

Introduction to Dermatology

- Functions & Structures of the Skin
- How to Approach a Dermatology Patient
- Descriptive Terms Used in Dermatology
- Morphology of Skin Lesions
- Reaction Patterns
- Treatments used in Dermatology

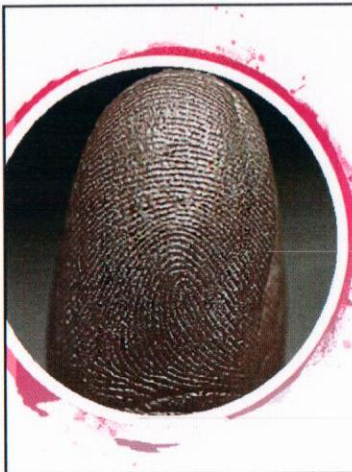
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Course Objectives

- To learn and understand the normal structure of the skin
- To be able to take proper history from a dermatology patient
- To be able to describe lesions by using proper dermatological terminology
- To be able to formulate a list of differential diagnosis
- To be able to diagnose and treat common skin disorders
- To be familiar with dermatologic emergencies

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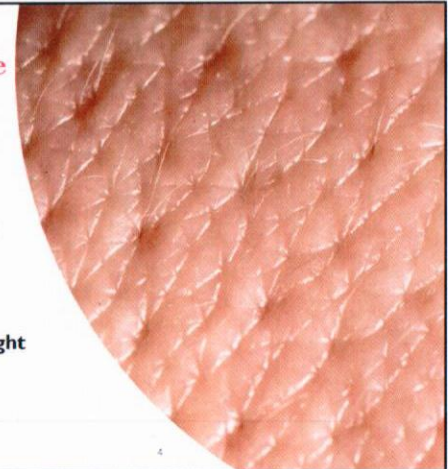


Structure and Function of the Skin: Basic and Physiology

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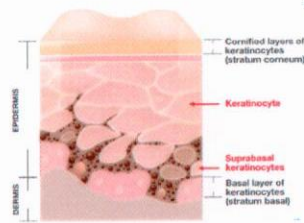
Structure and Function of the Skin: Basic and Physiology

- The skin is the largest and heaviest organ in human body
- Body surface area of 1.5- 2 m²
- Contributes to 1/6- 1/7 of body weight



Structure and Function of the Skin: Basic and Physiology

- It consists of many cell types called "**Keratinocytes**"
- Specialized structures like the **Basement Membrane**
- It serves multiple functions that are **crucial to health and survival**



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Structure and Function of the Skin: Basic and Physiology

Functions of the skin:

- **Immune:**
 - Barrier to harmful exogenous substance & pathogens, **Langerhans cells** in the skin are part of the adaptive immune system
- **Metabolic and Endocrine:**
 - Prevents loss of water & proteins, vitamin D production after **UVB** exposure



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Structure and Function of the Skin: Basic and Physiology

Functions of the skin:

- **Sensory organ:**
 - Contains a variety of nerve endings that respond to heat, cold, touch, pressure, vibration and pain. Hence, protects against physical injury
- **Thermoregulation:**
 - Through **eccrine glands** and **dermal blood vessels** Important component of immune system
- **Cosmetic Importance**



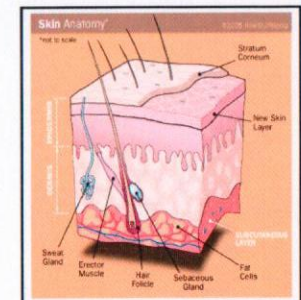
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Structure and Function of the Skin: Basic and Physiology

Skin Structure

The skin consists of:

- ✓ **Epidermis**
- ✓ **Basement membrane**
- ✓ **Dermis**
- ✓ **Subcutaneous tissue**
- ✓ **Skin appendages** (hair, nail, sweat & sebaceous glands)



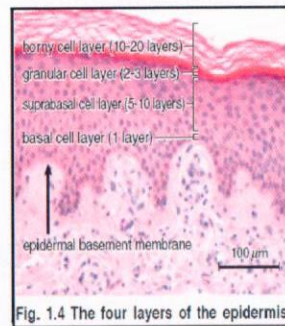
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Skin Structure

Epidermis:

- The outermost layer of the skin
- Composed primarily of keratinocytes and other cells like (Melanocytes, Langerhans cells)



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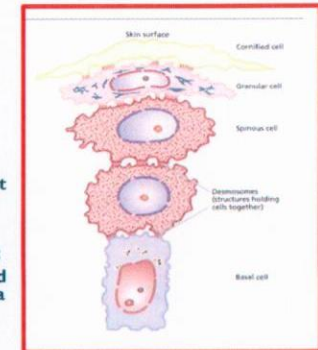
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Skin Structure

Epidermis:

Composed of four layers:

- **Stratum basalis (Basal layer):**
 - Columnar or cuboidal dividing cells that are in contact with the basement membrane
- **Stratum spinosum (Spinosum layer):**
 - So called because of desmosomes and keratin filaments that gives the cells a spiny appearance



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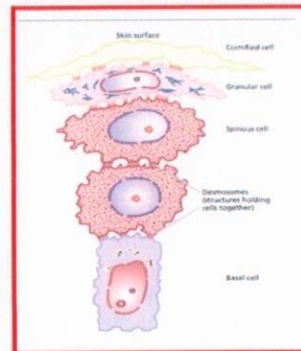
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Skin Structure

Epidermis:

Composed of four layers:

- **Stratum granulosum (Granular layer):**
 - Formed of flat cells containing keratohyaline granules
- **Stratum corneum:**
 - The outermost layer, composed of elongated and flattened dead cells with no nuclei or organelles called 'corneocytes'



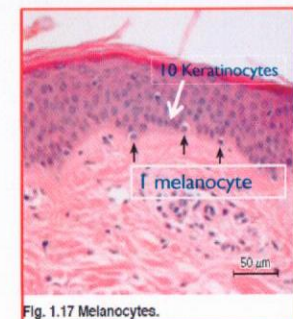
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Skin Structure

Stratum Basalis

- 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

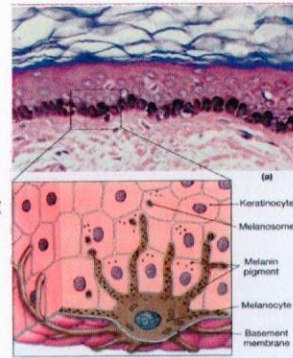


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Skin Structure

- Melanosomes are transferred to adjacent cells by means of dendrites thus forming the **"EPIDERMAL MELANIN UNIT"**
- The size of melanosomes and packaging differentiate white from dark skin
- The number of melanocytes are equal in white and dark skin



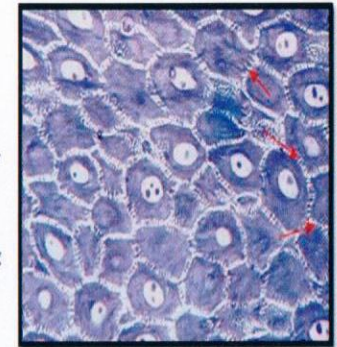
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Skin Structure

Spinous cell layer:

- Keratinocytes adhere to each other by **Desmosomes** (complex modification of the cell membrane)
- Desmosomes appear like spines
- Langerhans cells are antigen presenting cells present in abundance in this layer



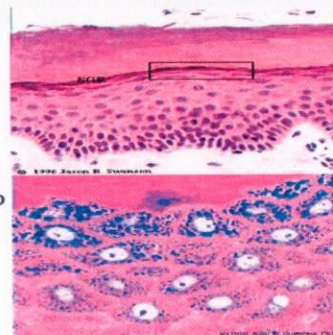
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Skin Structure

Granular cell layer :

- 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 like palms and soles



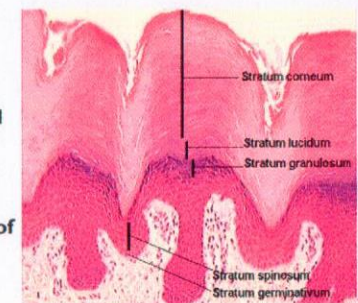
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Stratum corneum layer:

- The cells in this layer are flattened and have no nucleus
- Cells have a thick envelope that resist chemicals
- Stratum lucidum is found in thick skin of the palms and soles below the stratum corneum



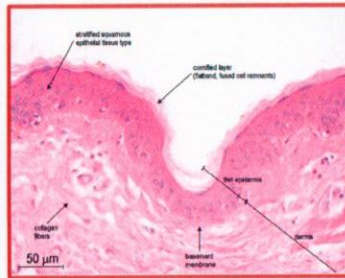
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Skin Structure

Basement Membrane :

- It is a pink homogenous area between the epidermis and dermis
- It consists of a number of proteins
- It is the site of attack injury in blistering diseases
- Thickened in certain skin diseases like discoid lupus erythematosus



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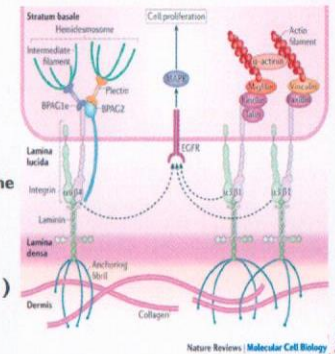
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Skin Structure

Basement Membrane

Formed by:

1. Plasma membrane of basal cells and hemidesmosomes (proteins that anchor the basal cells to basement membrane)
2. Thin clear amorphous space (lamina lucida)
3. An electron dense area (lamina densa)
4. Anchoring fibrils that anchors the epidermis to dermis

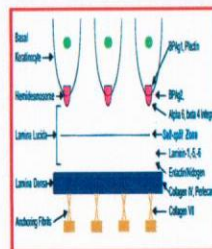


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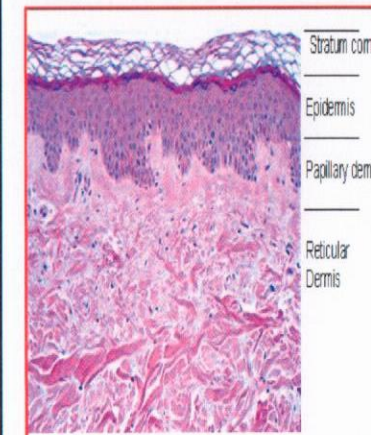
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Skin Structure

Basement Membrane



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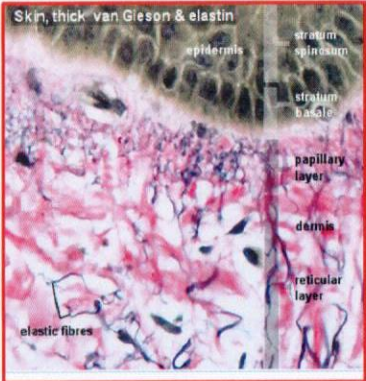


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The Dermis

- Divided into:
 - Papillary dermis
 - Reticular dermis

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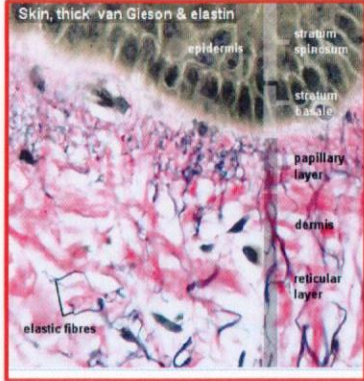


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The Dermis

- Consists of:
 - Collagen fibers**
 - 70-80%
 - Provides strength to skin
 - Elastic Fibers**
 - 1-3%
 - Provides elasticity
 - Protection against shearing forces

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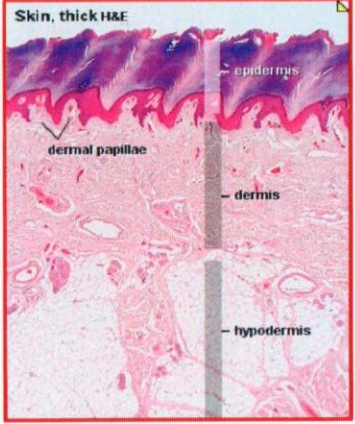


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The Dermis

- Ground substance** (proteoglycans)
 - Binds water and maintains the skin turgor
- Blood vessels**
 - To nourish the overlying epidermis
- Fibroblasts**
 - Produce the above elements

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Structure and Function of the Skin: Basic and Physiology

Functions of the Dermis:

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

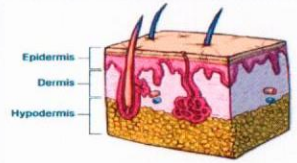
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Skin Structure

Subcutaneous Fat:

- Composed of lipocytes



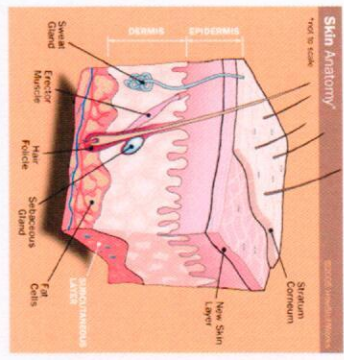

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Skin Structure

□ Skin Appendages

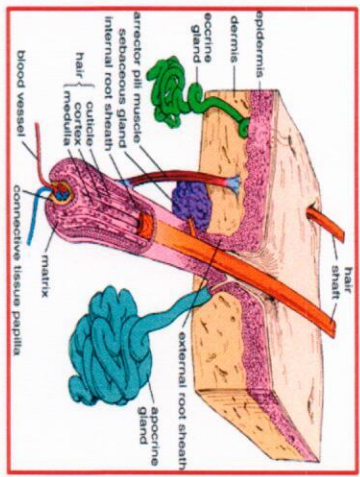
- Include:
- Hair Follicles
 - Nails
 - Eccrine/ apocrine sweat glands
 - Sebaceous glands



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Skin Appendages



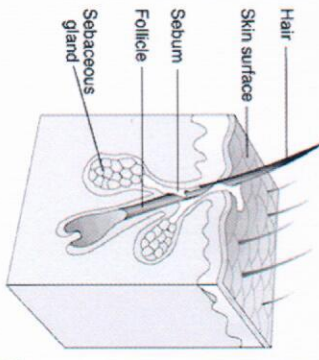
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Skin Structure

□ Pilosebaceous Unit

Formed by the hair follicles with its attached sebaceous gland



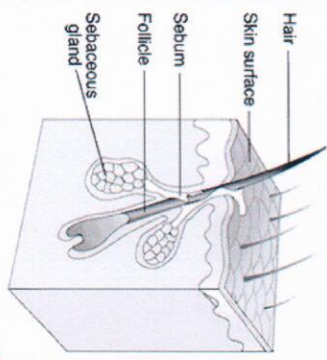
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Skin Structure

□ Sebaceous gland

- Attached to hair follicles or open freely
- Present in the scalp, forehead, face, upper chest except palms and soles
- Sebaceous glands in the areola are called 'Montgomery tubercles', and 'Meibomian glands' in the eyelid

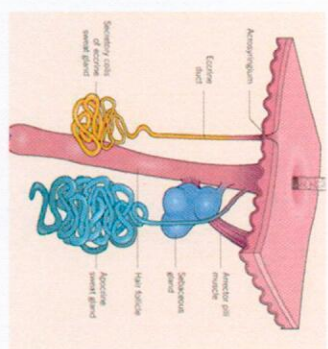


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Skin Structure

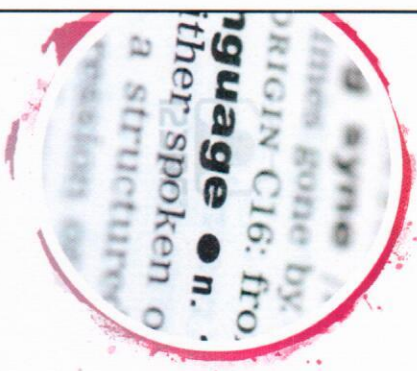
- ❑ **Apocrine sweat glands**
- Are modified sweat glands that present in the axillae, anogenital, external ear canal, the eye lids (**moll's glands**) and the areolae
- Under **adrenergic** stimuli



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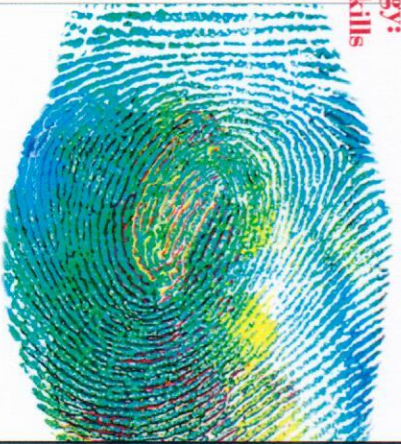
The Language of Dermatology: Descriptive and Morphology skills

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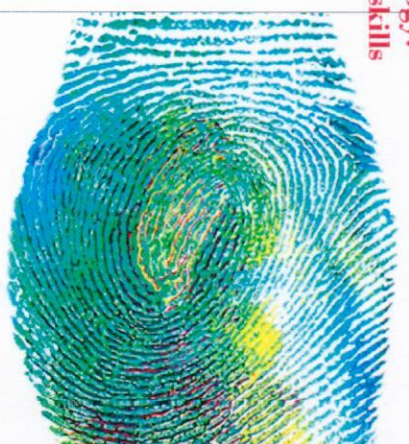
Why Do Dermatologists Use Words That Are Rarely Used By Other Medical Specialties?



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The Language of Dermatology: Descriptive and Morphology skills

- The language of dermatology is different, and the use of correct dermatologic terms is important to accurately describe skin lesions
- A good description of a skin lesion enables the listener to formulate a series of differential diagnosis

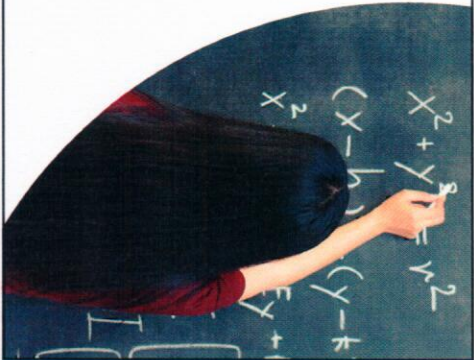


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The Language of Dermatology: Descriptive and Morphology skills

How do you approach a patient with skin lesions ?

- > History
- > Examination
- > Investigations



$x^2 + y^2 = r^2$
 $(x-h)^2 + (y-k)^2 = r^2$
 $x^2 - y^2 = (x-y)(x+y)$



The Language of Dermatology: Descriptive and Morphology skills

Approach to the patient with skin lesions:

Examination:

- Use good light when examining a patient
- Examine nails, hair & mucous membrane
- Describe skin lesion as follow :
 - Distribution*
 - Configuration
 - Size
 - Border and shape
 - Color
 - Morphology (Primary lesion and Secondary changes)

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Approach to the patient with skin lesions:

History:

- Personal Data: Age, gender
- Chief Complaint : Onset, duration, progression, associated symptoms (itching, pain), triggering and relieving factor (sun,heat,..Etc)
- Drug and allergy Hx
- Family Hx
- Social Hx
- Systemic review

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Distribution:

- Distribution refers to how the skin lesions are scattered or spread out
- Skin lesions may be isolated (solitary/ single) or multiple
- The localization of multiple lesions in certain regions aids in making a diagnosis, as skin diseases tend to have characteristic distribution
- Aids in understanding the extent of the eruption and its pattern

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Distribution:

- **Acral:**
 - Affects distal portions of limbs (hand, foot) and head (ears, nose)
- **Dermatomal:**
 - Corresponding with nerve root distribution
- **Extensor:**
 - Involving extensor surfaces of limbs
 - Contrast with flexor surfaces

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Distribution:

- **Flexural:**
 - Involving skin flexures (body folds); also known as intertriginous
- **Generalized:**
 - Universal distribution; may be scattered or diffuse
- **Koebnerised:**
 - Arising in a wound or scar
 - The Koebner phenomenon refers to the tendency of several skin conditions to affect areas subjected to injury

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Distribution:

- **Photosensitive:**
 - Favouring sun exposed areas.
- **Seborrhoeic:**
 - The areas generally affected by seborrhoeic dermatitis, with a tendency to oily skin (seborrhoea)
 - Scalp, behind ears, eyebrows, nasolabial fold, sternum and intercapular

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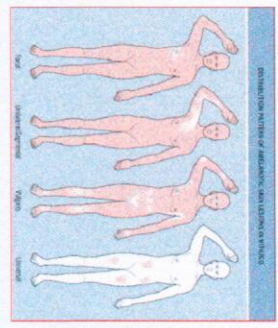
Distribution:

- **Symmetrical:**
 - In the same regions, the left side is affected in a similar way to the right side.
- **Unilateral:**
 - Wholly or predominantly on one side of the affected region.

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Generalized/ universal



Bilateral / symmetrical



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The Language of Dermatology: Descriptive and Morphology skills

Dermatomal



Photosensitive



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Koebnerised



Examples:

- Psoriasis
- Lichen planus
- Vitiligo
- Lichen nitidus

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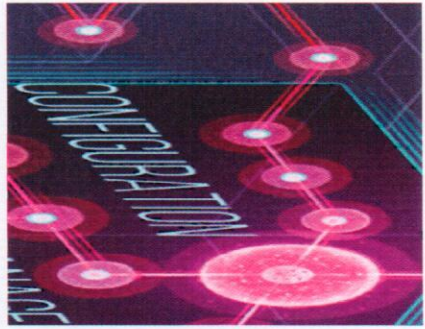
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Configuration:

- Refers to the shape or outline of the skin lesions
- Skin lesions are often grouped together



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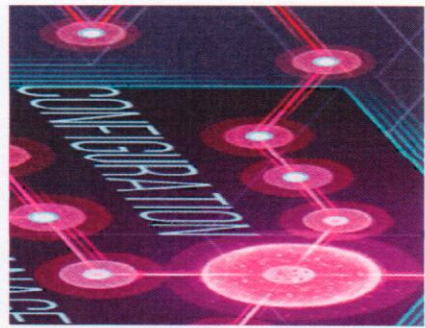


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Configuration:

- Nummular lesion: Round (coin-shaped) lesions, also known as "Discoid"
- Linear lesion: A linear shape to a lesion often occurs for some external reason such as scratching

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**The Language of Dermatology:
Descriptive and Morphology skills**


Configuration:

- Target lesion: Concentric rings also known as iris lesion
- Annular: Lesions grouped in a ring like pattern
- Grouped: as in herpes simplex lesion
- Reticular: net like pattern

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Annular



ANNULAR LESION

Nummular/ discoid lesion



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Reticular




Linear




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Target lesion



Grouped

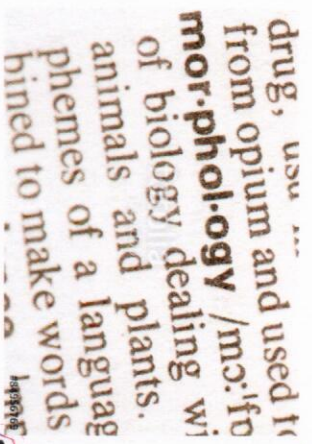


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Morphology
Skin lesions are divided into:

- > Primary- Basic lesion
- > Secondary- Develop during evolution of skin disease by scratching or infection



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Primary skin lesions

- Macule/patch
- Papule/plaque
- Nodule
- Cyst
- Wheal
- Vesicle/ bulla
- Pustule
- Burrow

Secondary skin lesions

- Excoriation
- Erosion
- Scale
- Fissure
- Ulcer
- Scar
- Lichenification


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Primary skin lesions

- **Macule:**
 - > Flat circumscribed discoloration that lacks surface elevation or depression
 - > < than 0.5 cm in diameter


A. Borrix




B. Condens




C. Wick




E. Papule




F. Pustule and pyrus




G. Papule




L. Scale



J. Dermatitis



K. Vesicle

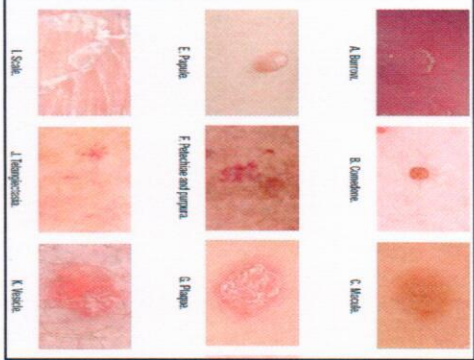


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Primary skin lesions

- **Patch:**
- Flat circumscribed skin discoloration
- "A large macule" > 0.5 cm in diameter



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Primary skin lesions

- **Papule:**
- Elevated, solid lesion < 0.5cm in diameter
- Examine for color and surface changes eg: Umbilicated, Keratotic, Papillomatous, Flat topped



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Primary skin lesions

- **Plaque:**
- Elevated, solid confluence or expansion of papules, > 0.5cm in diameter
- Lacks a deep component



**The Language of Dermatology:
Descriptive and Morphology skills**

Primary skin lesions

- **Nodule:**
- Elevated, solid lesion, > 0.5cm in diameter
- With deep component



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Primary skin lesions

- **Cyst:**
- Nodule that contains fluid or semisolid material



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Primary skin lesions

- **Vesicle:**
- Elevation that contains clear fluid
- **Bulla:**
- Localized fluid collection > 0.5 cm in diameter "a large vesicle"
- Can be tense or flaccid



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Primary skin lesions

- **Burrow:**
- Linear tunnel in the epidermis induced by scabies mite



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Primary skin lesions

- **Pustule:**
- Elevation that contains purulent material
- A pustule is a purulent vesicle
- It is filled with neutrophils, and may be white, or yellow
- Not all pustules are infected



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Primary skin lesions

Wheal (Hive):

- > Firm, edematous plaque that is evanescent (short lived) and pruritic



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Secondary skin lesions

Excoriation:

- > Linear erosion induced by scratching



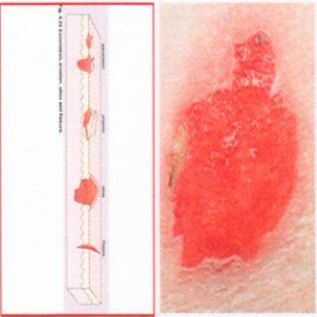
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Secondary skin lesions

Erosion:

- > A partial and superficial focal loss of epidermis that heals without scarring



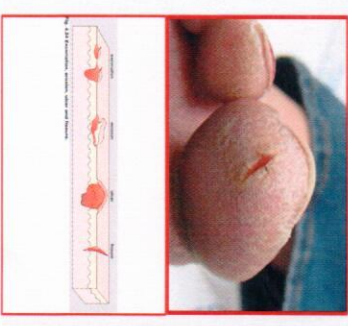
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Secondary skin lesions

Fissure:

- > Vertical loss of epidermis and dermis with sharply defined walls; "cracks in skin"



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Secondary skin lesions

▪ Ulcer:

- A full thickness focal loss of epidermis and dermis
- Heals with scarring

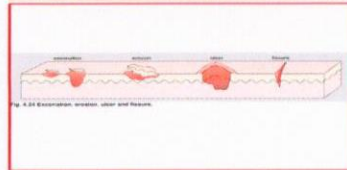
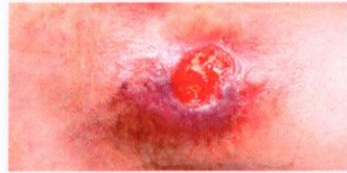


Fig. 4.24 Excoriation, erosion, ulcer and fissure.

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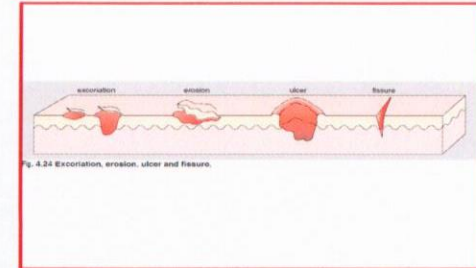


Fig. 4.24 Excoriation, erosion, ulcer and fissure.

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Secondary skin lesions

▪ Crust:

- A collection of cellular debris, dried serum and blood
- Antecedent primary lesion usually a vesicle, bulla, or a pustule



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The Language of Dermatology: Descriptive and Morphology skills

Secondary skin lesions

▪ Scale:

- Thickened stratum corneum



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Secondary skin lesions

- **Scar:**
 - A collection of new connective tissue
 - May be hypertrophic or atrophic
 - Implies dermoepidermal damage



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Secondary skin lesions

- **Lichenification:**
 - Increased skin markings secondary to chronic scratching



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Important Signs in Dermatology

- Nikolsky sign
- Auspitz sign
- Koebner's phenomenon
- Dermatographism



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Important Signs in Dermatology

- **Nikolsky sign:**
 - Rubbing of apparently normal skin induces blistering of the skin
 - Seen in pemphigus vulgaris and toxic epidermal necrolysis (TEN)

Figure 2. A positive Nikolsky's sign in toxic epidermal necrolysis.



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Important Signs in Dermatology

▪ **Auspitz sign:**

- Removal of scale on top of a red papule produces bleeding points
- Seen in psoriasis



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Important Signs in Dermatology

▪ **Koebner's phenomenon:**

- The tendency for certain skin diseases (psoriasis, vitiligo, lichen planus, warts) to develop at sites of trauma



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Important Signs in Dermatology

▪ **Dermatographism:**

- Firm stroking of the skin produces erythema and Wheal
- Seen in physical urticaria
- In patients with atopy, stroking produces white dermatographism rather than red



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Investigations in Dermatology

- Wood's lamp
- KOH preparation
- Tzank smear
- Prick test
- Patch skin test
- Skin punch biopsy



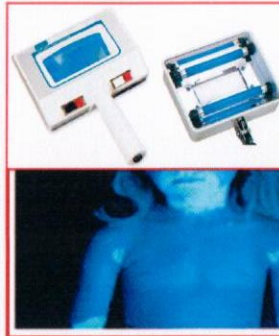
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Investigations in Dermatology

➤ Wood's lamp :

- Produces long wave UVL (360nm)
- Useful in :
 - Tinea Versicolor - yellowish green fluorescence
 - Tinea Capitis - yellow green fluorescence in *M.canis*, *M.audouini*
 - Vitiligo - Milky white
 - Erythrasma - coral red fluorescence



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Investigations in Dermatology

➤ KOH preparation for fungus:

- Cleanse skin with alcohol Swab
- Scrape skin with edge of microscope slide onto a second microscope slide



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Investigations in Dermatology

➤ KOH preparation for fungus:

- Put on a drop of 10% KOH
- Apply a cover slip and warm gently
- Examine with microscope objective lens



Figure 2: 10% KOH preparation showing broad thin walled septate hyphae with irregular branching (500x)

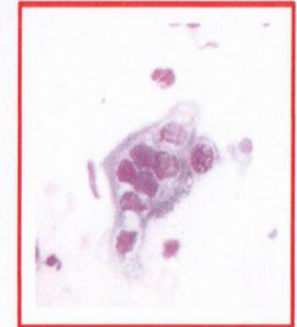
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Investigations in Dermatology

➤ Tzank smear:

- Important in diagnosing:
 - Herpes simplex or VZV (multinucleated giant cells)
 - Pemphigus Vulgaris (acantholytic cells)



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Investigations in Dermatology

➤ Tzanck smear:

▪ Method:

- Select a fresh vesicle
- De-roof and scrape base of the vesicle
- Smear onto a slide
- Fix with 95% alcohol
- Stain with Giemsa stain
- Examine under microscope



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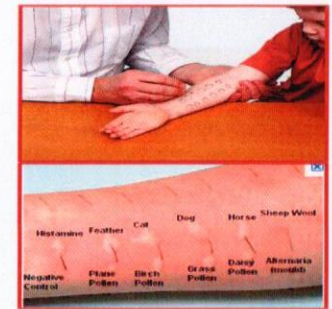


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Investigations in Dermatology

➤ Prick test:

- Put a drop of allergen containing solution
- A nonbleeding prick is made through the drop
- After 15-20 minutes the antigen is washed and the reaction is recorded



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Investigations in Dermatology

➤ Prick test:

- A positive test shows urticarial reaction at site of prick
- Detects **immediate-type IgE mediated reaction**
- Emergency therapeutic measures should be available in case of anaphylaxis



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Investigations in Dermatology

➤ Patch Skin Test:

- Important in contact dermatitis
- Select the most probable substances causing dermatitis
- Apply the test material over the back



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Investigations in Dermatology

➤ Patch Skin Test:

- Read after 48 & 72 hr., look for (erythema, edema, vesiculation)
- Positive patch test showing erythema and edema
- In severe positive reaction vesicles may be seen



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Investigations in Dermatology

➤ Skin Punch Biopsy:

- Clean skin with alcohol
- Infiltrate with 1-2 % xylocaine with adrenaline
- Rotate 2-6 mm diameter punch into the lesions



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Investigations in Dermatology

➤ Skin Punch Biopsy:

- Lift specimen and cut at base of lesion
- Fix in 10% formalin
- For Immunofluorescence put in normal saline
- Suture if 5 mm punch is used



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Thank You

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