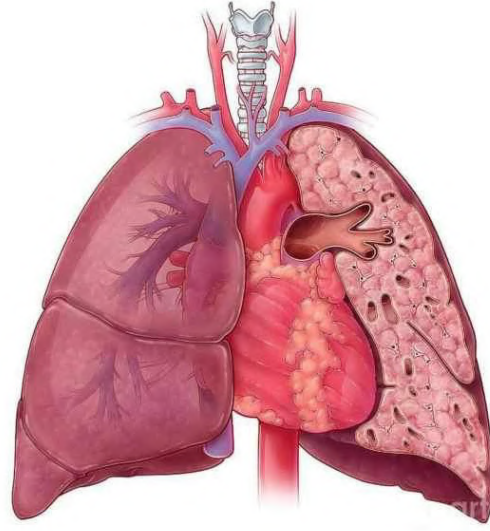


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لجان الدفوعات



تفريغ أناتومي

Skin

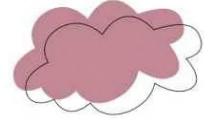
موضوع المحاضرة:

8

رقم المحاضرة:

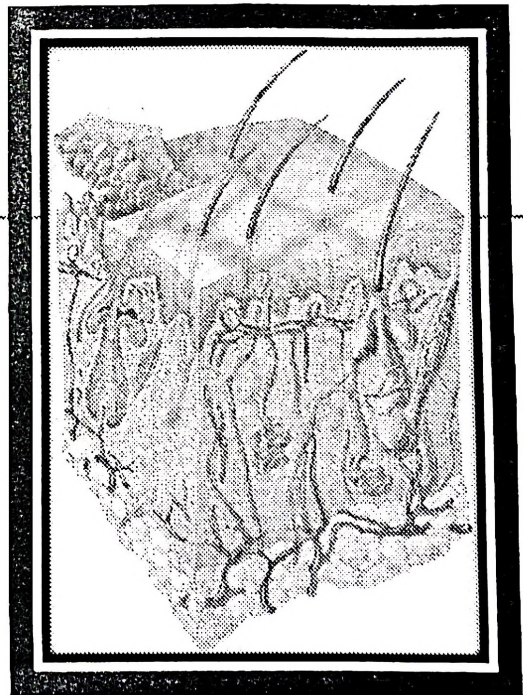
Yara Hani

إعداد الصيدلانية:



The Integumentary System

Dr. Mustafa Saad
(2021)



- ①
- The integumentary system is formed of the skin and its accessory structures. These include:

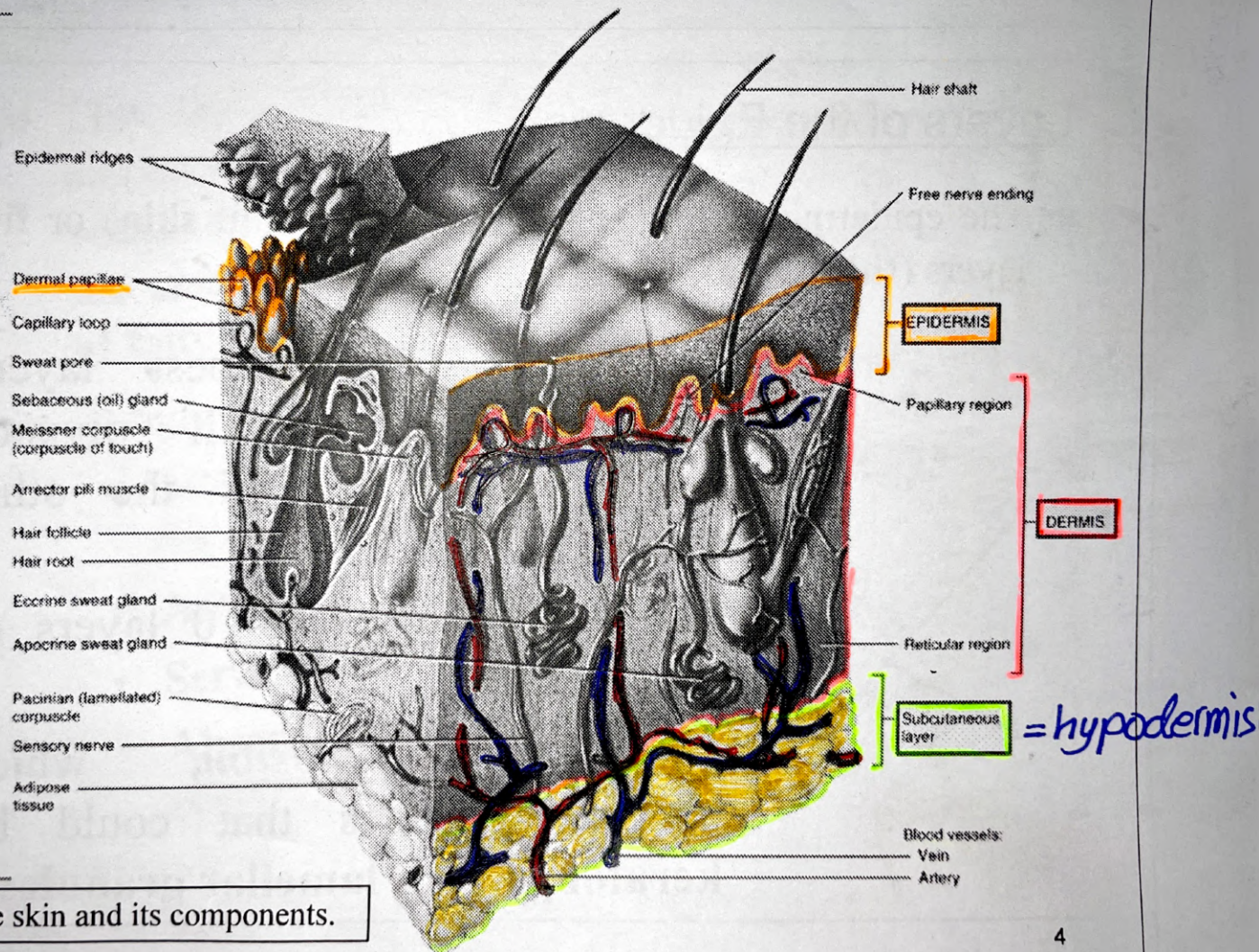
- Hair → الشعر
- Arrector pili muscle
- Sebaceous and sweat glands → الغدد المسؤولة عن انتصاب الشعر "المعروف بالقشعريرة"
- Nails → الأظفار

- Functions of the skin:

- Regulation of body temperature → تنظيم درجة حرارة الجسم
- Blood reservoir →
- Protection → الحماية
- Cutaneous sensations → الاحساس بالجلد
- Excretion and absorption → الإفراز والامتصاص
- Synthesis of vitamin D → تصنيع (V.D)

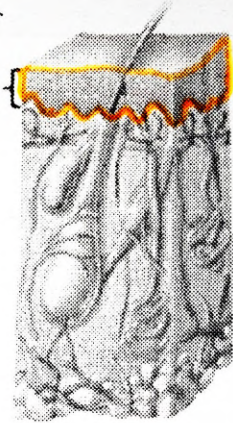
Structure of the Skin

- The skin (**cutaneous membrane**) covers the body and is the largest organ of the body by surface area and weight. Weight is about 16% of body weight. It's thinnest on the eyelids, thickest on the heels.
→ يكون الخف على الجفون
→ وادسك على الكعبين
- The skin is formed of two major layers:
 1. Outer layer called the **epidermis**. (superficial)
 2. Inner layer called the **dermis**. (Deep)
- ^{أسفل} Beneath the dermis is a **subcutaneous layer** (also called the **hypodermis**) which attaches the skin to the underlying tissues and organs.



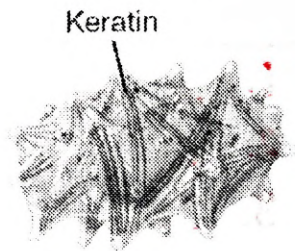
The Epidermis

- The epidermis is composed of stratified squamous keratinized epithelium.
- It contains four major types of cells:



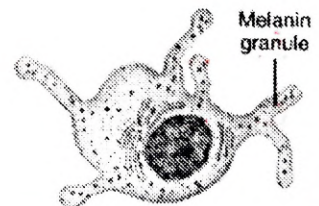
Stratum 1)
[spinosum]

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



Stratum
[basale]

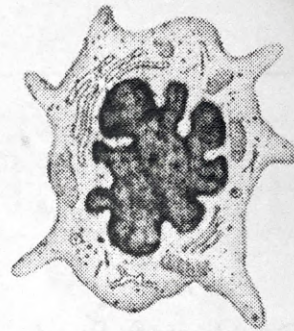
Melanocytes: which produce the pigment **melanin** that protects from damage by ultraviolet radiation.



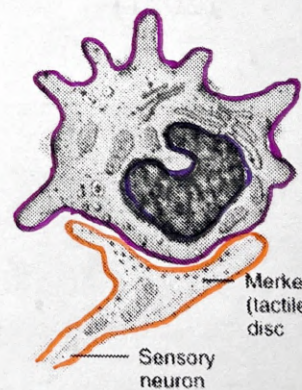
تحت البشرة من اشعة (UVA) و اشعة الشمس .

Fig.2: The epidermis and its cells.

3) Langerhans cells: involved in immune responses.



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

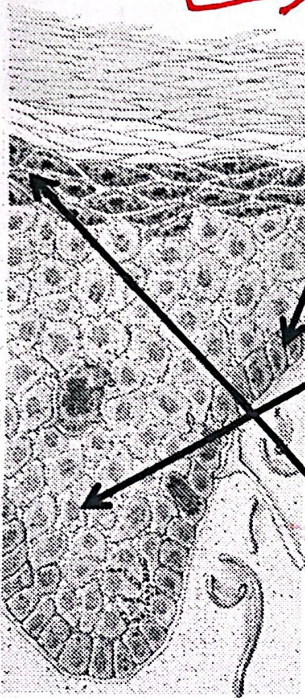


موجود في راحة
ال (neuron) المؤلف
عن ال (tactile).

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).



1) Stratum basale (deepest layer), where continuous cell division occurs to produce all the other layers.

2) Stratum spinosum, 8-10 layers of keratinocytes.

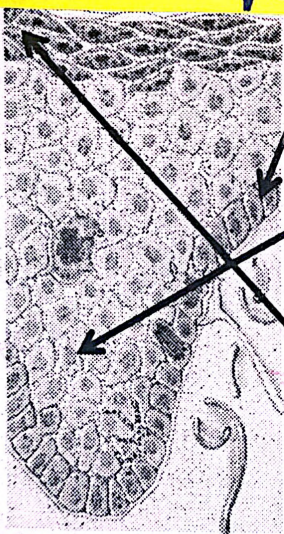
3) Stratum granulosum, which contains granules that could be keratohyalin or lamellar granules.

Stratum basale → بتشكل القاعدة و
 يتكون اقرب للـ (basement membrane) الى بيحصل
 (epidermis) عند (dermis) لذلك يمثل
 (deepest layer) ويكون فيها انقسامات كثيرة
 حتى تعوض الخلايا التالفة في
 الطبقات الي فوقها .

4
 four layers (thin skin) or five

اعمق طبقة
basale (deepest layer),
continuous cell division

occurs to produce all the other
layers.



2) Stratum spinosum, 8-10 layers of
 keratinocytes.

3) Stratum granulosum, which
 contains granules that could be
keratohyalin or lamellar granules.

طبقة السنية



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

- 5) Stratum corneum (The Keratin layer): 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.



→ فقط مش أكثر

→ احلال به لذل يستمر
تعوديها من الطبقات
الى فوقها .

es about the layers:

- 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.

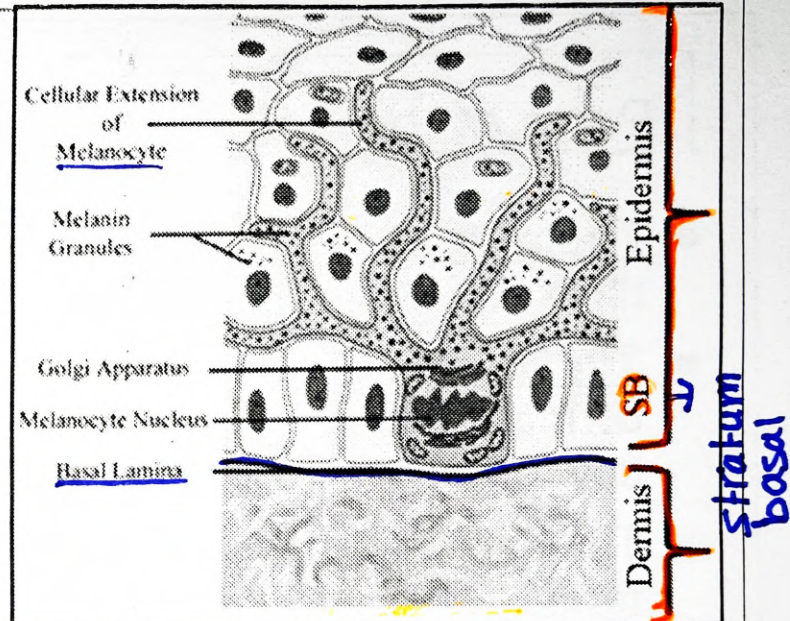


Fig.3: Position of melanocytes.

- 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.

التي تكون بين الخلايا
القريب على بعضها

Notes about the layers:

- Merkel cells and the cell bodies of melanocytes are found within the stratum

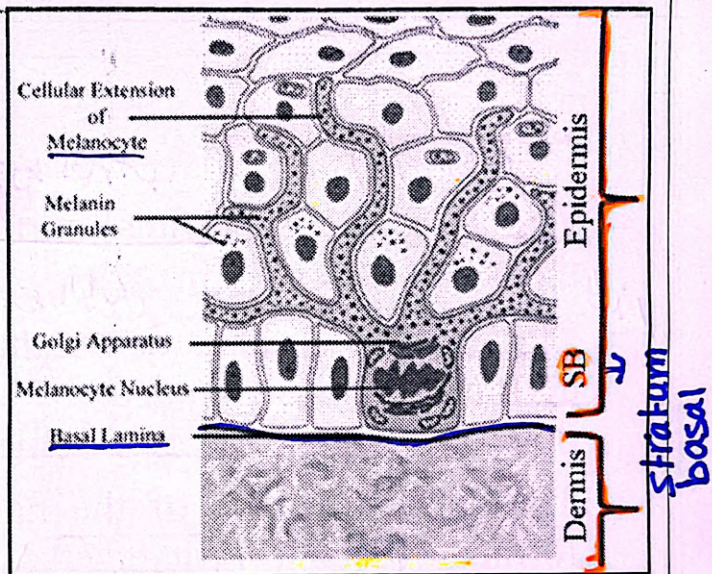


Fig.3: Position of melanocytes.

Stratum granulosum →

من اسمها يكون فيها (grains)

(Lipids) (secretion) (Lamellar granule)

حتى تعمل (Protection) (water) (lose) (epidermis)

the stratum granulosum bind with release a lipid-rich secretion that to prevent water loss.

to desmosomes to help in the adhesion of the cells to each other.

الذي يتكون بين الخلايا
التي تلتصق بها

The Dermis

- The dermis is a layer of connective tissue that provides structural and nutritional support for the epidermis.
- 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.
 - Capillary loops. → شعيرات دموية
 - Corpuscles of touch and free nerve endings.

← المسؤولة عن (sensation and tactile)

Fig.4: Papillary region of the dermis.

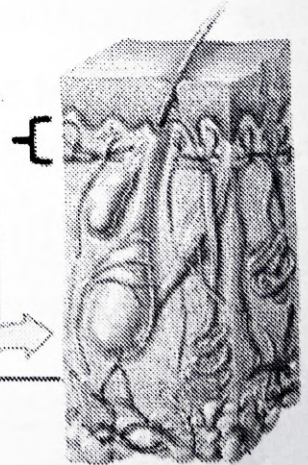
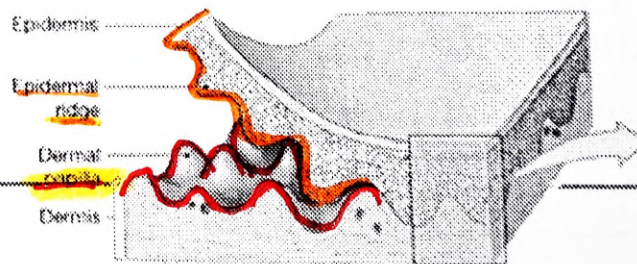




Fig.5: Fingerprint.

- 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**.

البرص
الاحتكاك
قبضة

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

- Adipose cells
- Hair follicles
- Nerves
- Sebaceous (oil) glands, and sweat glands

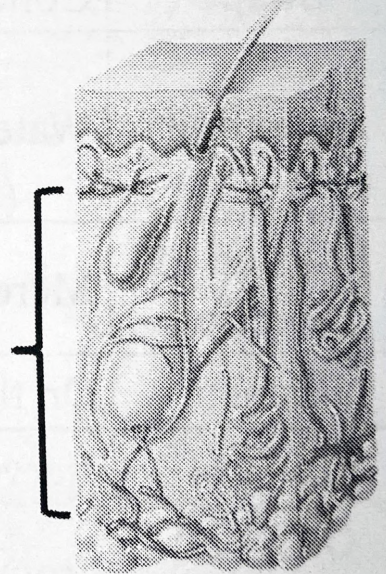


Fig.6: Reticular region of the dermis.

The Subcutaneous Tissue

- 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 → طبقة عازلة
- Serves as an energy storage site
- Absorbs shocks (as in palms and soles) ← باطن القدم



Fig.7: Subcutaneous tissue.

Accessory Structures of the Skin

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.

■ Functions of hair:

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

فروة الرأس



الرموش

Parts of the hair

(body)

الجزء الخارجي

- The shaft: the superficial part of the hair that extends beyond the surface of the skin. الجزء الخارج

الجزء

- The Root: 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.
 (dermis) من يوصل
 (epidermis) من

- The shaft and root of the hair are formed of 3 concentric layers:

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

(القرميد الى يغطي السطح البيوت)

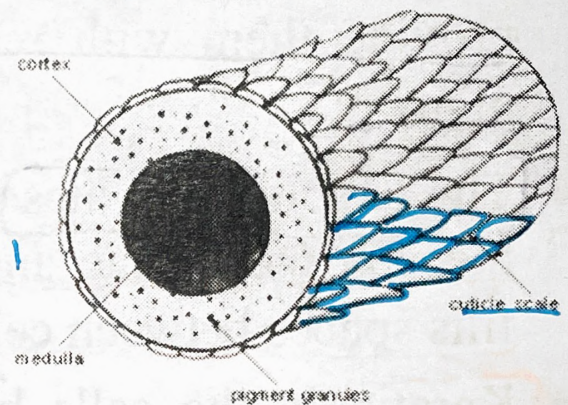
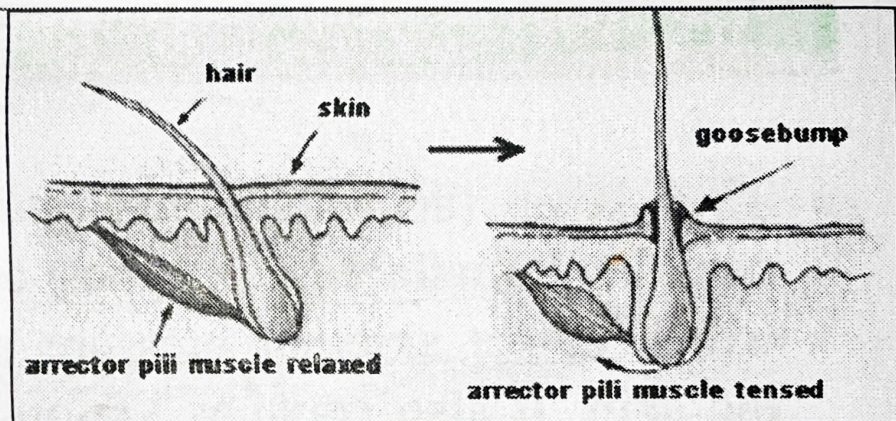


Fig.8: Layers of hair.

Fig.11: Action of the arrector pili muscle.



- 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'.
- 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.

دهن

جفاف

يمنع نمو البكتيريا

Sweat Glands

الانبط الف اللحية

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

الكولوزوجية

البكتريا التي تعطي رائحة الجسم

exocytosis

منذ الولادة

البالوغ (لان مرتبط بالهرمون)