

# Lecture (1)

## Introduction and language of dermatology

Lecture outline:

1. Function and structure of the skin.
2. Approach to dermatology patient.
3. Descriptive terms and morphology of skin lesions.
4. Important signs and investigations.
5. Topical therapy.

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Color index: slides, **doctor notes**, extra explanation.



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DOCTOR DID NOT EXPLAIN/MENTION WHAT IS HIGHLIGHTED. THEY WERE ONLY PROVIDED IN THE SLIDE(S)

## Function and structure of the skin.

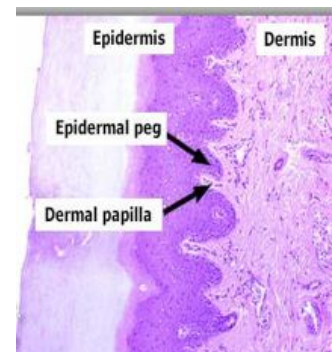
### Function:

- Barrier to harmful exogenous substance & pathogens.
- Prevents loss of water & proteins.
- Sensory organ protects against physical injury.
- Regulates body temperature.
- Important component of immune system.
- Vit. D production by absorbing UVB.
- Has psychological and cosmetic importance such as hair, nails.

### Skin structure:

The skin consists of:

- Epidermis
- Basement membrane
- Dermis
- Subcutaneous tissue
- Skin appendages

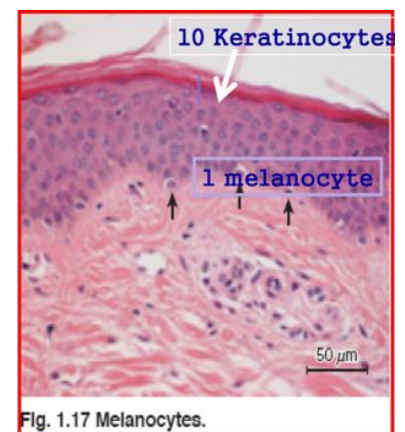


### Epidermis

- Consist of several zones:
- Basal layer (stratum basale): columnar dividing cells.
  - Spinous layer (stratum spinosum): polyhedral cells attached by desmosomes.
  - Granular layer (stratum granulosum): flat cells containing keratohyalin granules.
  - Cornified layer (stratum corneum): dead cell with no organelles.

### Basal cell layer (stratum basale):

- Rest on the basement membrane.
- Divides continuously and move upwards.
- Melanocytes are dendritic cells lying between basal cells in a ratio of 1:10.
- They synthesize melanin stored in melanosomes.



### Spinous cell layer (stratum spinosum):

- Adhere to each other by **desmosomes** (complex modification of the cell membrane).
- Desmosomes appear like spines hence the designation **Stratum Spinosum**.
- Langerhan cells are antigen presenting present in abundance.

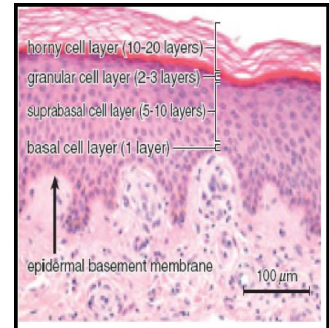


Fig. 1.4 The four layers of the epidermis

### Granular cell layer (stratum granulosum):

- Diamond shaped cells.
- Cytoplasm is filled with **Keratohyaline granules**.
- Thickness of this layer is proportional to the thickness of the **stratum corneum** layer.
- In thin skin, it is 1-3 cell layers and 10 cell layers in thick skin.



Fig. 2.2-1 Normal skin (hematoxylin and eosin staining).

### Cornified layer (stratum corneum):

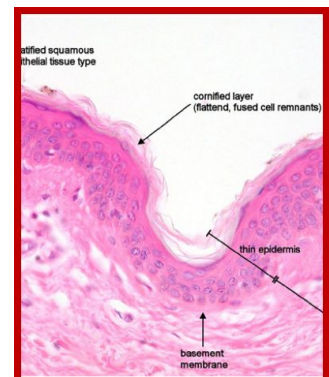
- The cells in this layer have no nucleus.
- It is 25 cell layer.
- Cells have thick envelope that resist chemicals.

### Basement membrane:

- It is a pink undulated homogenous area between the epidermis and dermis
- It consists of number of proteins.
- It is the site of attack injury in blistering diseases.

### Formed by:

- Plasma membrane of basal cells and hemidesmosomes.
- Thin clear amorphous space (lamina lucida).
- An electron dense area (lamina densa).
- Anchoring fibrils that anchors the epidermis to dermis.



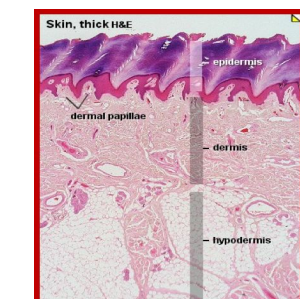
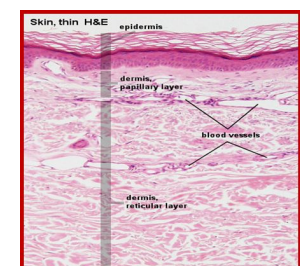
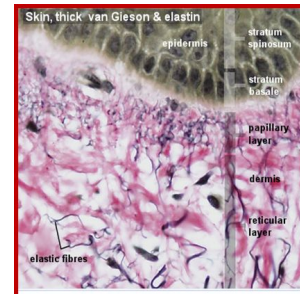
## Skin structure:

**Dermis:** is divided into

- Papillary dermis.
- Reticular dermis.

Consists of:

1. **Collagen fibers:**
  - Provides strength
  - Thin fibers in papillary dermis but thick and coarse in the reticular dermis.
2. **Elastic Fibers:**
  - Provides elasticity
  - Protection against shearing forces.
3. **Ground substance:**
  - Binds water and maintains the skin turgor.
4. **Blood vessels:**
  - To nourish the overlying epidermis also.
5. **Fibroblasts:**
  - Produce the above elements.



## Function of dermis:

- It provides **nourishment to the epidermis** and interact with it during wound repair.
- It gives the skin its **strength**, elasticity, and softness.

## Subcutaneous Fat:

- Composed of lipocytes.

**Skin Appendages:** include:

- Eccrine/apocrine sweat glands. (**Eccrine**; **cholinergic stimuli**. **Apocrine**; **adrenergic stimuli**).
- Sebaceous glands “**everywhere except palms and soles. Diseases that relate to sebaceous glands include acne and seborrheic dermatitis.**”
- Hair Follicles.
- Nails.

## Eccrine sweat glands:

- Tubular structures open freely on the skin; not attached to hair follicles.
- Under the influence of cholinergic stimuli.
- Present everywhere **except** the vermilion border<sup>1</sup>; nail beds; labia minora and glans.
- Abundant in palms and soles.

<sup>1</sup> is the normally sharp demarcation between the lip and the adjacent normal skin

### Apocrine sweat glands:

- Secrete viscous material that give musky odor when acted upon by bacteria.
- Present in the axillae; anogenital area; modified glands in the external ear canal; the eye lids (moll's glands); and areolae.
- Under **adrenergic stimuli**.

### Sebaceous glands:

- Attached to hair follicles or open freely.
- Present in the scalp, forehead, face, upper chest **except palms and soles**.
- Secrete sebum to moisturize the skin.
- Sebaceous glands are under the control of **androgens**.

### Hair follicles:

- Hair follicle has the hair shaft, hair bulb and the bulge.
- Pilosebaceous unit include: hair follicle + sebaceous gland + arrector pili muscle.

### Nails:

- The nail plate is formed of hard keratin.
- Proximal nail fold morphology can be altered in connective tissue disease.
- The lunula is the visible part of the matrix.
- The matrix covers the mid-portion of the distal Phalanx.
- Fingernails grow 3mm/month.
- Toenails grow 1mm/month.
- Nails can be affected in systemic and skin diseases.



### NAIL DISORDERS

- 1- ABSENT PART: Anonychia congenita
- 2- NAIL PITTING: Psoriasis
- 3- CUTICLE INVASION: Lichen planus
- 4- PIGMENTATION & RIDGING: Monilia
- 5- DISTAL ONYCHOLYSIS: Tinea
- 6- SPOON NAILS: Iron deficiency Anemia
- 7- DISCOLORED & INVERTED EDGES: Ectodermal Dysplasia
- 8- CLUBBING: Hypoxia, Malignancy or Toxins
- 9- BITTEN NAILS (SHORT): Anxiety
- 10- SPLINTER HAEMORRHAGE: Bac. Endocarditis
- 11- YELLOW: Bronchiectasis, Lymphoma & Edema
- 12- HALF & HALF: Hepatic Necrosis
- 13- RIDGING: Rheumatoid arthritis
- 14- LONGITUDINAL BROWN LINES: Addison's, Breast cancer & Melanoma
- 15- WHITE NAILS: Anemia
- 16- RED NAILS: SLE, Polycythemia
- 17- HORIZONTAL WHITE & PINK BANDS: Nephrotic Syndrome
- 18- BRITTLE NAILS: Hypothyroidism



## Approach to dermatology patients.

### Approach to dermatology patients:

#### Step 1:

Start with basics

- Age
- Race
- Sex
- Occupation

#### Step 2:

History of skin lesion:

- When? Onset.
- Where? site of onset.
- Extension of lesions.
- Evolution.
- Associated symptoms.
- Aggravating factors.
- Treatment.

#### Step 3:

- Past medical history.
- Family history.
- Drug history.
- Occupational, travel and social history.

### Examination:

- Use good light when examining a patient.
- Examine hair, nails & mucous membrane.

#### Describe:

- General appearance of patient.
- Distribution of lesions.
- Arrangement.
- Type.
- Shape.
- Color.
- Size.

#### Palpation:

- Look for consistency, mobility, depth and tenderness.

#### Distribution:

##### **Generalized** can be:

- Symmetrical:
  1. Universal (head to toe)
  2. Bilateral
- Asymmetrical:
  1. Diffuse.
  2. Unilateral.

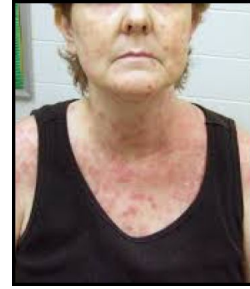
##### **Localized**:

- Acral.
- Malar.
- Sun exposed.
- Trauma sites.
- Flexures.
- Specific part.

## Descriptive terms and morphology of skin lesions

### Photodistribution:

- Lesions occurring over sun exposed skin.
- Protected areas remain free of lesions.



### Linear:

- Forms a line.



### Dermatomal:

- Occurring within the distribution of nerve.



### Annular:

- Ring like.



### Herpiform/Grouped:

- Lesions grouped in a manner similar to herpes simplex lesions.



### Reticular:

- Net like.



### Verrucous, warty, papillomatous:

- Surface consisting of finger like projections (in papilloma).



**Nummular/discoid:**

- Coin like lesions (**Dermatomyositis**).

**Guttate:**

- Drop-like, “en gouttes” (guttate psoriasis).

**Targetoid:**

- Round-lesions with concentric border and a dark center (erythema multiforme).
- Iris like.

**Umbilication:**

- Round depression in the center (molluscum contagiosum).





## Morphology

Skin lesions are divided :into

1. Primary =Basic lesion.
2. Secondary= Develop during evolution of skin disease or created.

### 1-Primary Skin Lesions

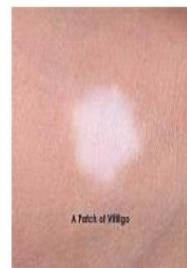
**1-Macule :** only change in color no elevation no depression

- Flat circumscribed discoloration
- that lacks surface elevation or depression.
- **less than 1 cm in size.**
  - Vitiligo.
  - Freckle.



**2-Patch:** only change in color no elevation no depression

- Flat circumscribed discoloration;
- **a large macule more than 1cm.**
- Vitiligo.
- Melasma.



**3-Papule :**

**Elevated, Solid lesion**  
**< 0.5cm in diameter.**

Notice

- color
- and surface changes (like →

- Umblicated
- Keratotic
- Papillomatous
- Flat topped.

e.g

- Molluscum Contagiosum.
- Acne.



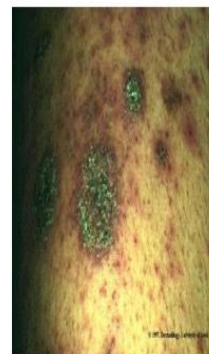
Macule with elevation become papule

**4-Plaque:**

Elevated, solid confluence or expansion of papules,  
**> 0.5 (lacks a deep component ).**

A flat topped palpable lesion more than 1 cm in size.  
e.g. Psoriasis.

Patch with elevation become plaque.



**5-Nodule :**

A solid, circumscribed elevation whose greater part lies beneath the skin surface.

> 0.5 cm in diameter;  
with deep component

(elevation+depth)

- Erythema Nodosum.
- Basal cell carcinoma

**6- Cyst:**

Nodule that contains fluid or **semisolid material**.

**7-Vesicle (Describe The Base Of Lesions and content of lesion)**

Elevation that contains **clear fluid**.

A small **less than 5 mm** in diameter  
e.g. Dermatitis Herpetiformis. Herpes.

**8-Bulla:**

- Localized fluid collection. **>0.5cm** in diameter
- a large vesicle.
- e.g. Bullous Pemphigoid

**11-Wheal:**

Firm, **edematous** plaque that is **evanescent** (**short lived**) and pruritic  
**also called a hive.**

with a **pale center and a pink margin.**

**less than 24 h**

e.g. Urticaria.

**9-Burrow: (specific only for scabies)**

Linear tunnel in the epidermis **induced by scabies mite.**

**10-Purpura:**

Extra-vasation of red blood cells giving **non-blanchable erythema** → Doesn't turn white when you press on it

**12-Pustule:**

Elevation that contains **purulent material**.

- Pustular Psoriasis.
- Acne.



## 2- Secondary Skin Lesions

### Scale :

**Thick stratum corneum**

### Crust: (also called scab)

A collection of **cellular debris**, **dried serum** and **blood** .

**Antecedent primary lesion usually** a **vesicle, bulla, or pustule**.

### Erosion:

A partial **focal loss of epidermis** that heals **without scarring**.

**Erosion= the dermis not involved**

### Excoriation :

Linear erosion induced by scratching.

### Fissure :

**Vertical loss of epidermis and dermis** with sharply defined walls: crack in skin.

### Ulcer :

A full thickness **focal loss of epidermis and dermis**; heals with scarring.

### Scar:

A collection of **new connective tissue**; may be **Hypertrophic** or **atrophic**. **Implies dermoepidermal damage**  
scar happen → when dermoepidermal junction damage

### Lichenification:= Acanthosis(histological term )

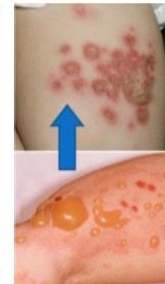
Increased skin markings secondary to scratching

### Acanthosis

histological term used to describe epidermal thickening due to increase keratinocytes in the spinous layer.



Scale



Crust



Erosion



Excoriation



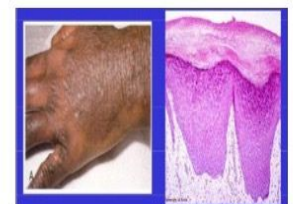
Fissure



Scar



Ulcer



Lichenification

### \*\*Specialized Terminology

#### Sclerosis:

Hardening of the skin .(Skin is un-pinchable) .

## Important Signs in physical examination

### 1-Nikolsky Sign :

Rubbing of apparently normal skin induce blistering. Seen only in pemphigus vulgaris and toxic epidermal necrolysis (TEN).

### 2- Auspitz Sign:

forceful removal of scale on top of a red papule produces bleeding points Seen in psoriasis.

### 3- Koebner's phenomenon:

Trauma to the skin re- produce certain diseases like Psoriasis, Vitiligo, Lichen planus and Warts.

### 4- Dermatographism:

Firm stroking of the skin produces erythema and wheal.

Seen in physical urticaria.

In patient with atopy, stroking produces white dermatographism rather than red.

## Investigations

### 1-Wood's lamp:

- Produces long wave UVL (360 nm)
- Useful in:
  - Tinea Versicolor
  - Tinea Capitis
  - Vitiligo
  - Erythrasma
  - Melasma

### 2-KOH preparation (for fungus (used for scaly lesions not vesicular)

### 3- Tzank smear: (used in vesicular lesions to diagnose):

- Herpes simplex or VZV (**multinucleated giant cells**)
- Pemphigus Vulgaris (**acantholytic cells**).
- Stain with Giemsa stain. → Examine under microscope.

### 4-Prick test:

- Put a drop of allergen containing solution
- A non bleeding prick is made through the drop.
- After 15-20 min the antigen is washed and the reaction is recorded.
- Positive test shows :

- ❖ urticarial reaction at site of prick.
- ❖ Detects immediate-type IgE mediated reaction. (type 1 hypersensitivity reaction).
- ❑ Emergency therapeutic measures should be available in case of anaphylaxis.

### 5-Patch skin test

- Important in Allergic contact dermatitis. (Type 4 cellular immunity)
- Select the most probable substance causing dermatitis.
- Apply the test material over the back.
- Read after 48 & 72 hr. Look for (erythema, edema, vesiculation)
- Positive shows edema and erythema, in severe cases vesicles could present
- Clean skin with alcohol.
- Infiltrate with 1-2% xylocaine with adrenaline.
- Rotate 2-6 mm diameter.
- punch into the lesions.
- Lift specimen and cut at base of lesion.
- Fix in 10% formalin
- For Immunofluorescence → Put in normal saline. (to keep the tissue fresh).
- Suture if 5 mm is used. (if less than 4 mm we do not need to suture it but if more than 4 mm we need to suture)

### 6-Direct immunofluorescence:

- Used to diagnose autoimmune diseases e.g.
  - Pemphigus Vulgaris
  - Bullous pemphigoid
- Detects immunoglobulin and complement deposits in skin.
- The deposits will give a green fluorescence
- Fluorescence will be noted if *immunoglobulin deposits are found intercellular between the epidermal cells as in pemphigus vulgaris, while found the Basement membrane zone as in bullous pemphigoid.*

### 7- Indirect Immunofluorescence :

Detect auto antibodies in the serum.

It is used:

- To confirm a diagnosis
- To differentiate between bullous diseases
- To monitor disease activity.

## Topical treatment

- ★ *A wide variety of topical agents are available*
- ★ *Delivers the drug to target site.*
- ★ **(Golden rule).**
  - *IF the lesion is dry -wet it → How to wet it? Creams, ointments*
  - *IF wet -dry it →How to dry it? Using compressors (cloth of water) will cause it to evaporate*

### ★ *Topical drugs consist of*

1- *Active substance: →like steroids, antimicrobial agents.*

2- *Vehicle: → Is the base in which the active ingredient is dispersed.*

### **Topical steroids side effects:**

- Atrophy and striae.
- Telangiectasia and purpura.
- Masking the initial lesion.
- Perioral dermatitis and rosacea or acne.
- Systemic absorption.
- Tachyphylaxis (sudden loss of response).

### ★ *Guidelines regarding steroid use:*

- *Avoid use for extended periods of time.*
- *Avoid high potency steroid on flexures and face*
- *Avoid high potency steroid in children.*

### ★ *Examples :*

- ☐ **Creams** : *are mixture of oils and water in which the active substance is dispersed. white in color useful in folds.and are applied to wet lesions.*
- ☐ **Ointments** *are primarily grease ,useful in dry lesions and Are translucent.*
- ☐ **gels** *are mixtures of propylene glycol and water. Sometimes they contain Alcohol. They are translucent and are best used in wet disorders and hairy regions.*

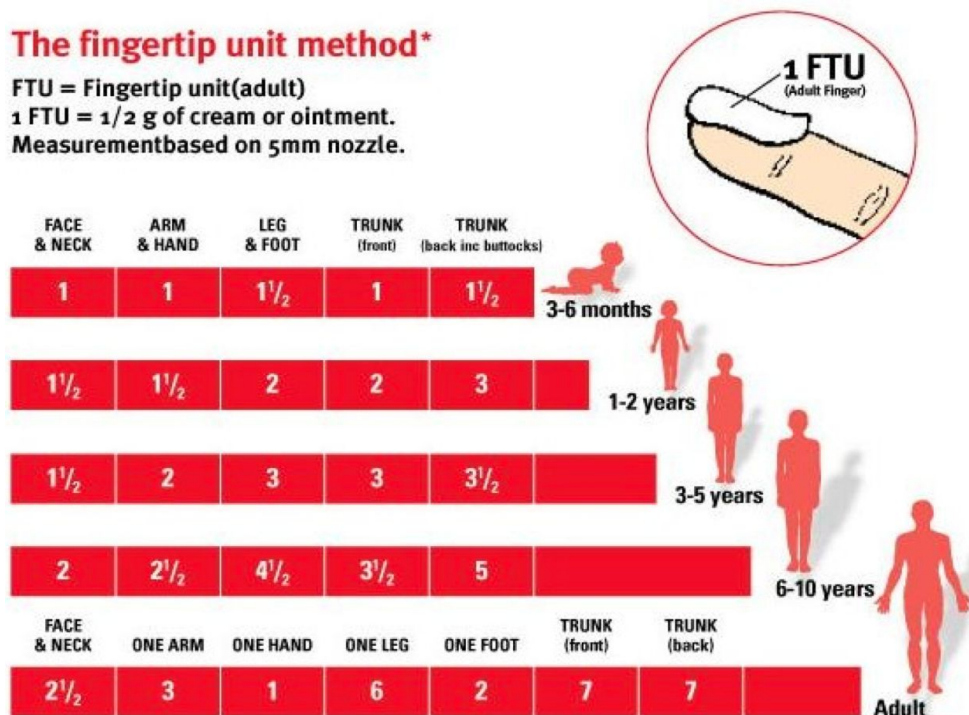
- ❑ Use it by **Finger tip unit**:
- ❑ The amount of cream/ointment expressed from 5mm nozzle.  
It weighs 0.5g → It covers 2 hand units.

### The fingertip unit method\*

FTU = Fingertip unit(adult)

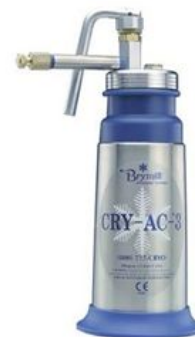
1 FTU = 1/2 g of cream or ointment.

Measurement based on 5mm nozzle.



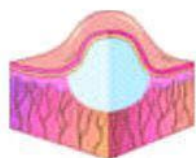
### Other therapeutic modalities:

1. Phototherapy machine/NBUVB.
2. Hand and feet narrow band UVB.
  - ❖ 1 & 2 are used to treat: vitiligo, psoriasis, lichen planus and atopic dermatitis.
3. Liquid nitrogen gun (Cryotherapy): Used to treat warts.

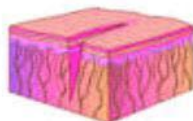


## Summary

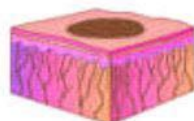
### Primary skin lesions



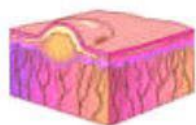
Cyst



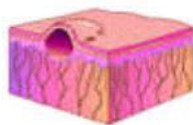
Fissure



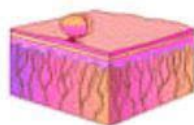
Macule



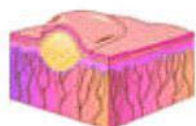
Nodule



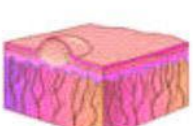
Papule



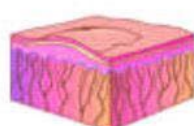
Polyp



Pustule



Vesicle



Wheal