

Histology Lab- Skin

انفلاحي THE INTEGUMENTARY SYSTEM

It consists of:

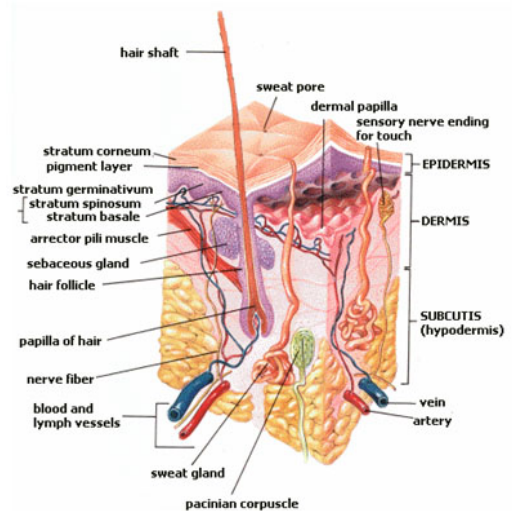
1- **The skin.**

[زوائد ج ملحقه]

2- **The skin appendages:**

- Hair.
- Nail.
- Sweat, sebaceous & mammary glands.

[الصفه]



فـ Skin يعتمد على الطبيعة

- 7

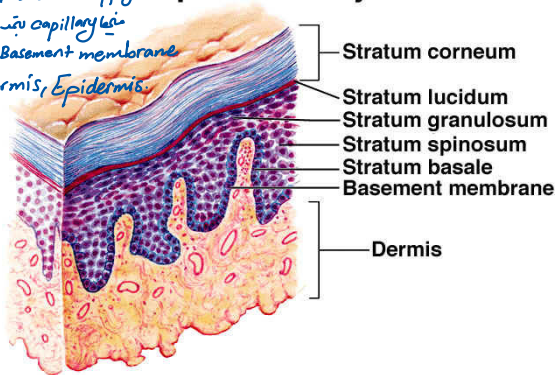
Aravascular
بلا وعاء
عروق
Blood supply

معروف ہے
vascular

Epidermis
(2 origin)
(مشتق)

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٢٠٠٠ Blood supply
 ٢٠٠١ capillary
 ٢٠٠٢ Basement membrane
 Dermis, Epidermis



THE EPIDERMIS →

تیکڑے سے 5 اجزائے
میں 4 انواع میں نکلتا ہے

- It is a **keratinized stratified squamous epithelium**.
سب سے اونچے سے cell
غشائے اونچے سے cancer
[squamous cell carcinoma].
- It consists of four types of cells:**

1-Keratinocytes.

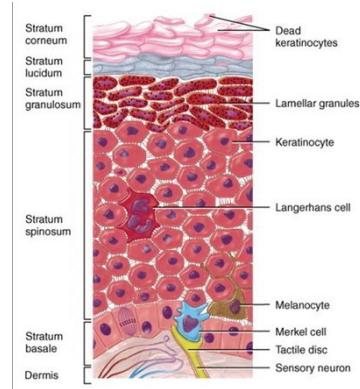
2-Melanocytes.

3- Langerhans cells.

4- Merkel's cells.

کل وجودی انہا شکل
درجہ بندی، رنگ
بلائیڈم و ڈیٹیکٹا۔

Non keratinocyte اور Keratinocyte
اور 3 الباقیہ



سرطانہ الجلد لیسیم ہے
Melanoma
ہی جگہ سے
Melanocyte
والے
poor prognosis

Nonmelanoma
نوع
① Squamous cell carcinoma.
② Basal cell carcinoma.

keratinocytes / تَطْلَعُ keratin KERATINOCYTES

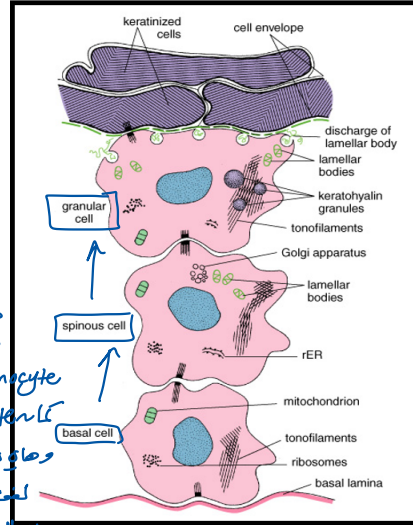
- They are the most abundant cells in the epidermis. → لانه اصلا مرضيها تفضل بقى
Skin keratinization.

Keratinization (15-30 days):

- The superficial epithelial cells are shed off at the surface and are replaced by cells arise from stem cells in the basal layer. → صما صرح هما في طبقات
هلا ال Basal cell تبصغ

- As the cells move upwards:* keratinocyte كبريه تبصغ

- The keratin filaments (cytokeratin filaments) accumulate inside the cells. وها في تبتزه الأدم
لغزوة ، و صكنا
- The nucleus and organelles are disappearing. و صا الطبة لاي يتكبر منه keratin
تتكبر خلايا مية بين ما حيا nucleus , organels



بكونا في طبقات
Thick skin

- The cells die. The cell die.

KERATINOCYTES

- If the process of keratinization occurs more rapidly (one week): The superficial keratinized cells will accumulate and desquamate forming thick scales (*dandruff*).

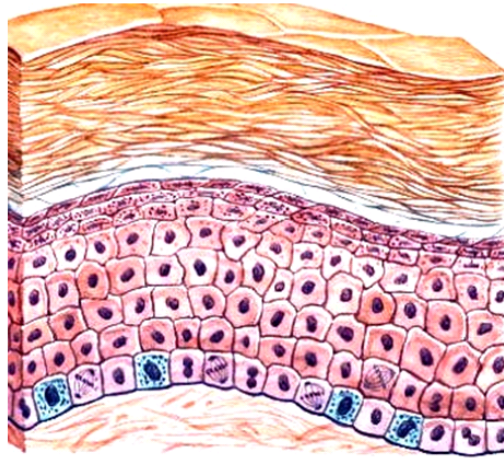
شوره

• keratolytic agent در کاهش تجمع و لایه‌برداری شوره



• keratin
• های متغیر لیست
• می‌تواند به

THE KERATINOCYTES ARE ARRANGED IN 5 LAYERS

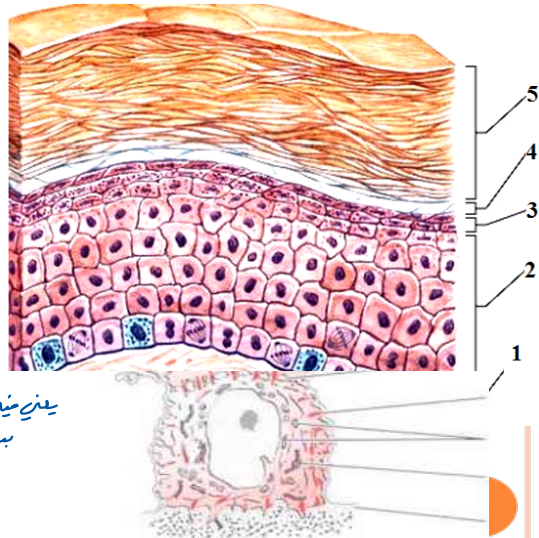


كل الطبقات فيها Keratinocyte ، لكن بأشكال مختلفة .



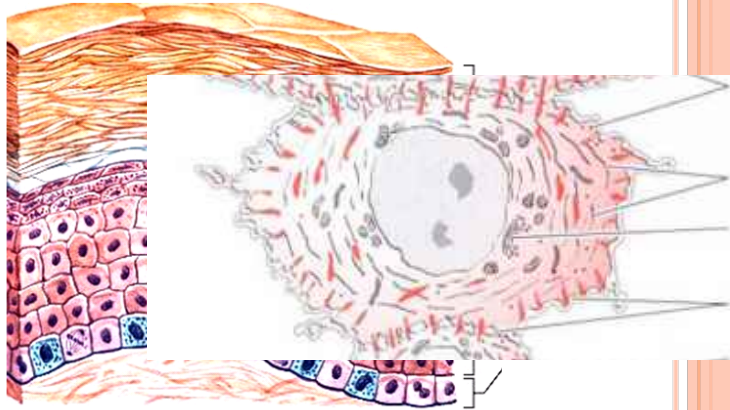
1-STRATUM GERMINATIVUM = STRATUM BASALE

- **Number of layers:** one layer.
- **Structure:**
 - 1- *Shape of cells:* low columnar. بسبب الطبقات التي فوقها. → مصغرة (تصغير)
 - 2- *Nucleus:* large oval.
 - 3- *Cytoplasm:* deep basophilic (numerous polysomes). عشيرة لصنع بروتين لصنع keratin
 - 4- The cells are attached together by desmosomes and to the basement membrane by hemidesmosomes. يعني فيه زوايا سدسة الخلايا ماسكة ببعضها
 - 5- Frequent mitotic figures. لأنها تنقسم إلى stem cells
- **Function:** renewal of keratinocytes



2-STRATUM SPINOSUM = PRICKLE CELL LAYER

- **Number of layers:** 5-10.
- **Structure:**
 - 1- *Shape of cells:* polyhedral.
 - 2- Multiple *spinous processes* which interdigitate the similar processes of adjacent cells by *numerous desmosomes*.
- **Function:** resisting the effects of friction and pressure.



3-STRATUM GRANULOSUM = GRANULAR LAYER

• **Number of layers:** 3-5.

• **Structure:**

1- **Shape of cells:** diamond shaped.

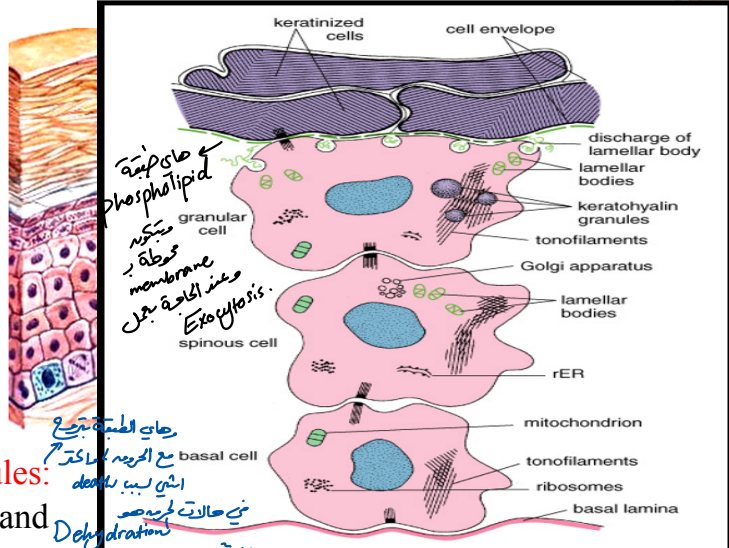
2- **Nucleus:** flattened.

3- **Cytoplasm:** deeply basophilic & granular contains:

Keratohyaline granules: non-membrane bounded granules (packing keratin filaments together).

Membrane-bounded lamellated granules:

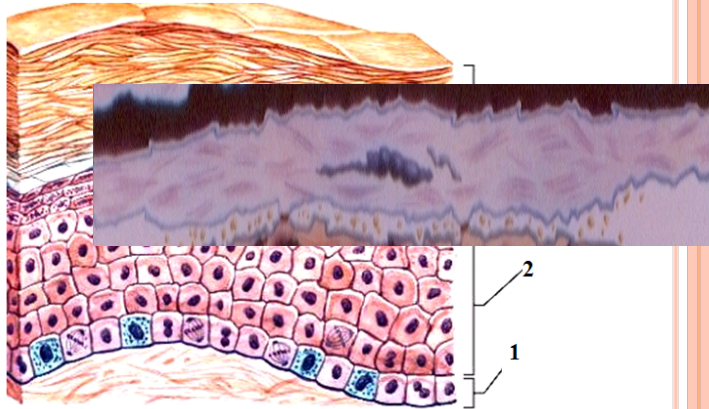
Its synthesis starts in stratum spinosum and they increase in number in stratum



تتكون من طبقتين من الجلد.

4-STRATUM LUCIDUM = CLEAR ZONE

- **Structure:** 2-3 layers.
- **Structure:** لأنه جلي الطقة سبباً أمتد الـ *organelles*.
 - 1- *Shape of cells:* flattened & pale.
 - 2- *The nuclei and the organelles:* are degenerating.
* ليس لها مظهرية
- الطبقة التي تليها غائبة عن العينين تتكون من *organelles* أمتد.
 - 3- *The cytoplasm:* contains densely packed keratin filaments.



الطبقة القرنية.

5-STRATUM CORNEUM = HORNY LAYER

- **Number of layers:** 20-30.

- **Structure:**

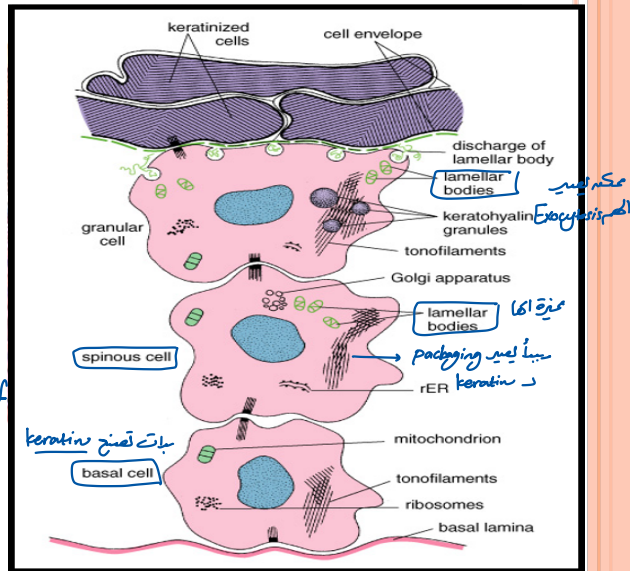
1- *Shape of cells:* flat cells in the form of eosinophilic horny scales.
 لأنه بس صافيه keratin
 مهادل keratin عبارة عن protein

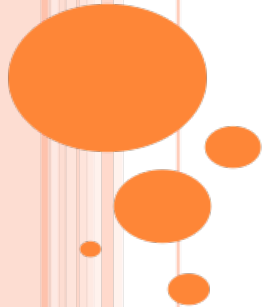
2- *The nuclei and organelles:* degenerated.
 بسكونه منه Basic amino acid

3- *Cytoplasm:* contains densely packed keratin filaments.

4- The cells adhere to each another by remnants of desmosomes.

↓
لأنه املاها الطبقة ج توقع ، غا بدري انبعا بعضها كثير عيني.





NON KERATINOCYTES

تفرز مادة الـ Melanin .
التي يتحدد لونها بالإنسان .

MELANOCYTES

تكون عميقة لنفسه عند النكل
لكنه قدرتها انما تقل melanin
تختلف من انسان لآخر

The color of the skin depends on the interaction of three factors:

- 1- The content of *carotene* (yellow). - يكون مخيم مادة β -Carotene التي يتكسبهم $\rightarrow$ الصبغة التي تعطي لونه اصفر على ترقي في مصبوغة بالجزر .
حار اللون .
- 2- The oxygenated *hemoglobin* in the capillaries (red). - هي الصبغة مصبوغة في SC.Fat [Hypodermis]
- 3- The *melanin pigments* (brown to black). - عشانه هي لونه SC.Fat يكون اصفر .

↓
عشانه هي لونا
الـ anemic يكونوا
pale

- هي الـ 3 أسباب مع الاسباب الـ Environmental
أر الـ genetic هي التي يتحدد لونها بالإنسان .



I-MELANOCYTES

• Features:

1- **Site:** in the epidermis, between the cells of the stratum basale (also found in the hair follicle).

2- **Structure:** branching cell, its cytoplasm contain **melanosomes**.

• Function:

Melanin formation which protect against the harmful effect of ultraviolet rays, thus exposure to sun light accelerates the rate of melanin production.

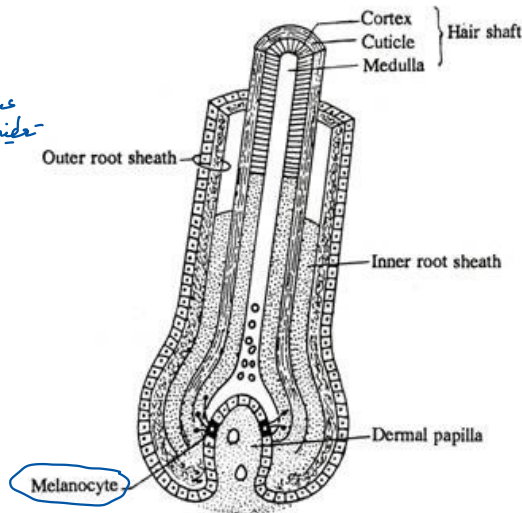
عشانه صليبه الناجم الي عايشة
في الصبغات مناطق م اشعة السطح الخارج
بكوننا أسمر منا .

بب معجزة في Basal layer

عشانه
تطيني لونه الشعر

هاي سبه granules
يصنعها صب الحاحه . عيني سبه
بحاجة اخزنه .

مادة سبه
Epidermis في Columnner cell

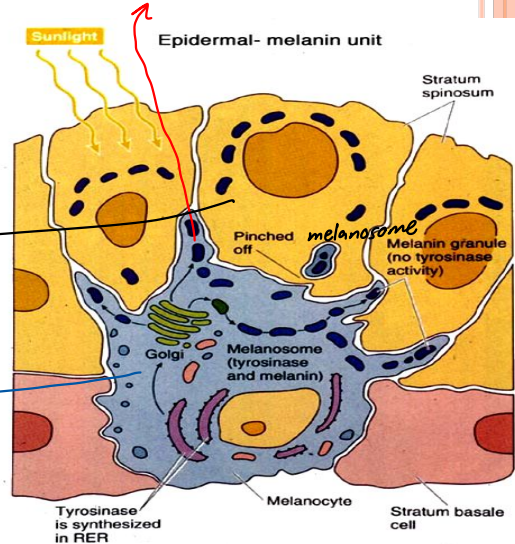


MELANOCYTES

• من cell لـ cell

- **Cytocrine secretion:** unusual mode of secretion, in which the cytoplasmic processes of melanocytes transfer the melanosomes into the neighboring epidermal cells.

الغى و branching كثير



• هاي الخلية بعدم اخذت الـ melanosome .
• يتطبع الـ melanin نومه nucleus ، ليه ؟
• عنده تحمل لك شحمية تحمي النواة من أشعة الشمس الضارة .

• لبتصنع الـ melanin في vesicle [melanosome] .
• متفكره مباشرة خلية ثانية ، يعني ما بتفرز melanin بل بتطلع melanosome بالغلط .

• هاي الخلية اناي بتأخذ melanosome من ابي بتنتفع .

• داسم الخلية cytocrine secretion (عملية نقل الـ melanosome) .

• لانه اصلا اشعة الشمس بتأثر على النواة
• وعلى DNA وبتغير الخلية تنقسم بشكل
• abnormal وياصير Cancer
• نأنا بمحي النواة عن طريق melanin .
• عشان هيلع الناس الشراكت
• عرضة لـ skin cancer لانه ما عندهم
• شحمية الـ melanin .

MELANOCYTES

- **The number of melanocytes:** Nearly the same in all races. Although, hereditary and racial factors control the amount and size of melanosomes and the rate of transfer by melanocytes. ✓



MELANOCYTES

1- Albinism: Lack of pigmentation, in which the melanocytes fail to form melanin. → *لأنه ما عندهم انزيم Thyrosinase
فهم عشانه اصنع melanin*

2- Vitiligo : a depigmentation disorder occurs due to degeneration of melanocytes.

↓
أو melanin
- بكون فيه autoantibody يهاجم الـ melanocyte
منصير مناطق فيها صبغة ومناطقه لا.

- بما انه autoimmune فيمكنه الاتي عنه
التهن Hypothyroidism , DM

↓
علاجه / انه اخلي مناطق
الـ pigmented اعادها
لـ Depigmented أسهل .



عبارة عن Macrophage

II-LANGERHANS CELLS

- **Origin:** blood monocytes (mononuclear phagocytic system) *Kupffer cell, Osteoclast* نفس

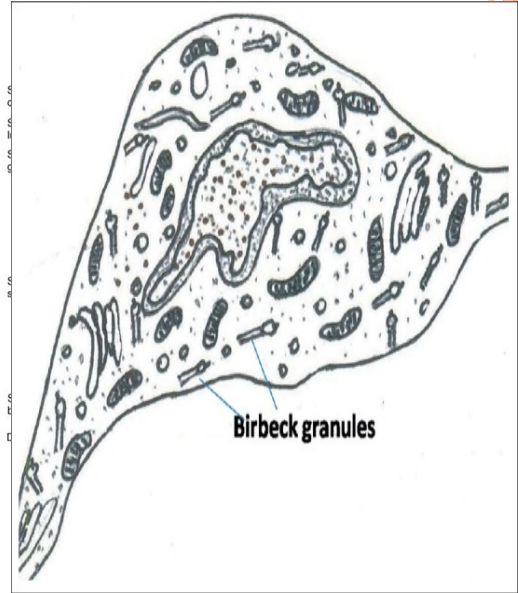
• features:

1- LM:

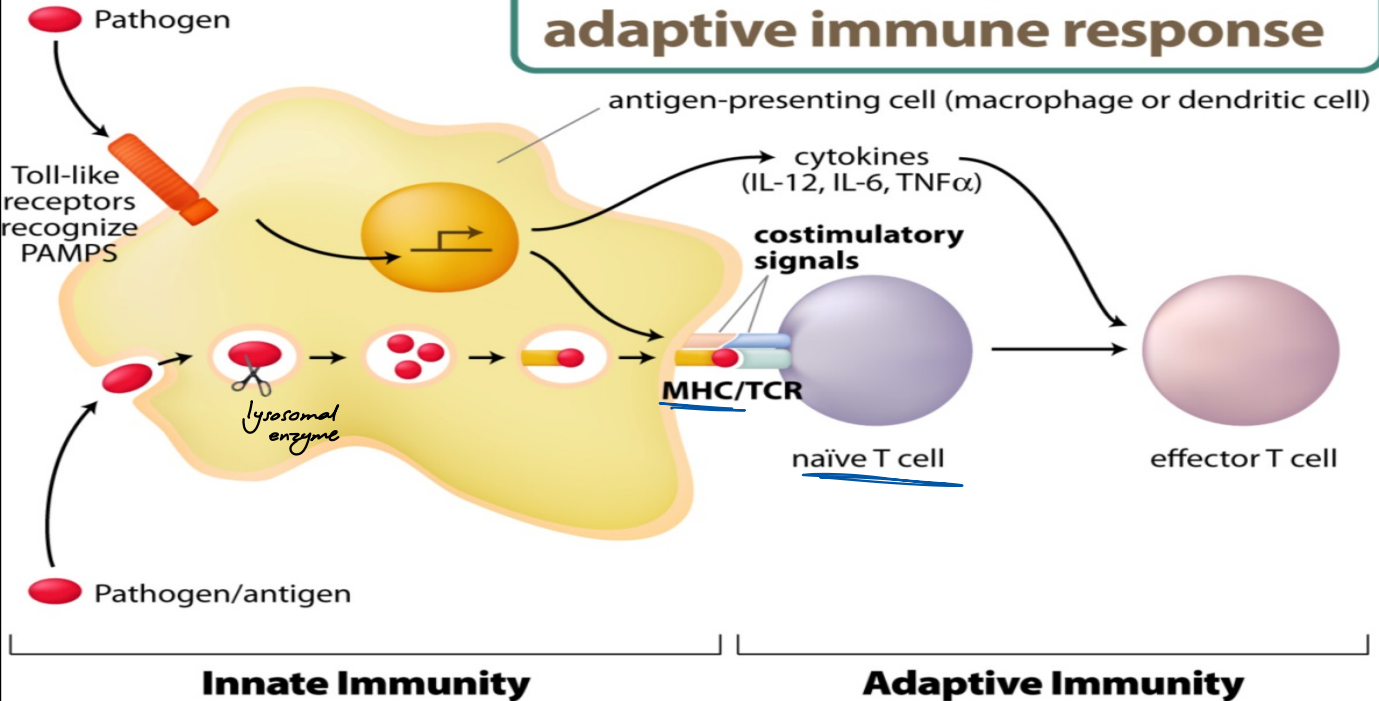
- > **Shape:** branching cells with multiple cytoplasmic processes. لأنه هي APC بها قطع Antigen → عشاء تتحرك وتعمل phagocytosis
- > **Nucleus:** folded & irregular. للمنطقة T lymphocyte ، غلافه غشائي
- > **Cytoplasm:** pale.
- > **Site:** between the cells of stratum spinosum.

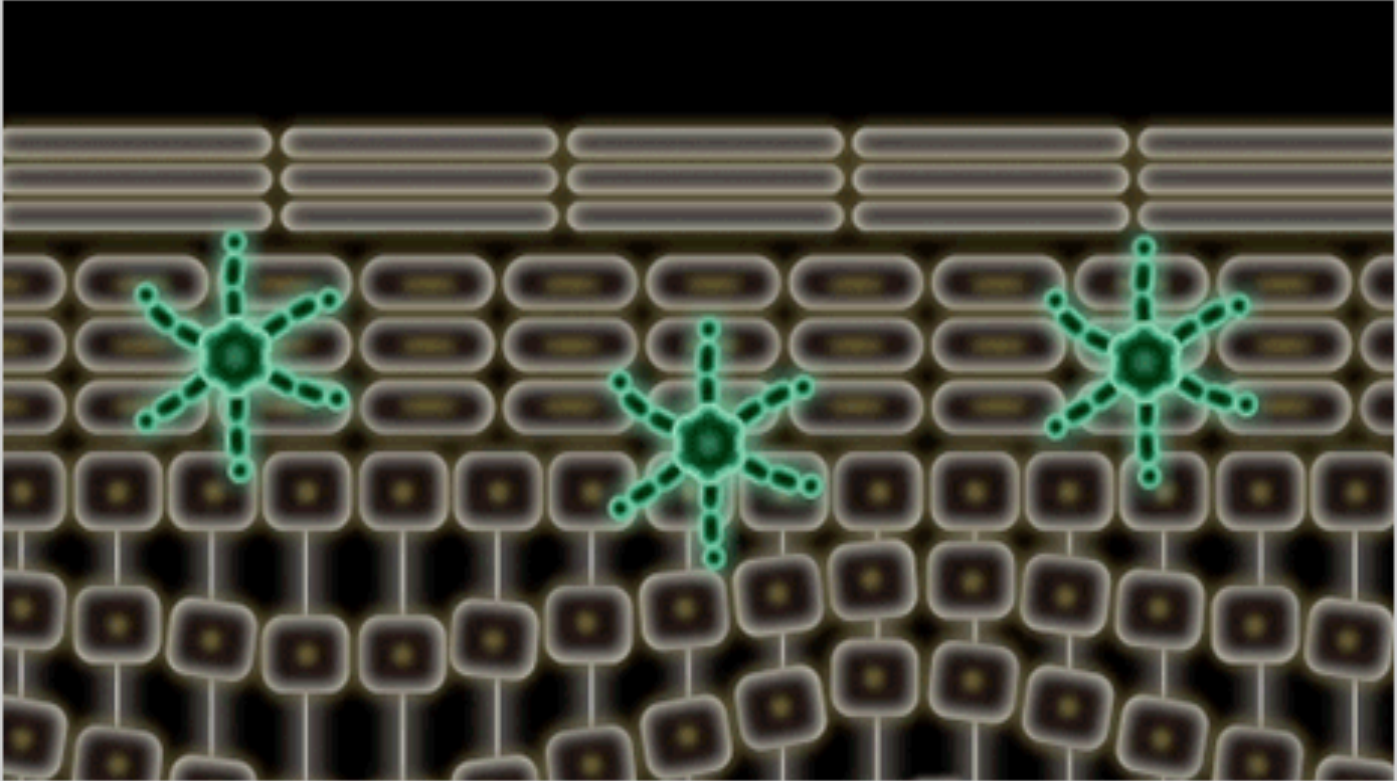
2- EM:

- > numerous **lysosomes.** لأنه مابينها ايها تكون مشبة لانها immune cell مع تحرك كثير
- > **Desmosomes** منسج بينها keratin منسج فيها



Innate immunity is critical to adaptive immune response





LANGERHANS CELLS

- Function:** *Immune function*

Antigen presenting cells (binding, processing and presenting the antigen to T lymphocytes. They are involved in *the cutaneous contact hypersensitivity reaction*.

لہذا انہوں نے مائیکل جسم غریب رکھایں اور cell قتل Engulfment
 presentation اور T cell، صرغ اور T cell مقلد

mediator، حیدر Inflammation، خفہ Hotness، redness، swelling

Hypersensitivity انہ لہذا مادہ میفز ان Inflammation reaction
 علیہ اشیاء مایکس منہ مایکس لہذا
 زہی مقلد مایکس مایکس منہ الکولور مایکس لہذا

Eczema ← مصطلح لہذا لہذا Inflammation مایکس skin



III-MERKEL, S CELLS

• Features:

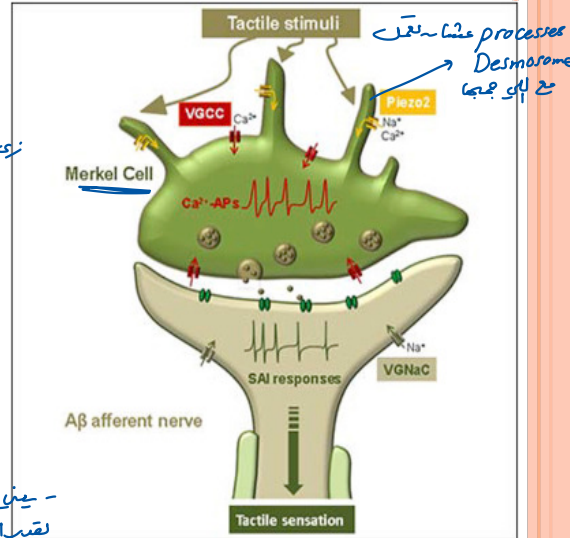
- **Shape:** large cells with short processes.
- **Site:** the basal layer of the epidermis. *میلانوسیت*
- They are attached to the keratinocytes by **desmosomes**. → *محل اتصال*
- The sensory nerve fibers pierce the basement membrane, end as expanded discs near the Merkel's cells

• Function:

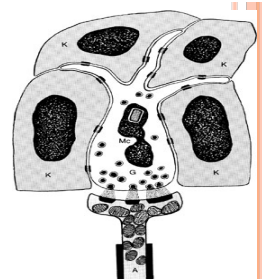
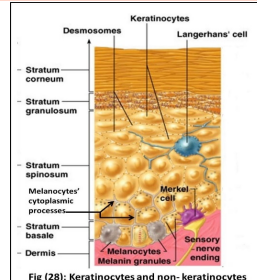
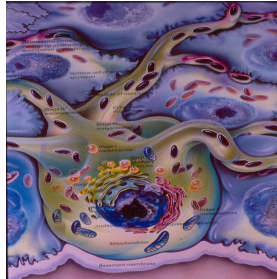
Receptors for fine touch sensation.

نرم لمس حساسیت

*اینها حساسیت های مختلفی
لقد حساسیت های مختلفه
سه کل انواع مختلفه*



	Melanocyte	Langerhan , s cell	Merkel , s cell
1- Site	Basal layer.	Stratum spinosum.	Basal layer.
2- Function	Melanin secretion which acts as a screen against UV radiation.	Antigen presenting cell responsible for cutaneous hypersensitivity.	Receptors for light touch.
3- Structure	Branching cells. Cytoplasm contains melanosomes.	Branching cells with irregular nucleus. Cytoplasm contains lysosomes.	Large cell with short processes. Connected to keratinocytes by numerous desmosomes.



DERMIS

- It is a ^{vascular} connective tissue layer.

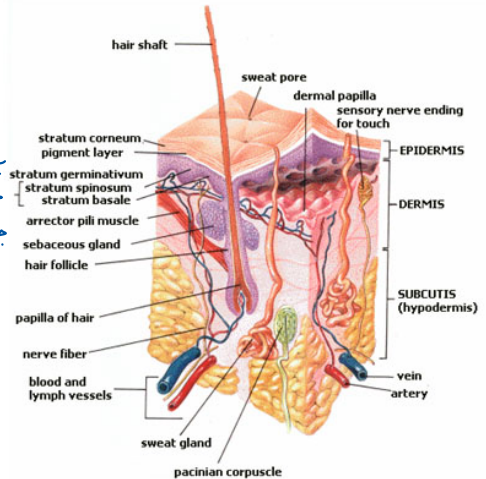
- It contains:*

1- Epidermal downgrowths: the hair follicles, the sweat glands & the sebaceous glands. → *یعنی یہاں موجود ہیں*

2- Sensory nerve endings (receptors).

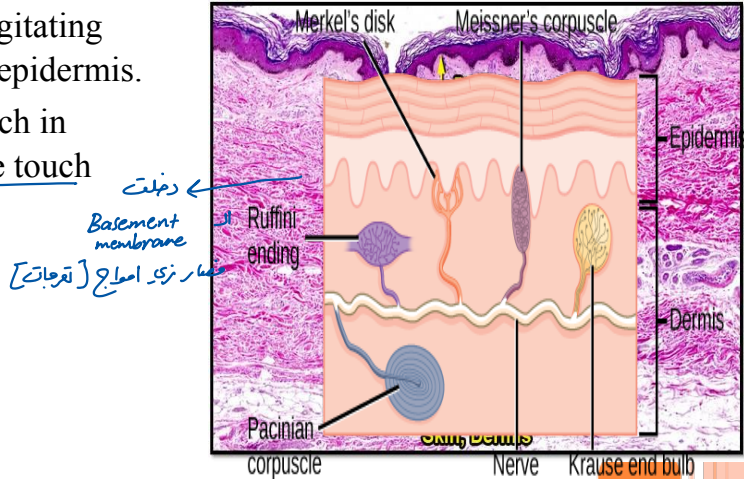
3- Numerous capillaries: for thermoregulation and nutrition.

*میں Epidermis
Dermis*



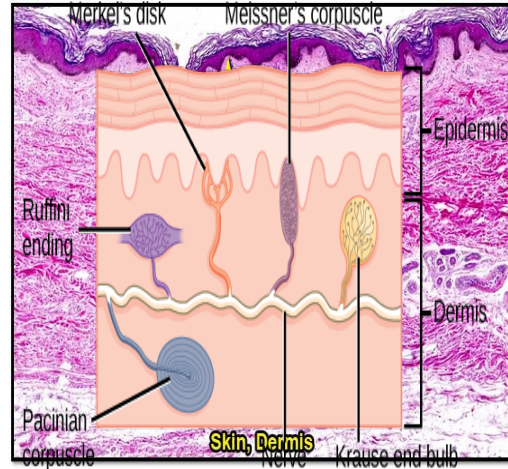
I-PAPILLARY LAYER

- It is the thin superficial layer, interdigitating with the basement membrane of the epidermis.
- **Structure:** *loose connective tissue* rich in blood capillaries & receptors for fine touch and temperature sensation.



. Fiber ne ātām hā
II- RETICULAR LAYER

- It is the deep thick layer. ✓
- **Structure:** *dense irregular connective tissue* (more fibrous and less vascular than the papillary layer) contains:
 - 1- Collagen & elastic fibers.
 - 2- Sensory nerve endings for pressure sensation.



THE HYPODERMIS →

مستند من skin هي SC. Fat
هي التي تبقى skin يكون mobile.

- It is a subcutaneous layer lies under the dermis (it is not a part of the skin). ✓

- **Structure:** loose connective tissue rich in fat cells. ✓

• **Functions:**

- 1- Attaches the skin to the underlying tissue. ✓

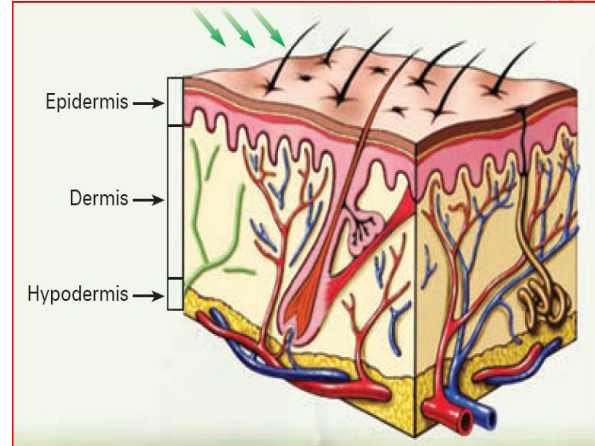
- 2- Storage of fat. ✓

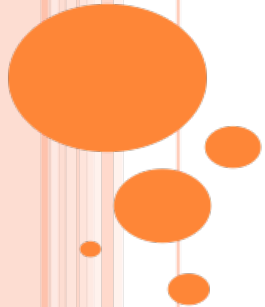
- 3- Contains the large blood vessels that supply the skin. ✓

جدران vessels التي في skin جارية اسفل من هاء الطبقة.

- 4- Allows a great mobility of the skin(except in palm& sole). →

التركانية معرضة ل mechanical stress. → Thick skin اسف





SKIN APPENDAGES

I-HAIR FOLLICLE

- Definition: an epidermal downgrowth into the dermis.
- It ends by *the hair bulb* which is invaginated by a vascular connective tissue dermal papilla (if destroyed, the hair follicle dies and the hair will not grow again).

جوفه فيها

Blood supply

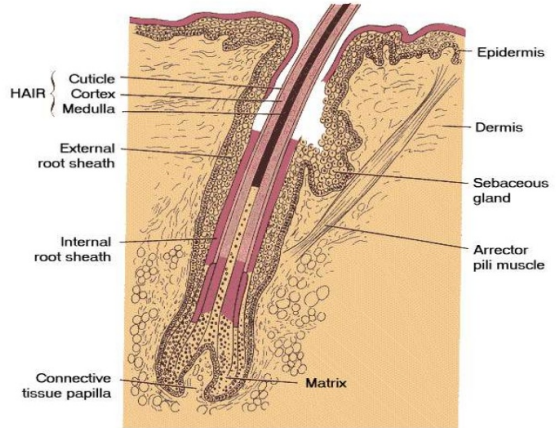
Follicle J

لوصافه فيها خلايا مث

ج ترصع تنم لشقرة

مهاد لاي بصير مع الناحي

الاي يتاخذ Chemotherapy .



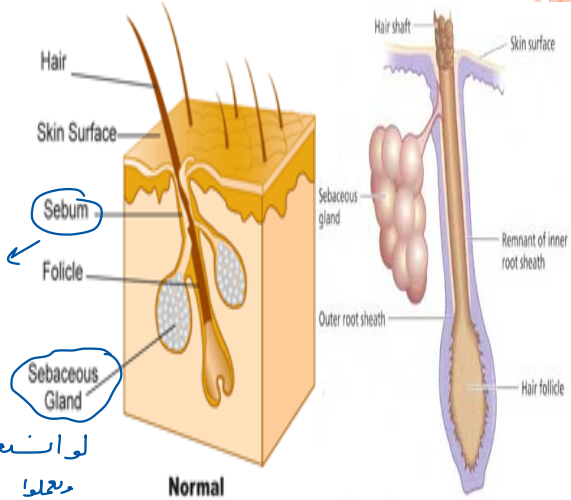
II-SEBACEOUS GLANDS

- **Origin:** from the upper third of the hair follicle.
- **Sites:** They are most numerous over the head and ano-genital area.
- **Type:** simple or simple branched alveolar, holocrine glands.

- خلايا الـ sebaceous cell -
 - يفرغ الـ sebaceous cell -
 - خلايا الـ sebaceous cell -

hair follicle
 نبتة بطلع لبرا.

لوانسعا، حبيبات
 sebaceous cyst

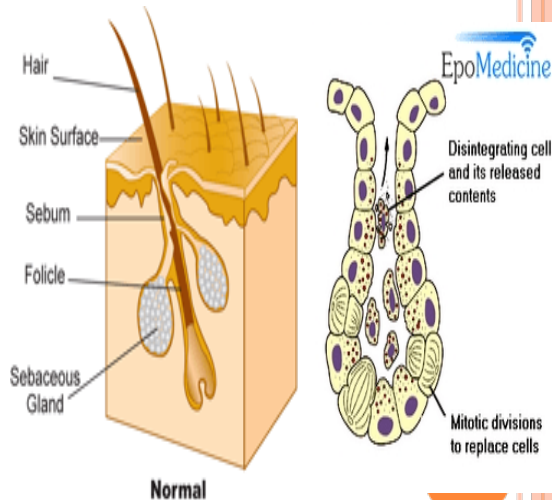


II-SEBACEOUS GLANDS

• **Structure:**

① A- The secretory portion:

- It is pale & alveolar in shape.
- It is lined by a layer of flattened *sebaceous glands* germinal cells resting on a basement membrane.
- This layer proliferates & differentiates, becomes polyhedral and accumulate sebum.
- Then they are pushed to the center, where they degenerate while discharging their secretion.



II-SEBACEOUS GLANDS

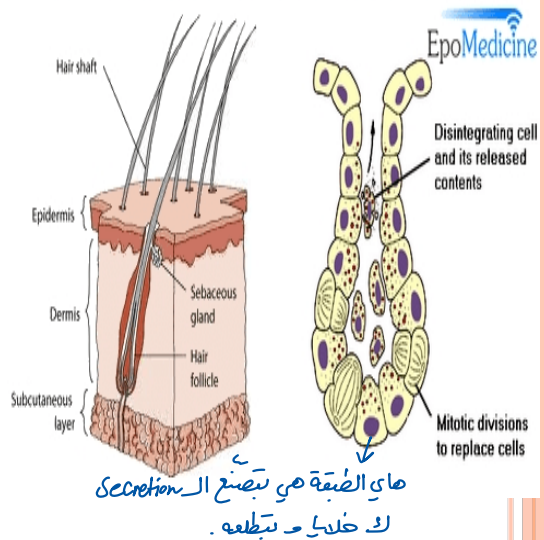
• Sebum:

➤ **Definition:** fatty substance + cell debris + keratin.

➤ **Functions:**

- 1- lubrication of the skin surface and hair.
- 2- has a bactericidal effect.

antifungal ~LE



II-SEBACEOUS GLANDS

②

B-The excretory duct:

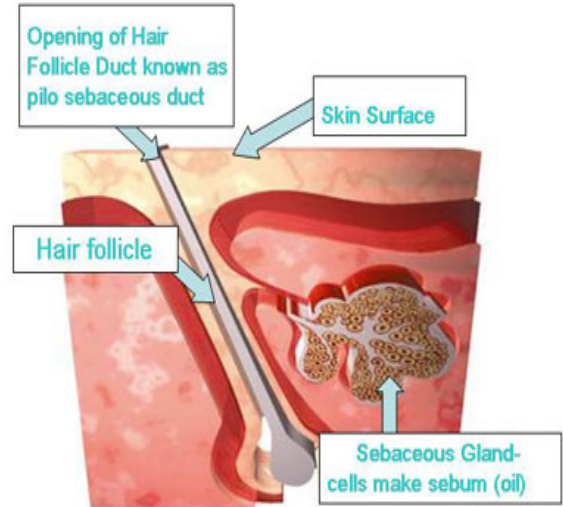
- It is short and wide, opens obliquely into the upper third of the hair follicle; directly into the skin surface. ✓
- It is lined by stratified squamous epithelium.

لأنها جارية من skin. [هي امتداد Epidermis صائر إلى invagination لجدار]

* تكثر في puberty. [أو sex hormones هي التي بجسمها]

عندما يصل الأطفال ما بعد عندهم Acne.

له من الجفان بكونه عندهم مشاكل في الهرمونات منبهر عندهم Acne.



Acne

لصيرة لبشرة الدصينة .



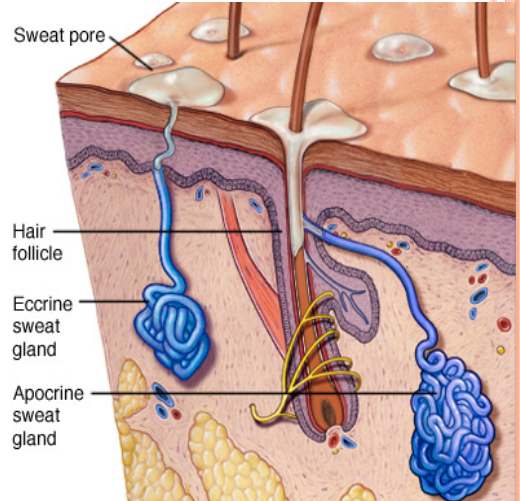
لكنه /
الرؤوس السوداء بغير
ما تستكرار Duct لكنه
فمن جزي صند مفتوح يوصل
منه هوا ، بغير اكله
ل Sebum يصير لونه
اسود .

الى يصير انه افضل ليجمع sebum
ويكونه كثيره Thick
منبسط الى duct ، وليكثر
الى على skin بقتا ثقوب ثقيل
Inflammation
وهذا هو اللي يسببه

عنه صليه اهم علاجات
ال acne ان اعطى
antibiotic
عنه ارتفع غمور
Bacteria .

III- SWEAT GLANDS

- **Type:** simple coiled tubular glands.
الغدة البسيطة الأنبوبية.
- **Site:** deep in the dermis or the hypodermis. → في الطبقات العميقة للجلد.
- **Classification:** the eccrine & the apocrine glands. ✓

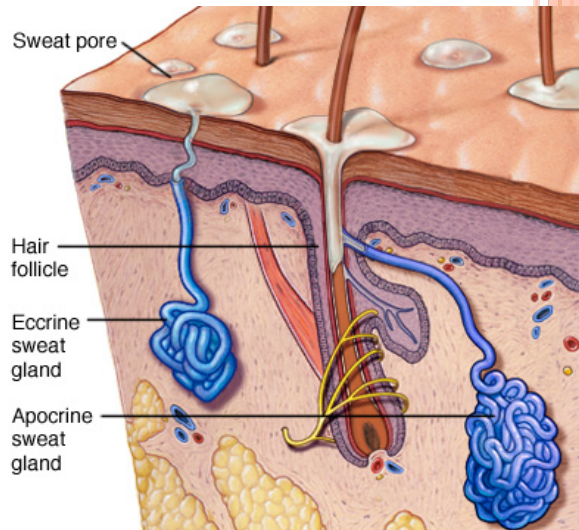


A-THE ECCRINE SWEAT GLANDS

- **Site:** all over the body.
- **Secretion:** watery rich in sodium chloride. مائه رايحة مميّة.
- **Activity:** since birth.
- **Structure:**

1- The secretory portion: small rounded acini with narrow lumen and composed of three cell types:

- **Dark pyramidal cells:** secreting glycoprotein (mucoid).



② → clear cuboidal cell → secreting watery secretion.

③ → Myoepithelial cells → secretion & squeezing secretion

2- **The Excretory Duct**: lined by stratified cuboid cell

• Skin surface → تفتح فيه Epidermis → helicle coarse → يتصلح في

• Eccrine ← يتفتح في cell surface مباشرة

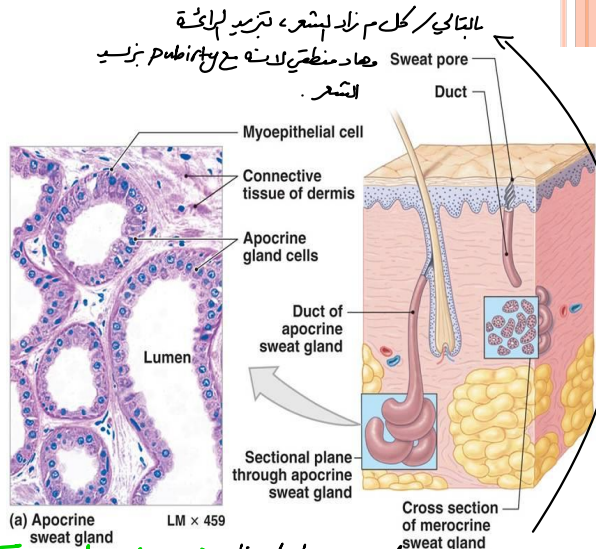
تفتح في hair follicle جديده لغرض

II- THE APOCRINE SWEAT GLANDS

- **Sites:** in the skin of axilla, areola of the breast, and perianal region. اله رائحة سيئة .
- **Secretion:** viscous, has a characteristic odor.
- **Activity:** at puberty. → عقبانه هذه الطول قدم لغرض ما يجبه الى رائحة سيئة .
- **Structure:**

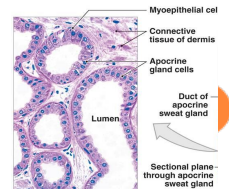
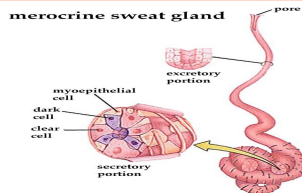
1- **The secretory portion:** acini which are larger and of wider lumen than the eccrine gland, composed of two types of cells:

- cuboidal cells with apical secretory granules. يصنع الدهن الى viscous
- myoepithelial cells. يتركه عتانه يطبع

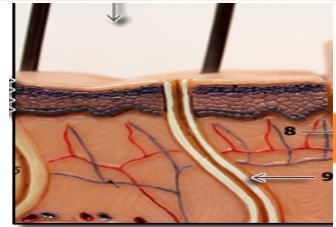
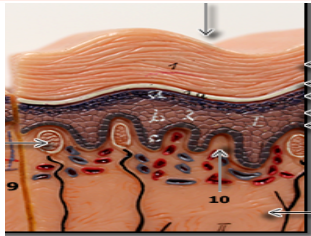


2- **The Excretory** → lined by stratified cuboid
• Hair follicle في

	Eccrine sweat gland (ec= outside)	Apocrine sweat gland
1- Site	All over the body.	Axilla , perianal region & breast.
2- Activity	Since birth.	At puberty.
3- Secretion	Watery.	Viscous with odour.
4- Secretory portion	• Smaller with narrow lumen. • Consists of 3 types of cells: 1. dark pyramidal: gives mucous secretion. 2. clear cuboidal: gives watery secretion. 3. myoepithelial cell: squeeze secretion into the duct.	• Large with wider lumen. • Consists of 2 types of cells: 1. cuboidal cell: gives mucous secretion. 2. myoepithelial cell.
5- Duct	Opens into skin surface.	Opens into hair follicles.



	<u>Thick skin</u>	<u>Thin skin</u>
1- Thickness	Thicker (5 layers).	Thinner (4 layers).
2- Stratum corneum	Thicker.	Thinner.
3- Hair follicles	Absent. ✓	Present.
4- Sebaceous glands	Absent ✓	<u>Present.</u>
5- Sweat glands	More. ✓ متناثر صليح دائما في الطبقة الجلدية صما التي نعرفها	Less.
6- Sites	<u>Palm & sole.</u>	<u>The rest of the body.</u>



FUNCTIONS OF THE INTEGUMENTARY SYSTEM

- 1- Protection of the body against any injurious agents (Keratin in stratum corneum). ✓
- 2- Water proof-barrier: lipid-rich extracellular material in stratum granulosum and stratum corneum. ✓
- 3- Screening against ultraviolet rays: melanin pigments. ✓
- 4- Perception of stimuli: sensory nerve endings. ✓
- 5- Excretion of nitrogenous products ^{kidney ex.} and sodium chloride: in sweat. ✓
- 6- Formation of vitamin D: mainly in stratum basale and spinosum. ✓



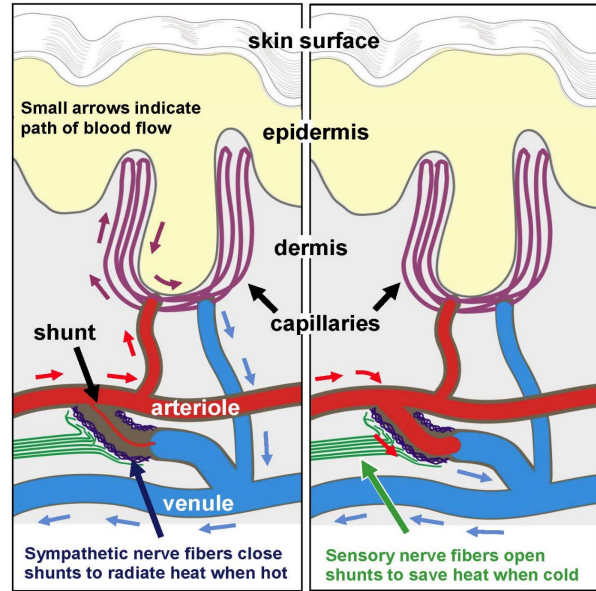
FUNCTIONS OF THE INTEGUMENTARY SYSTEM

8- Regulation of the body temperature:

➤ *In hot weather:*

- 1- Increase sweating.
- 2- Vasodilatation of the dermal capillaries & closure of the arteriovenous shunt increase cutaneous blood flow & increase heat loss. ✓

➤ *In cold weather:* constriction of dermal blood vessels and opening of the arteriovenous shunts decrease cutaneous blood flow and decrease heat loss. ✓



↓
عندي نوعين من Blood supply في skin هما / capillary bed ، shunt .

↓
تكون موجودة بين
vein, artery

- لو الدنيا حارة الطبيعي اطلع الحرارة من جسمي لبرا ، وبالتالي بي اطي ال capillary معبى دم ، عشان الحرارة الموصلة تطلع ، بتكون لونه الوجه احمر .
- لكنه لو برد ، بي احتفظ بالحرارة باني ارجع ال Blood على circulation عن طريق shunt ، عشان يصلح في الشرايين .
- بكرة ال lips لو كظم انزعه عشان ال vasoconstriction .

THANK YOU