INTRODUCTION TO DERMATOLOGY

Objectives of the course

- To know the normal skin structure.
- To be able to take proper history.
- To be able to describe lesions by using proper dermatological terminology.
- To be able to formulate a differential diagnosis.
- To be able to diagnose and treat common skin disorders.
- To be familiar with dermatologic emergencies .

Lecture outlines

- Function , Structure of the skin.
- Approach to dermatology patient.
- Descriptive Terms and morphology of skin lesions.
- Important signs and Investigations.
- Topical therapy.

Introduction to dermatology

- The skin is a complex, dynamic organ.
- It is the largest organ of the body.

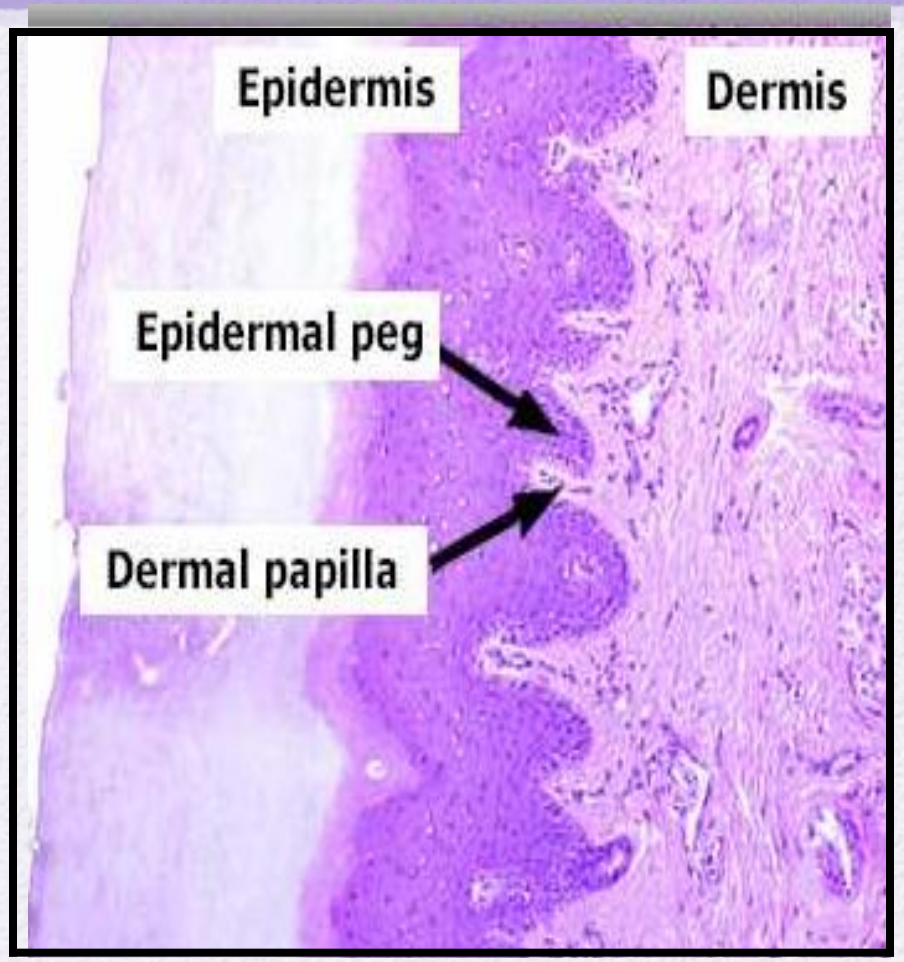
Function

- 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

- **"epi" coming from the Greek meaning "over" or "upon”**
- **Is the outermost layer of the skin.**
- **The main type of cells are:**

✓ Keratinocytes

✓ Melanocytes

✓ Merkel cells

✓ Langerhans cells

Skin Structure

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 keratohyaline granules.
- Cornified layer (stratum corneum):dead cell with no organells.

Skin Structure

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.

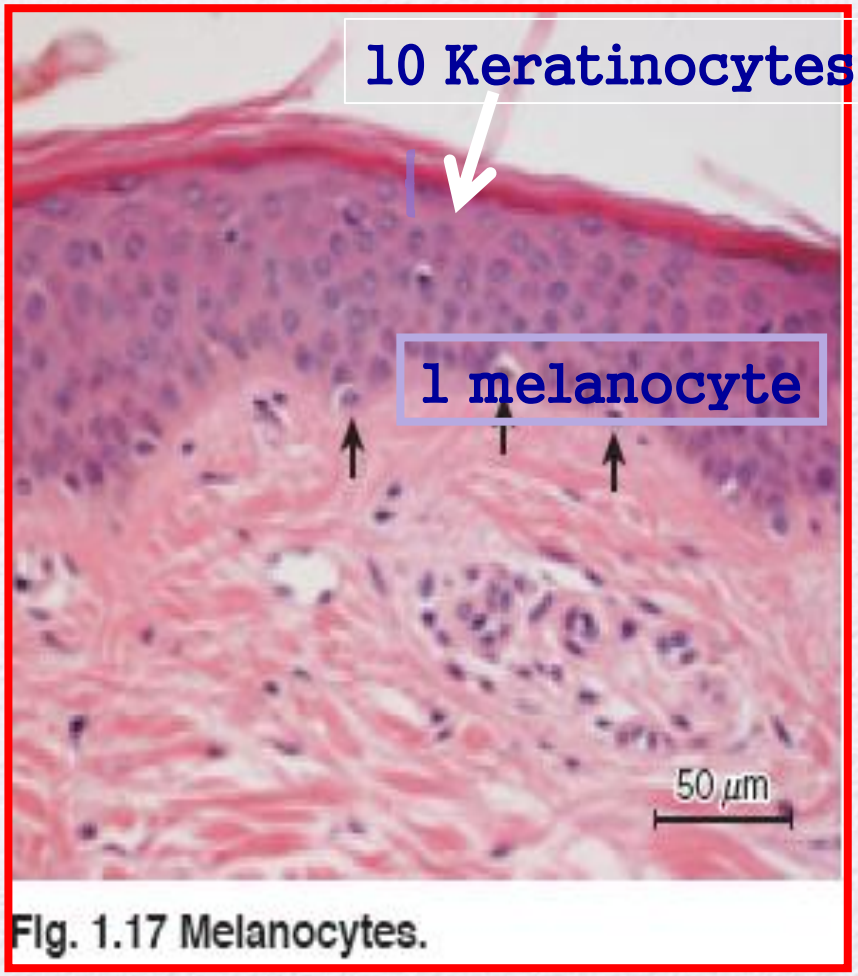


Fig. 1.17 Melanocytes.

Skin Structure

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 .

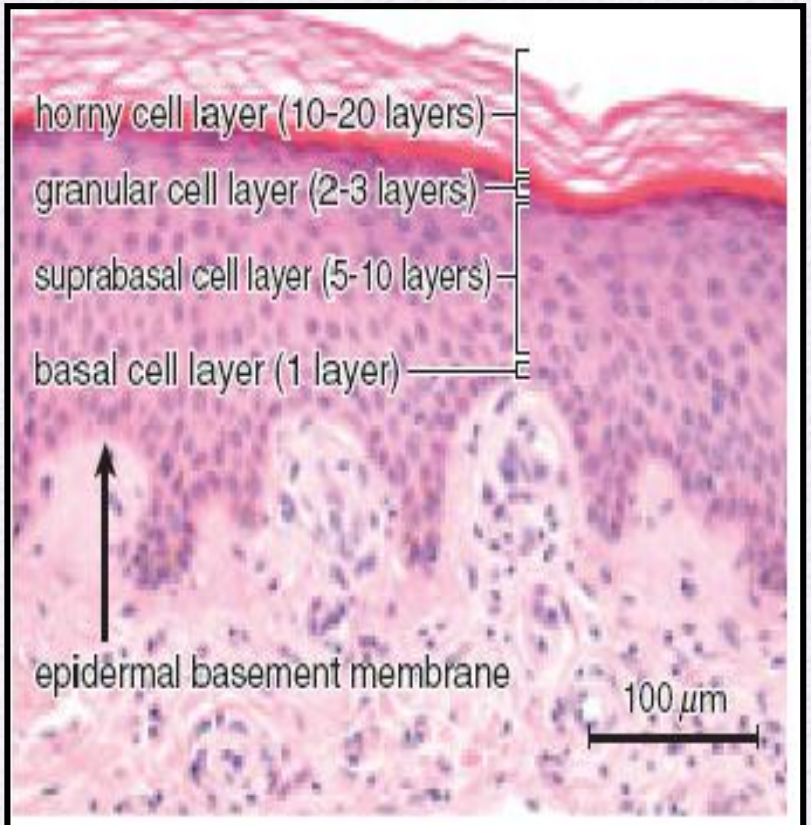


Fig. 1.4 The four layers of the epidermis

Skin Structure

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 cornium layer .**
- **In thin skin it is 1 -3- cell layers and 10 cell layers in thick skin.**

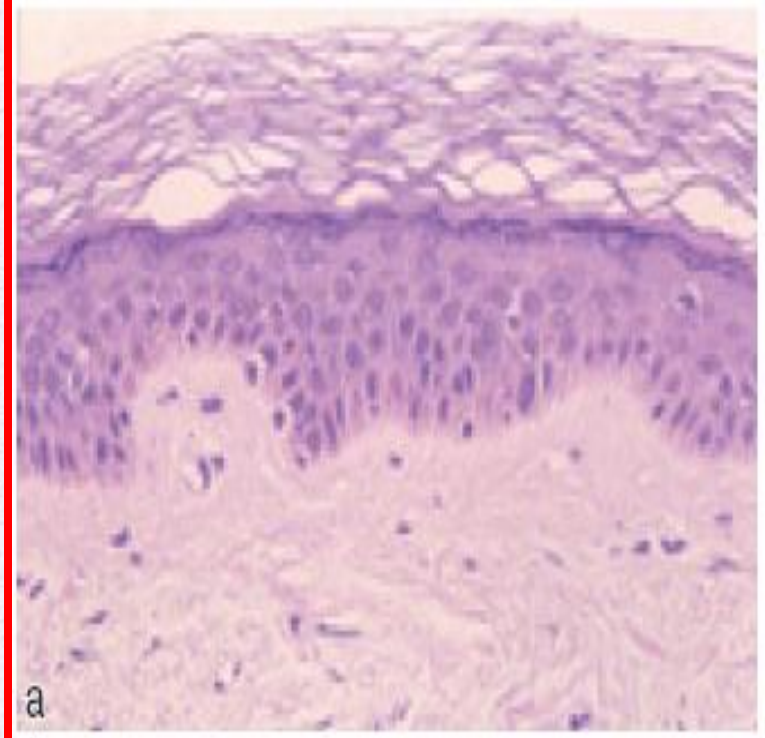


Fig. 2.2-1 Normal skin (hematoxylin and eosin staining).

Skin Structure

Cornified layer (stratum corneum):

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

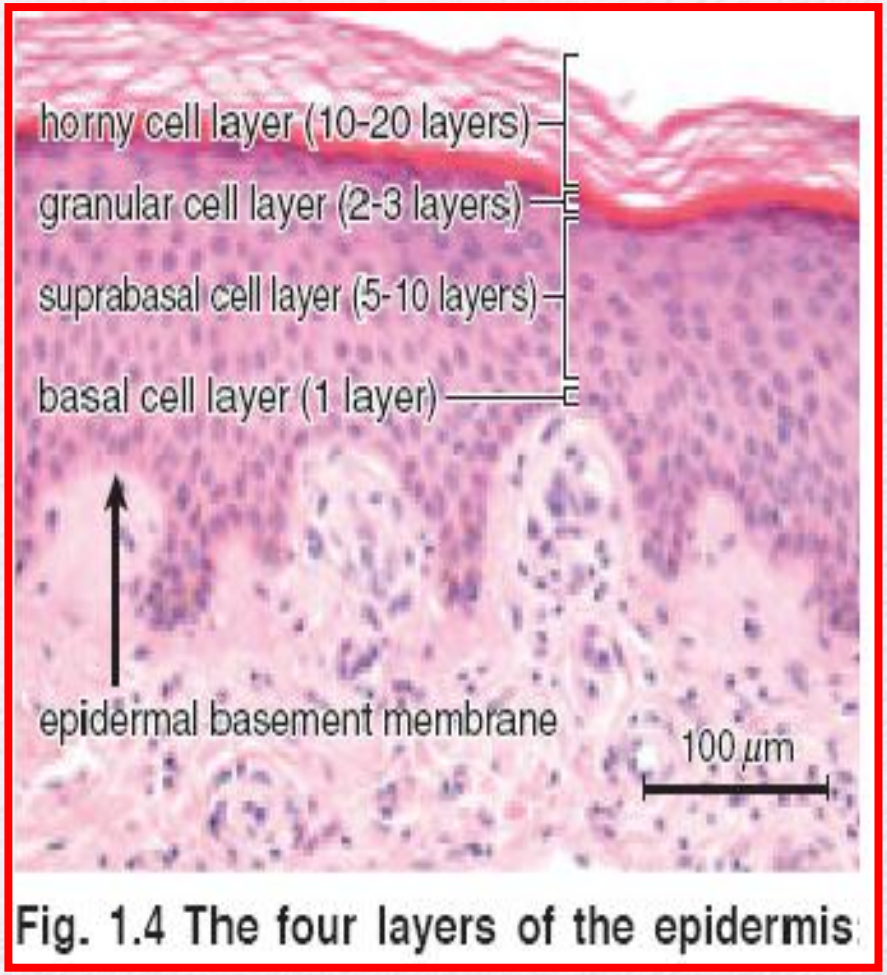
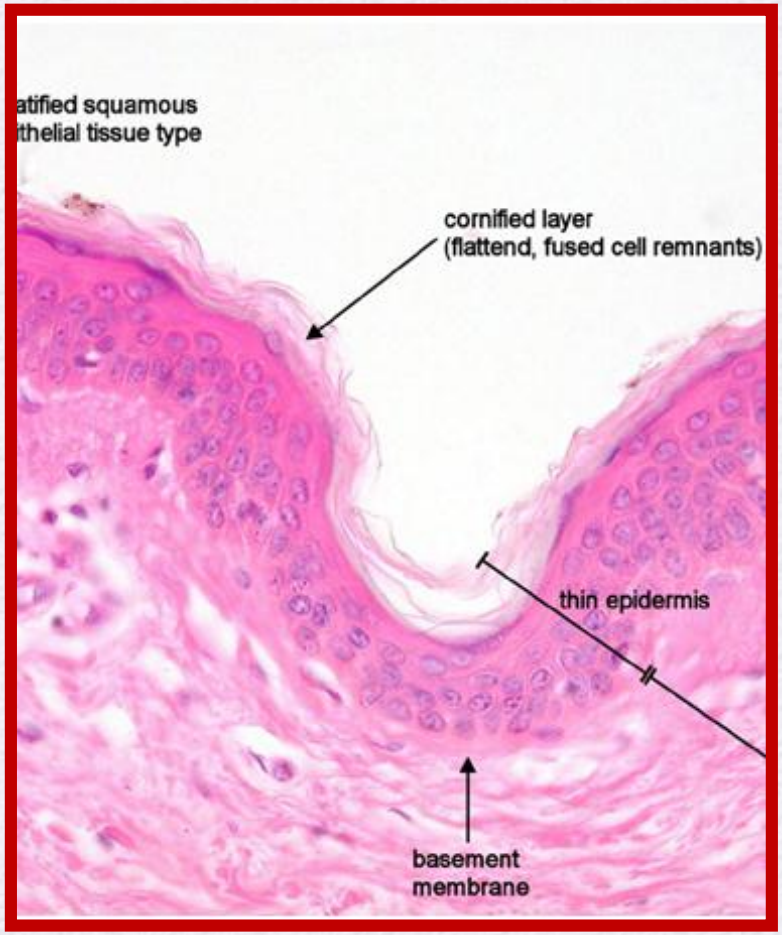


Fig. 1.4 The four layers of the epidermis

Basement membrane

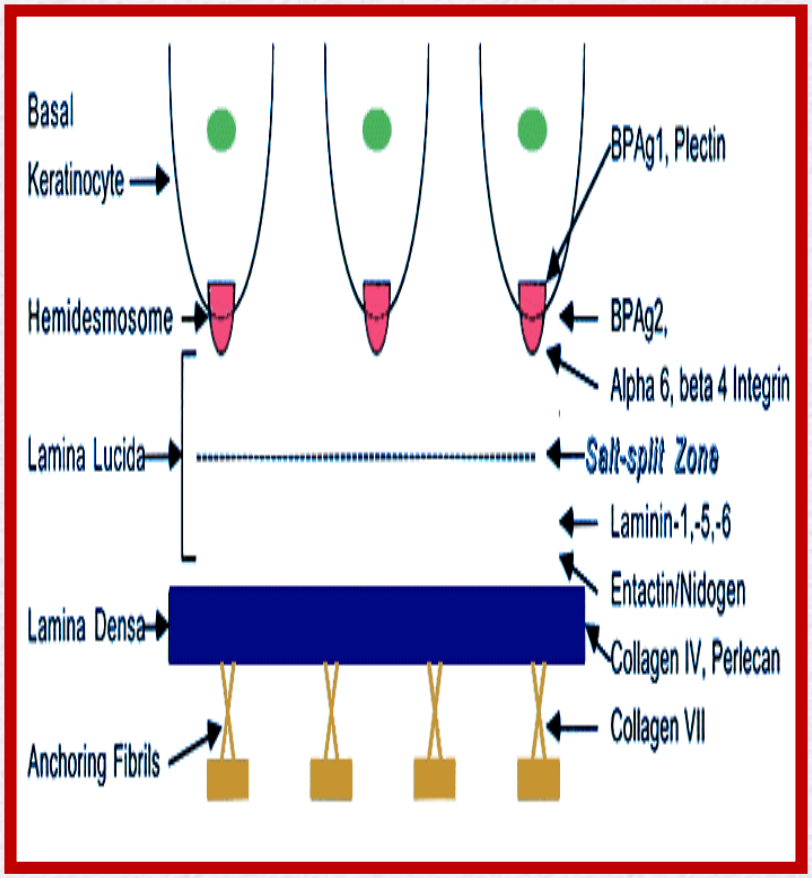
- It is a pink undulated homogenous area between the epidermis and dermis
- It consist of number of proteins.
- It is the site of attack injury in blistering diseases.



Basement membrane

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 .

Skin Structure

2) Elastic Fibers:

- Provides elasticity
- Protection against shearing forces.

Skin structure

3) Ground substance:

Binds water and maintains

the skin turgor.

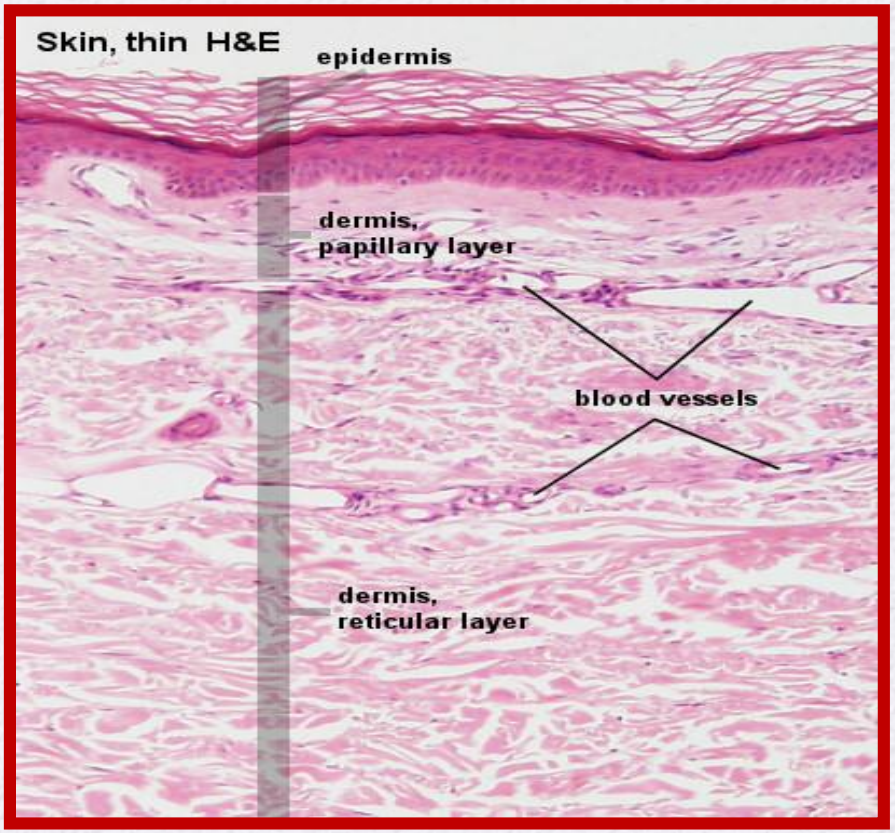
4) Blood vessels:

To nourish the overlying

epidermis also.

5) Fibroblasts:

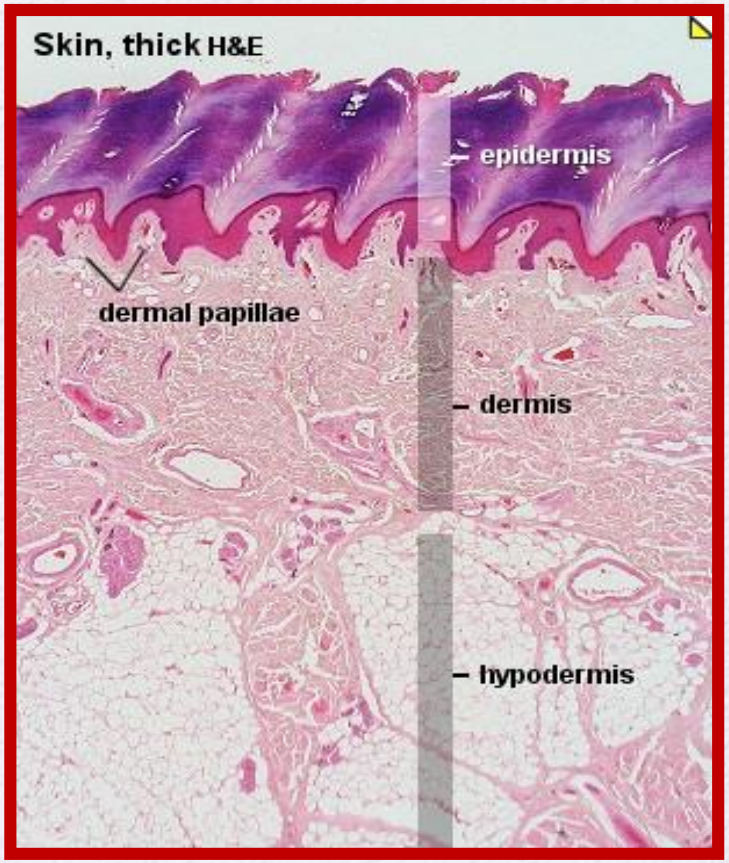
Produce the above elements.



Skin Structure

Function of dermis:

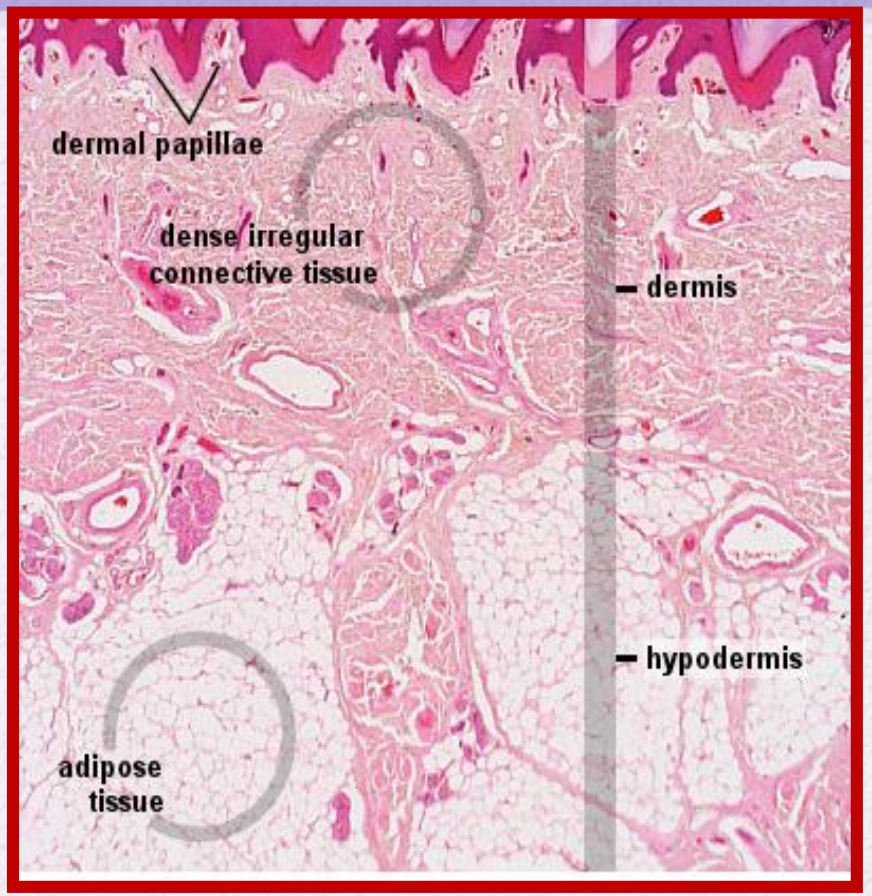
- It provides nourishment to the epidermis and interact with it during wound repair.
- It gives the skin its strength, elasticity, and softness.



Skin structure

Subcutaneous Fat:

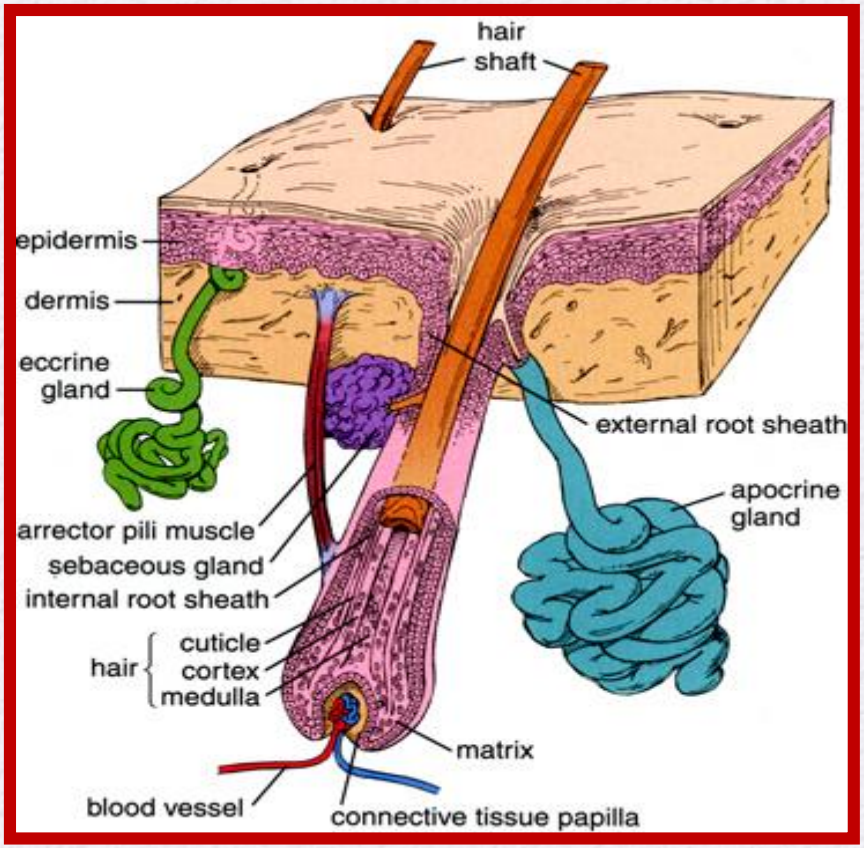
- lies below the dermis.
- Attach the skin to underlying bone and muscle as well as supplying it with blood vessels and nerves.
- The main cell types are fibroblasts, macrophages and adipocytes .



Skin Structure

Skin Appendages: include

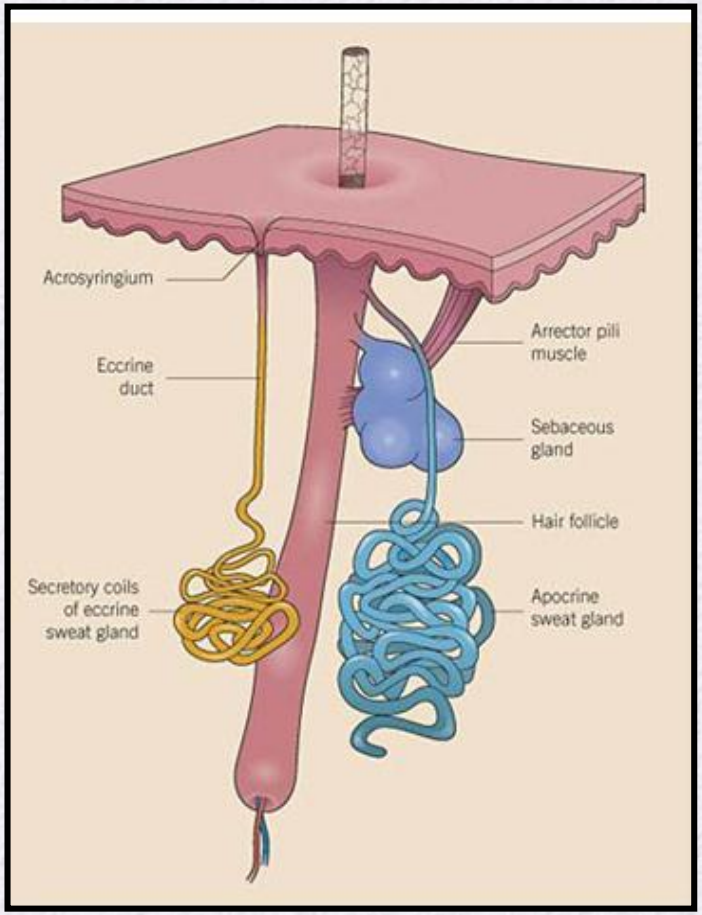
- Eccrine/ apocrine sweat glands.
- Sebaceous glands.
- Hair Follicles.
- Nails



Skin appendages

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 ; nail beds ; labia minora and glans.
- Abundant in palms and soles.



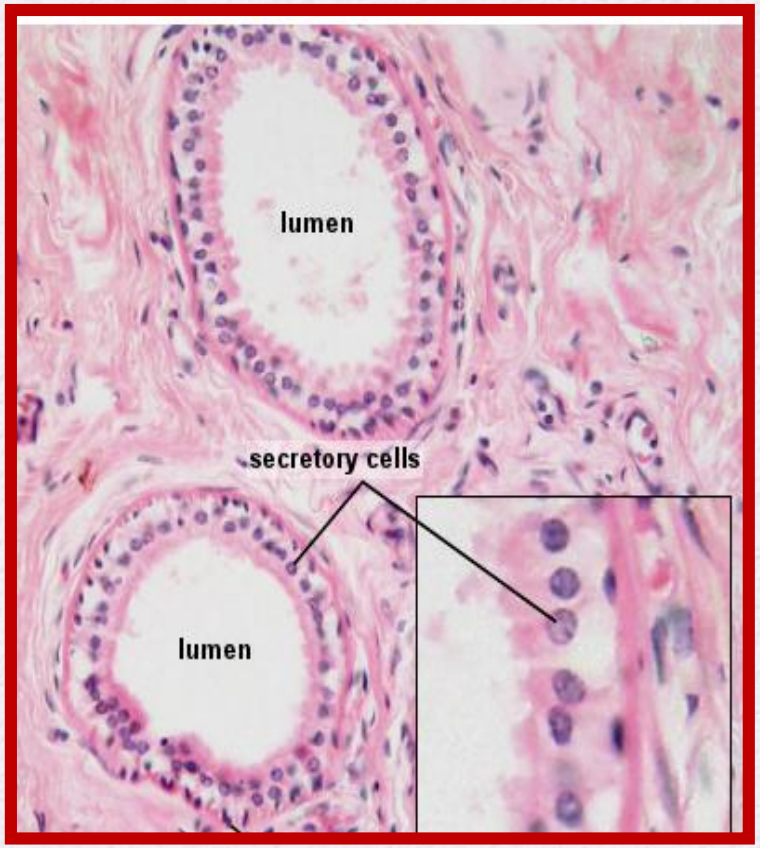
Skin appendages

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.

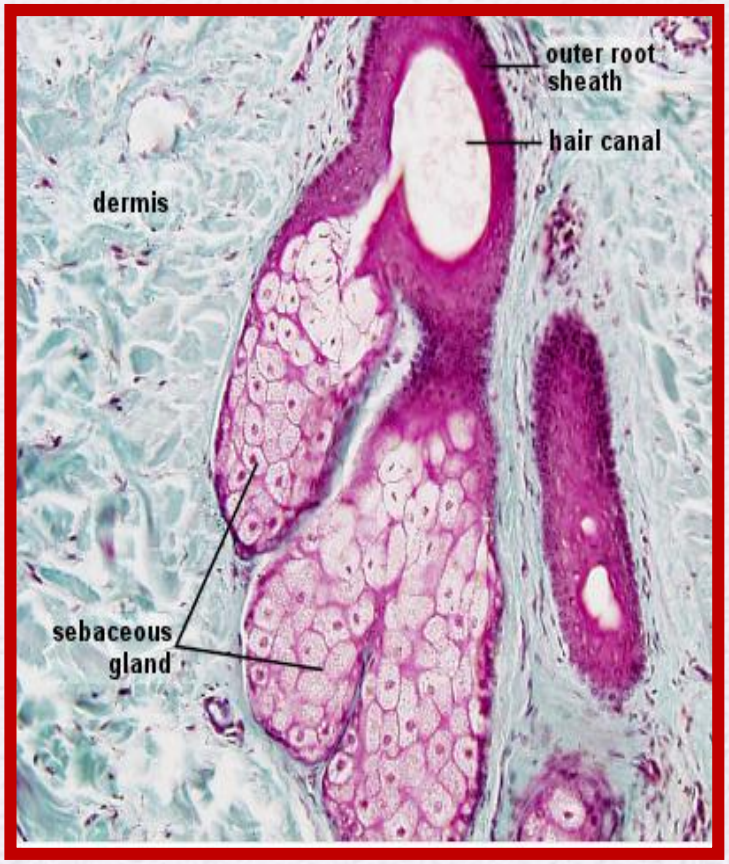
- Under adrenergic stimuli.



Skin appendages

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.



Skin Appendages

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

Skin appendages

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 midportion of the distal Phalanx.

Skin appendages

- Fingernails grow 3mm/month.
- Toenails grow 1mm/month.
- Nails can be affected in systemic and skin diseases

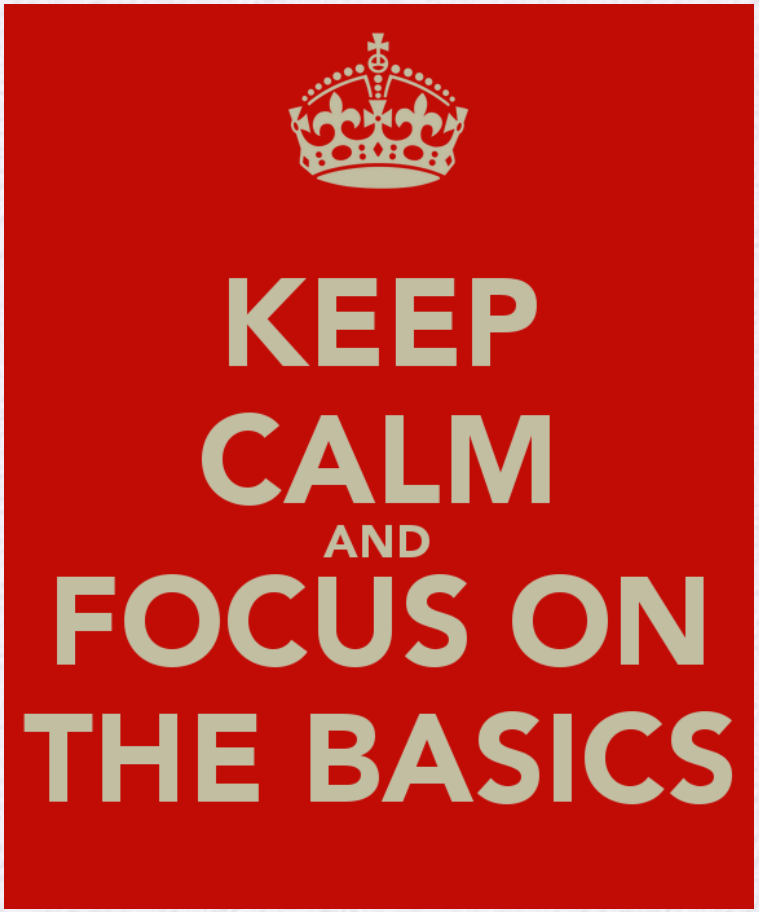
Lecture Outlines

- Function , Structure of the skin.
- Approach to dermatology patient.
- Descriptive Terms and morphology of skin lesions.
- Important signs and Investigations.
- Topical therapy.

Approach to Dermatology Patient

Step 1: Start with basics

- Age
- Race
- Sex
- Occupation



Approach to Dermatology Patient

Step 2 : History of skin lesion

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

Approach to dermatology patient

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

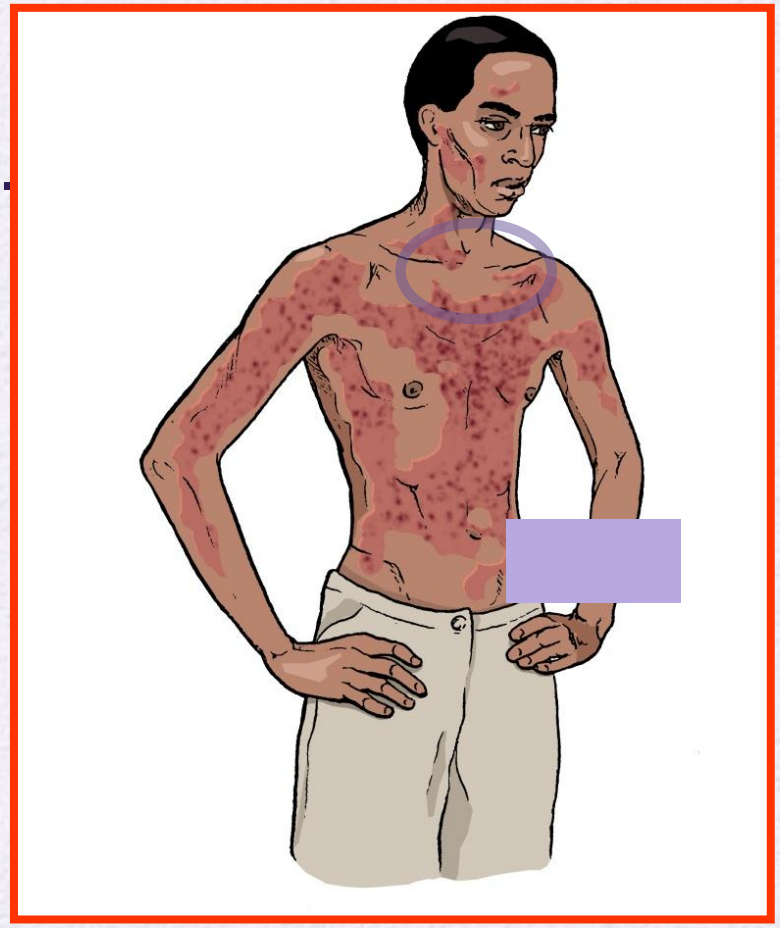
Examination

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

Examination

Describe..

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



Examination

Palpation:

- Look for consistency, mobility, depth and tenderness.

Distribution

Generalized :can be

- Symmetrical:

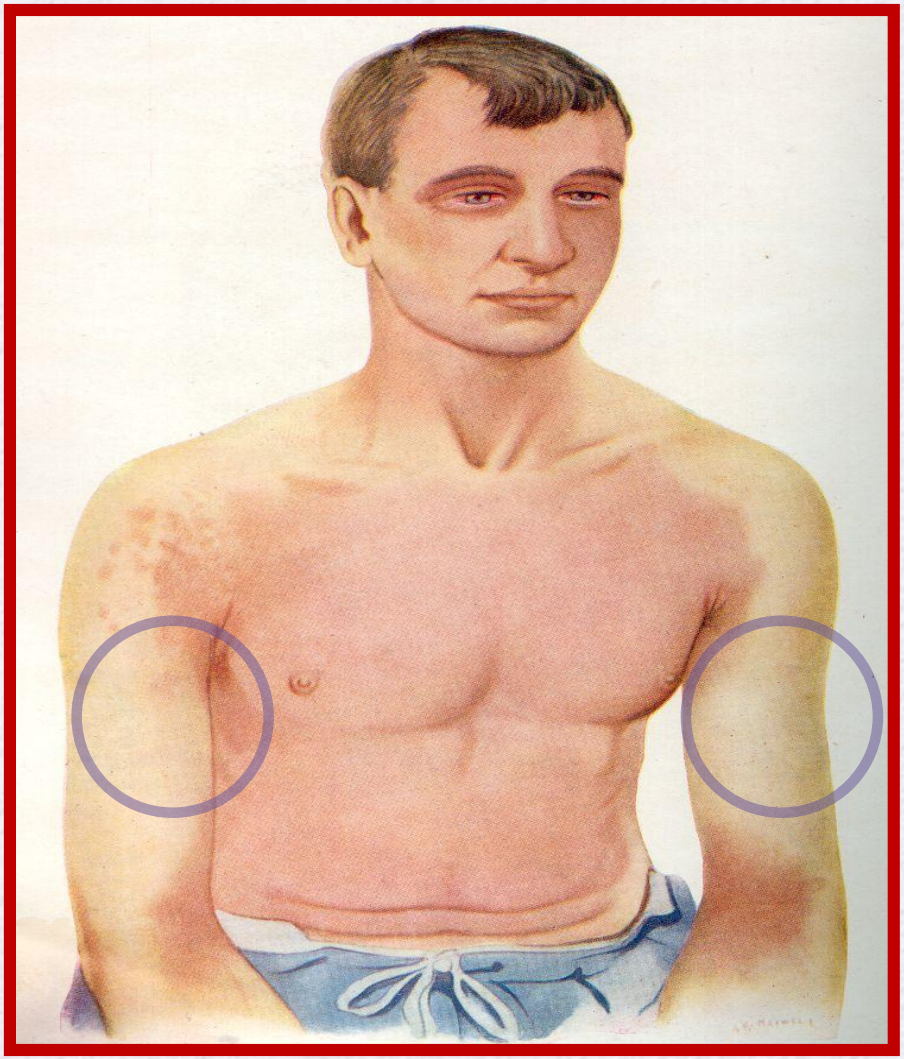
1.Universal (head to toe).

2.Bilateral.

- Asymmetrical:

1.Diffuse.

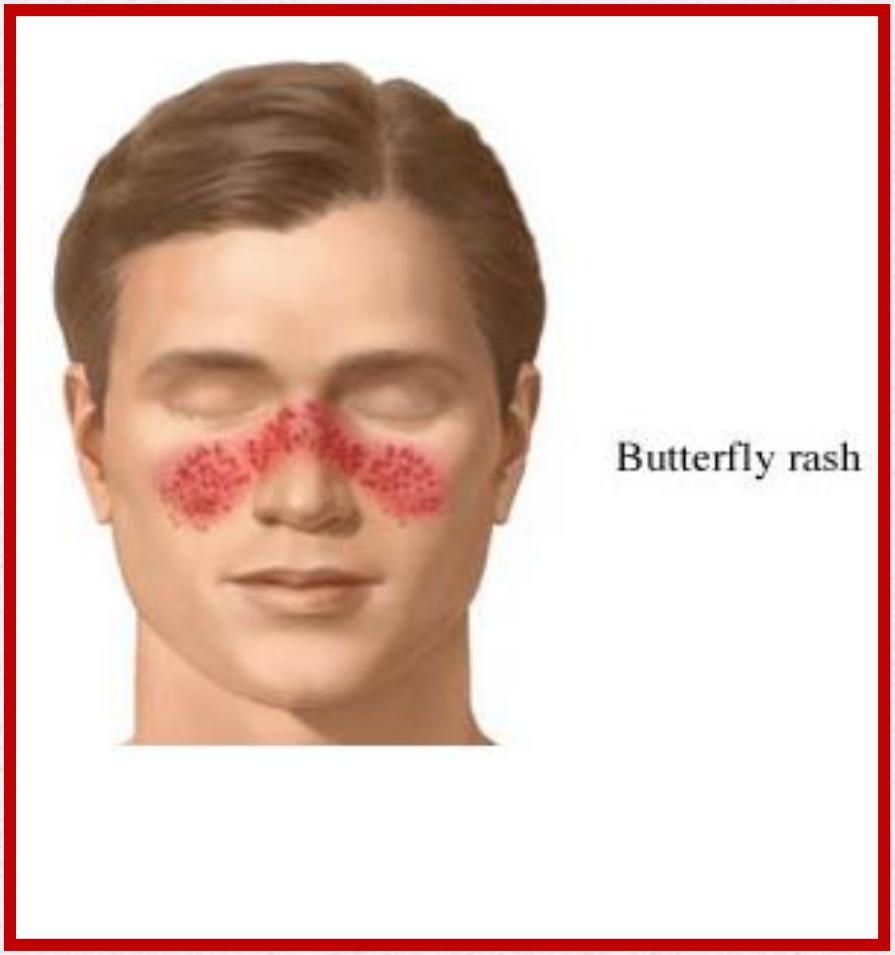
2.Unilateral.



Distribution

Localized:

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



Lecture outlines

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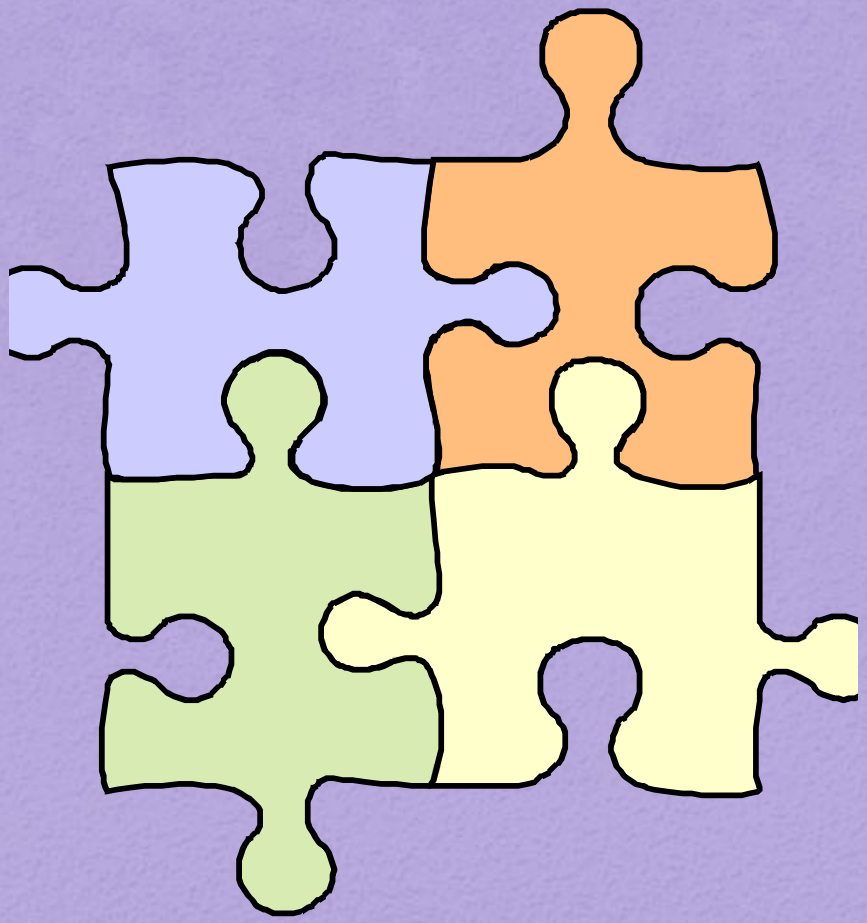
Descriptive Terms (Arrangement)



Descriptive Terms

Photodistribution:

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

Descriptive Terms

Linear:

- Forms a line .

Descriptive Terms

Dermatomal:

- Occurring within the distribution of nerve.

Descriptive Terms

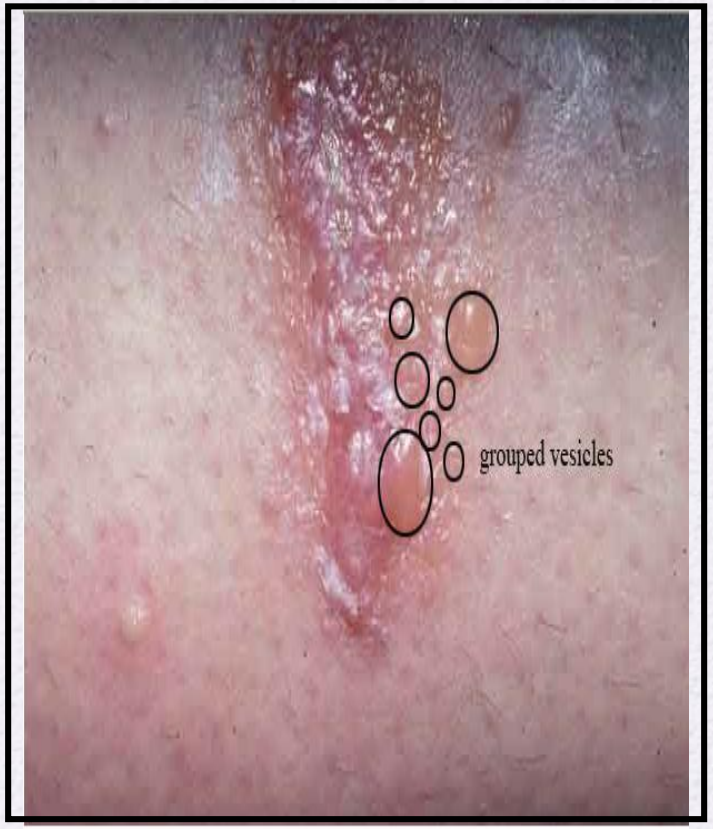
Annular:

- Ring like .

Descriptive Terms

Herpitiform/Grouped:

- Lesions grouped in a manner similar to herpes simplex lesions



Descriptive Terms

Reticular:

- Net like .

Descriptive Terms

Verrucous, warty, papillomatous:

- Surface consisting of finger like projections.

Descriptive Terms

Nummular/discoid:

- coin like lesions.

Descriptive Terms

Guttate:

- Drop like, “en gouttes”.

Descriptive Terms

Targetoid:

- Round lesions with concentric border and a dark center.
- Iris like.

Descriptive Terms

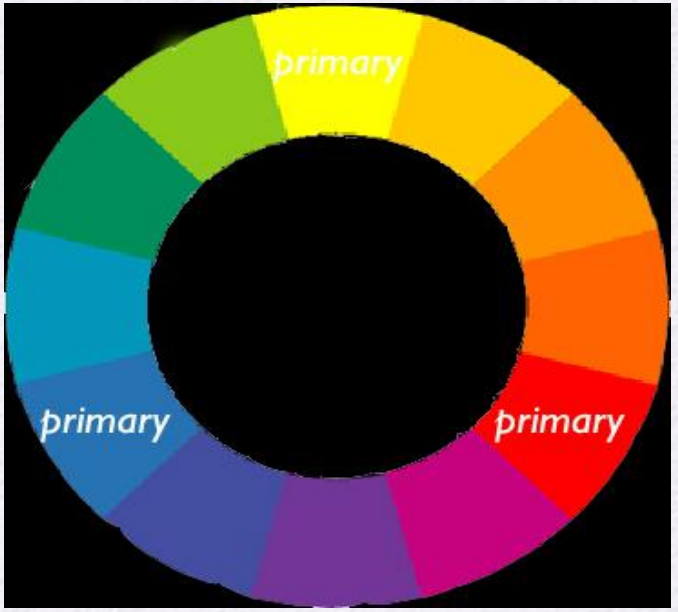
Umbilication:

- Round depression in the center.

Morphology

Skin lesions are divided into:

- Primary =Basic lesion.
- Secondary= Develop during evolution of skin disease or created by scratching or infection



Morphology

- Primary lesions
  - Macule/patch
  - Papule/plaque
  - Nodule
  - Cyst
  - Wheal
- Secondary lesions

Morphology

- Primary lesions
- Vesicle/bulla
- Pustule
- Purpura

- Secondary lesions
- Excoriation
- Erosion
- Scale
- Fissure
- Ulcer

Primary Skin Lesions

Macule :

- A flat circumscribed area of altered skin color less than 1 cm in size.
- Lacks surface elevation or depression.

Primary lesions

Patch:

- Flat circumscribed skin discoloration;
- More than 1cm.

Primary Skin Lesions

Papule :

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

Primary Skin Lesion

Plaque:

- Elevated, solid confluence or expansion of papules .
- > 0.5cm in diametern(lacks a deep component).

Primary Skin Lesions

Nodule:

- Elevated, Solid lesion.
- > 0.5 cm in diameter; with deep component.

Primary Skin Lesions

Cyst:

- Closed sac-like lesion that contain liquid or semi-solid substance.
- Usually soft and has depth.

Primary Skin Lesions

Vesicle:

- Elevation that contains clear fluid < 0.5cm in diameter.

Bulla:

- Localized fluid collection. >0.5cm in diameter (large vesicle).

Primary Skin Lesions

Purpura:

- Extra-vasation of red blood cells giving non- blanchable erythema.

Primary Skin Lesion

Wheal:

- A transient, edematous slightly raised lesion, characteristically with a pale center and a pink margin.

Primary Skin Lesions

Pustule:

- Elevation that contains purulent material.

Secondary Skin Lesions

Scale:

- Thick stratum cornium

Secondary Skin Lesion

Crust:

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

Secondary Skin Lesions

Erosion:

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

Secondary Skin Lesions

Excoriation:

- Linear erosion induced by scratching.

Secondary Skin Lesions

Fissure :

- Vertical loss of epidermis and dermis with sharply defined walls, (crack in skin).

Secondary Skin Lesion

Ulcer:

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

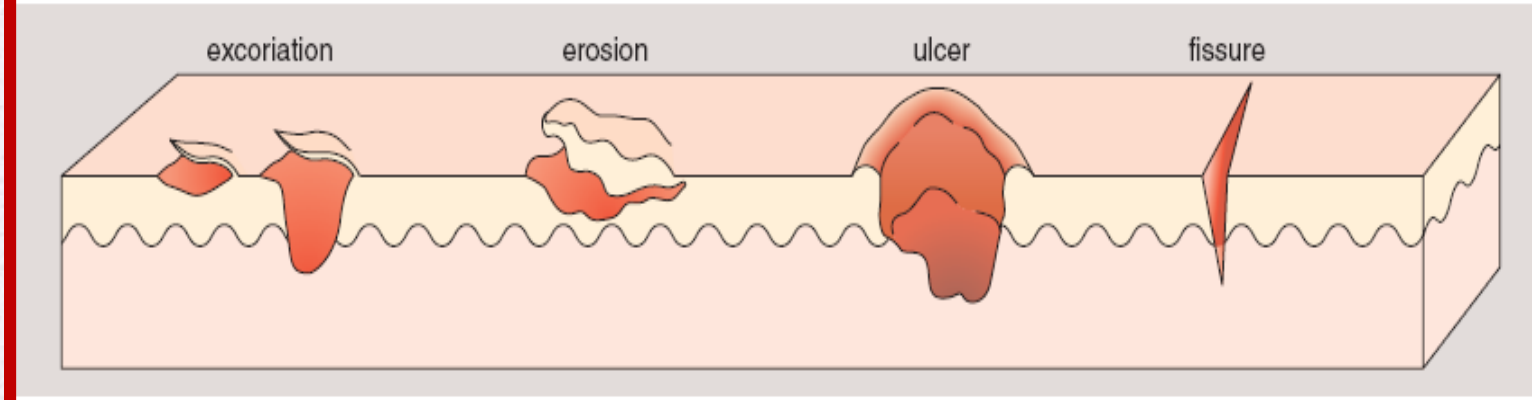


Fig. 4.24 Excoriation, erosion, ulcer and fissure.

Secondary Skin Lesions

Scar:

- A collection of new connective tissue.
- May be Hypertrophic or Atrophic.
- Implies dermoepidermal damage.

Secondary Skin Lesions

Lichenification:

- Increased skin markings secondary to scratching.

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Important Sign in Dermatology

NIKOLSKY SIGN:

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

Important Signs in Dermatology

AUSPITZ SIGN:

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

Important Sign in Dermatology

Koebner's phenomenon:

Trauma to the skin re- produce certain diseases like:

- Psoriasis
- Vitiligo
- Lichen planus.
- Warts.

Important Signs in Dermatology

DERMATOGRAPHISM:

- Firm stroking of the skin produce erythema and wheal.
- Seen in physical urticaria.
- In patient with atopy, stroking produces white dermatographism ratherthan red.

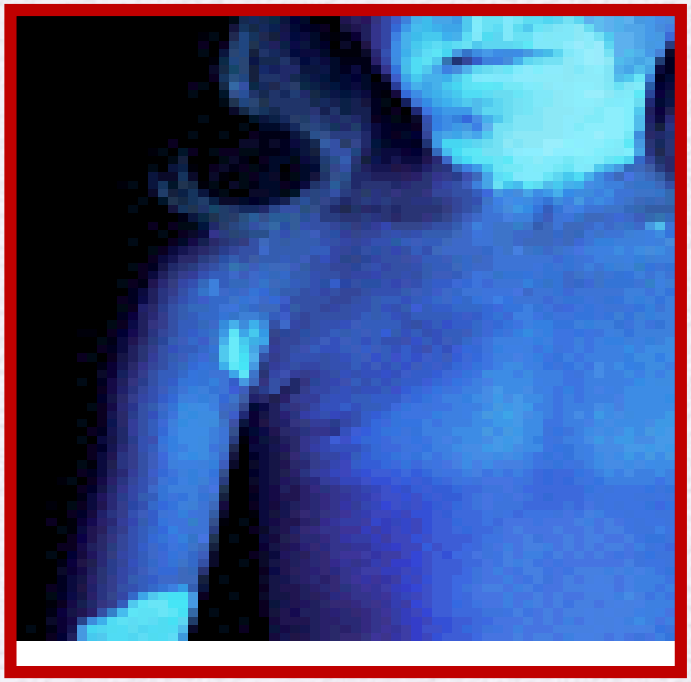
Investigations

Wood's lamp:

Produces long wave UVL (360 nm)

Useful in:

- Tinea Versicolor-yellowish green flourescence.
- Tinea Capitis -yellow green flourescence in M.canis, M. andouini.
- Vitiligo - Milky white.
- Erythrasma –coral red flourescence.
- Melasma becomes more intensefied.



Investigation

KOH preparation for fungus:

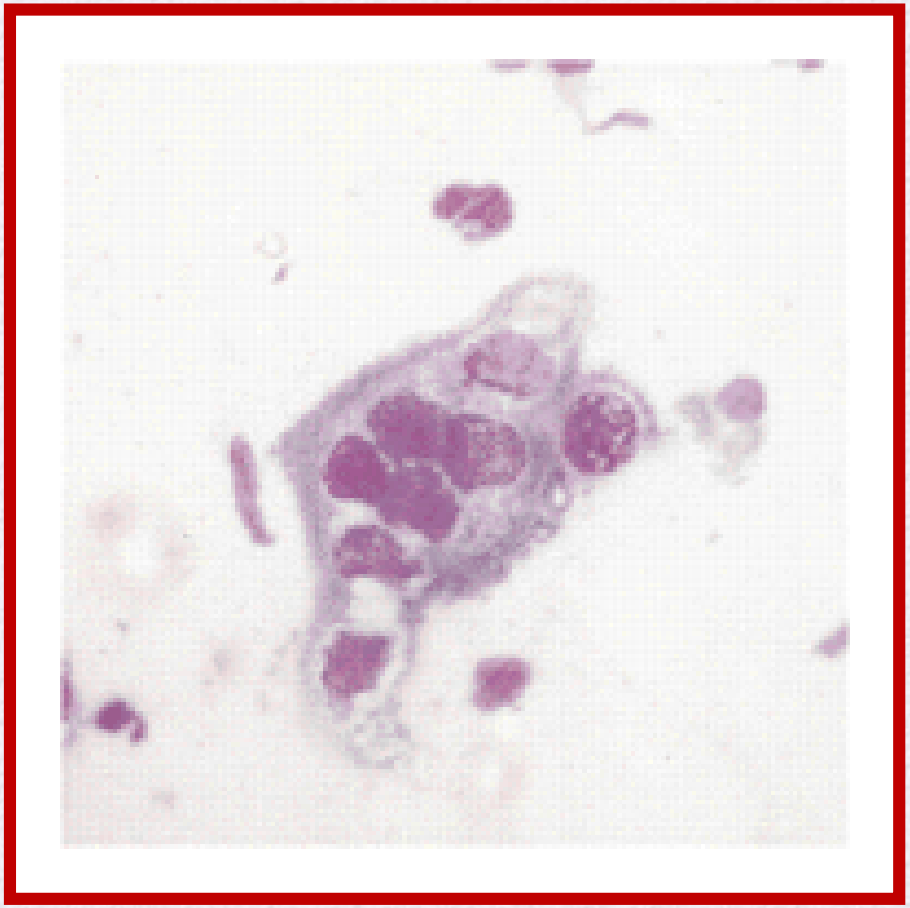
- Cleanse skin with alcohol Swab.
- Scrape skin with edge of microscope slide onto a second microscope slide.
- Put on a drop of 10% KOH.
- Apply a cover slip and warm gently.
- Examine with microscope.

Investigation

Tzank smear :

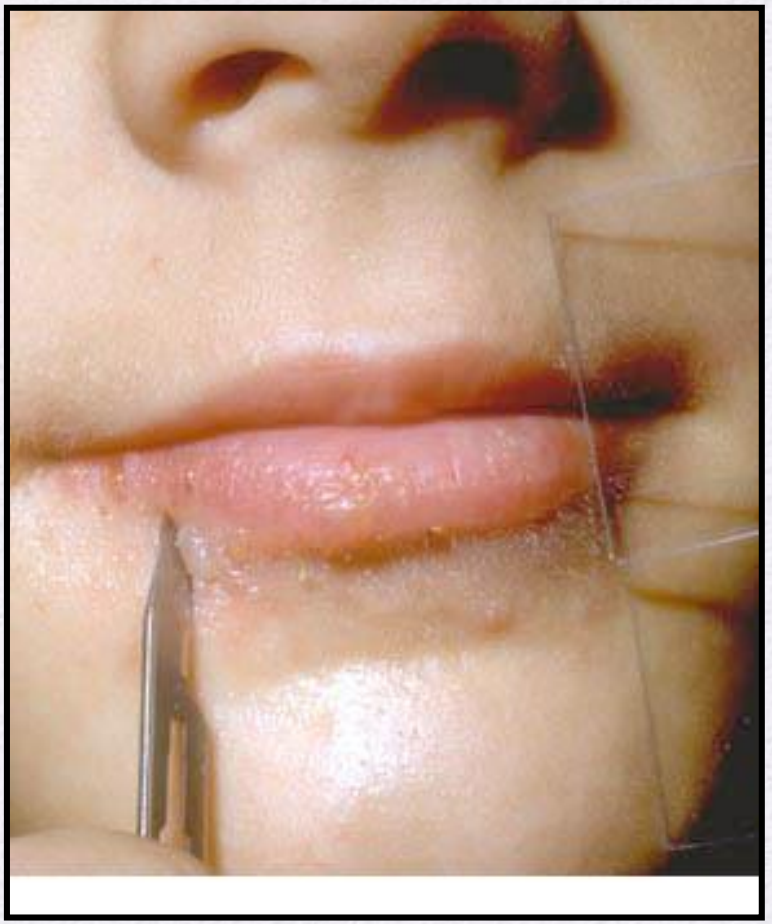
Important in diagnosing:

- Herpes simplex or VZV (multinucleated giant cells).
- Pemphigus Vulgaris (acantholytic cells).



Tzank smear

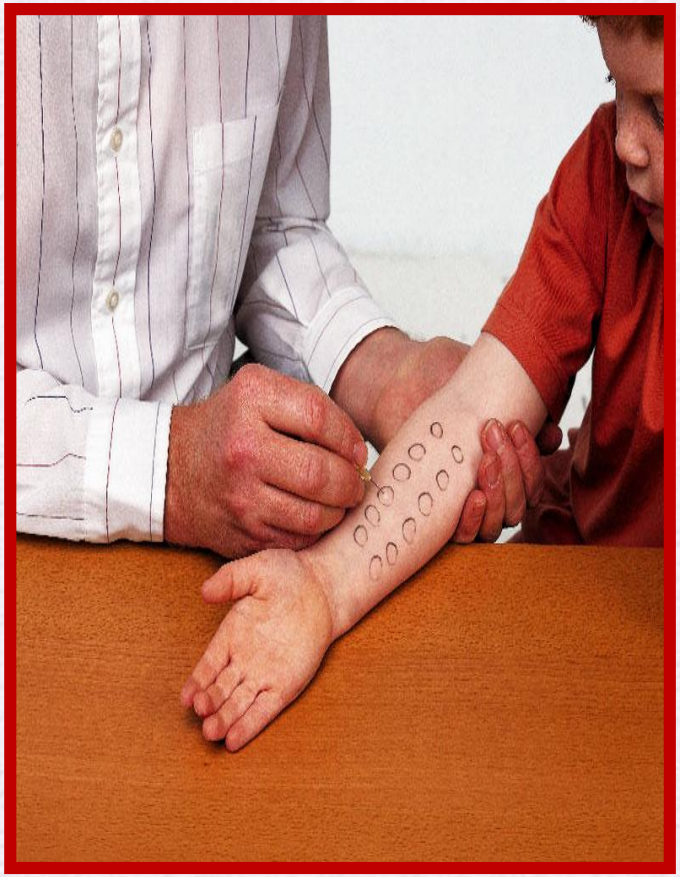
- Select a fresh vesicle.
- De-roof and scrape base of the vesicle.
- Smear onto a slide.
- Fix with 95% alcohol.
- Stain with Giemsa stain.
- Examine under microscope.



Investigation

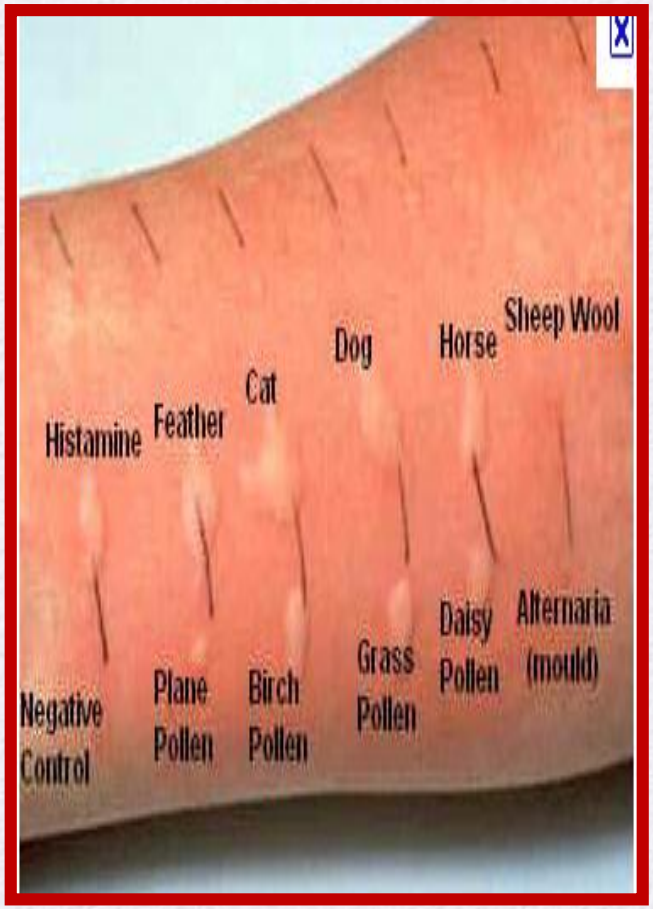
Prick test :

- Primary method for the diagnosis of IgE mediated allergies in most allergic diseases.
- Useful in the diagnosis of hay fever allergy, food allergy, latex allergy, drug allergy and bee and wasp venom allergy.



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 , the reaction is recorded.
- Positive test shows urticarial reaction at site of prick.
- Emergency therapeutic measures should be available in case of anaphylaxis.



Investigations

PATCH SKIN TEST:

- Useful diagnostic test for patients with allergic contact dermatitis.
- Select the most probable substance causing dermatitis.
- Apply the test material over the back.

PATCH SKIN TEST

- Read after 48 & 72 hr.
- Positive patch test showing erythema and edema.
- In severe positive reaction vesicles may be seen.

Investigation

SKIN PUNCH BIOPSY:

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

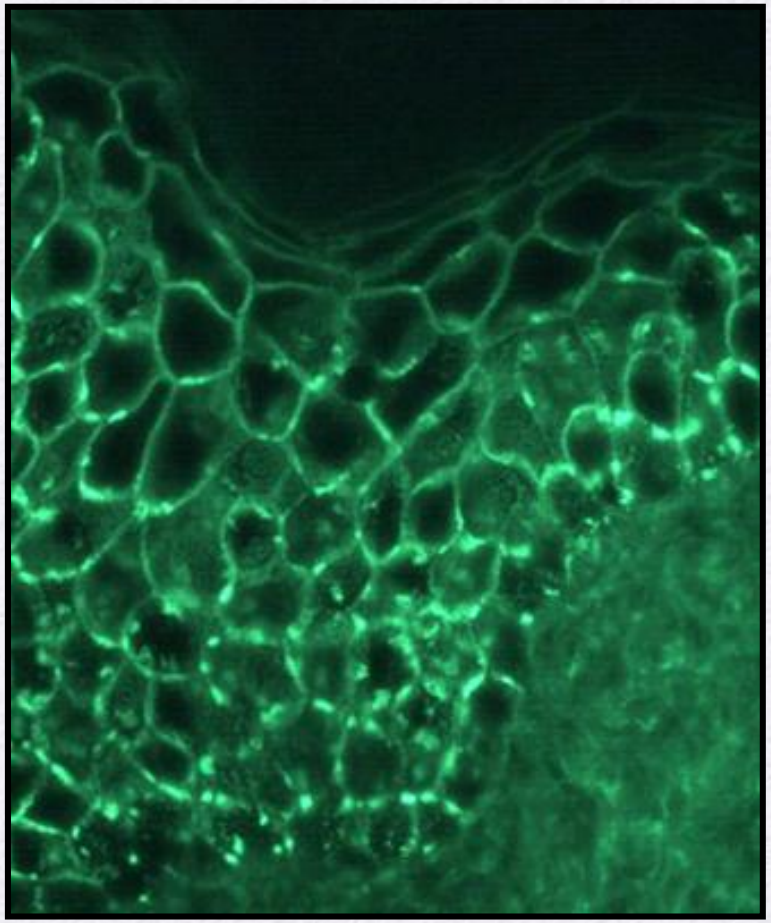
SKIN PUNCH BIOPSY:

- Lift specimen and cut at base of lesion.
- Fix in 10% formalin
- For Immunoflourescence put in normal saline.
- Suture if 4 or 5 mm is used.

Investigations

Direct immunoflouresence DIF:

- 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



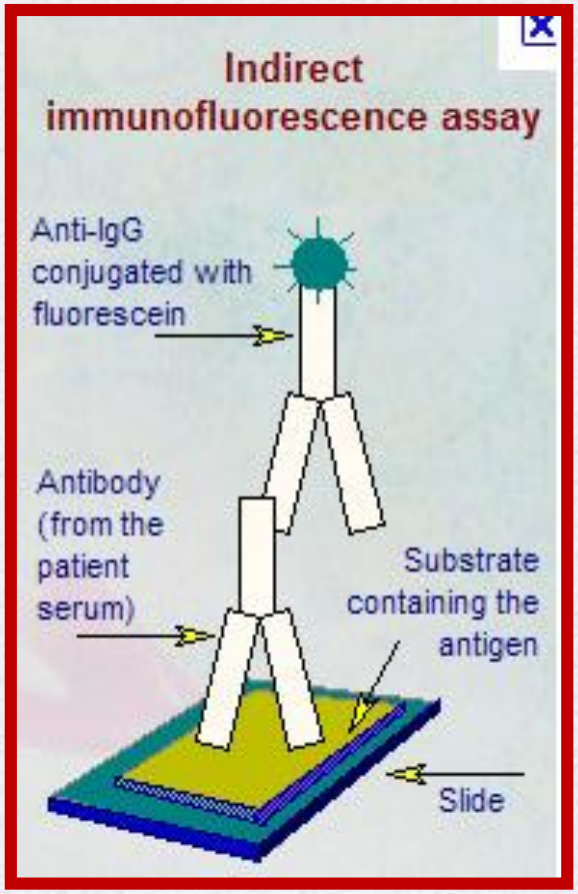
Investigations

Indirect ImmunoFluorescence : IDIF

- Detect auto antibodies in the serum.

It is used:

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



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Topical Therapy

- A wide variety of topical agents are available.
- Delivers the drug to target site.

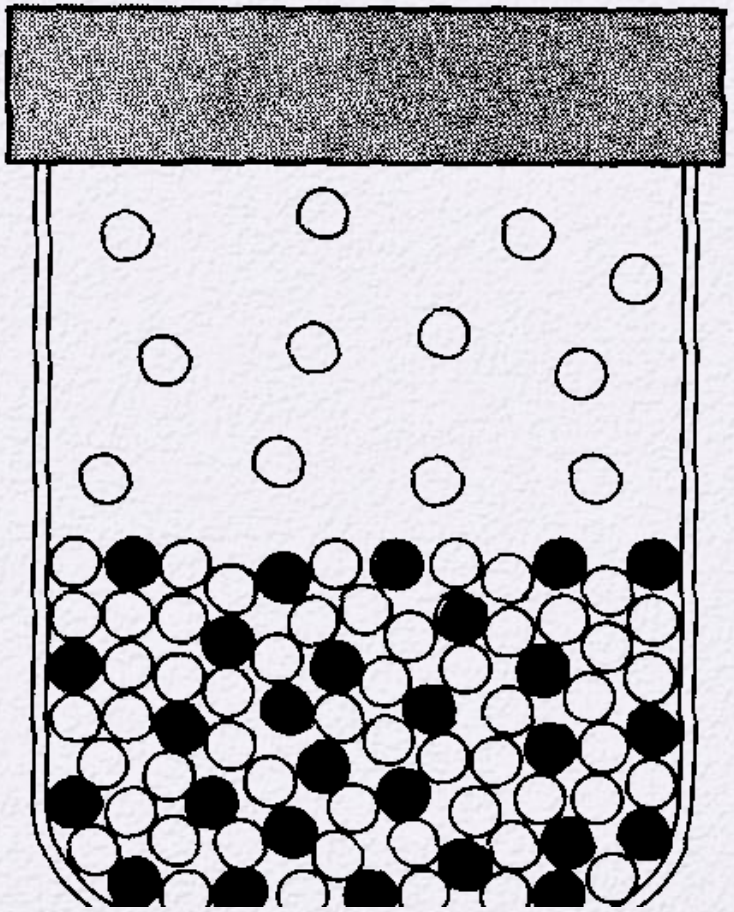
<u>Golden rule:</u>

- IF the lesion is dry -wet it
- iF wet -dry it.

Topical Therapy

Topical drugs consist of:

- Active substance: like steroids, antimicrobial agents.
- Vehicle: Is the base in which the active ingredient is dispersed.



Topical therapy

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).

Topical therapy

Guidelines regarding steroid use:

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

Topical Therapy

- **Cream** is 50 % oil and 50 % water.
- creams are useful in wet lesions.
- They are white in color.

Topical Therapy

- **Ointment** is 80 % oil and 20 % water.
- Ointments are useful in dry lesions.
- They are translucent.

Topical Therapy

- **Gels** are mixtures of propylene glycol and water.
- Sometimes they contain alcohol.
- They are translucent.
- used in wet lesions and hairy regions.

How much to use?

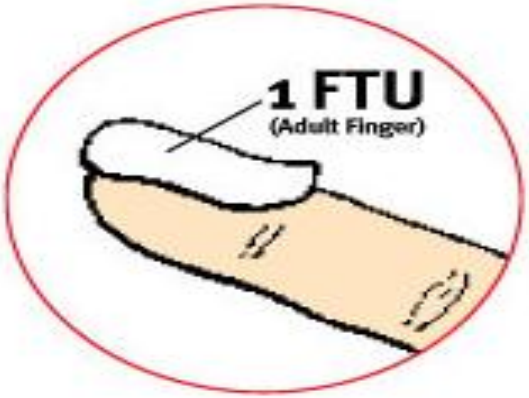
Finger tip unit:

- The amount of cream/ointment expressed from 5mm nozzle.
- It weighs 0.5g.
- It covers 2 hand units.

Finger Tip Unit

The fingertip unit method*

FTU = Fingertip unit(adult)
1 FTU = 1/2 g of cream or ointment.
Measurementbased on 5mm nozzle.



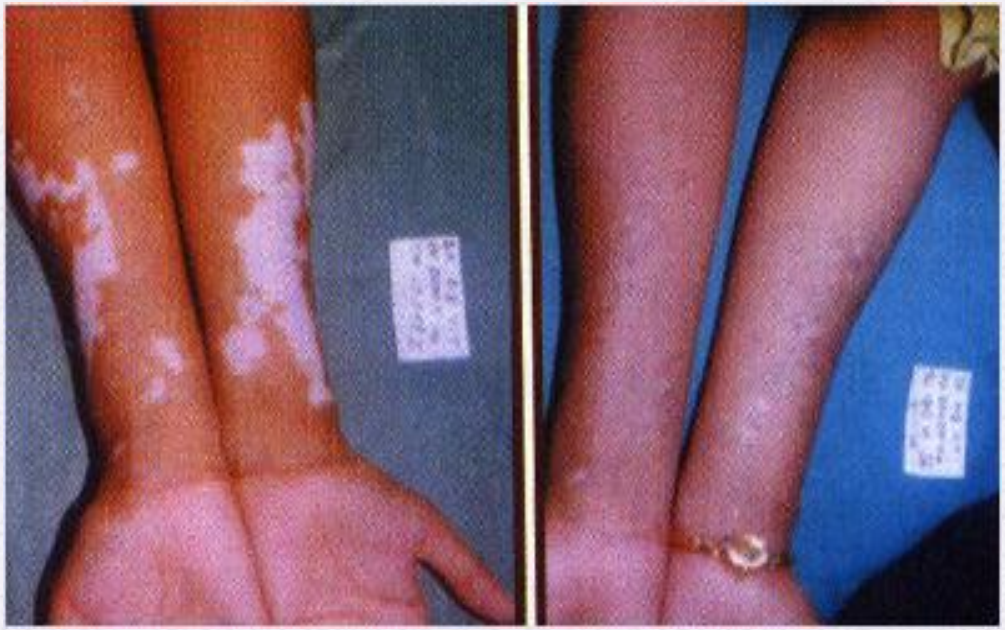
FACE & NECK	ARM & HAND	LEG & FOOT	TRUNK (front)	TRUNK (back inc buttocks)	
1	1	1½	1	1½	3-6 months
1½	1½	2	2	3	1-2 years
1½	2	3	3	3½	3-5 years
2	2½	4½	3½	5	6-10 years

FACE & NECK	ONE ARM	ONE HAND	ONE LEG	ONE FOOT	TRUNK (front)	TRUNK (back)	
2½	3	1	6	2	7	7	Adult

Other therapeutic modalities

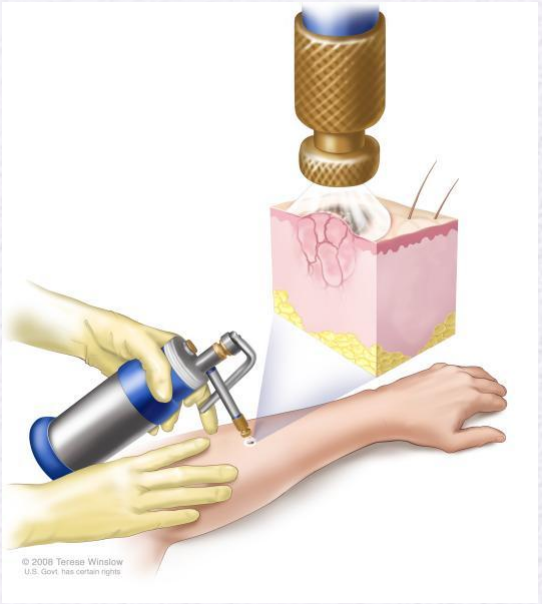
Phototherapy machine/NBUVB

Hand and feet narrow band UVB



Vitiligo treated by NBUVB

Other indications include psoriasis lichen planus and atopic dermatitis.



- Liquid nitrogen gun (Cryotherapy).
- Used to treat warts.

THANK YOU