NORMAL SKIN

Dermatology Seminar

Skin

- The largest organ in the body
- Help in regulate body temperature
- Prevent water loss (e.g. In case of burns, severe injuries,…)
- First Barrier against infection

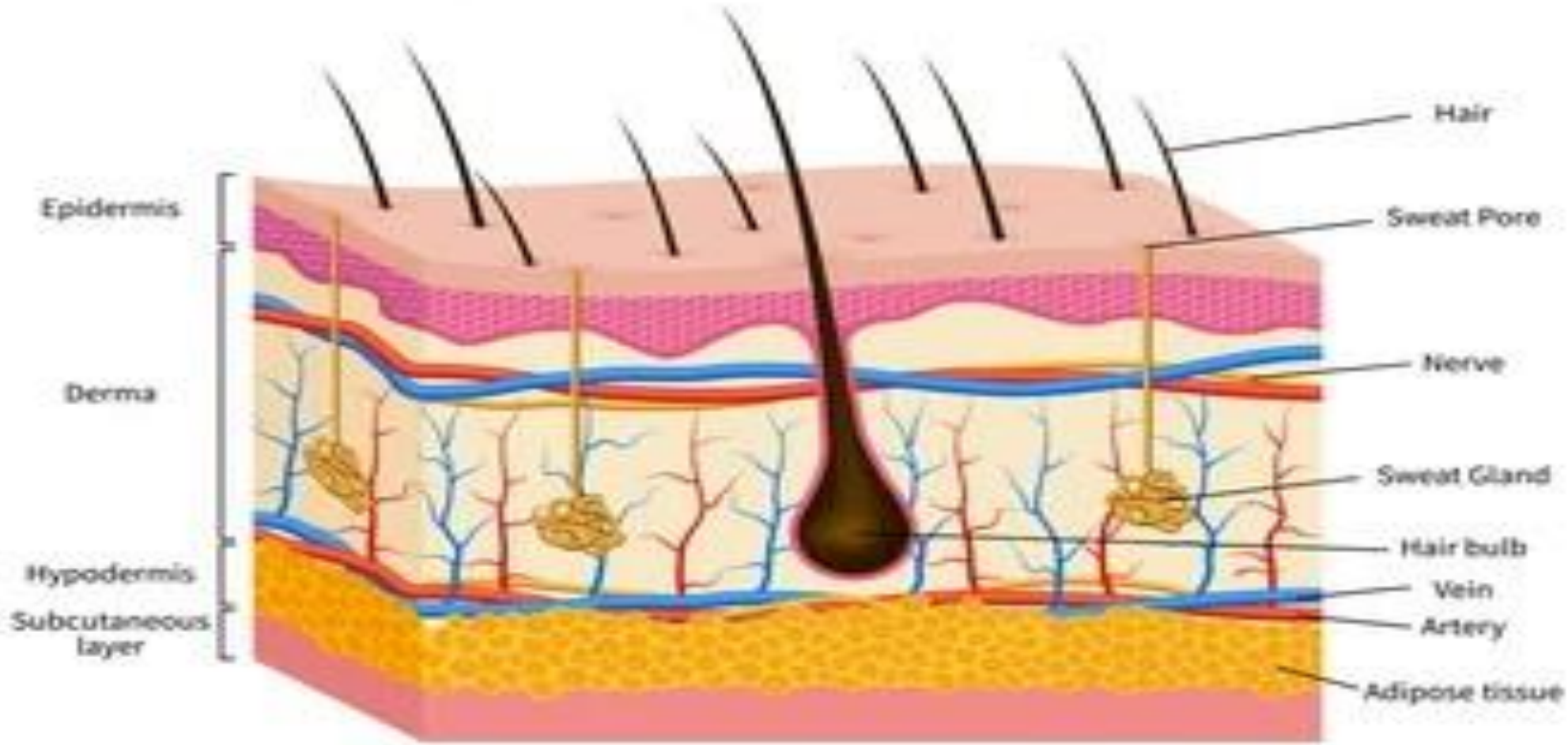
Skin layers

- **Epidermis** : Keratinocytes (squamous epithelial cells)
  Avascular
  Rich in keratin (tough protein)

- **Dermis** : contains connective tissues, blood vessel, lymphatic, nerves, hair follicles, sweat glands …

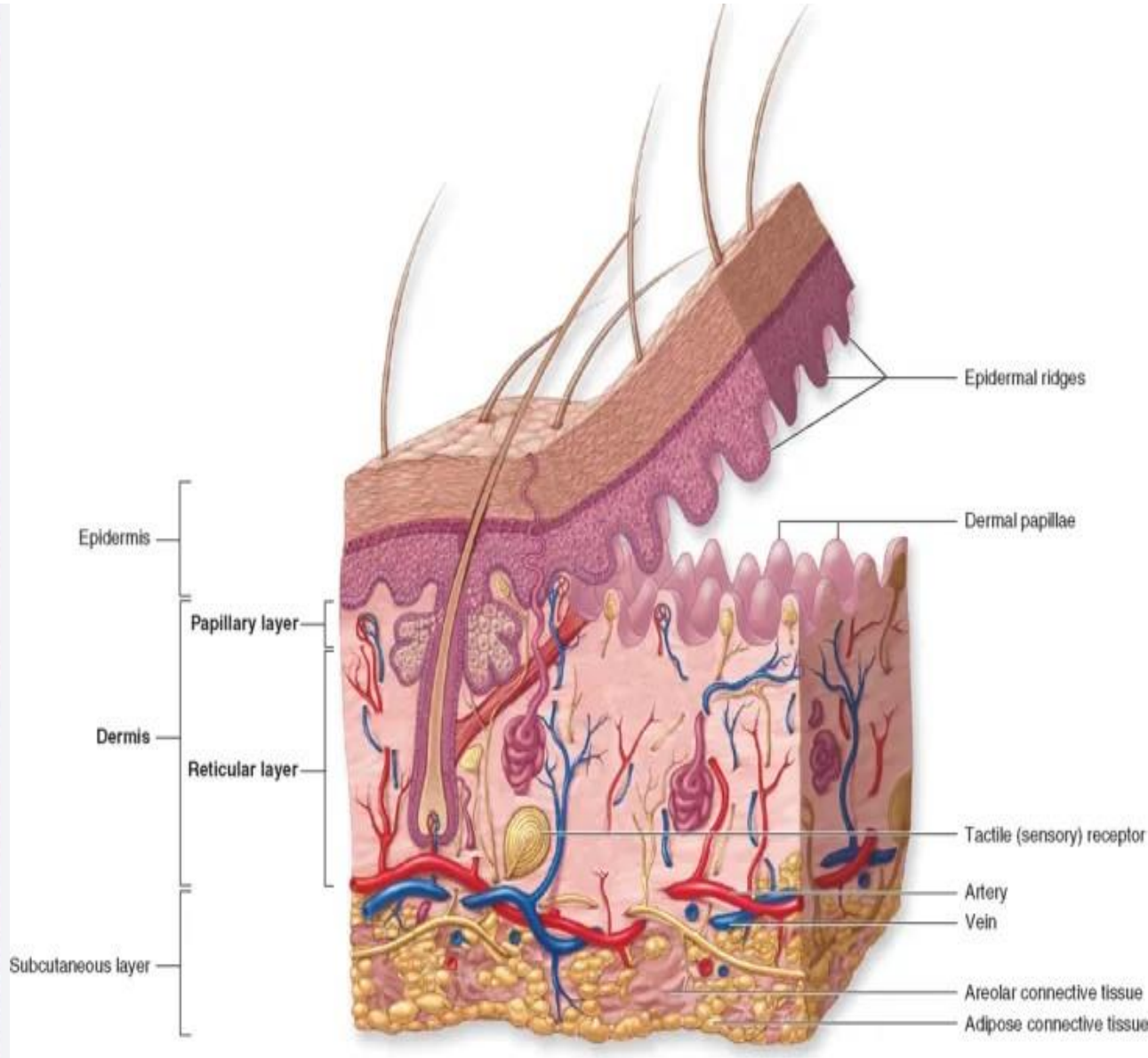
- **Suncutaneuous fat**: (aka hypodermis or subcutis)

SKIN ANATOMY

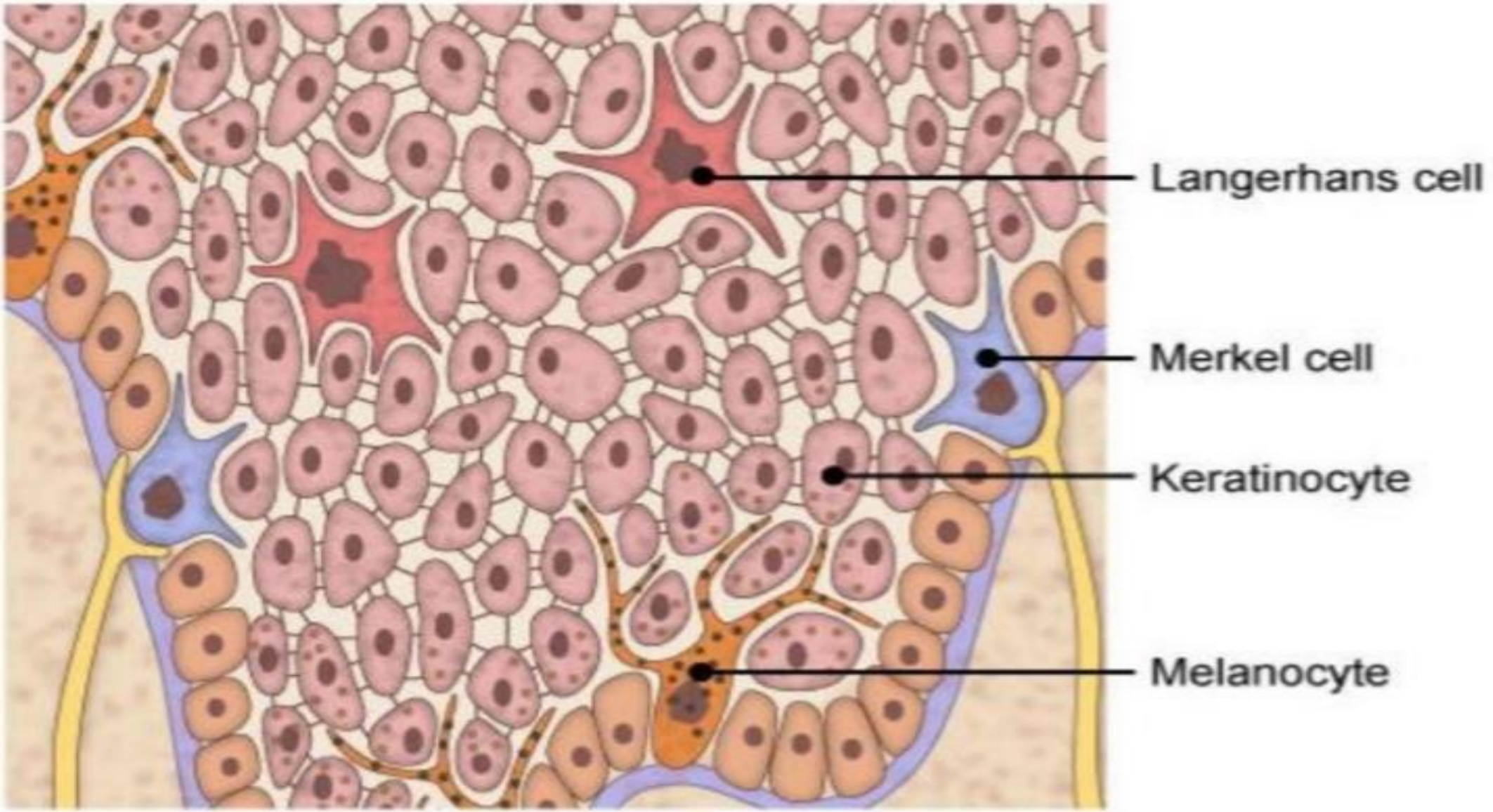


Epidermal-dermal junction

- The **dermal papillae** are nipple-like extensions of the dermis into the epidermis
- The epidermis conforms to the contours of the underlying dermal papillae forming **epidermal ridges (Rete ridges)**
- Note: the basement membrane follows the contour of the interdigitations between epidermis and dermis (**Epidermal-dermal junction**)



TYPES OF EPIDERMAL CELLS



Histology

- (1)-**<u>keratinocytes</u>**:
  - Approximately 90% of epidermal cells are **Keratinocytes**, Produce **keratin**
  - Produce **lamellar granules** that helps **waterproof** the skin.
- (2)-**<u>Melanocytes</u>**:
  - located in the **stratum basale**
  - Synthesize **melanin**: Dark brown pigment, protect skin from damaging effects of **UV radiation**
  - Exposure of the skin to sunlight promotes increased synthesis of melanin

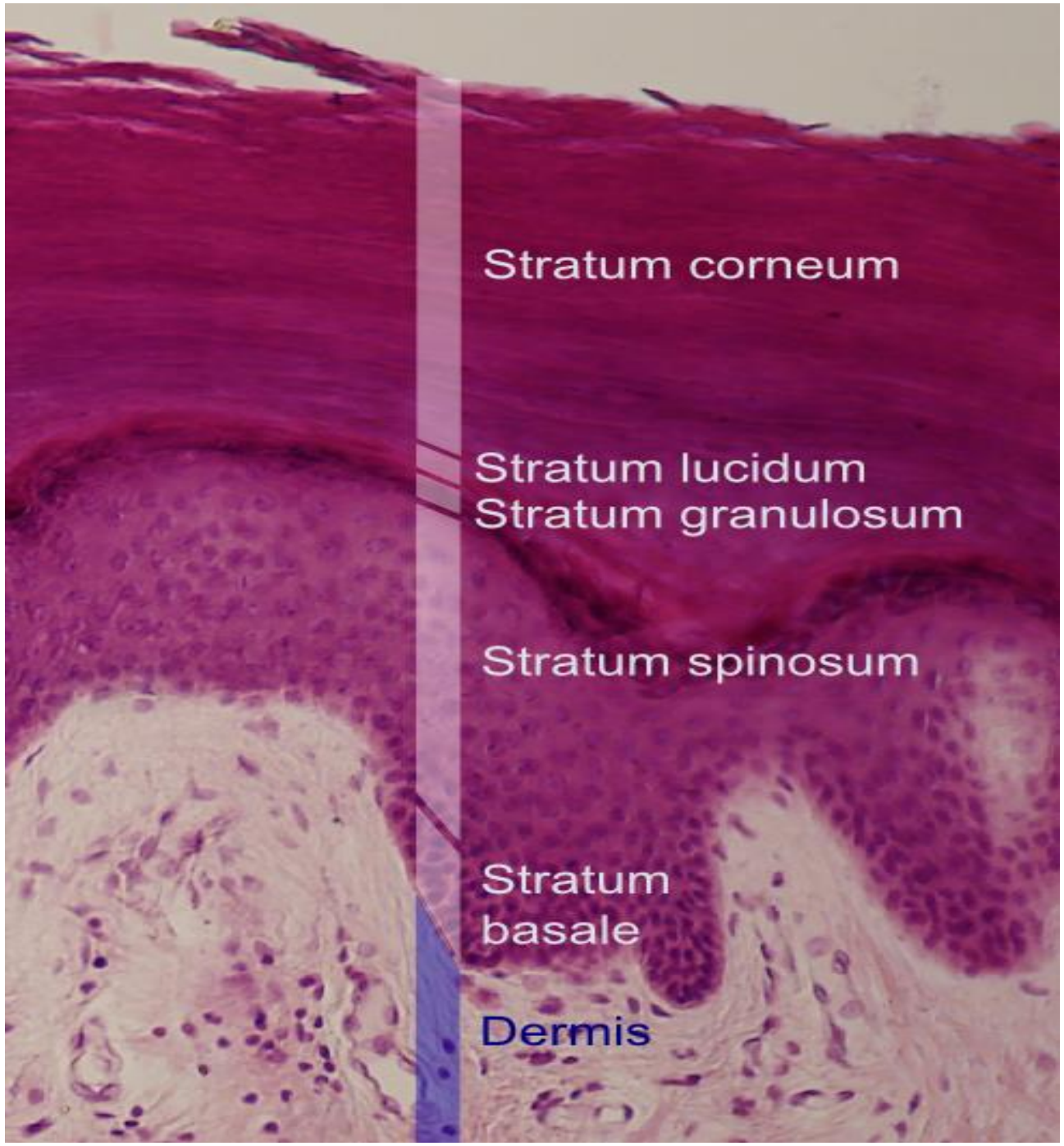
Histology

- (3)- **Langerhans cell**
  - Originate from bone marrow (monocytes)
  - Mainly in the stratum spinosum
  - Langerhans cells recognize, phagocytose, and process foreign antigens
  - Represent 2-8% of epidermal Cells

- (4)- **Merkel cells:**
  - Are found in the **stratum basale**
  - Are most abundant in the fingertips
  - Are closely associated with afferent (sensory) unmyelinated Axons
  - Function as **light touch receptors** (mechanoreceptors)

Epidermis layers

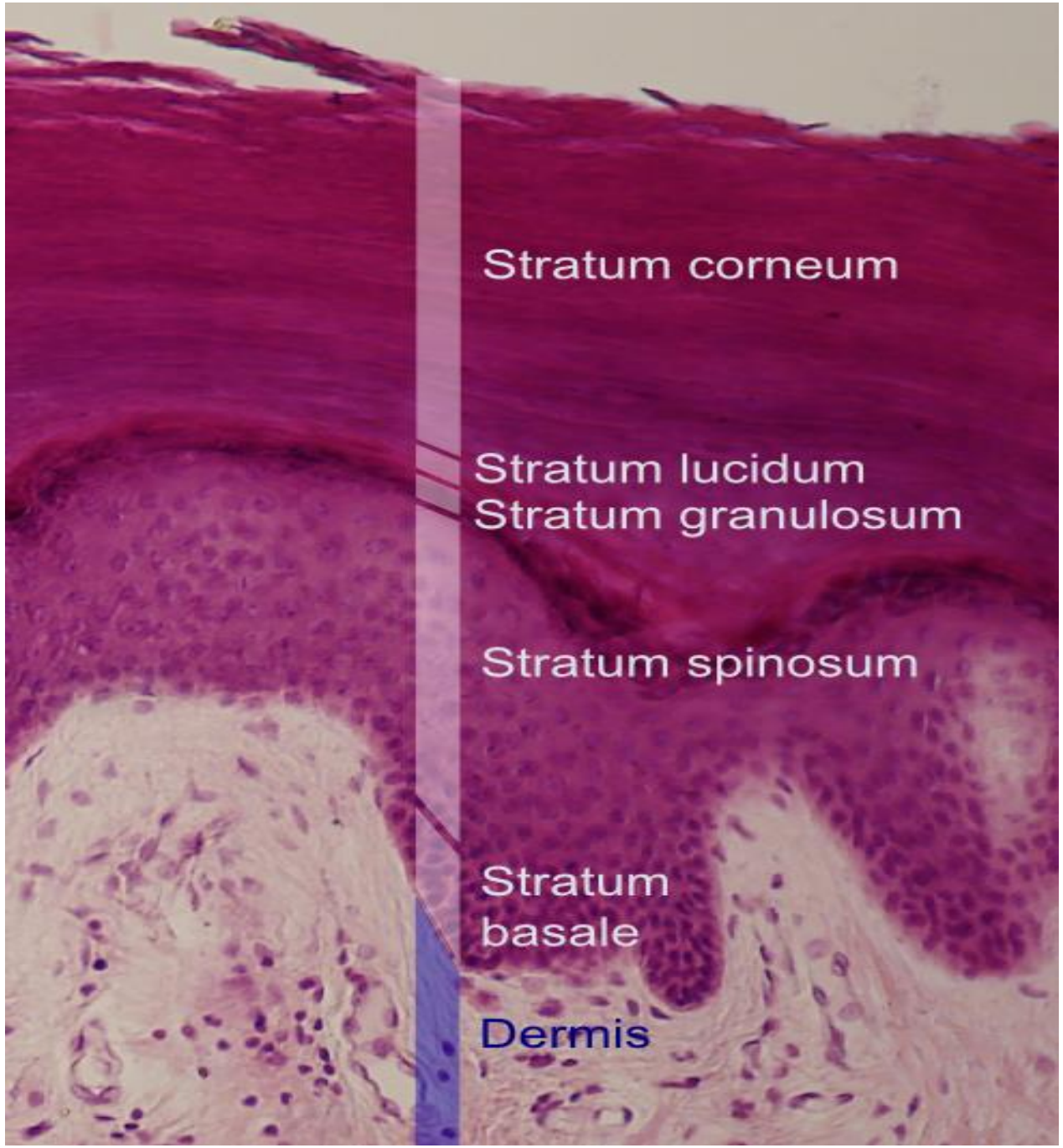
- **Stratum basalis**: Single layer of Basal cells (stem cells), which can regenerate the skin.
  Rest on the basement membrane
- **Stratum spinousum:** cells have spines, formed by *desmosomes.*
- **Stratum granulosum:** contains *Keratohyalin granules,* which form Keratin filaments.



Epidermal layers

- **Stratum lucidum:** thin clear layer contains dead skin cells.

- **Stratum corneum:** contain *Anucleated cells,* Filled with **keratin filaments**



Types of skin

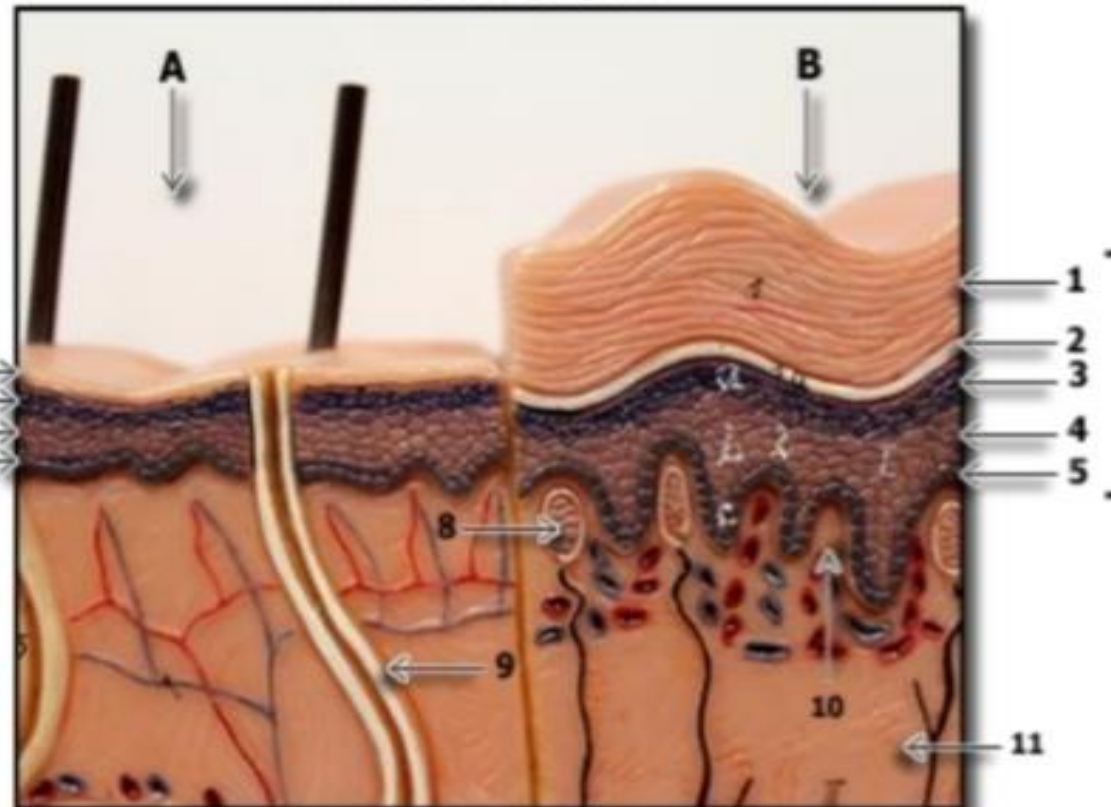
Thin skin

*4 layers
*less Prominent stratum corneum
* Less developed stratum granulosum
* Dominant and lines most of the body surface
* Thicker dermis
* hair and sebaceous glands

Thick skin

*5 layers
* Prominent stratum corneum
* Well developed stratum granulosum
* Palms of the hands and soles of the feet
* Thinner dermis
* No hair and sebaceous glands

Thin vs. Thick skin



Dermatopathology

- Terms used to describe **Microscopic** findings, used in analysis of **skin biopsy.**

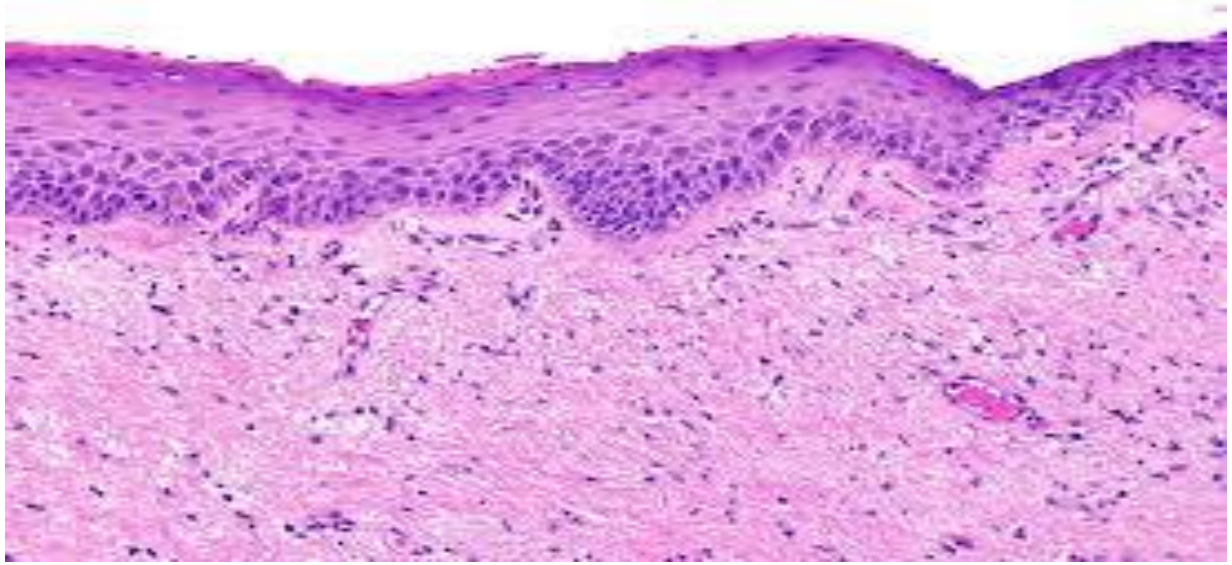
- **Hyperkeratosis**
- **Parakeratosis**
- **Hypergranulosis**
- **Spongiosis**
- **Acantholysis**
- **Acanthosis**

Hyperkeratosis

- Thickening of **stratum corneum**
- Excess quantity of **keratin** (a tough, protective protein)
- Seen in some skin conditions like psoriasis, callus,..

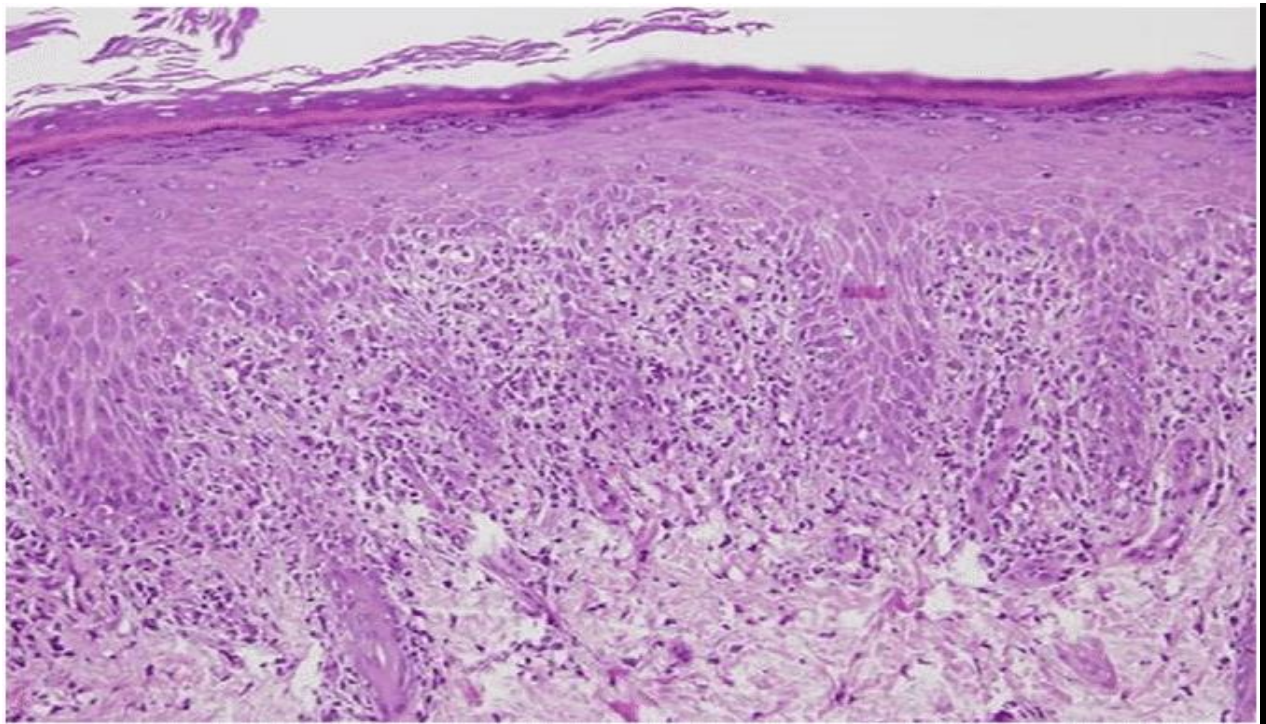
Parakeratosis

- **Hyperkeratosis** +**retained nuclei** in **stratum corneum.**
- Indicates **hyperproliferation**
- Seen in Skin disorders (**Psoriasis**) and **skin Malignancies** .



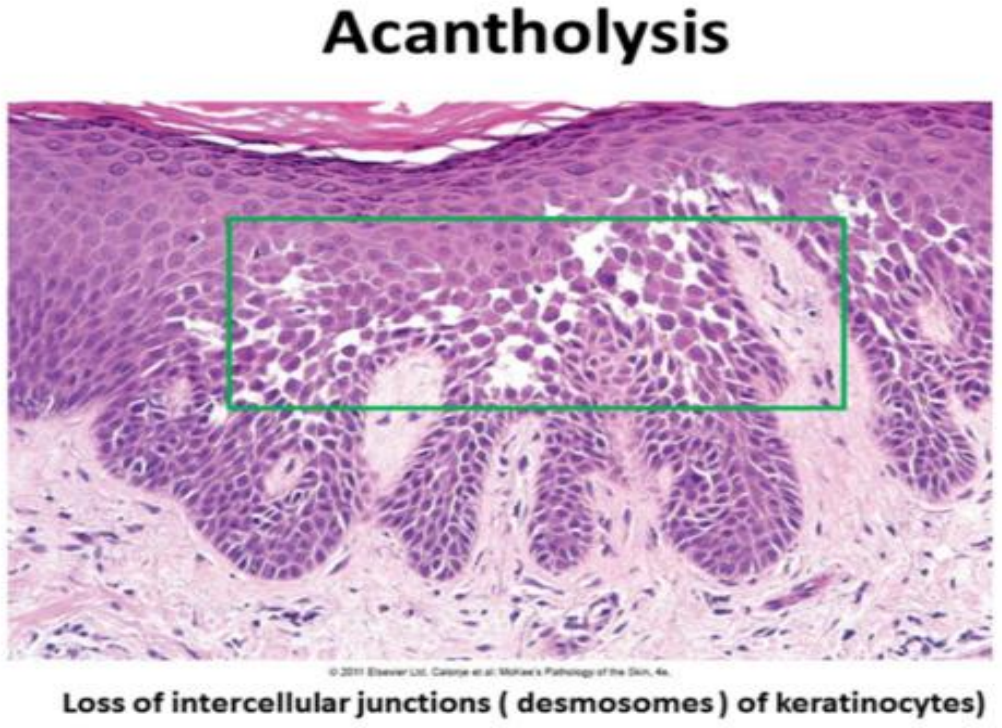
Hypergranulosis

- Increase thickness of **stratum granulosum.**
- Classic finding in **lichen planus**



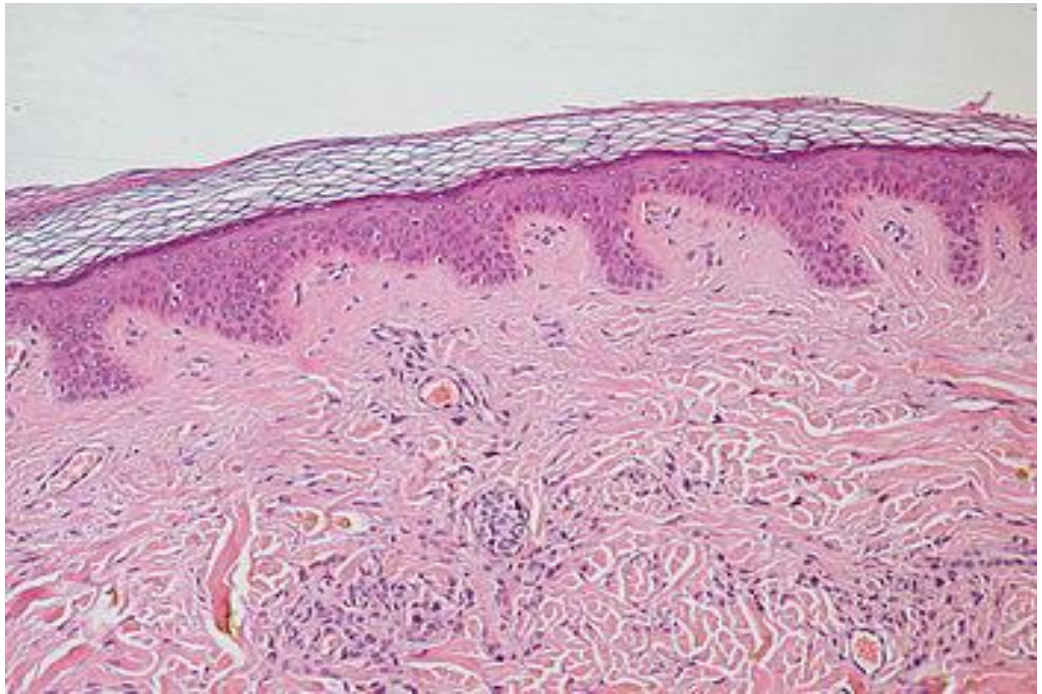
Acantholysis

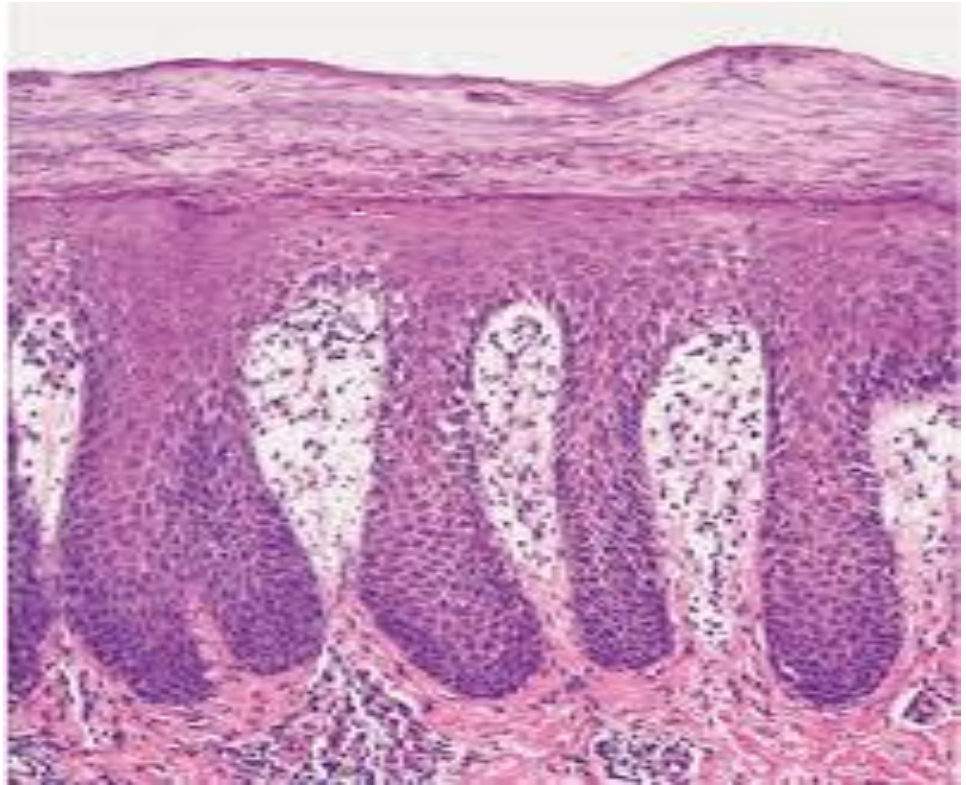
- **Loss of connections** between Keratinocytes, often loss of ***desmosomes.***
- Appears as “rounded Keratinocytes”, Detached, floating freely in epidermis.
- Key feature of **<u>Pemphigus vulgaris</u>**



Acanthosis

- Diffuse epidermal hyperplasia
- **Elongated clubbed Rete ridges**
- **Spinous** layer thickening





Acanthosis Nigricans

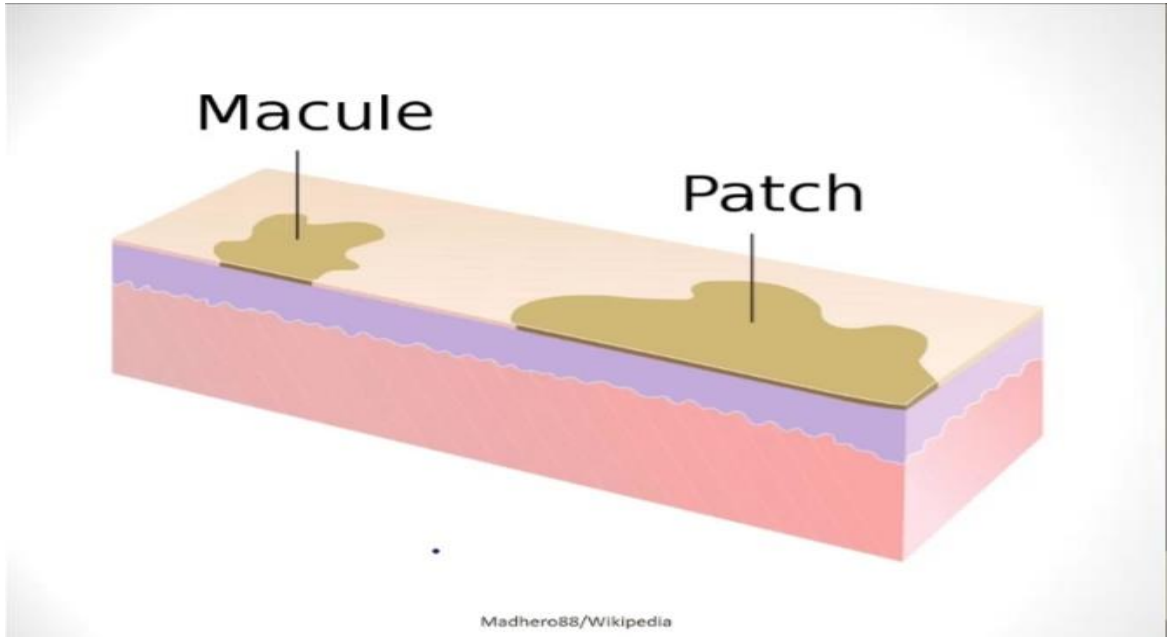
- Hyperpigmented (darkened) plaques on skin
- Intertriginous sites(folds), classically in neck and axillae.
- Associated with insulin resistance (obesity, diabetes)
- Rarely associated with Malignancy (gastric adenocarcinoma most common)

Skin Lesions

- **Primary lesions**
  - Directly caused by disease process
  - Described using standard terminology
  - Macules, papules, vesicles, bulla
- **Secondary lesions**
  - Modification of primary lesion
  - Or caused by trauma, external factors
  - Scale, crust, erosion, fissure, ulcer

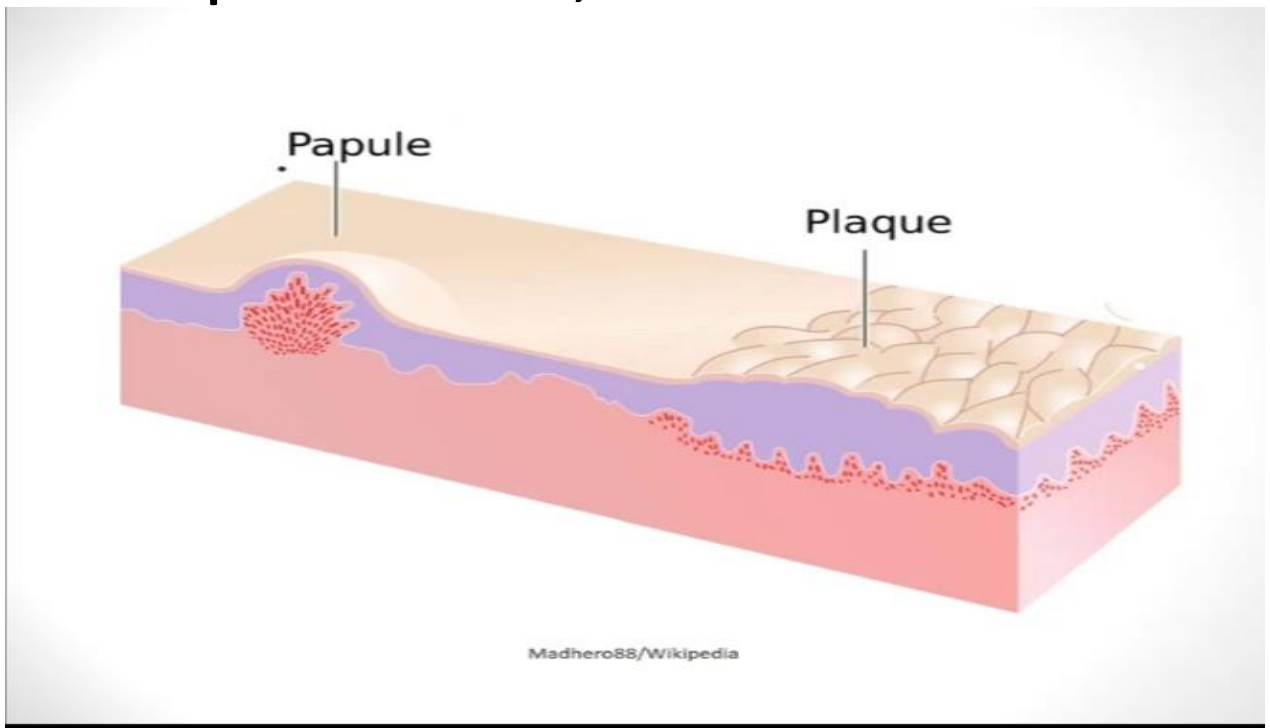
Macules and Patches

- Flat lesions (not raised)
- Macules: <1cm , as in freekle
- Patches : >1cm, as in vitiligo



Papules and plaques

- Raised lesion
- Papules: <1cm, as in mole/nevus
- Plaques: >1cm, as in Psoriasis



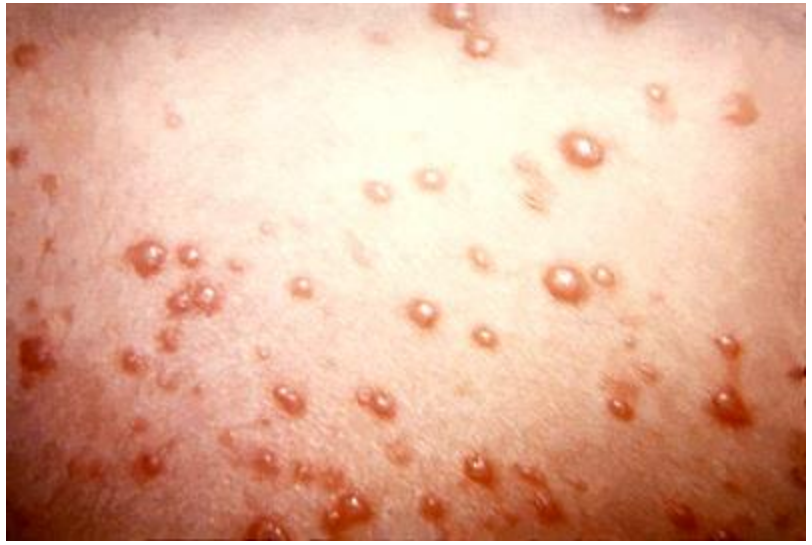
Maculopapular rash

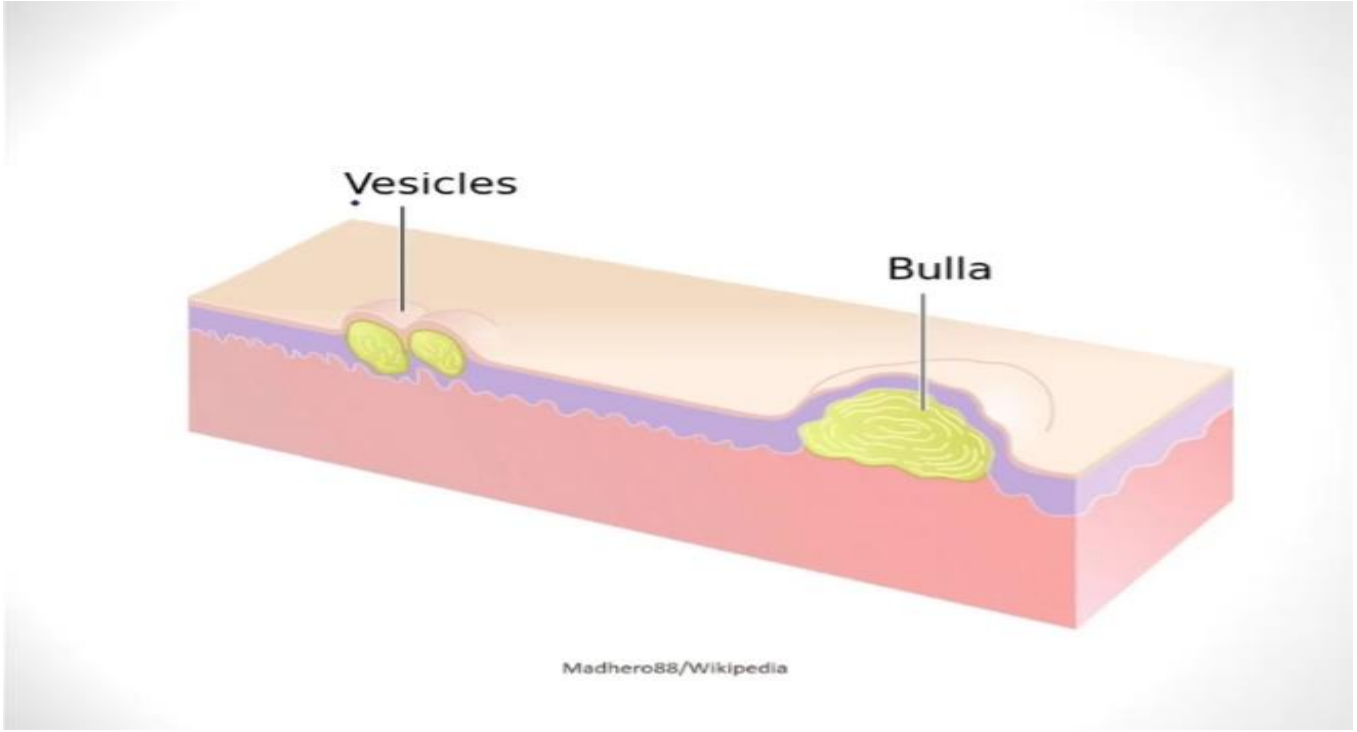
- collection of small skin lesions, some are flat (Macules) and some are raised (papules).

- Common in many Disorders: Drug rash, scarlet fever, syphilis, Rubella.

Vesicles and Bulla

- Fluid-filled lesions (blisters)
- Vesicles: <1cm , as in chickenpox
- Bulla: >1cm, as in bullous pemphigoid





Pustules

- Pus-filled lesion
- White center
- Seen in pustular Psoriasis, acne

Wheal

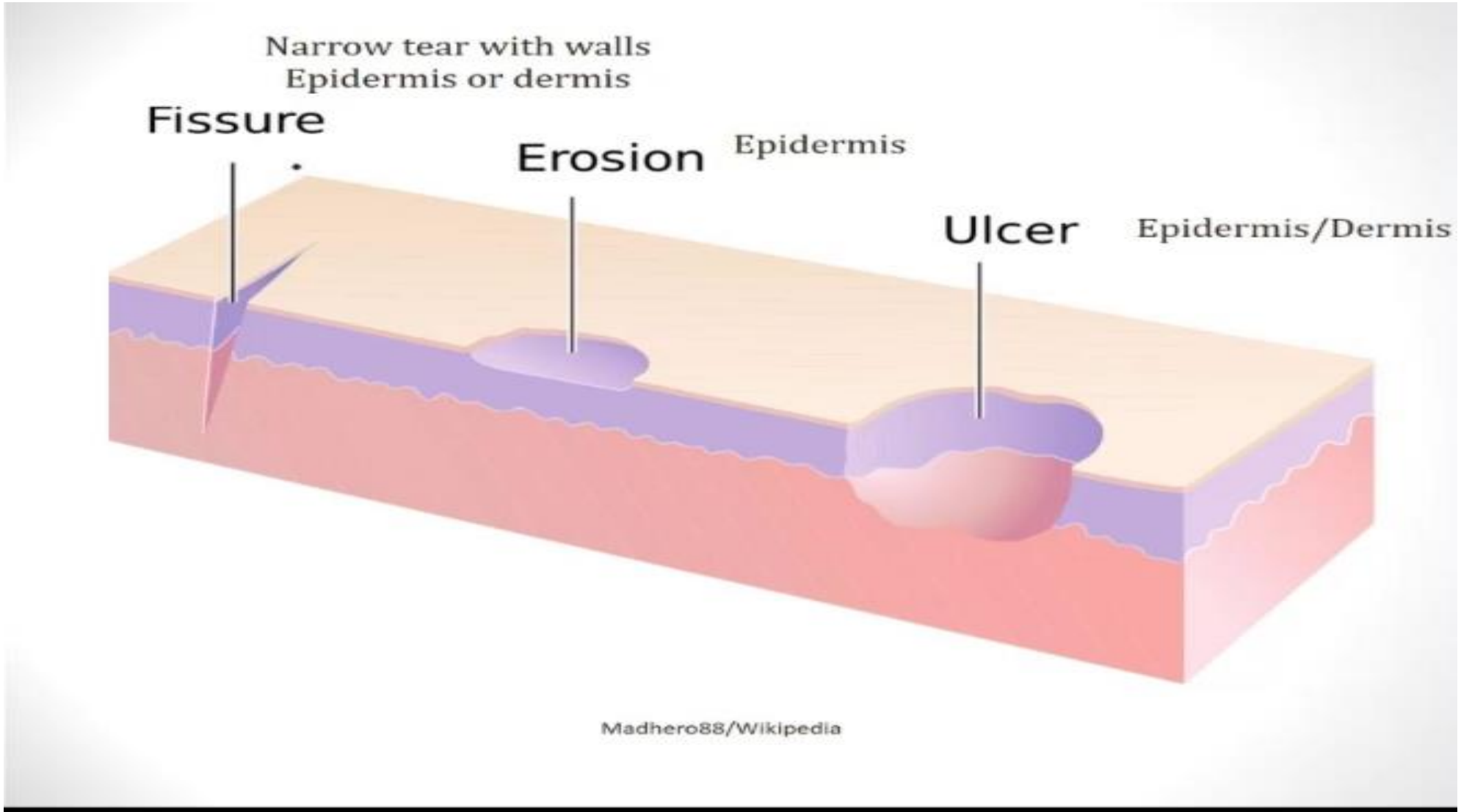
- ***Smooth,*** elevated Papules or plaques.
- Surrounded by **Erythema (redness)**
- ***Itchy***
- Caused by **dermal edema**
- Component of **Urticaria (**allergic reaction**)**

Secondary lesions

- **Scale:** peeling/flaking of stratum corneum
    - Seen in Psoriasis

- **Crust:** dried exudate of skin lesion
    - Seen in impetigo

Secondary lesions



History taking

Box 1.1 **Dermatology history-taking**

- Where – site of initial lesion(s) and subsequent distribution
- How long – continuous or intermittent?
- Trend – better or worse?
- Previous episodes – timing? Similar/dissimilar? Other skin conditions?
- Who else – Family members/work colleagues/school friends affected?
- Symptoms – Itching, burning, scaling, or blisters? Any medication or other illnesses?
- Treatment – prescription or over the counter? Frequency/time course/compliance?

Physical examination

Box 1.2 **Examination of skin lesions – key points**

Distribution

Examine all the skin for clues. For example, there are many possible causes for dry thickened skin on the palms, and finding typical psoriasis on the elbows, knees, and soles may give the diagnosis.

Morphology

Are the lesions dermal or epidermal? Macular (flat) or forming papules? Indurated or forming plaques? Well defined or indistinct? Forming crusts, scabs or vesicles?

Pattern

The overall morphology and distribution of the rash – for example, an indeterminate rash may be revealed as pityriasis rosea when the 'herald patch' is found.

Resources

- ABC of Dermatology 6th edition
- Uptodate.com
- Boards and beyond Usmle
- Skin histology lectures by Dr Heba kalbouneh
- Wikipedia

THANK YOU