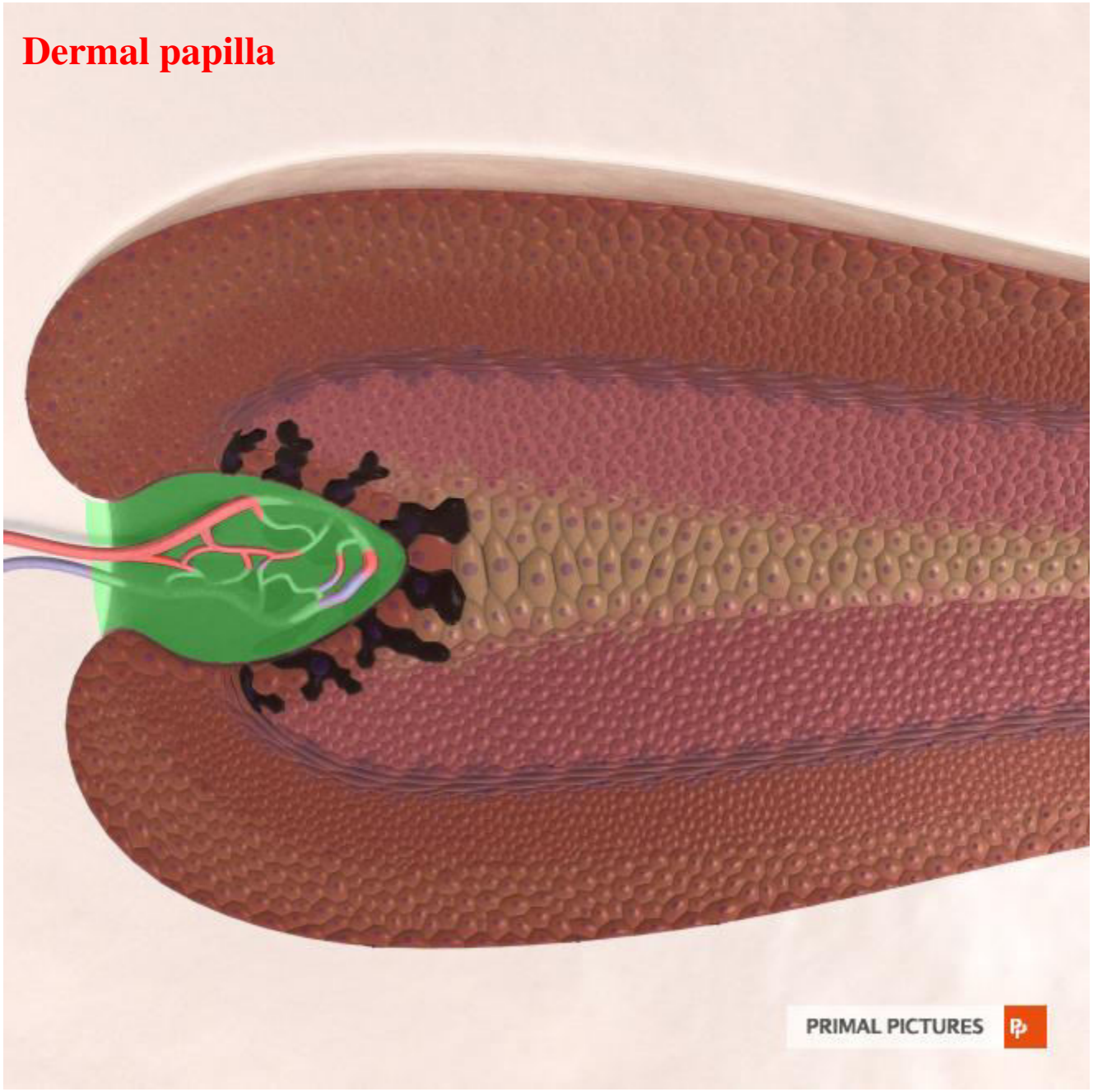


Hairs grow discontinuously, with periods of growth followed by periods of rest and this growth does not occur synchronously in all regions of the body or even in the same area

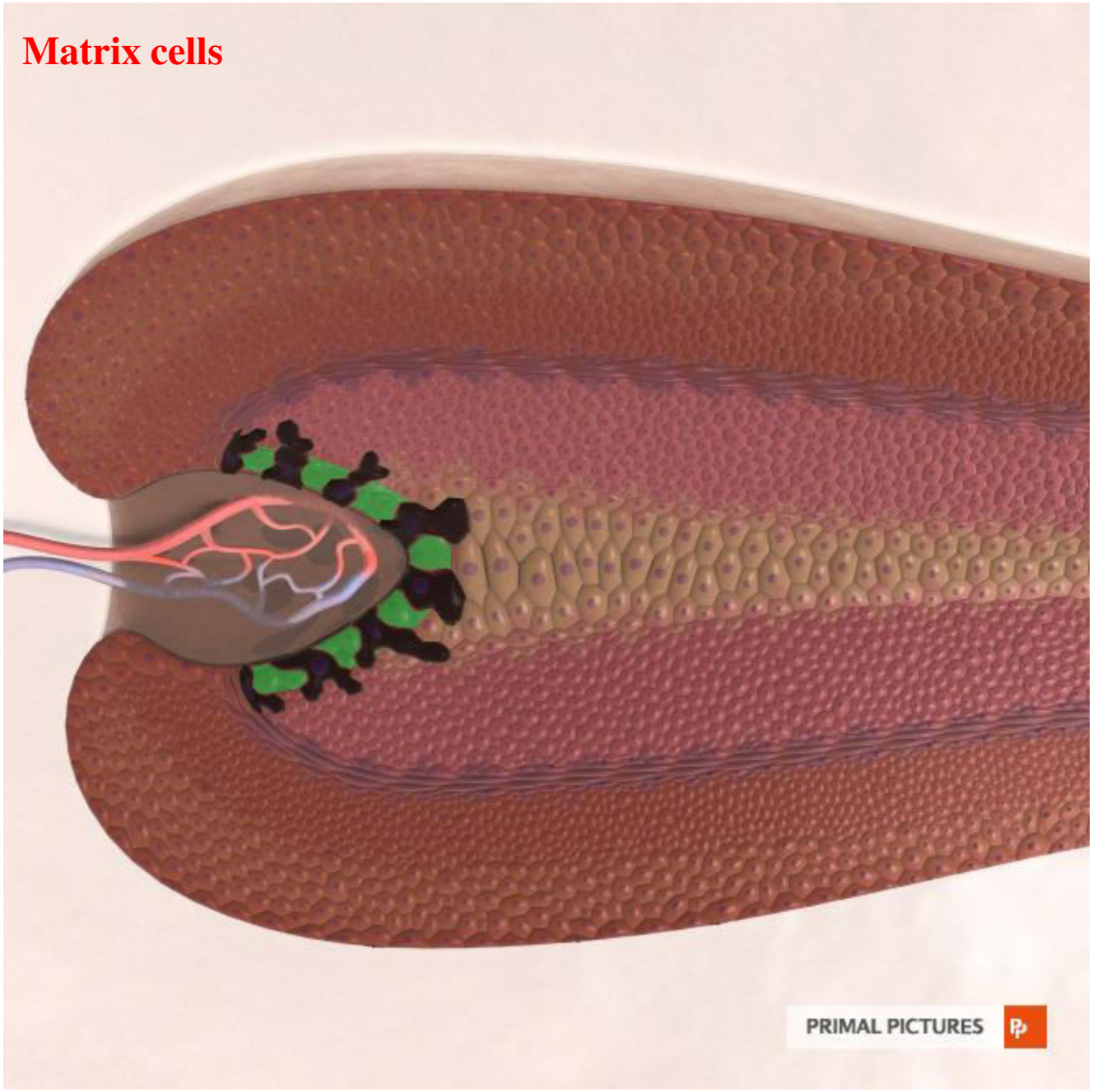



Dermal papilla
Medulla
Cortex
Cuticle
Outer root sheath
Inner root sheath
Epidermis of skin
PRIMAL PICTURES

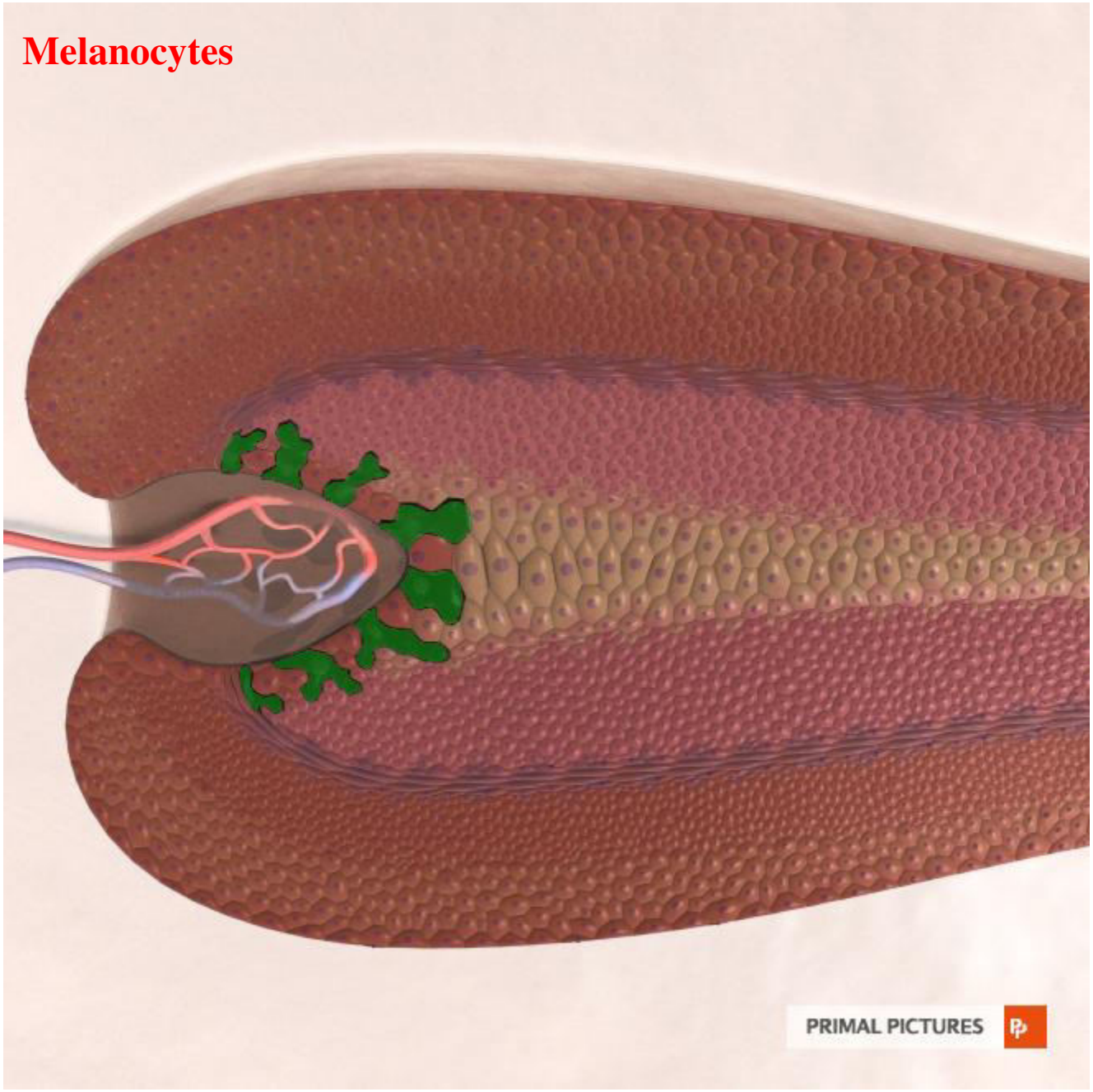
Dermal papilla



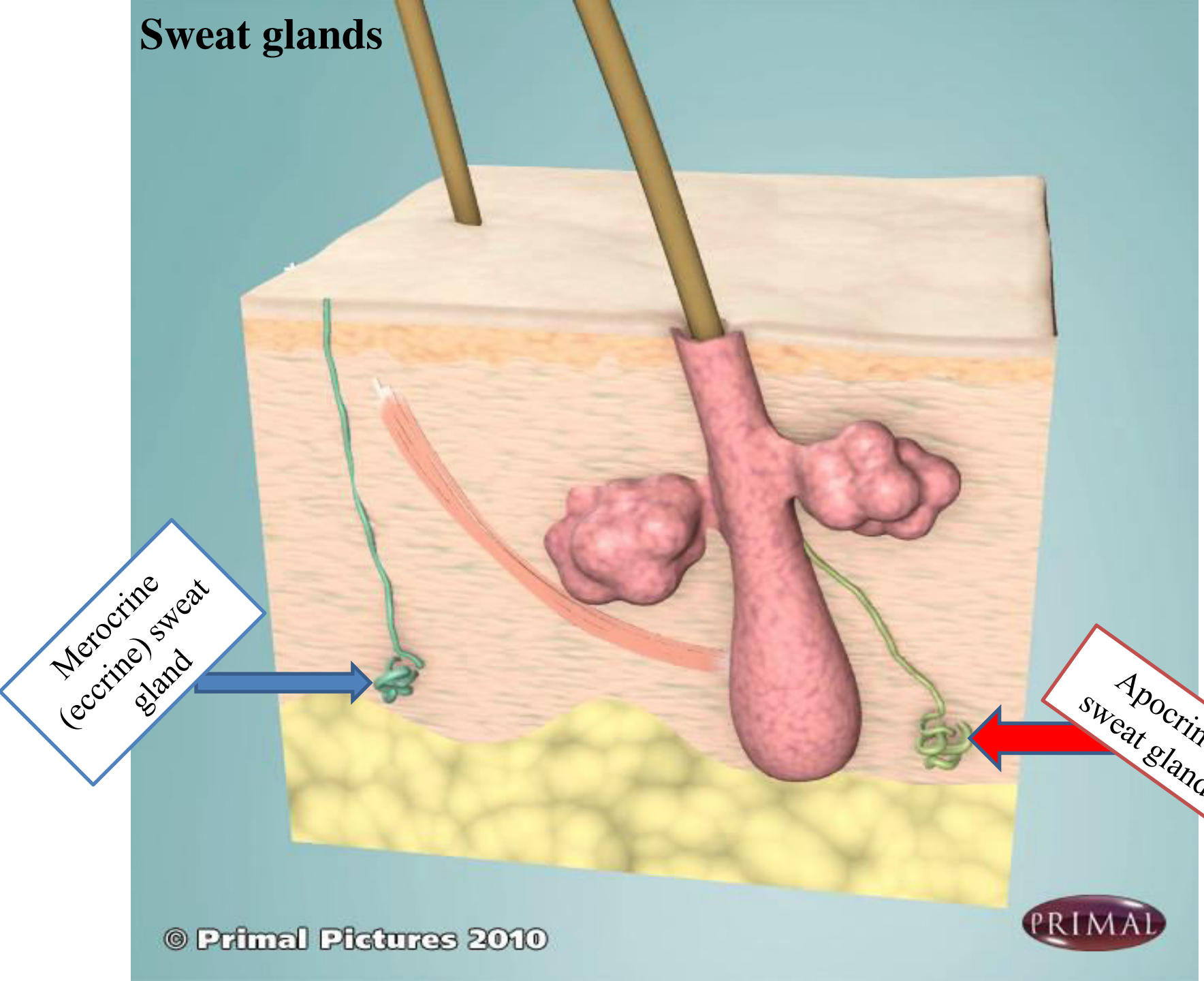
Matrix cells



Melanocytes



Sweat glands



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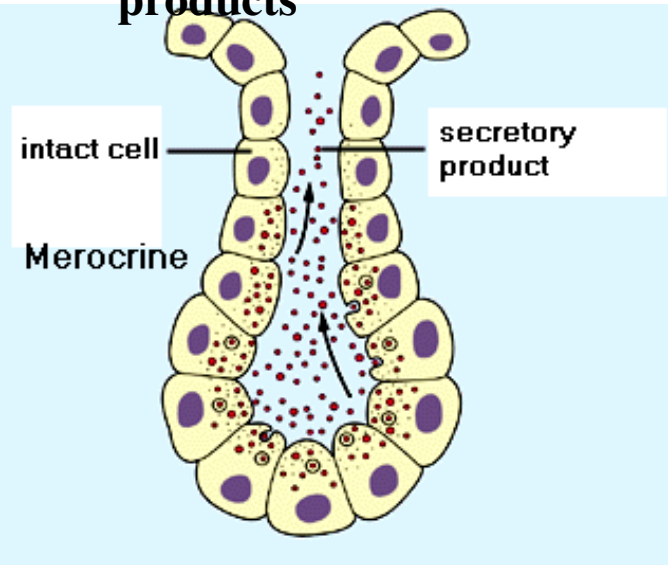
Sweat Glands

Eccrine sweat gland

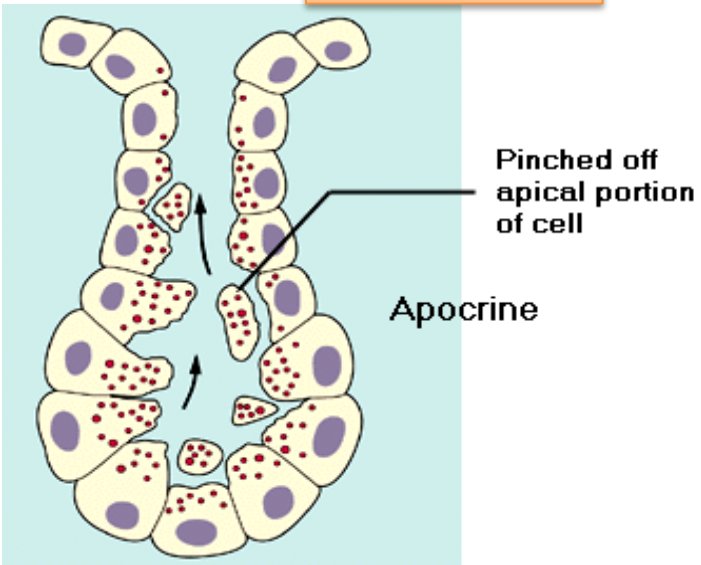
- Merocrine secretion
- Empty directly onto skin surface
- Location: most all over body (esp. abundant on palms & soles: ~ 500/cm^2)
- Clear, watery secretion (99% H_2O; rest NaCl + some waste products

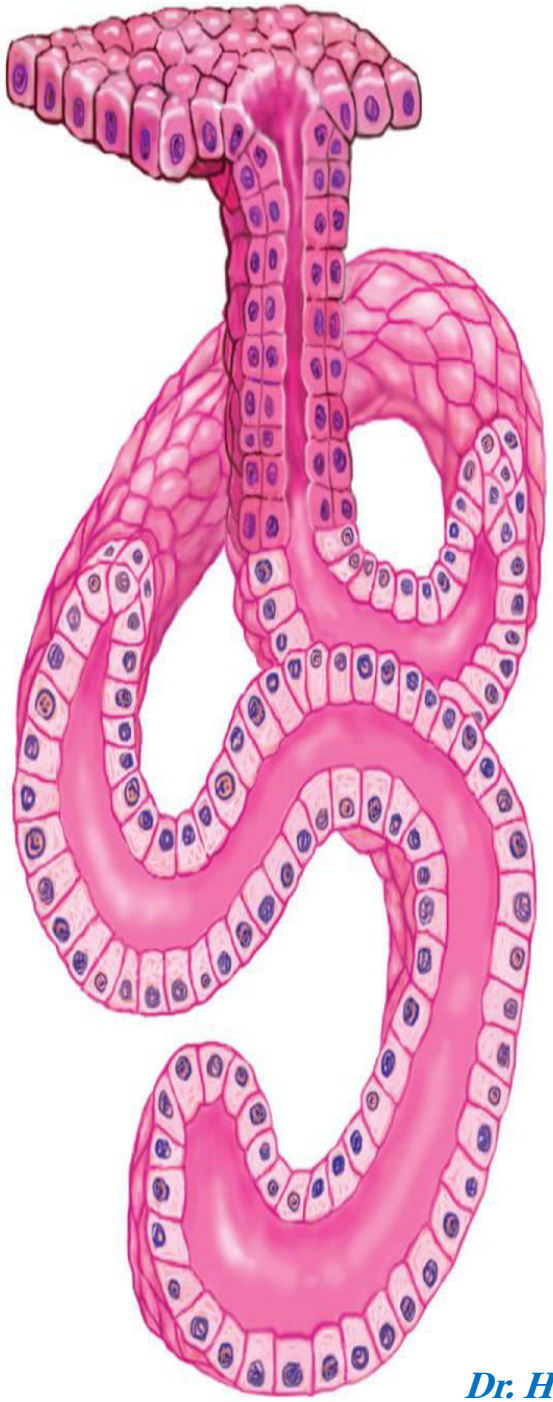


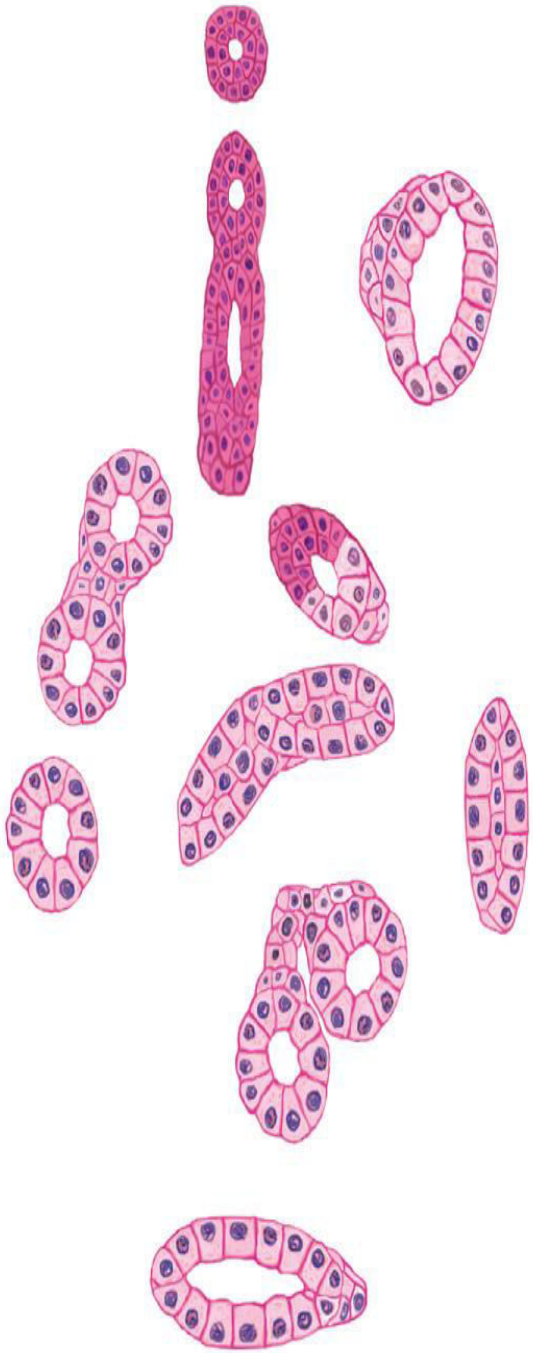
Apocrine sweat gland

- Empty into hair follicle
- Location: armpits, groin, nipples
- Viscous, cloudy secretion → good nutrient source for bacteria (odor !!)
- Secretion may contain Pheromones
- Secretion begins at puberty and is stimulated during emotional distress

Scent glands







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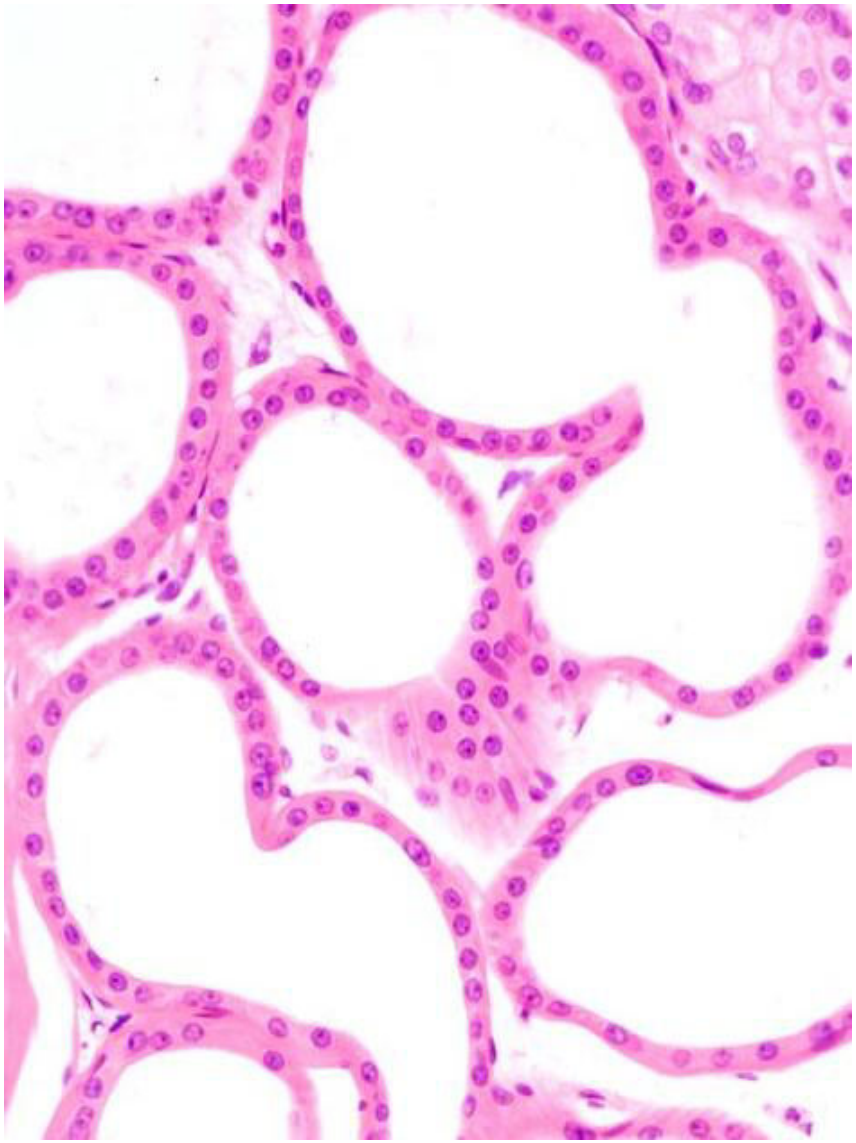
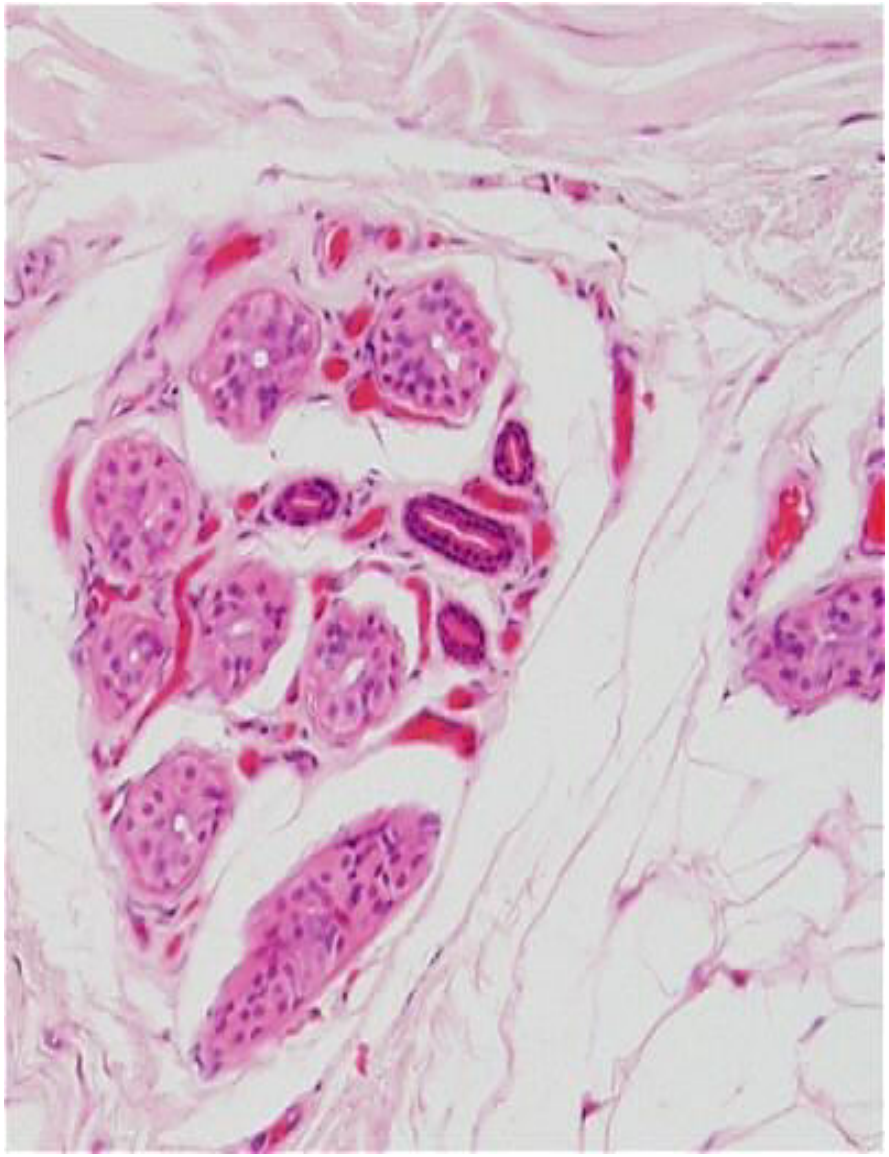
Apocrine sweat glands



Eccrine (merocrine) sweat glands

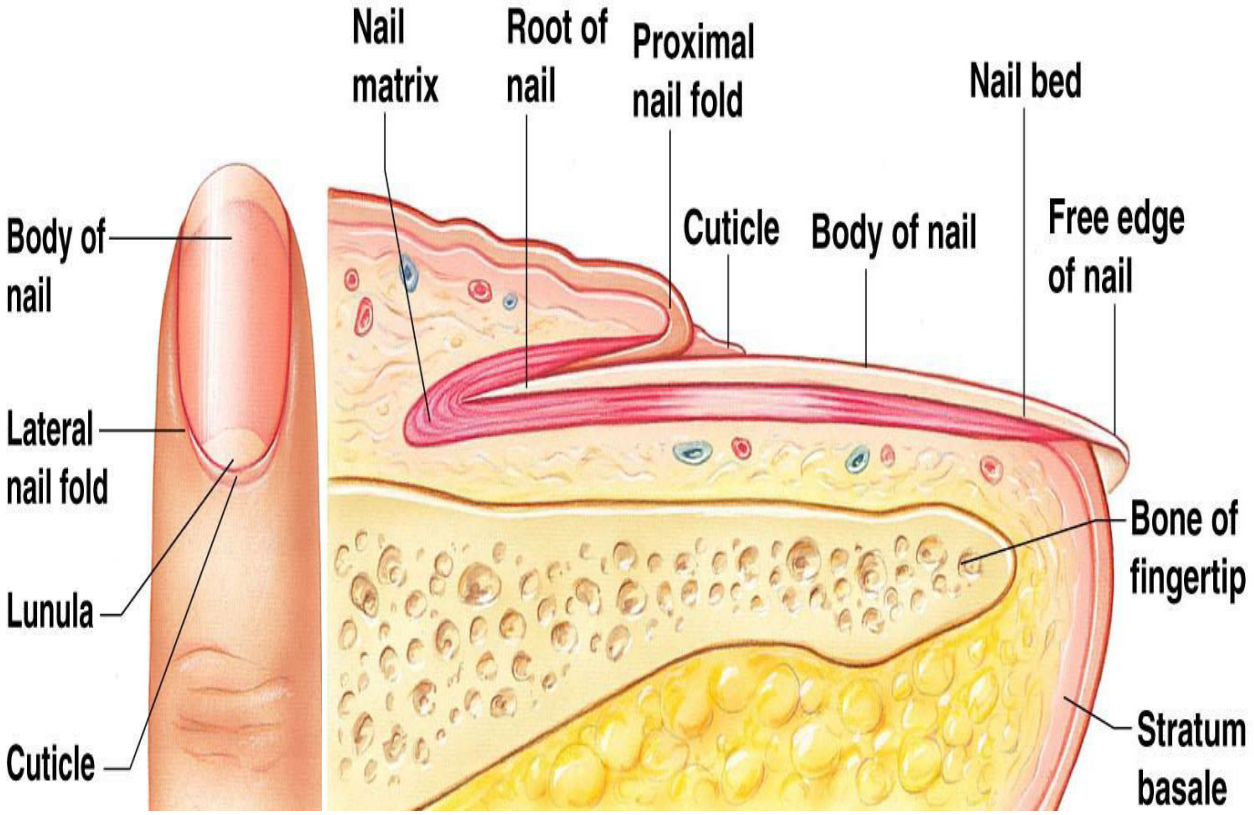


Nails

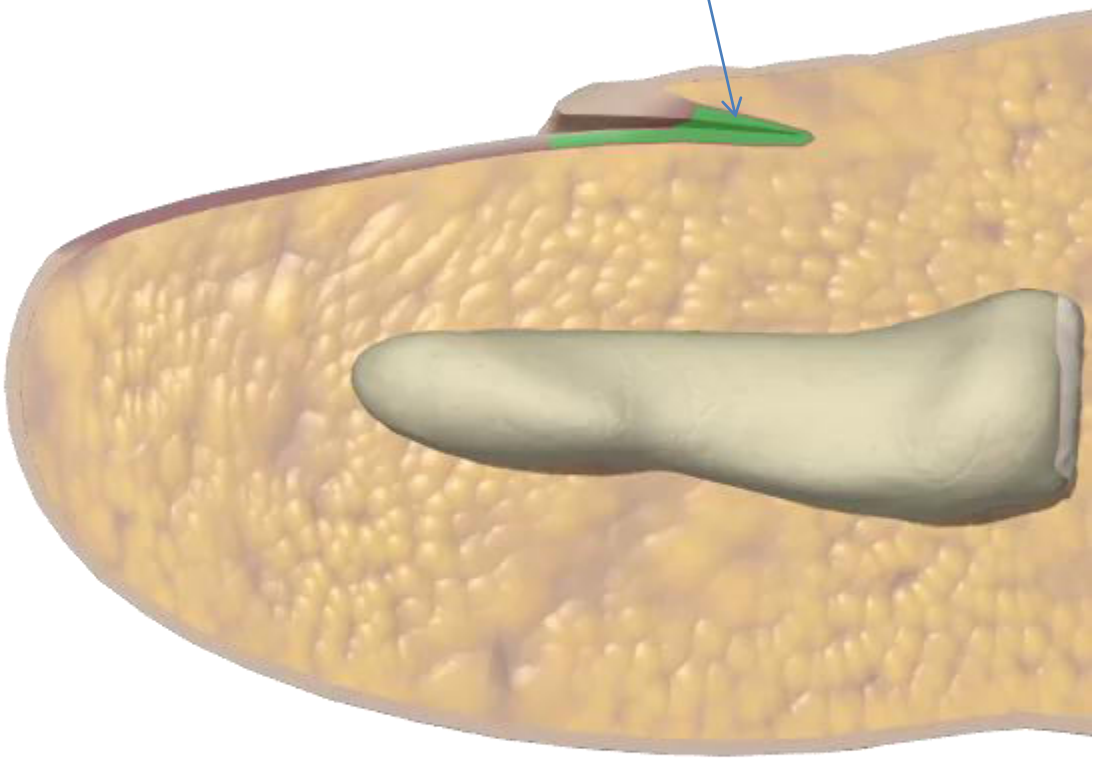
Hard plates of keratin on the dorsal surface of each distal phalanx
Lack of pigment makes them colorless

Nail parts

1. Free edge: the part you cut
2. Body: pink part
3. Lunula: white semicircle area
4. Eponychium: proximal nail fold (cuticle)
5. Hyponychium: under the free edge where dirt accumulates
6. Nail bed: directly under the pink part
7. Nail matrix: growth



Nail matrix



PRIMAL PICTURES

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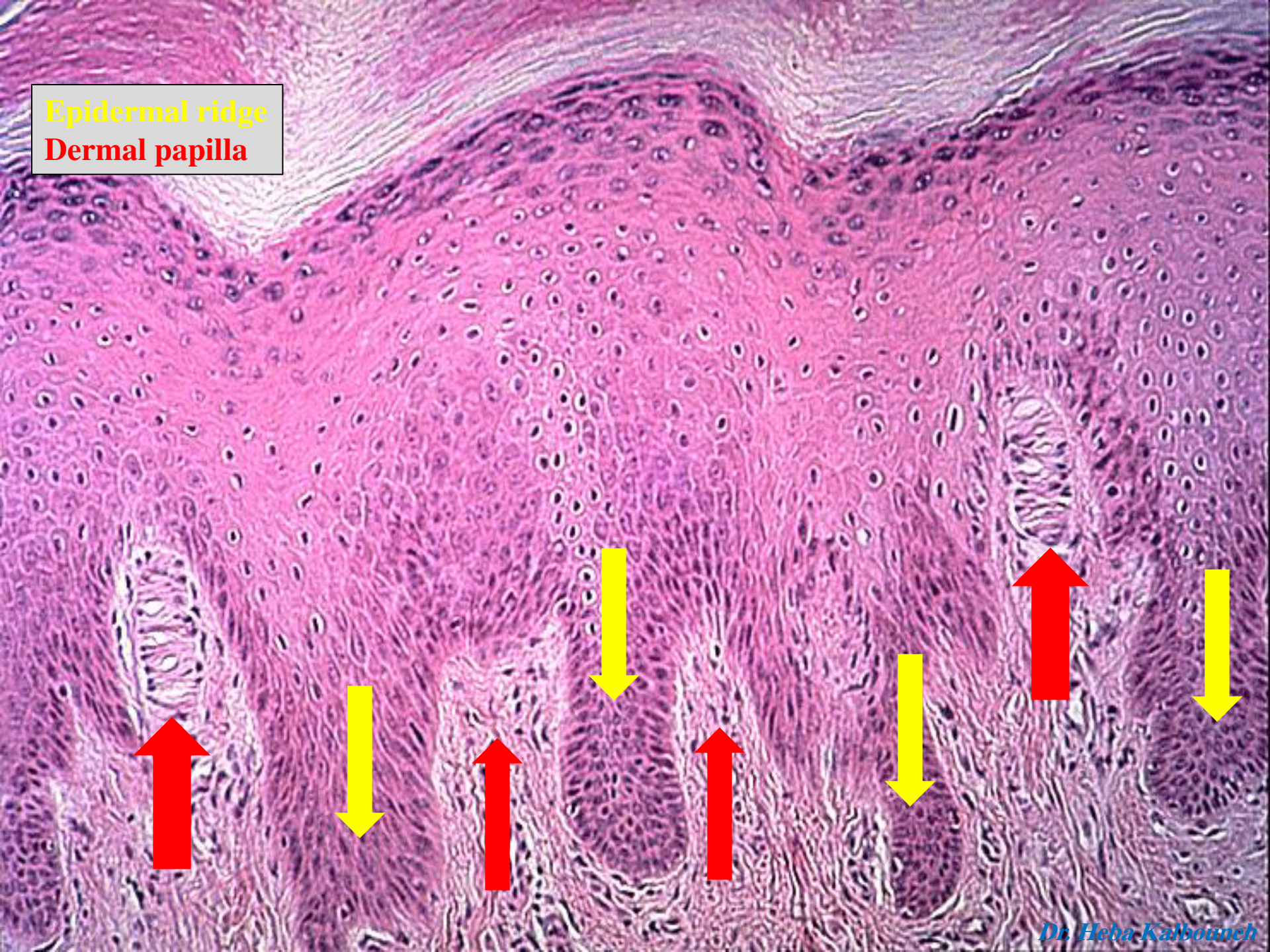
Practical sections for the exam


Epidermal ridge
Dermal papilla
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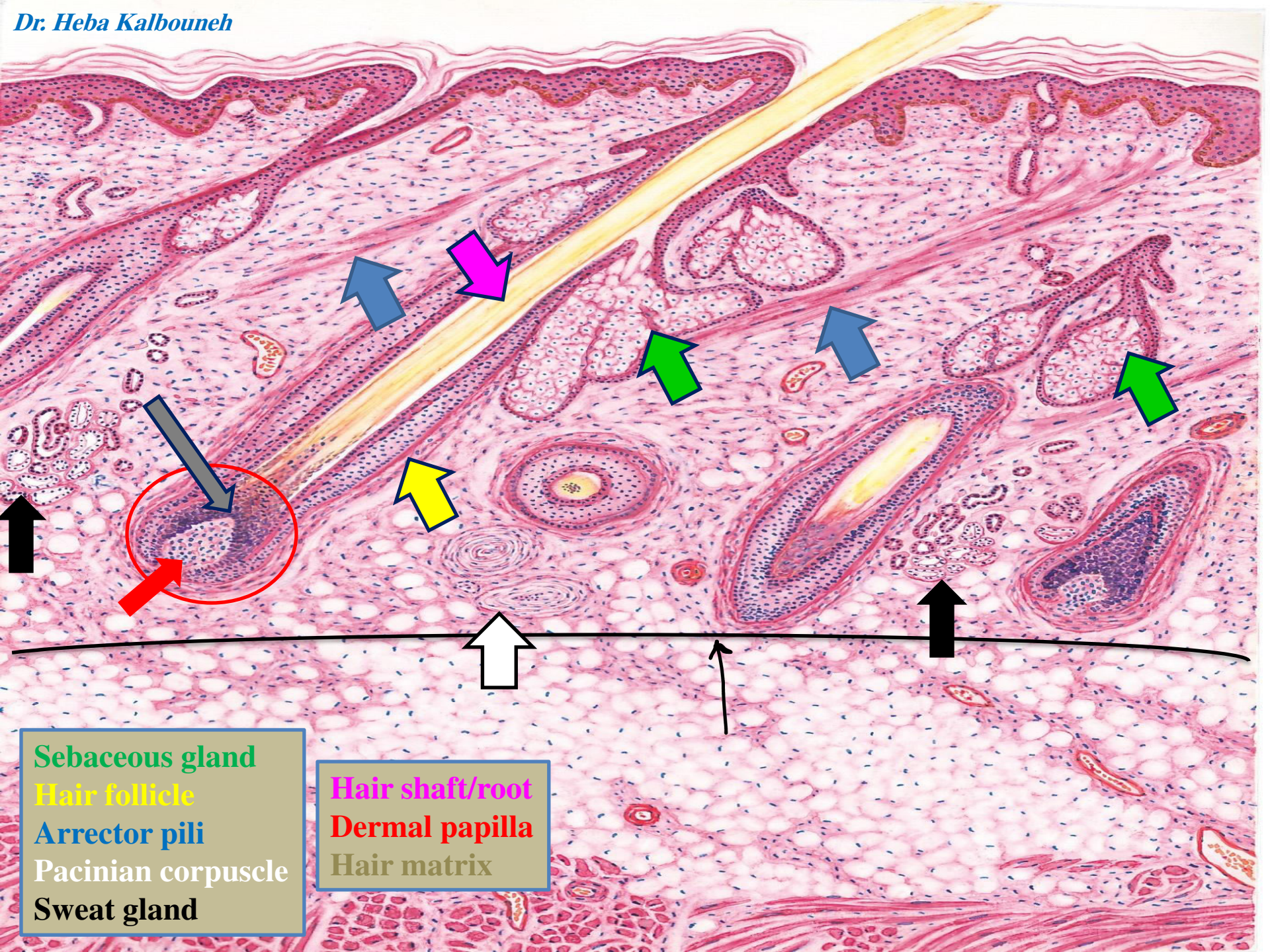
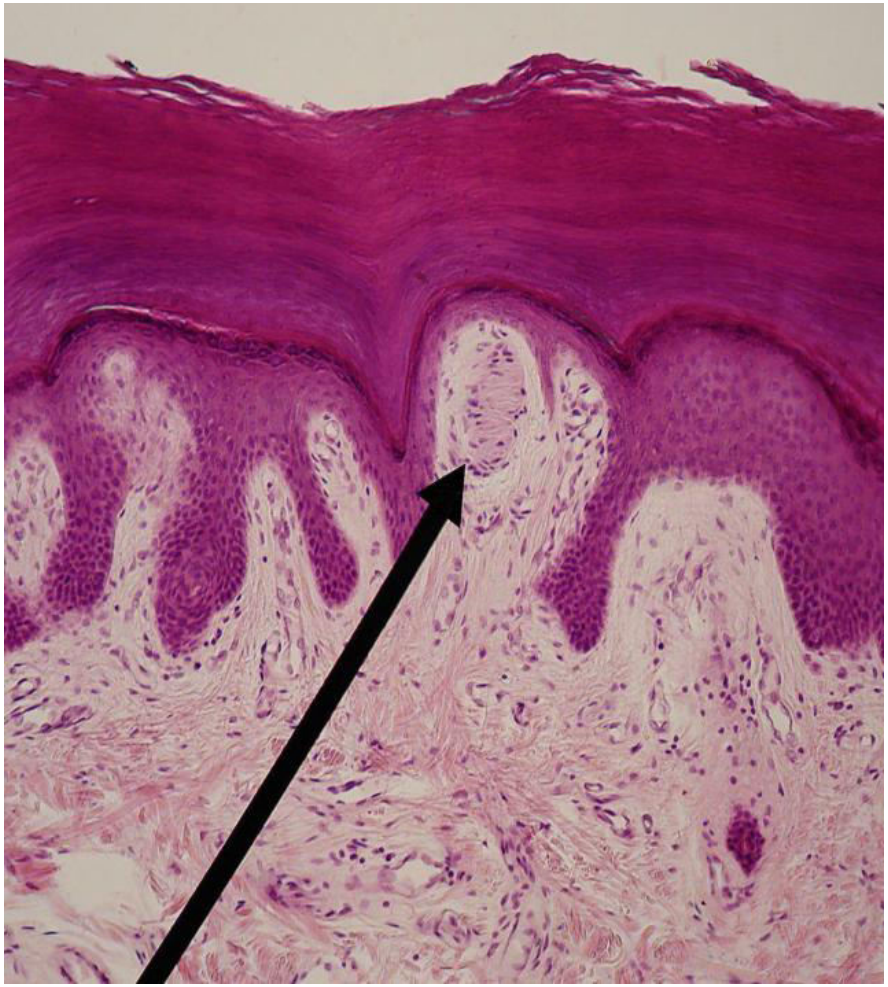
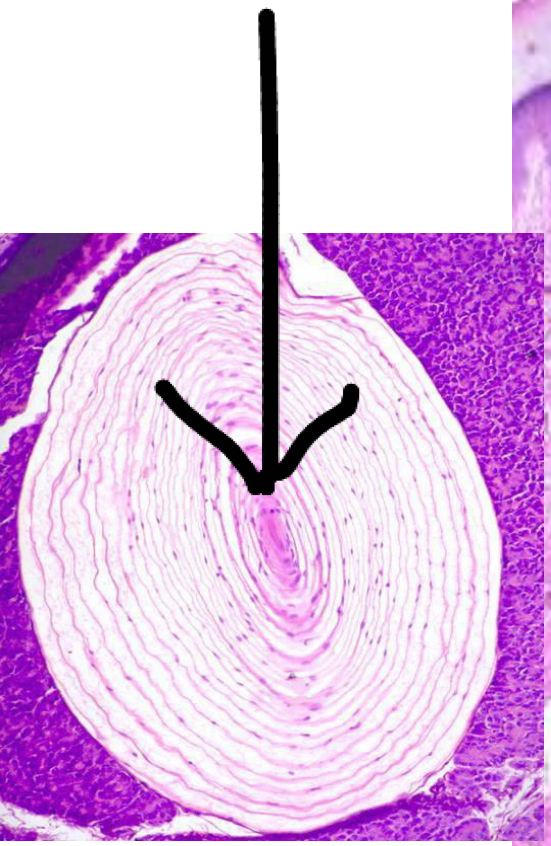


Meissner corpuscle



Pacinian corpuscles



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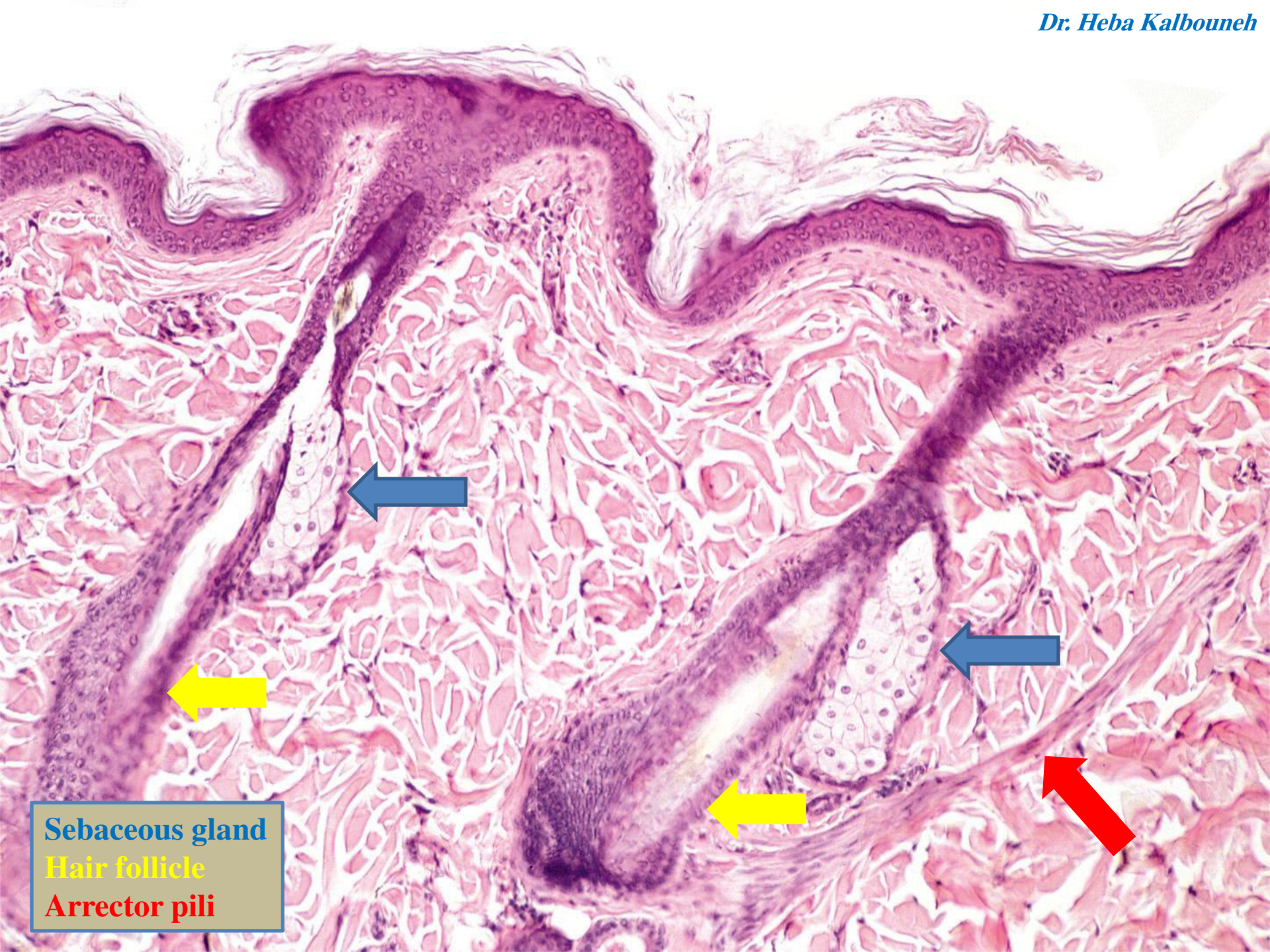
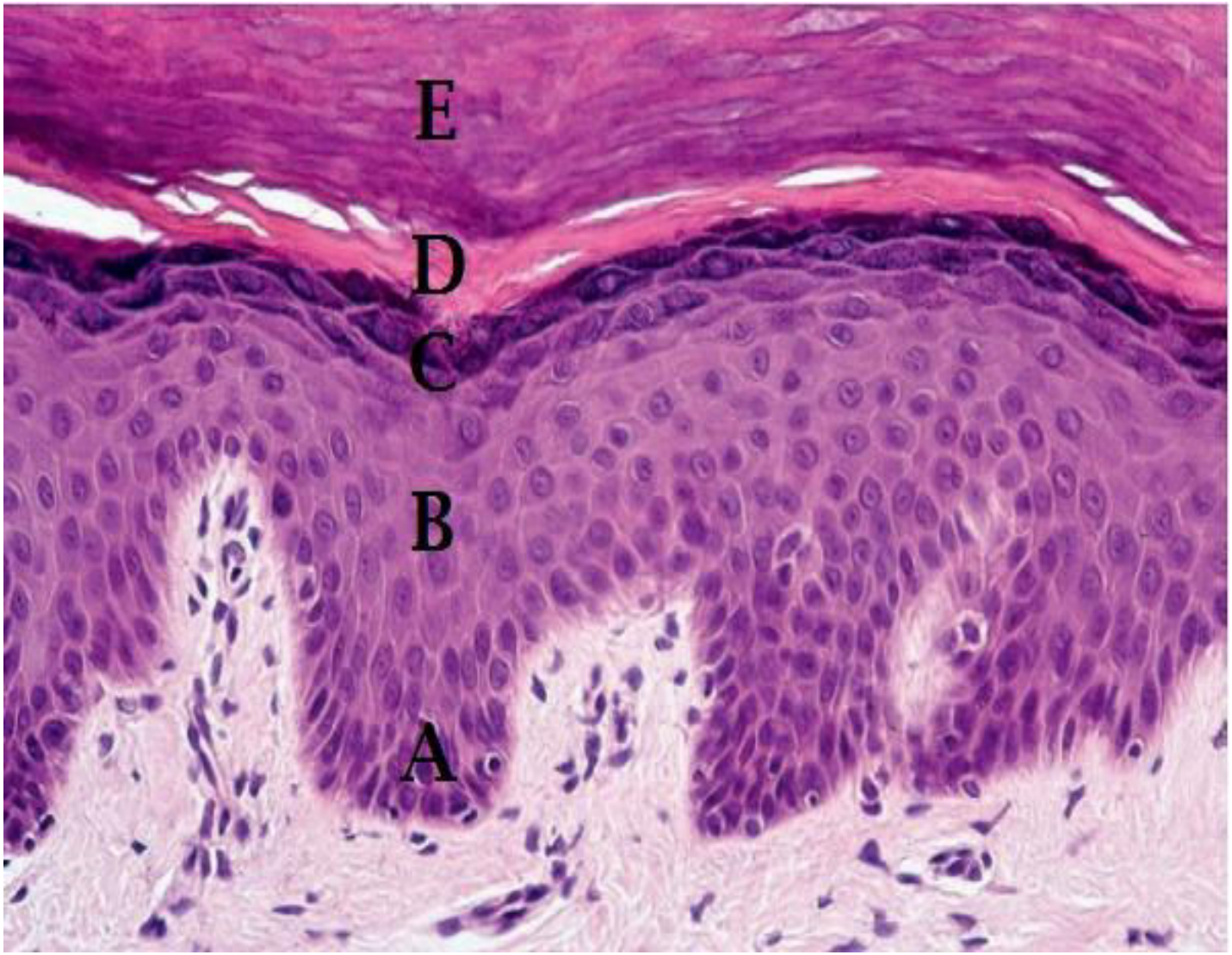
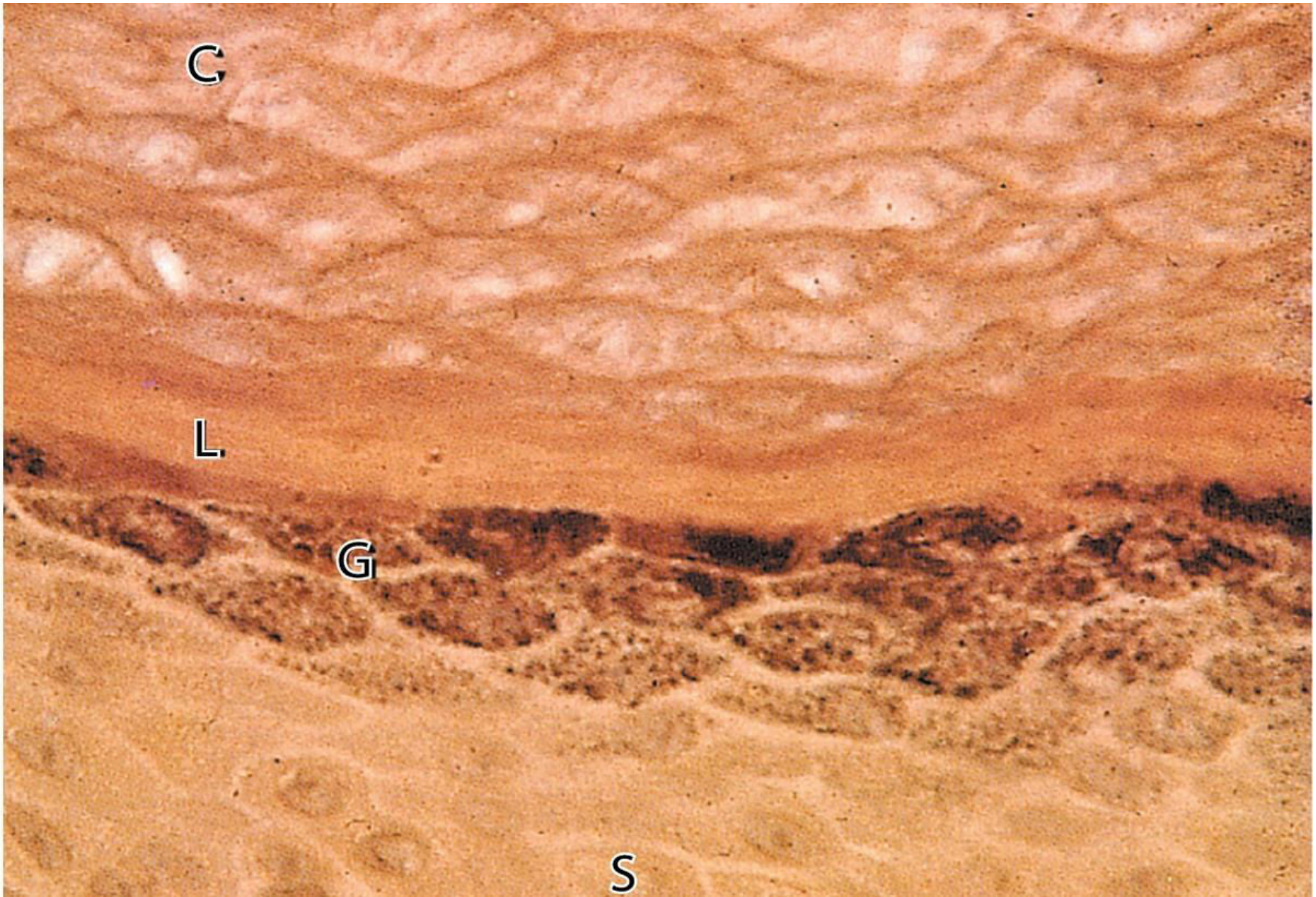



E
D
C
B
A

THICK OR THIN SKIN ????



Q1: Which of the following is a real difference between thick and thin skin?

a. Thick skin has hair follicles while thin skin doesn't

b. Thick skin has thinner dermis than thin skin

c. Unlike thick skin, thin skin has well developed stratum granulosum

d. None of the above is a real difference

ANSWER: B

Q2: A component of the hair follicle that is formed by the continuation of epidermis of the skin:

a. Inner root sheath

b. Outer root sheath

c. Glassy membrane

d. None of the above

ANSWER: B

Q3: Merkel cells and melanocytes are located in:

a. Stratum corneum

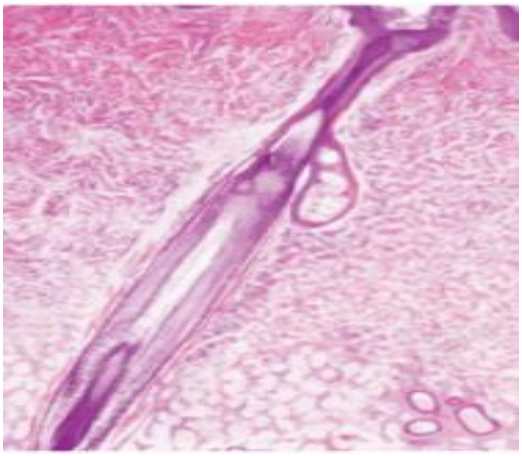
b. Stratum granulosum

c. Stratum spinosum

d. Stratum basale

ANSWER: D

Q4: Which of the following is false regarding this section?



a. It is found in thin skin such as the upper eyelid

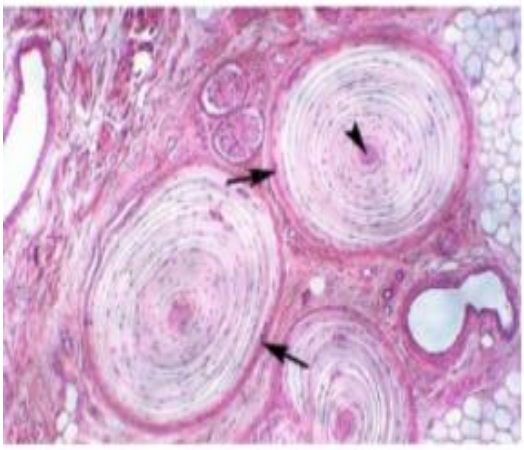
b. Both eccrine sweat glands and sebaceous glands can be seen

c. The inner root sheath ends at the level of sebaceous glands

d. None of the above is false

ANSWER: A

Q5: The labelled structure is:



a. Meissner's corpuscle

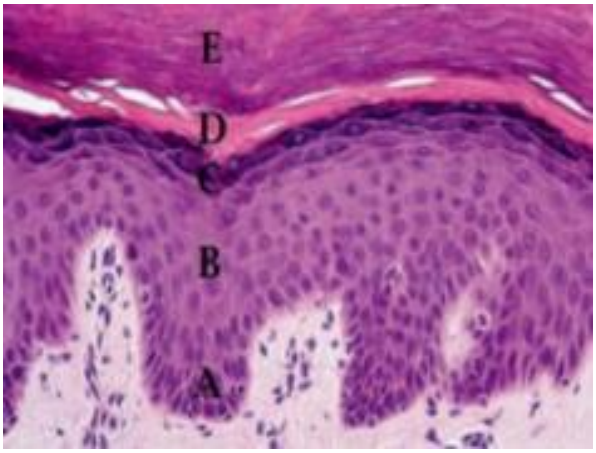
b. Pacinian corpuscle

c. Hair root

d. Apocrine sweat glands

ANSWER: B

Q6: Which of the following is false regarding this histology section:



a. It is taken from the palms and soles of the feet

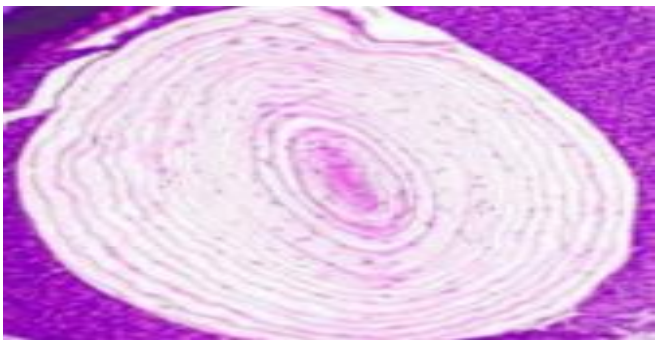
b. No hair or sebaceous glands

c. This section is taken from the eyelid

d. Thick skin with prominent stratum corneum

ANSWER: C

Q7: The following section represents:



a. Meissner corpuscle

b. Pacinian Corpuscle

c. Ruffini Corpuscle

d. Merkel disc

ANSWER: B

Q8: Apocrine sweat glands and sebaceous glands are similar to each other in which of the following features?

a. Location in the body

b. Association with hair follicles

c. Their mode of secretion

d. The produced material

ANSWER: B

Q9: Which of the following statements is wrong regarding thickskin?

a. It is found in palms and soles

b. Its epidermis consists of five layers

c. Its dermis is thicker than the dermis of thin skin

d. It has no hair or sebaceous glands

ANSWER: C

Q10: Which of the following is true about melanocytes?

a. They store the melanin pigment, so they appear brown in color

b. They are located in stratum spinosum

c. They transfer melanosomes to nearby keratinocytes

d. Their proliferation is stimulated by exposure to sun light

ANSWER: C

Q11: Mismatched pair:

a. Stratum spinosum / Langerhans cells are abundant

b. Stratum Lucidum / not found in all skin types

c. Stratum corneum / Dead cells

d. Stratum granulsoum / non-membranous bound lamellar granules

ANSWER: D