



لجان الترغعات

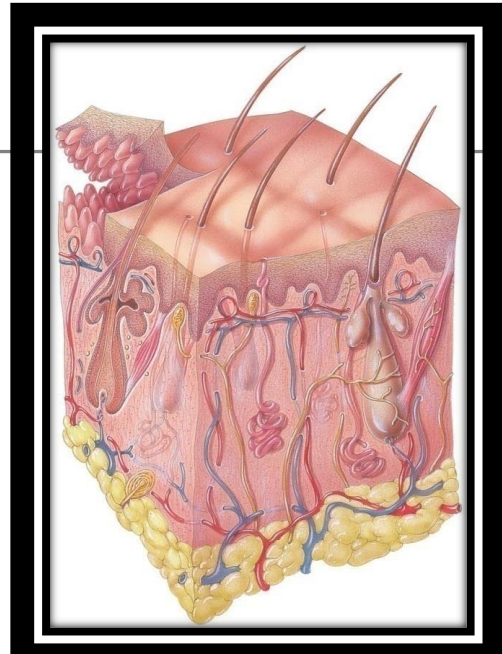
# ANATOMY

MORPHINE ACADEMY

MORPHINE  
ACADEMY

# The Integumentary System

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(2021)



بسمه هيك لا تا هرجشت  
بي آينگون كهان من  
accessory part (a → d)

- The **integumentary system** is formed of the skin and its **accessory** structures. These include:

a. **Hair**

b. Arrector pili muscle

c. **Sebaceous and sweat glands**

d. **Nails**

- Functions of the skin:

1. Regulation of body temperature

2. Blood reservoir

3. Protection

4. Cutaneous sensations

5. Excretion and absorption

6. Synthesis of vitamin D

تامينج Vit. D

# Structure of the Skin

- The skin (**cutaneous membrane**) covers the body and is the largest organ of the body by <sup>من ناحية</sup> surface area and weight. Weight is about 16% of body weight. It's thinnest on the eyelids, thickest on the heels.
- The skin is formed of two major layers:
  1. Outer layer called the epidermis.
  2. Inner layer called the dermis.
- Beneath the dermis is a <sup>تحت ال dermis</sup> subcutaneous layer (also called the hypodermis) which attaches the skin to the underlying tissues and organs. <sup>طبقة تالية</sup>

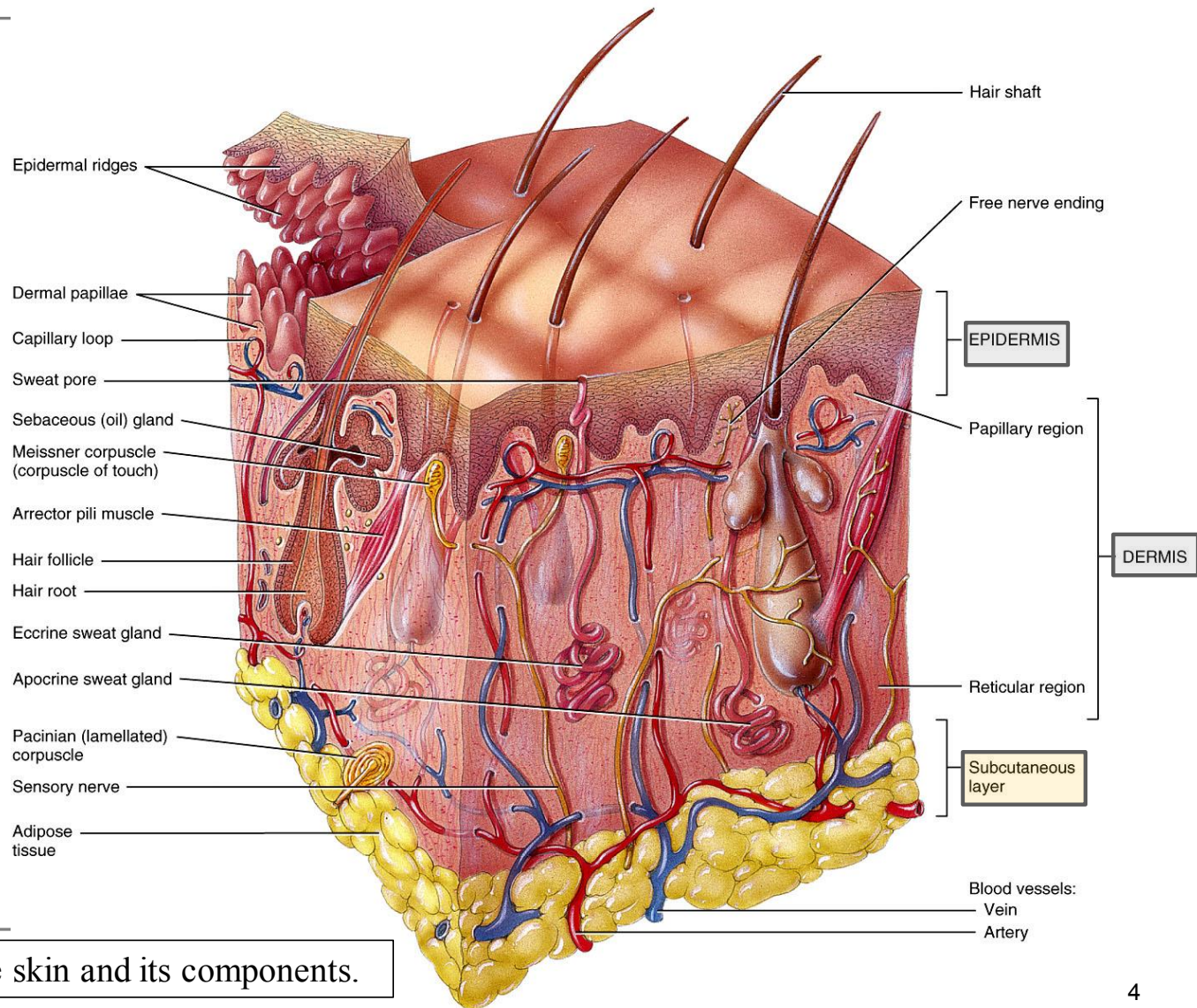


Fig.1: The skin and its components.

# The Epidermis

- The epidermis is composed of stratified squamous keratinized epithelium.

- It contains four major types of cells:

الخلايا المكونة للـ Epider.  
هم عبارة عن 4 cells

أغلب الخلايا Keratinocytes

- 1) Keratinocytes (90% of the cells) they form the layers of the epidermis and produce keratin which is a tough fibrous protein that provides protection.

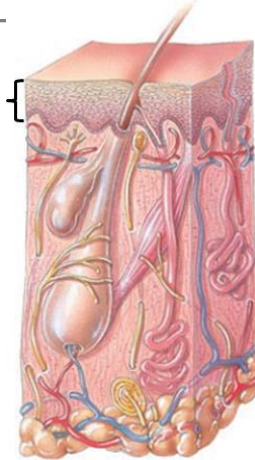
Function

إفراز الكيراتين

- 2) Melanocytes: which produce the pigment melanin that protects from damage by ultraviolet radiation.

مهم ولون  
أفراز صبغة  
الميلانين

وظيفة الميلانين  
عشان ليمنع ليعرنا  
يقتل من  
Skin cancer



Keratin

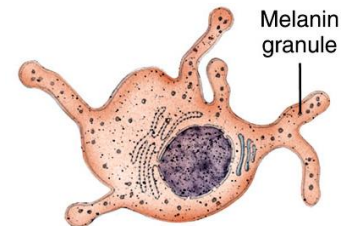
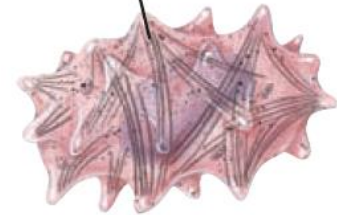
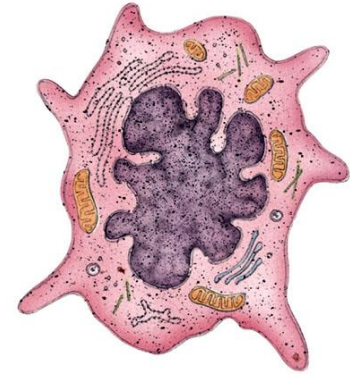


Fig.2: The epidermis and its cells.



3) Langerhans cells: involved in immune responses.   
 وظائفها الاستجابية المناعية



4) Merkel cells: which function in the sensation of touch along with the adjacent tactile discs (derived from a neuron).

يكونون متصلين مع Merkel c. مع وظائفهم الاحساس باللمس  
 sensation of touch

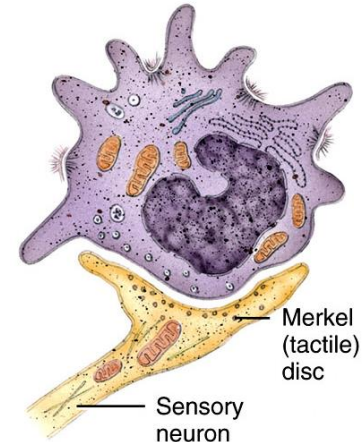
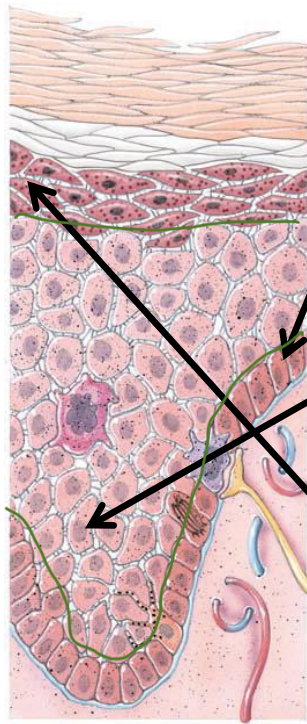


Fig.2: The epidermis and its cells (continued).

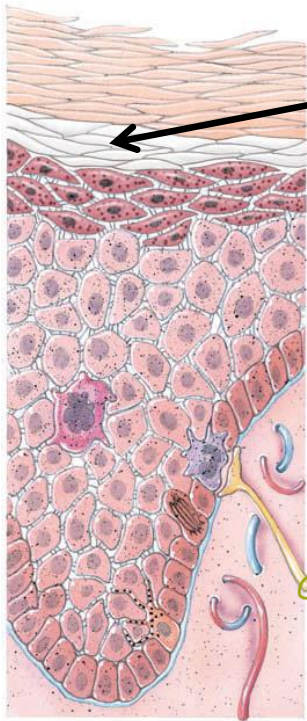
# Layers of the Epidermis

- The epidermis is formed of four layers (thin skin) or five layers (thick skin). *stratified* <sup>بما انها</sup>



- 1) Stratum basale (deepest layer), where continuous cell division occurs to produce all the other layers. *basement membrane* <sup>بيني فوقه</sup> *مباشرة* <sup>اوله طبقة</sup> <sup>(عبارة عن طبقة وضع)</sup> <sup>4 layers</sup> <sup>5 layers</sup> <sup>thick يعني</sup> <sup>eyelids (الاجفون) تحبس</sup> <sup>4/5 الى حدودها تكون</sup> <sup>طبقة المكان مثلاً داخل الايدي والقدم ماي</sup>
- 2) Stratum spinosum, 8-10 layers of keratinocytes. <sup>عبارة عن 8-10</sup> <sup>من الـ Keratinocytes (الخلايا التي تشكل 90% من خلايا الجلد)</sup> <sup>الطهر من طبقة</sup>
- 3) Stratum granulosum, which contains granules that could be keratohyalin or lamellar granules. <sup>تتوي</sup> <sup>أشياء عليها</sup> <sup>1</sup> <sup>2</sup>





4) Stratum lucidum is present only in thick skin (the skin of the fingertips, palms, and soles).

موجودة فقط  
بالـ thick skin  
5 layers

5) Stratum corneum (The Keratin layer):

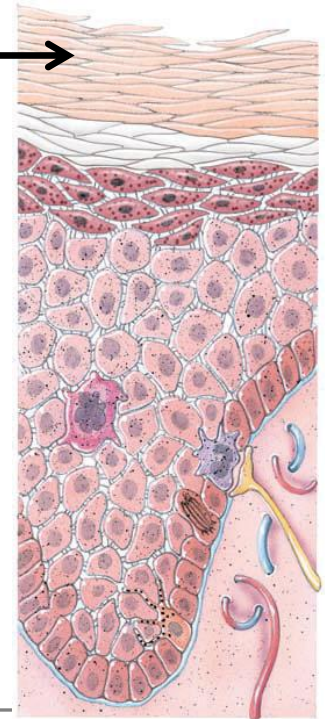
ها هي الطبقة  
مكونة من  
corneocytes  
أو بسوسم  
squames

composed of many sublayers of flat, dead keratinocytes called corneocytes or squames. These are nothing more than cell membranes filled with keratin. They are continuously shed and are replaced by cells from deeper strata.

ها هي الطبقة عبارة عن  
Keratinocytes ولكن dead يعني ميتة

صفحة تحتوي على Keratin & cell membrane

بس تقوية بتطلع لظوف بتكون  
str. corne. لبدن بغير لظوف (تتكسر) ويبي  
بد الها dead Kerat. ثانية



## Notes about the layers:

- اقلب اسلايد ولا تكون راح اكتب لكم حكي  
الاحتود عن هالف الاسلايد
- Merkel cells and the cell bodies of melanocytes are found within the stratum basale. The branches of melanocytes extend between adjacent keratinocytes to provide them with melanin pigment.

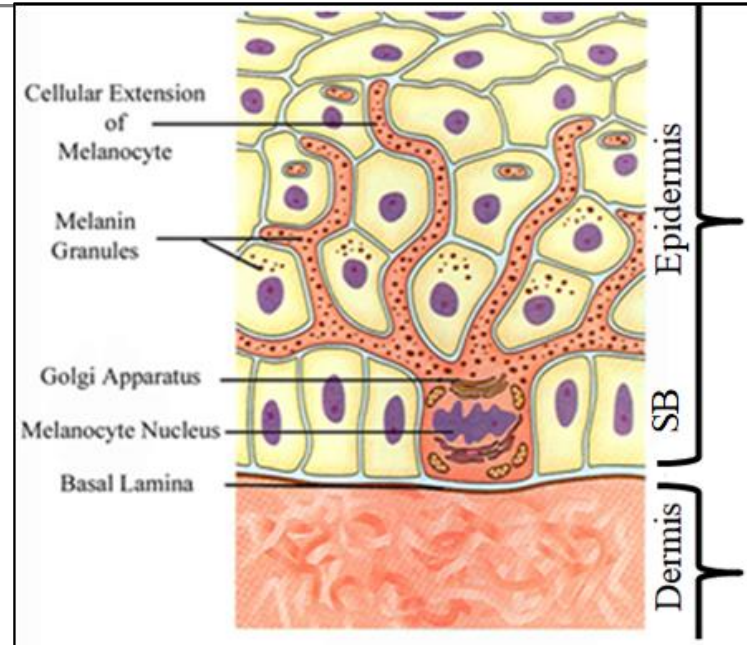


Fig.3: Position of melanocytes.

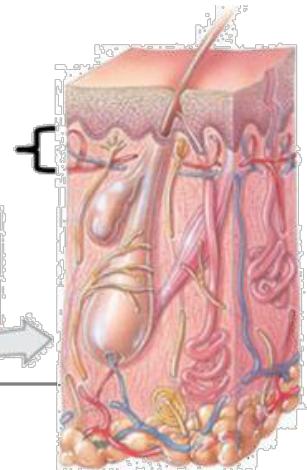
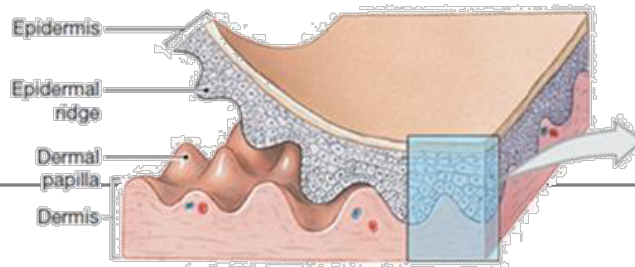
- The lamellar granules of the stratum granulosum bind with the cell membrane and release a lipid-rich secretion that fills spaces between cells to prevent water loss.
- Keratin in the cells bind to desmosomes to help in the adhesion of the cells to each other.



# The Dermis

- The dermis is a layer of connective tissue that provides structural and nutritional support for the epidermis. *هو طبقة epidermis وليتي دكت ال ولفعل بنهم basement mem.*
  - Formed of two regions:
- ① Outer *papillary region* consists of loose (areolar) connective tissue containing:
    - *Dermal papillae* – tissue of the dermis that projects between the epidermal ridges (which are epidermal tissue passing down into the dermis). This increases the area of contact between the epidermis and dermis. *تؤدات طالعة من ال dermis بالتي ال epithelium*
    - Capillary loops. *بالمقابل في قداما process طالعة من ال epith. بالتي ال dermis وما يسمى epidermal ridges*
    - Corpuscles of touch and free nerve endings.

Fig.4: Papillary region of the dermis.





الى حركتنا عندهم النغزات والالوان هاهي بتكون البهمة



Fig.5: Fingerprint.

- The overlap between the dermis and the epidermis is reflected on the surface of the skin by a pattern of elevations and depressions that forms the **fingerprints** (and footprints). Their function is to increase firmness of grip by increasing friction.

papi. ليمتد من عند

reg. لحد ما تاوصل

hypodermis لجهة

هي حجومها كين كبير بعكس هذي

2.

The deeper reticular region consists of dense collagenous irregular connective tissue containing:

- Adipose cells خلايا دهنية
- Hair follicles بصيلات الشعر
- Nerves
- Sebaceous (oil) glands, and sweat glands

هضمول  
هيلك  
بصيلات  
يعني

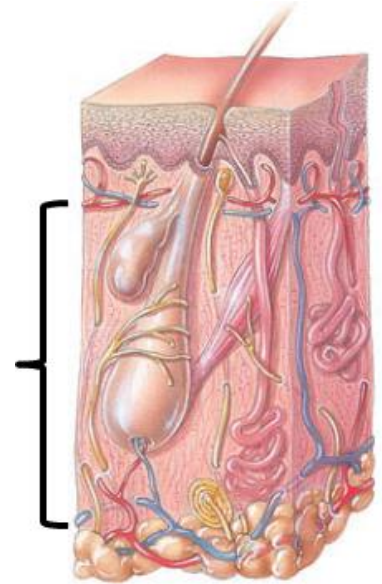


Fig.6: Reticular region of the dermis.

# The Subcutaneous Tissue

الطبقة الثالثة  
التي تحت ال  
Dermis

- This layer (and sometimes the dermis) contains lamellated (pacinian) corpuscles which detect external pressure applied to the skin. It also contains various amounts of fatty tissue.

- Functions:

- Attaches the skin to the underlying tissues and organs
- Acts as an insulator بتشتغل كعازل
- Serves as an energy storage site
- Absorbs shocks (as in palms and soles) لامتصاص أي صدمات

المسح والضغط الحساس  
بال  
pressure



Fig.7: Subcutaneous tissue.



# Accessory Structures of the Skin

## ① Hair (Pili)

- Hair is composed of columns of keratinized cells bonded together by extracellular proteins. It's present throughout the body, except in certain areas like the palms and soles.

الـ hair مكون من  
أعمدة من الخلايا المترسلة

من مادة البروتين

بطن الرجل  
من تحت  
بطن اليد  
ما فيهم شعر

### ■ Functions of hair:

- Protection (Hair on head protects scalp, eyelashes and eyebrows protect eye).
- Reduction of heat loss.
- Sensation of light touch.

# Parts of the hair

الجزء الخارجي الى مابين عليل

- **The shaft**: the superficial part of the hair that extends beyond the surface of the skin.
- **The Root**: <sup>الجزء الى داخل النك</sup> the deeper part of the hair that reaches down into the dermis. It's surrounded by the **hair follicle** which is a downward extension of the epidermis. <sup>Root محاط بـ ↑ بصيلة الشعرة</sup>

- The shaft and root of the hair are formed of 3 concentric layers: <sup>اجزاء الشعرة</sup>

- 1) **The medulla**: The **innermost** layer
- 2) **The cortex**: The **middle** layer
- 3) **The cuticle**: The **outermost** layer. Formed of highly **keratinized dead cells**, arranged like **shingles** on house roofs.

→ لشكلهم

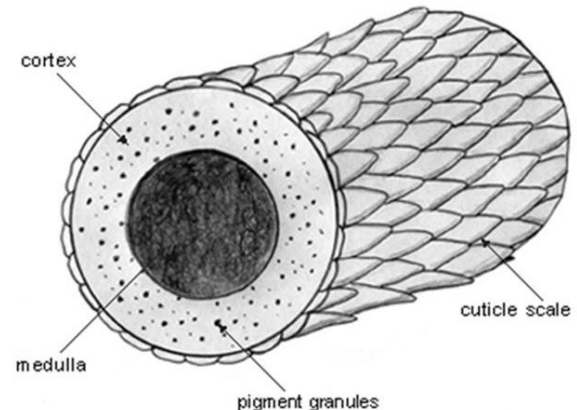
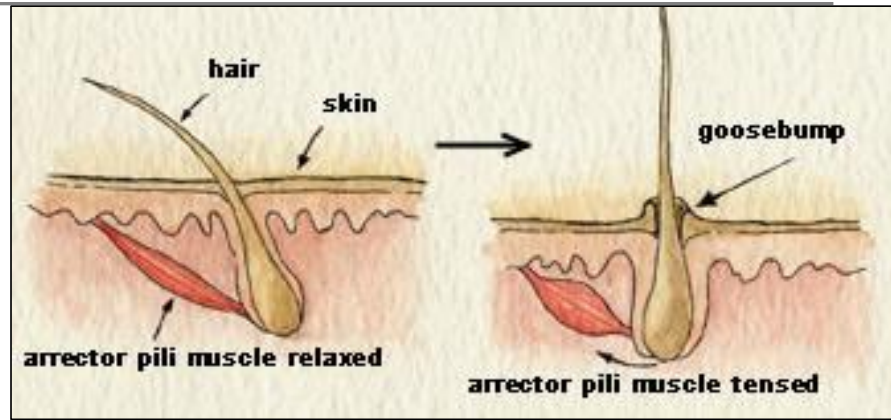


Fig.8: Layers of hair.

Fig.11: Action of the arrector pili muscle.

وحدة من  
Smooth  
muscles



- The **arrector pili muscle** is a bundle of smooth muscle cells that extends from the superficial part of the dermis to the dermal sheath of the hair follicle. Under stressful conditions, the muscle contracts pulling the hair making the shaft perpendicular to the surface and bulging the skin around the hair producing 'goosebumps'. قشيرة
- The **sebaceous gland** is located in the angle between the arrector pili muscle and the hair. It opens into the hair follicle. The secretion of this gland (sebum) prevents dehydration and inhibits growth of certain bacteria. ولافتها لمنع

# Sweat Glands 2 types

Feature	① Eccrine	② Apocrine
Location	All over the body, specially palms and soles	Axilla, groin, and bearded facial regions of adult males
Shape	Coiled	Coiled
Secretion	Watery	More viscous (bacteria acts on this secretion to produce body odor)
Method of secretion	Merocrine	Merocrine
Opens	On the surface of the skin	Mostly into the hair follicle
Control	Nervous	Hormonal
Onset of action	From birth	At puberty
Functions	Helps cool the body. Elimination of waste products	Stimulated during emotional stress