MED437
KING SAUD UNIVERSITY

DERMATOLOGY 437

1,2-Introduction to Dermatology Part 1&2 (Skin Structure & Dermatological Language)

Objectives:

1. Function , Structure of the skin
2. How to approach a Dermatology patient
3. Descriptive Terms used in dermatology
4. Morphology of skin lesions
5. Reaction patterns
6. Treatment used in Dermatology

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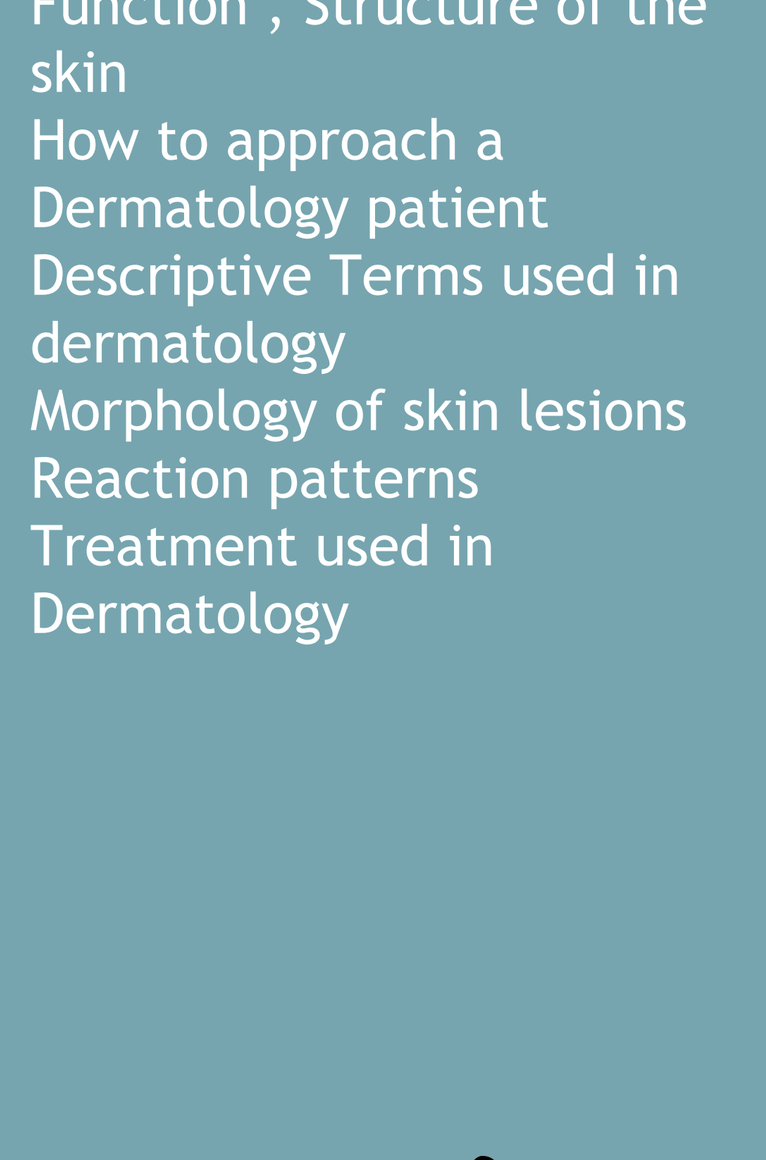
References: Doctor slides, Team 436, Amboss

Color Index:

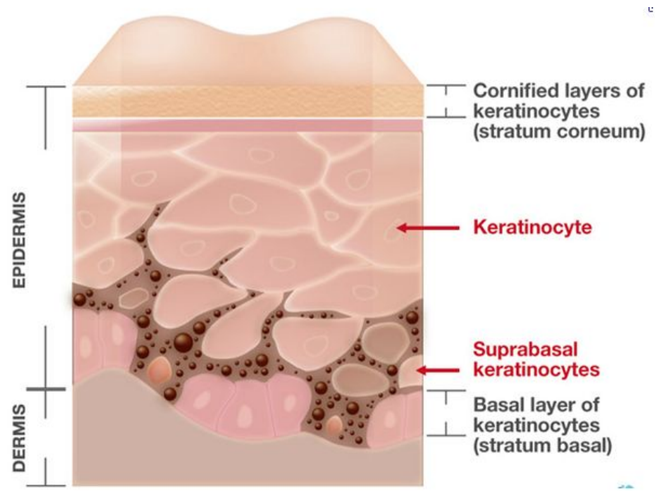
Important Doctor's Notes Book Extra

Editing File



The Skin:

- The skin is the largest and heaviest organ of the body,
- It has a body surface area of 1.5 - 2 m^2 and it contributes to 1/6 to 1/7 of body weight.
- 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.
- Skin diseases are common.
- Skin lesions maybe the presenting feature of an underlying systemic diseases.
- Skin disease can have serious psychosocial effects
- The skin is associated with RA , SLE , Dermatomyositis , Ankylosing spondylitis , Scleroderma .



Skin function:

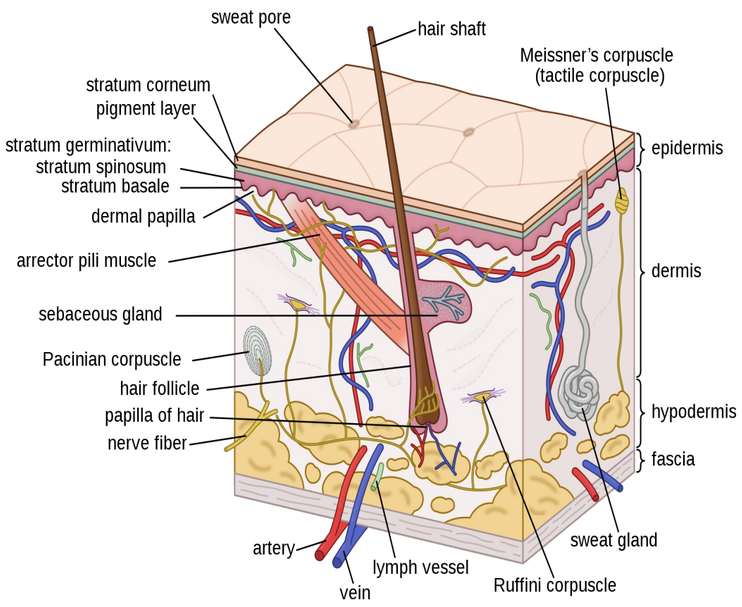
- **Immune:**
  - Barrier to harmful exogenous substance & pathogens
    - Chemical, antimicrobial, heat and radiation damage.
  - Langerhans cells in the skin are part of the adaptive immune system.

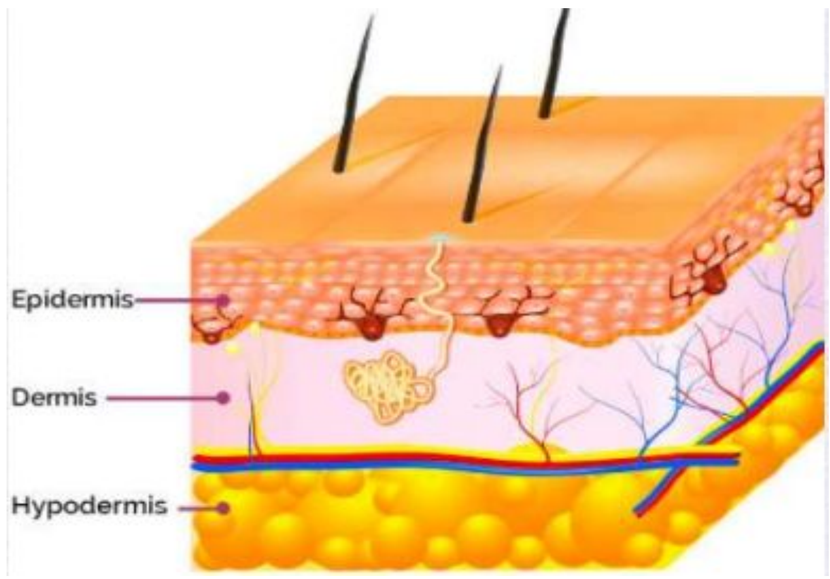
- **Metabolic & endocrine:**
  - Prevents loss of water & proteins, Vitamin D production by absorbing UVB.
  - Storage of fat in the hypodermis contain 50% of fat (subcutaneous tissue)

- **Sensation:**
  - 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
  - Regulates body temperature through the sweat glands, constriction or dilation of blood vessels by the autonomic nervous system.

- **Cosmetic Importance** such as hair, nails





Skin Structure:

The skin is consist of :

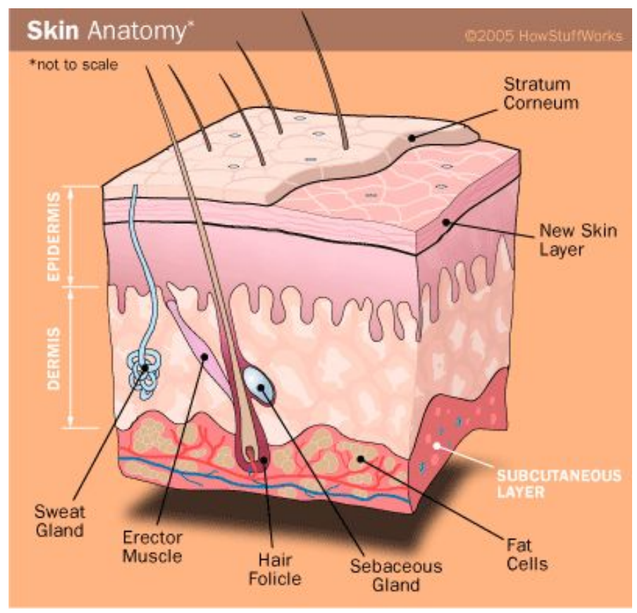
1- Epidermis

2- Basement membrane (separates the dermis from the epidermis and can be targeted in blistering diseases like SLE and connective tissue diseases)

3- Dermis (papillary and reticular)

4- Subcutaneous tissue (Hypodermis)

5- Skin appendage: (hair follicles, nail, sweat (eccrine + apocrine) & sebaceous glands)



1) Epidermis **Epi** coming from the Greek meaning **over**

- The outermost layer of the skin
- Composed primarily of keratinocytes and other cells like:
- Melanocytes, Langerhans cells(part of the immune system)).
- There are No blood vessels (cells receive nutrients via diffusion from capillaries in dermis)
- The thickness is site-specific (from 0.03 mm on the eyelids to 1.5mm on the soles of the feet)

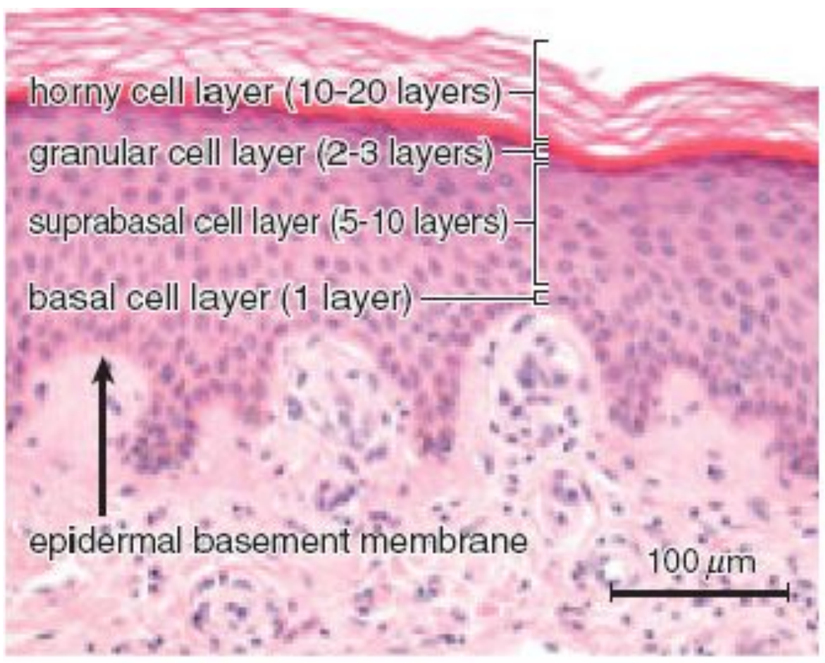
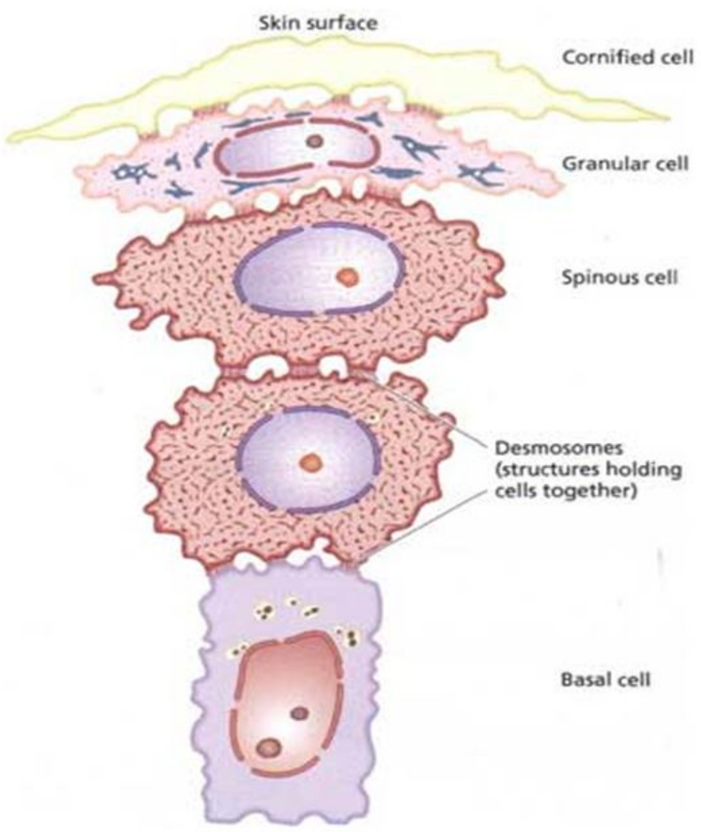
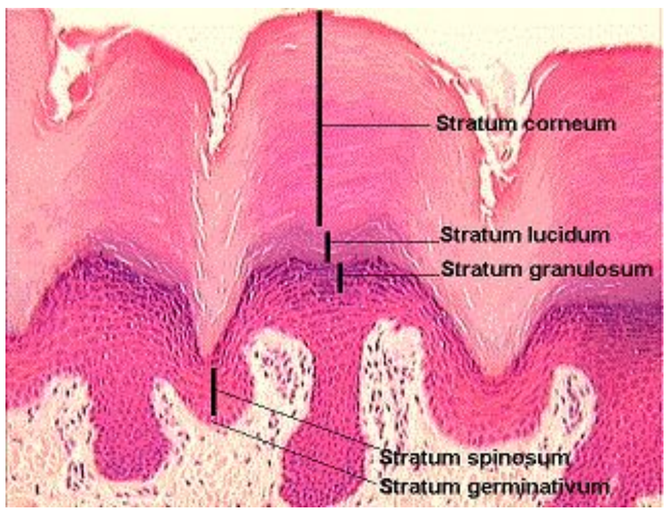


Fig. 1.4 The four layers of the epidermis

- **Composed of four layers:** (There is an additional fifth layer "Stratum lucidum" in the palms and soles)



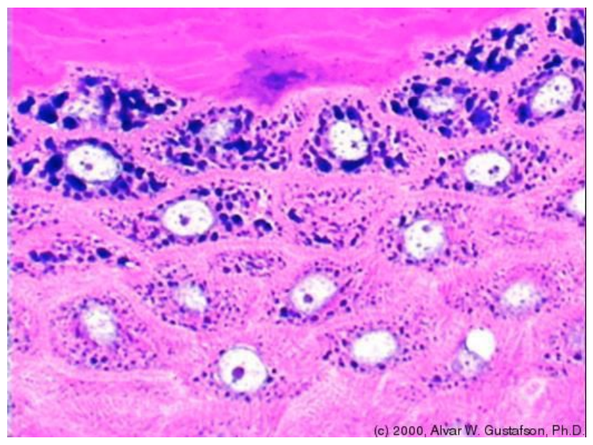
1. **Stratum corneum** (cornified horny cell layer) "Outermost"
   - The outermost layer of the epidermis.
   - Composed of elongated and flattened dead cells **with no nuclei or organelles** called 'corneocytes' (dead cells).
     - In diseases like psoriasis keratinocytes divides rapidly and the cells go up very fast that the nucleus get retained. So you will see nuclei in the stratum corneum (Parakeratosis).
   - The cells have a thick envelope that resist external chemicals.
   - 25 cell layers which is constantly being sloughed off



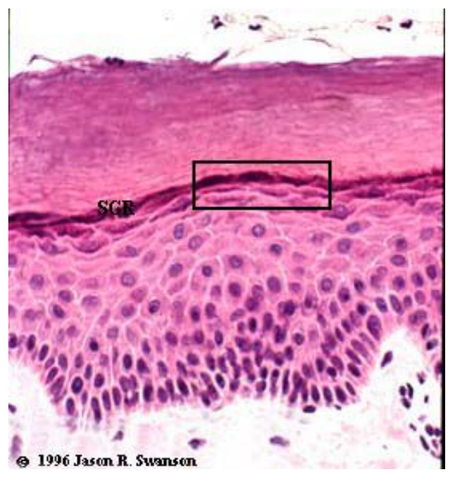
2. **Stratum lucidum**
   - Found only in thick skin of the palms and soles below the stratum corneum. Not always present. It is between granulosa and corneum.

1) Epidermis

3. Stratum granulosum (granular cell layer)

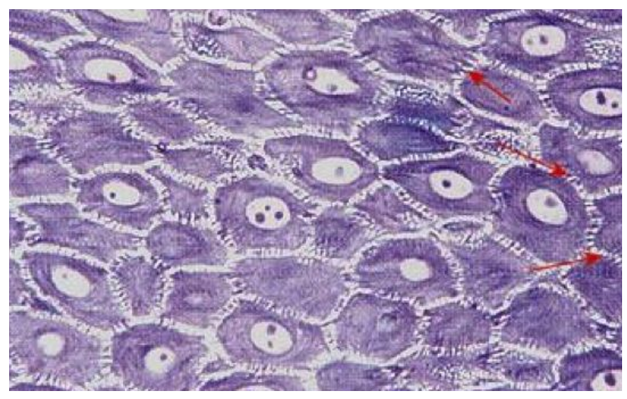


- Flat cells containing keratohyalin **granules** in the Cytoplasm
  - (responsible for the colour of the cells, making it the darkest layer) looks purple or violet
- Diamond shaped cells
- The thickness of this layer is **proportional** to that of the <u>stratum corneum</u> thicker in palms and soles than in the face because the stratum corneum is thicker there.
- In thin skin it is 1-3 cell layers and 10 cell layers in thick skin like palms and soles.
- Has a waterproof properties



4. Stratum spinosum (spinous cell layer)

- Actively dividing keratocytes
- Called Spinous because of desmosomes and keratin filaments that gives the cells a spiny appearance
- **Desmosomes:**
  - Complex modification of the cell membrane that adhere Keratinocytes to each other in this layer.
  - Appear like spines "prickle cells"
  - Targeted by certain autoimmune disorders causing loss of attachment leading to blistering diseases



- Langerhan cells
  - antigen presenting cells (MHC II) present in abundance in this layer.
    - Bone marrow derived (skin immune function/adaptive immunity)
    - Can be identified through birbeck granules.
    - Abnormal proliferation of these cells is seen in Langerhans cell histiocytosis

5. Stratum basalis (basal cell layer) "Innermost"

- Columnar or cuboidal dividing cells that are in contact with the basement membrane
- This layer rests on the basement membrane
- Stem cells of the epidermis divides continuously and moves upwards takes 28 days to transmit cells from this layer to stratum corneum
- **Melanocytes:**
  - Dendritic cells lying between basal cells in a ratio of 1:10 for every 10 keratinocytes, there is ONE melanocyte.
  - They synthesize **melanin** stored in **melanosomes** "pigment granules"
  - Scattered among the keratinocytes.
  - Produce melanin which is responsible for skin color and protection against UV light and can also be found in the hair bulb, eye and brain.

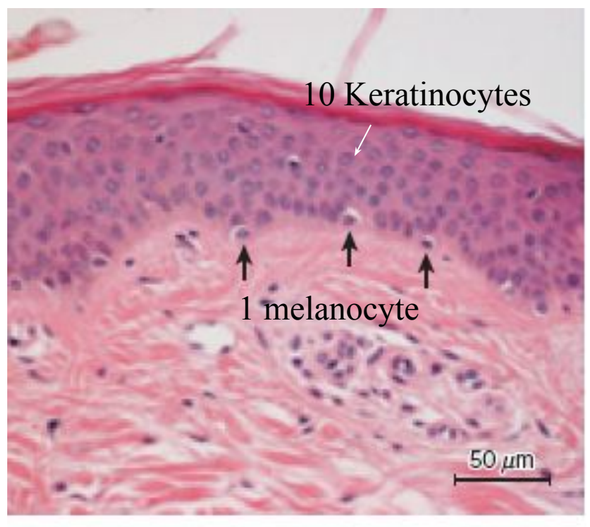
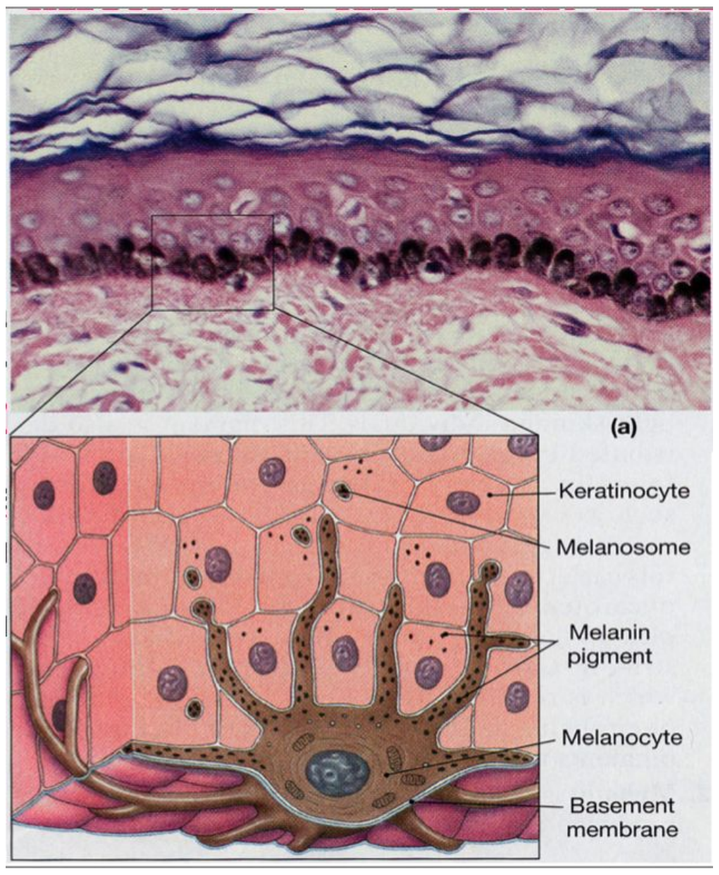


Fig. 1.17 Melanocytes.

1) Epidermis

5. Stratum basalis Cont:

- **Melanosomes:**
  - Transferred to adjacent cells (keratinocytes) by means of dendrites thus forming the epidermal melanin unit (the melanin melanosomes unit) includes melanosomes, melanocytes and keratinocytes
  - Serve as the packaging of melanin pigment.
  - The size of **melanosomes** and packaging differentiate white from dark skin,
- The NUMBER of **melanocytes** are EQUAL in white and dark skin "The difference is in the melanosomes"



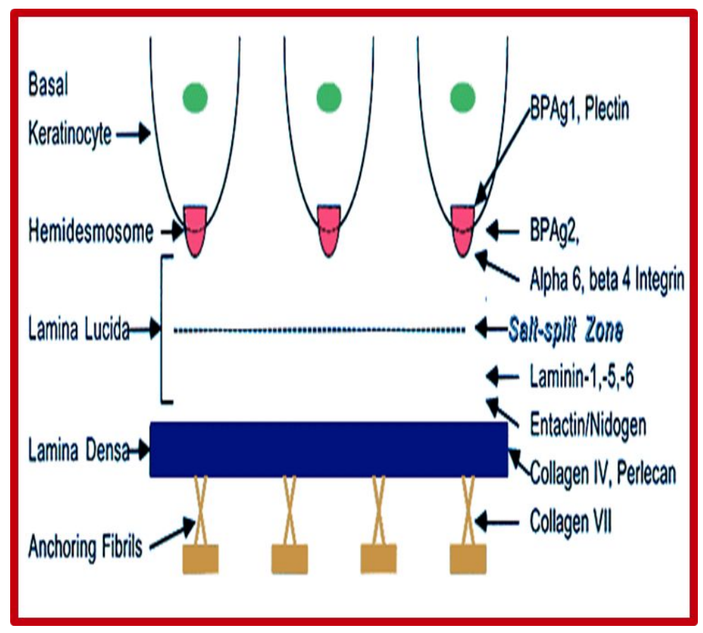
❖ **The main type of cells in the epidermis are:**

- **Keratinocytes**
  - Major cell type of the epidermis (about 90%)
  - They form in the stratum basale and move up to stratum corneum
  - The average time for a cell to travel is about 40 days in psoriasis the average is 3-4 days.
  - Produce keratin the main cell type in the skin as we go up the cells become less nucleated
  - **Cornification (keratinization):**
    - Cytoplasmic events that occur in the cytoplasm of epidermal keratinocytes during their terminal differentiation into dead horny cell (corneocyte).
    - The total process takes approximately 2 months.
    - It involves the formation of keratin polypeptides.
    - Abnormalities in this process lead to roughness and scaling of the skin like PSORIASIS (In psoriasis it takes 3 days which will result in a lot of scales)
- **Melanocytes**
  - They are found in the stratum basale
  - They produce melanin -> stored in melanosomes
  - There are 2 types of melanin: the brownish black **(eumelanin)** and the reddish yellow **(pheomelanin)**
  - Melanin packed into melanosomes and transported to basal keratinocytes
  - Skin colour is determined by the number and size of the melanosomes (not the number of melanocytes)
  - produce melanin responsible for skin color and protection against UV light
- **Langerhans cells**
  - Antigen-presenting immune cells
  - A role in the skin immunity
  - Can be found in the mid-epidermis
- **Merkel cells**
  - They are small round/oval cells
  - They act as touch receptors
  - They transmit sensory information in the skin to the sensory nerves
  - serve a neurological function They are is essential for light touch.

2) Basement Membrane

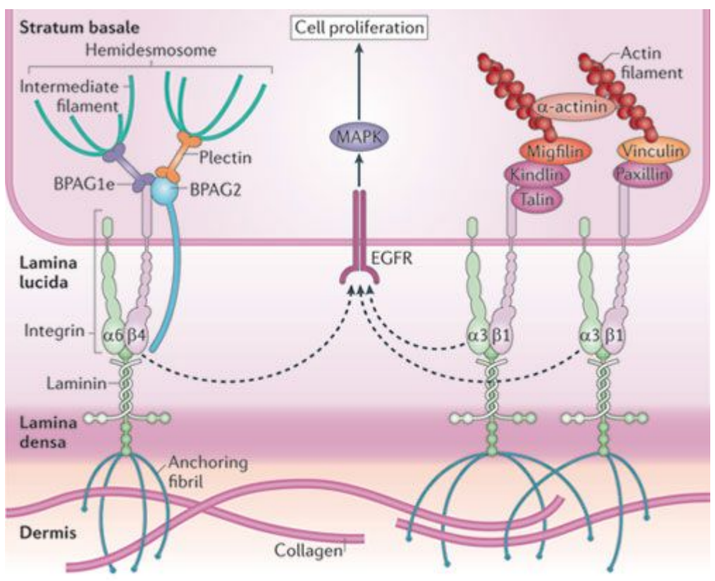
Dermoepidermal junction (BMZ):

- The meeting point of the dermis and epidermis
- Provide adhesion and transport of cells and molecules between them
- It is the site of attack injury in blistering diseases
- Consist of:
  - Basement membrane.
    - Anchors epidermis to the dermis
    - Has two layers:
      - Lamina lucida (Superficial)
      - Lamina densa (Deeper)
  - Hemidesmosomes
    - Connect the epidermis to the basement membrane
  - Collagen fibrils
    - Connect the stratum basale to the papillary layer.



Basement Membrane:

- Pink undulated homogenous area between the epidermis and dermis
- Consists of number of proteins.
- The site of attack injury in blistering diseases. Autoimmune bullous diseases leads to separation between epidermis and dermis thus blistering.
- Thickened in certain skin diseases like discoid lupus erythematosus feature of CT diseases on skin biopsy.
- **Formed by:**
  - **Plasma membrane** of basal cells and **hemidesmosomes** (proteins that anchor the basal cells to basement membrane)
  - Thin clear amorphous space (**lamina lucida**). Seen on EM only
  - An electron dense area (**lamina densa**).
  - **Anchoring fibrils** that anchors the epidermis to dermis.

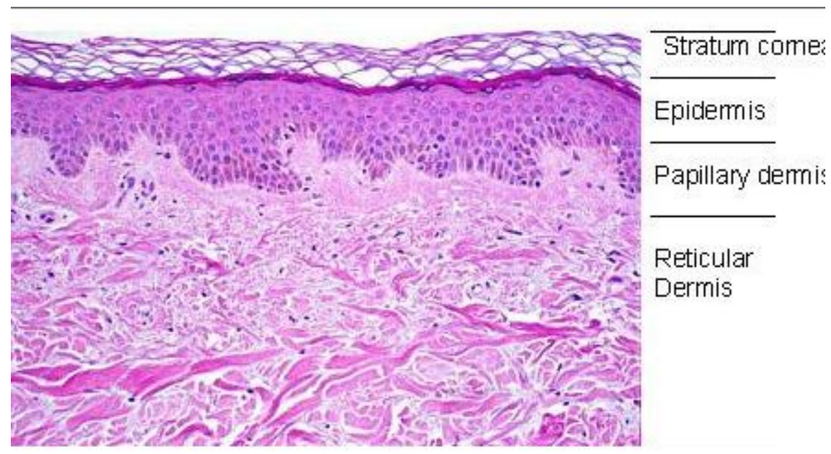


- Figure 1:
  - Congenital diseases could cause a mutation of one or more of the basement membrane proteins, reducing attachment of dermis to epidermis. Leading to blistering of the skin after touching it.
  - NB. in blistering diseases the targeted structures could either be the desmosomes (causing separation between keratinocytes) or the basement membrane (causing separation between dermis and epidermis).

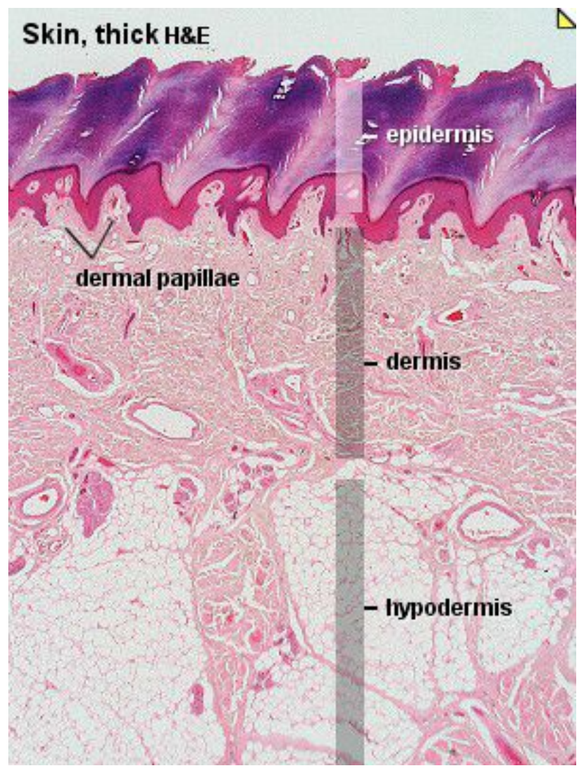
Figure 1

3) Dermis

- Provides nutrition and support to the epidermis and interacts with it during wound repair
- Gives the skin its strength, elasticity, and softness.
- Range between 1 and 4 mm in thickness (depends on age and body site)
- **It is divided into two layers:**
  - Papillary dermis (Upper layer)
  - Reticular dermis (lower layer) Bigger part contains more collagen & elastic fibers

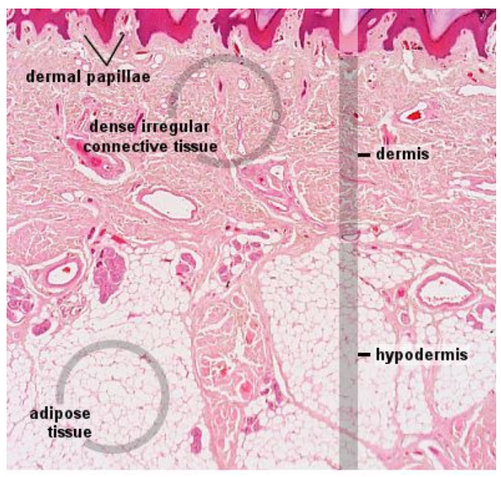


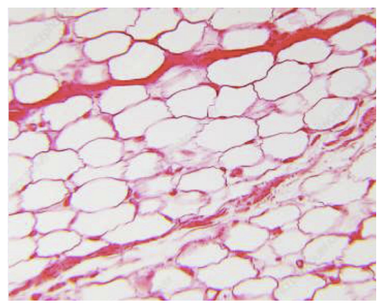
- **Consists of :**
  1. Collagen fibers: 70-80%
     - Provides strength to the skin
     - Thin fibers in papillary dermis
     - Thick fibers in the reticular dermis
  2. Elastic Fibers: 1-3 %
     - Provides elasticity
     - Protects against shearing forces
     - Protect against trauma
     - Collagen and elastin are reduced with age, this is why we give collagen for age related wrinkles.
  3. Ground substance (Proteoglycans and glycoproteins)
     - Binds water and maintains skin turgor.
  4. Blood vessels
     - Nourishment to the overlying epidermis
  5. Cellular component
     - e.g. (fibroblasts: produce the above elements 'collagen'), mast cells, plasma cells and histiocytes

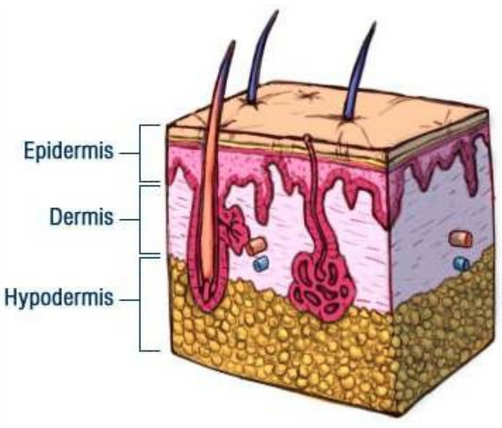


4) Hypodermis (Subcutaneous Fat)

- Composed of lipocytes:
  - The fundamental unit of Subcutaneous fat
- Lies below the dermis, binds the skin to underlying bone and muscle, and supply the dermis with blood vessels and nerves
- The main cell type:
  - Adipocytes (fat cells): used mainly for fat storage
  - Fibroblasts
  - Macrophages







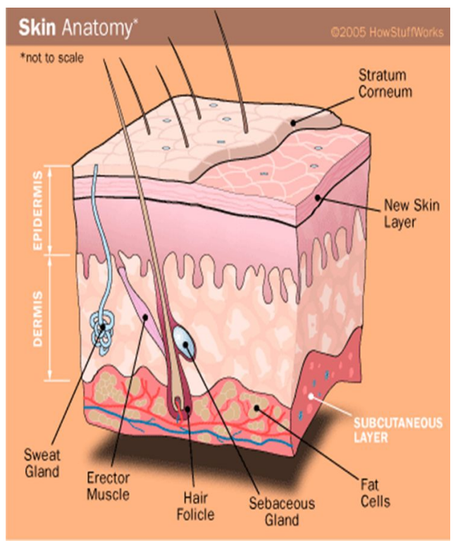
5) Skin Appendages

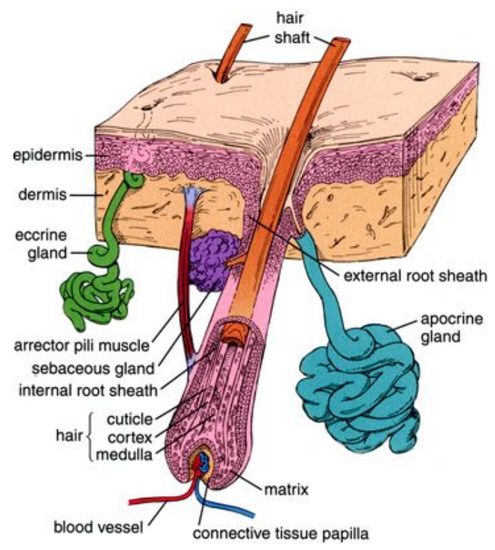
Skin-associated structures that serve a particular function

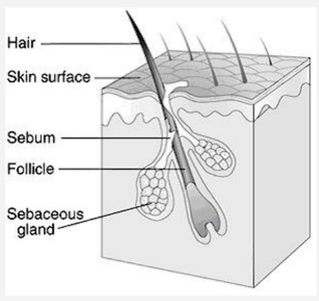
It includes:

1. Eccrine/apocrine sweat glands.
2. Hair follicles.
3. Sebaceous glands.
4. Nail

Pilosebaceous unit: Formed by the hair follicles with its attached sebaceous gland + arrector pili muscle. (you have to know that)

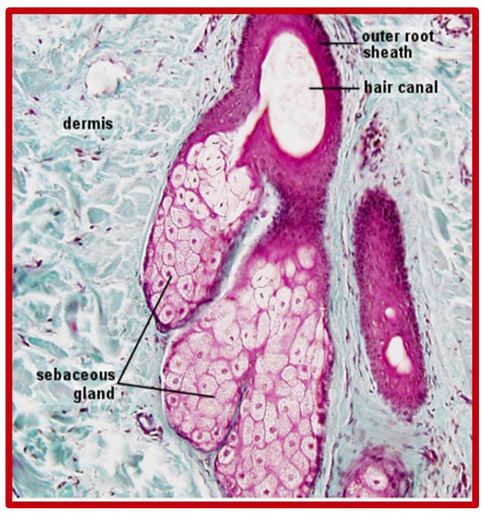






Sebaceous glands

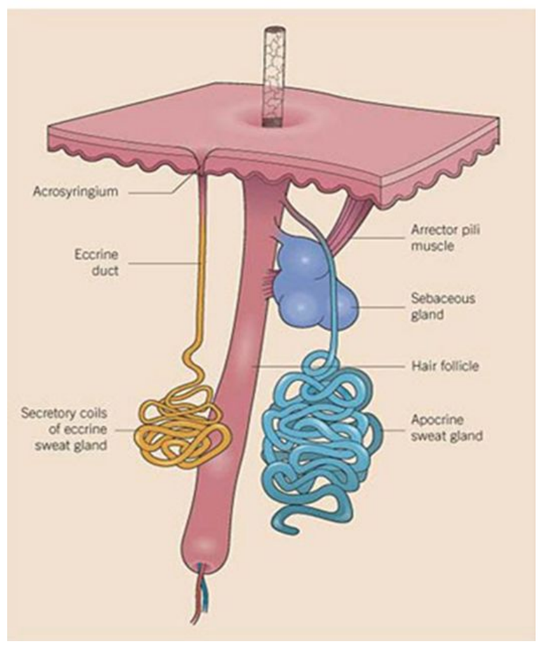
- Attached to hair follicles or open freely to skin. If attached, is called pilosebaceous unit.
- They secrete sebum to lubricate the hair and skin
- Present in the scalp, forehead,face, upper chest but NOT in the palms and soles. (Hands (palms) can be sweaty but never greasy/oily)
- Sebaceous glands are under the control of androgens
- Sebaceous glands in the areola are called Montgomery tubercles, in the eyelid they are called meibomian glands.
- Ectopic Sebaceous glands in the mucous membrane are called Fordyce spots can be more visible after fillers.



Fordyce spots

Apocrine sweat glands	• Modified sweat glands that present in the:
	  ○ Axillae
	  ○ Anogenital
	  ○ External ear canal
	  ○ Eyelids (moll's glands)
	  ○ Areolae.
	• Under adrenergic stimuli.
	• They are **larger** than eccrine glands.
	• They release region-specific secretions that bacteria act on.
	• They are mainly found in the axilla and genital skin.
	• Secrete viscous material that gives musky odor when acted upon by Bacteria.

Eccrine sweat glands	• Tubular structures that open freely and directly on the skin surface, not attached to hair follicles.
	• Under cholinergic stimuli. parasympathetic.
	• They present everywhere except:
	  ○ Vermilion border of lip
	  ○ Nail beds (under nail plate)
	  ○ Labia minora and glans penis.
	• They regulate body temperature.
	• +++ in palms and soles.
	• They are Not connected to the hair follicle while apocrine is attached to hair follicles.



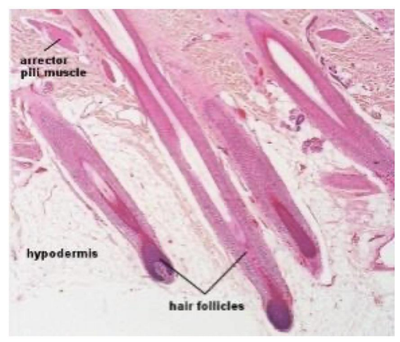
Extra from Dr.

Eccrine & Apocrine glands can be differentiated by 4 factors:		
	Apocrine	**Eccrine**
Location:	Axillae, areola, perineum, anogenital, EAC, eyelids	Everywhere **but** the vermilion, lips, EAC, nail beds, clitoris, labia minora, glans
Stimulation	Adrenergic "Nor/ Epinephrine"	Cholinergic "Acetylcholine"
Attachment to hair follicle	Attached to hair follicles. Do not open freely	Not attached to hair follicles
Opening	Excretory ducts open into hair follicles	Secretory ducts open directly into skin through sweat pores

5) Skin Appendages cont

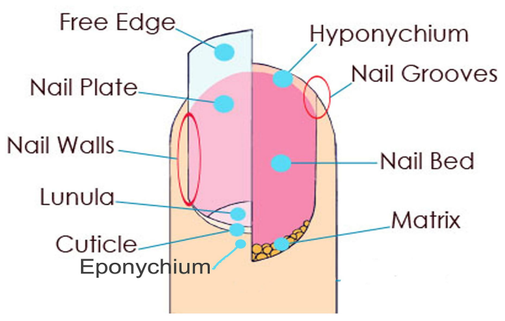
Hair

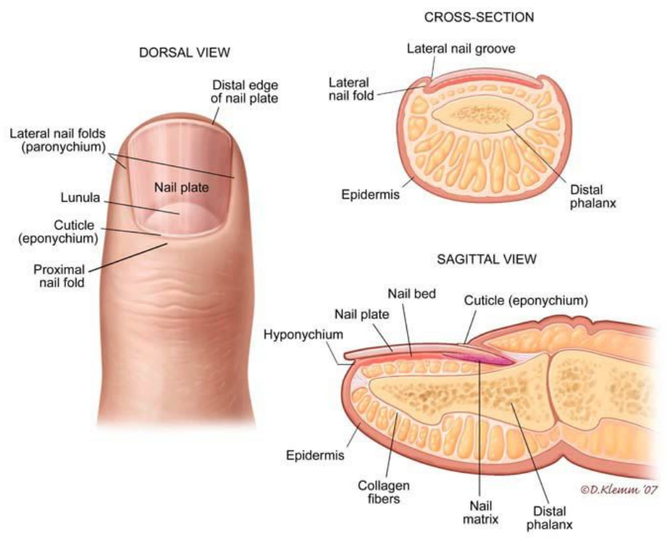
- We have up to 5 million hairs over the surface of the skin.
- Most of this is vellus hair (fine short hair)
- Terminal hair (longer and thicker hair) typically found on the scalp, axillae and the pubic area
- Hair growth is dynamic process within **three phases:**
  1. Anagen (active growing hair) develope From 2-5 years .
  2. Catagen (rest phase of the hair) develope from third weeks .
  3. Telogen (shedding of the hair). develope from third months .
- Hair follicle has the hair shaft, hair bulb and the bulge.

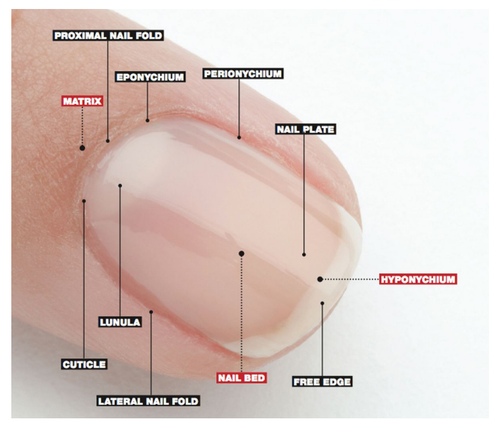


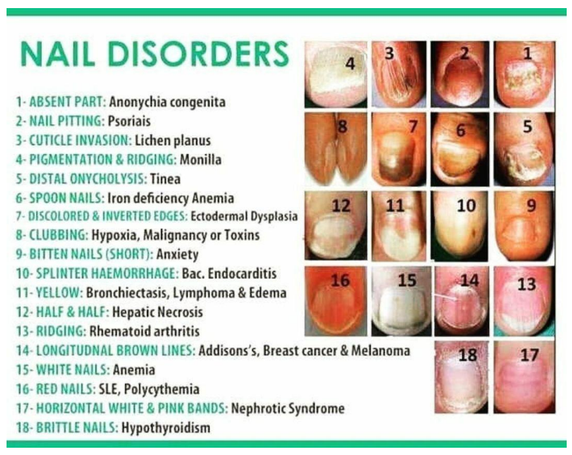
Nails:

- Consists of:
  1. The nail plate
     - formed of hard keratin.
     - Covers the nail bed
  2. Nail bed "below the plate"
  3. Matrix
     - The lunula is the visible part of the matrix.
     - The matrix covers the mid-portion of the distal Phalanx.
  4. Proximal and lateral nail folds
     - Proximal nail fold morphology can be altered in connective tissue disease.
  5. Hyponychium.
     - Contributes to tactile sensation and acts protection for the nail tip.
- Fingernails grow 3mm/month
- Toenails grow 1mm/month
- Can be affected in systemic and skin diseases like psoriasis: "pitting, onycholysis" fungal infection









Part 2 (Dermatological Language)

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

- 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.

How do you approach a patient with skin lesions?

History : → **Examination** → **Investigations**

1) History :

- **Personal Data:** Age, gender
- **Chief Complaint:** Onset, duration, progression, associated symptoms (itching, pain), triggering and relieving factor (sun,heat, ..Etc)
  - History of skin lesion
  - When? Onset
  - Where? site of onset
  - Extension of lesions
  - Evolution
  - Associated symptoms
  - Aggravating factors
  - Treatment "ask him if he ever seeks medical treatment, because some lesions differ after treatment" And discharge , shape , color

Condition	Skin manifestations
Cushing's syndrome	Bruising, striae, acne, hirsutism
Addison's disease	Hyperpigmentation of skin and mucous membranes, hirsutism
Internal malignancy	Dermatomyositis , pemphigus, vasculitis, annular erythemas, Sweet's syndrome, pruritus
Diabetes mellitus	Necrobiosis lipoidica, neuropathic leg ulceration, skin infections
HIV	Maculopapular rash at seroconversion, Kaposi's sarcoma, multiple head-and-neck molluscum contagiosum
Sarcoidosis	Lupus pernio, erythema nodosum
Lupus	Malar rash, photosensitivity, vasculitis
Coeliac disease	Dermatitis herpetiformis

- **Drug and allergy history:**
  - Over-the-counter, new, old medications
  - Any known drug allergies
- **Past medical history:** "Important"
  - Many common systemic diseases display skin manifestations
- **Family history:**
  - Does anyone in the family have a similar problem?
  - Does anyone in the family have a disorder of the skin?
  - N.B. Some skin conditions, e.g. neurofibromatosis, have a strong genetic basis)
- Psychological history:
  - People with severe, chronic skin disease may suffer from anxiety, depression and social isolation "like psoriasis"
  - The psychological problem may be the cause of the skin disease, e.g dermatitis artefacta "done by patient"
- **Social history:** VERY IMPORTANT !
  - Occupation and hobbies
  - History of contact with other affected individuals
  - Recent travel (abroad): It is important to be aware of endemic diseases in other parts of the world.
  - Sun exposure: tanning.. etc
  - Smoking habits: some conditions are related directly to smoking such as psoriasi, hidradenitis suppurativa and palmoplantar pustulosis
- **Systemic review**

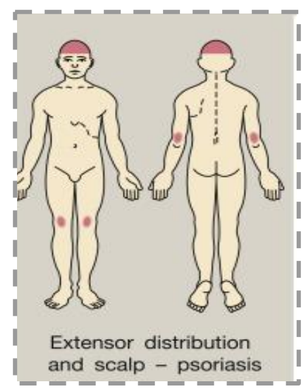
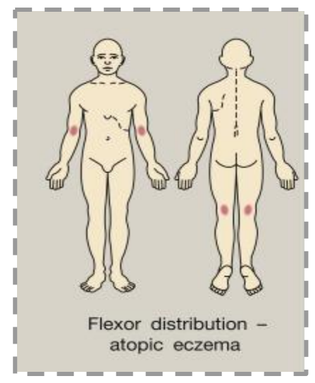
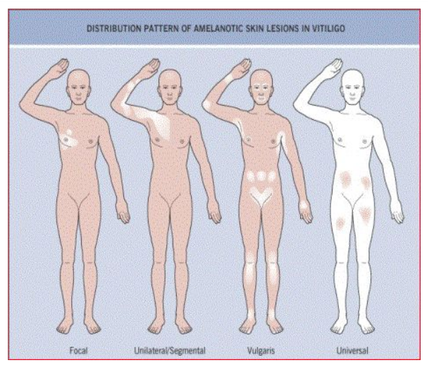
2) Examination

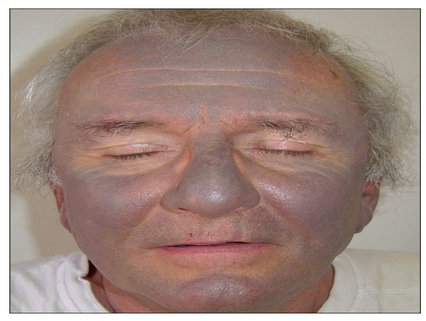
- Use good light while examining the patient.
  - Better natural sunlight. We use something called Dermatoscope (small instrument with a lens and it has light. We put it and we look at the lesions in magnified manner).
- **Examine:**
  - Hair, Nails, Mucous membrane, scalp, ear concha.
  - General appearance of patient: is he/she well? scratching or displaying other signs of distress
  - Inspection:
    - Is it symmetrical or asymmetrical?
    - Does it involve particular sites e.g. extensor or flexor, sun-exposed or covered?
    - Do lesions adopt any particular pattern e.g. diffuse, linear, grouped or scattered?
- **Describe skin lesions as follows:**
  - Distribution:
    - how the skin lesions are scattered or spread out.
  - Configuration:
    - shape or outline of the skin lesions : Annular "circular" , Grouped, Reticular "network", Linear, Target.
  - Size.
  - Colour: What colour is the affected skin?
  - Shape and border: Is the border well demarcated or not?
  - Morphology
    - Primary lesion
      - Primary lesion something appeared and we didn't scratch it and it didn't get abraded. Primary lesion looks what it looked like when it appeared.
    - Secondary changes
      - Secondary lesion means that there were secondary changes that happened to it and there are a certain lesions that cannot happen as primary lesions. They happen as primary lesion and they will progress into secondary lesions. For example in Eczema starts as an eczematous lesion with chronic changes from chronic itching Lichenification (will be discussed later) will occur on top of it (secondary changes).
- Lymph node exams in selected diseases like mycosis fungoides and skin cancers.
- Palpation: Tenderness,temperature, consistency, mobility and depth.

Colour	Examples
Black	Melanin, e.g. some naevi, melanoma
	Exogenous pigments, e.g. tattoos, pencil/ink
	Exogenous chemicals, e.g. silver nitrate, gold salts
	Deeply situated blood or melanin, e.g. angiomas, blue naevus
Blue–grey	Inflammatory diseases, e.g. orf
	Drug-induced pigmentation, e.g. phenothiazines, minocycline
Dark brown	Melanin nearest the skin surface, mostly melanocytic naevi
	Exogenous pigments, e.g. dithranol (anthralin) staining
Pale brown	Melanin near the skin surface, e.g. lentigo, freckles
Muddy brown	Melanin in the superficial surface, e.g. post-inflammatory pigmentation
Purple	Vascular lesions, e.g. angiomas
Dusky blue	Reduced amounts of oxygenated haemoglobin, e.g. poor arterial supply, central causes of cyanosis, methaemoglobinaemia
Violaceous and lilac	Lichen planus, edge of plaques of morphoea, connective tissue disorders, e.g. dermatomyositis
Pink–red	Many exanthemas and common disorders, e.g. psoriasis
Red–brown	Inflammatory dermatoses, e.g. seborrhoeic eczema, secondary syphilis
	Haemosiderosis, e.g. pigmented purpuric dermatoses

A) Distribution

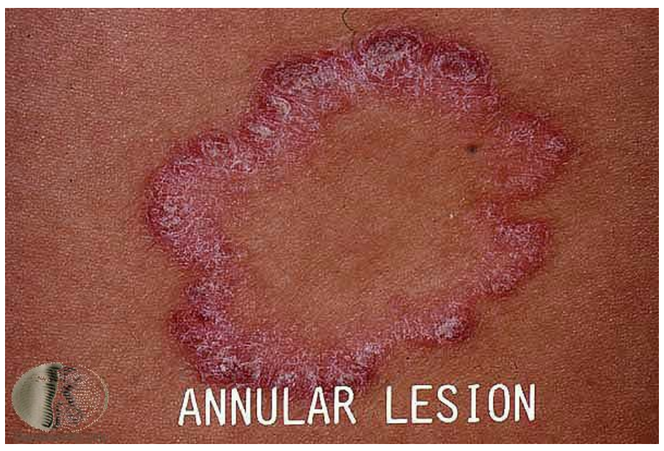
- Distribution refers to how the skin lesions are scattered or spread out
- Skin lesions may be isolated (solitary/ single) or multiple
- The localization of multiple lesions in certain regions aids in making a diagnosis, as skin diseases tend to have characteristic distribution
- Aids in understanding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

Distribution	Description	Picture
Acral	Affects distal portions of limbs (hand, foot) and head (ears, nose) e.g. vitiligo which happen under the finger	
Malar	Malar bone (cheeks). Like in SLE.	
Extensor	Involving extensor surfaces of limbs Contrast with flexor surfaces Henoch Schönlein purpura (vasculitis that happen in young kids) they only happen on extensor surfaces.	 
Flexural	Involving skin flexures (body folds); also known as intertriginous, ex: Inter-mammary	 
Generalized/ universal	(Universal distribution; may be scattered or diffuse)	
Symmetrical/ bilateral	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.	
Dermatomal	Corresponding with nerve root distribution. E.g, Shingles, Herpes Zooster	

Distribution	Description	Picture
Photosensitive	Lesions favoring sun exposed area. Protected areas remain free of lesions. Picture is photodermatitis	
Koebnerized	• Arising in a wound or scar. • The Koebner phenomenon refers to the tendency of several skin conditions to affect areas subjected to injury • Examples: ○ Psoriasis, Lichen planus, Vitiligo, Lichen nitidus. • Someone has psoriasis and have a lesion in the skin when the lesion go into healing process the injured area would have Psoriasis should be described as (Koebnerized), that's why we tell psoriasis patient to not do any necessary surgical procedure	 
Seborrhoeic	The areas generally affected by seborrheic dermatitis, with a tendency to **oily skin** (seborrhoea) **Scalp**, **behind ears**, **eyebrows**, **nasolabial folds**, **sternum** and **interscapular**	

B) Configuration

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

Configuration	Description	Picture
Nummular	Round (coin-shaped) lesions, also known as "Discoid" Active border and not clear in the center.	
Annular	Lesions grouped in a ring like pattern Active border and clear in the center. Some diseases they start like a papule and as the lesion gets bigger, it becomes empty on the side and follows an annular pattern What is the difference between Annular and Nummular lesions? Annular: like a half circle (empty inside). Nummular: like a coin	
Linear	A linear shape to a lesion often occurs for some external reason such as scratching. ,itching	

Configuration	Description	Picture
Grouped “Herpetiform”	Lesions **grouped** are as in herpes simplex lesion	
Reticular	Net like pattern. ex: erythema ab igne	
Guttate	Drop like, “Dzen gouttesdz”. E.g. guttate psoriasis.	
Target	Concentric rings and a dark center also known as iris lesion E.g. erythema multiforme, lung disease. Diff colors, pale border, erythematous.	
Umbilication	Round depression in the center	
Verrucous, warty, papillomatous:	Surface consisting of finger like projections (in papilloma).	

C) Morphology

- **Skin lesions are divided into:**
  - **Primary**: Basic lesion
  - **Secondary**: Develop during evolution of skin disease by scratching or infection

Primary lesions		Secondary lesions
• Macule/patch • Papule/plaque • Nodule • Cyst • Wheal • Vesicle/ bulla • Pustule • Burrow		• Excoriation • Erosion • Scale • Fissure • Ulcer • Scar • Lichenification

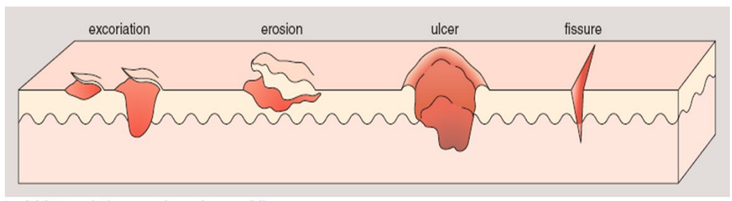
Primary skin lesions		
Lesion	**Description**	**Picture**
Macule	• Flat circumscribed discoloration that lacks surface elevation or depression (non-palpable Change in color only, no elevation or depression). • **< 0.5** cm in diameter. • **≤1** cm in size "amboss" • E.g. freckle, Pityriasis	 
Patch	• Flat circumscribed skin discoloration • > 0.5 cm in diameter " A large macule" • > 1 cm in size "amboss" • E.g. Vitiligo, melasma. • Macule and patch are the only colored primary lesions of the skin. If there is anything in the surface of the skin (elevation, depression or scales) it's no longer a macule or patch.	 

Papule	• Elevated, superficial, solid lesion
	• < 0.5cm in diameter
	• **≤1** cm in diameter "amboss"
	• Examine for color and surface changes.
	  ○ Umbilicated
	  ■ Immediately think Molluscum Contagiosum. Viral infection that creates big pimples on the face in children, especially in the summer when they go to public pools. Self limiting in 1-2 years but could be removed.
	  ○ Keratotic (scale)
	  ○ Papillomatous like warts
	  ○ Flat topped in **lichen planus**
	• As they grow and come together they coalesce and form a plaque
		
		 

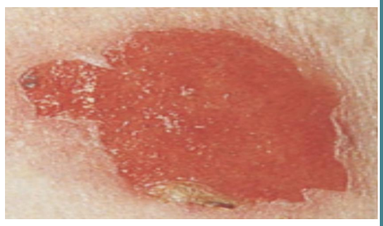
Plaque E.g. Plaque psoriasis	• Elevated, palpable, solid confluence or expansion of papules.
	  ○ Confluence (group) of papules leads to the development of larger, usually flat topped, circumscribed, plateau-like elevations known as Plaques
	• > 0.5cm in diameter.
	• > 1 cm in diameter "Amboss"
	• Lacks a deep component (elevation of skin)
	  ○ If it has a deep component it becomes a nodule or a tumor
	• How to differentiate between plaque and scale ? Plaque is a primary lesion that can have scales on it
		
		It is colored because it has Scales (secondary changes)

Primary Skin Lesion

Lesion	Description	Picture
Nodule	• Elevated, circumscribed, solid lesion. • > 0.5 cm in size (>1 cm "Amboss") • With deep component (elevation+depth) if you examine you feel there is deep extension under the skin • Eg. hydredenditits	
Cyst	• Nodule that contains fluid or semisolid material • It is usually soft and has depth • It looks like a nodule but its fluctuating, soft.	
Vesicle	• Elevation that contains clear fluid • < 0.5 cm in size • ≤ 1 cm in diameter "Amboss" • E.g. Dermatitis Herpetiformis. • **Blisters:** due to separation of basement membrane	
Bulla	• Localized fluid collection • > 0.5 cm in size • > 1 cm in diameter "amboss" • Bulla is a large vesicle • Can be **tense** of flaccid ○ In tense you can actually see the blister (bulla or vesicle), while in flaccid you can see only an erosion and you can rarely see the actual bulla or vesicle you see the scar. • E.g. Bullous Pemphigoid.	 
Burrow	• Linear **tunnel** in the epidermis induced by scabies mite • Only see burrows with scabies • Formed by entry and movement of the organism under the skin	
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 • Looks like a papule but has pus • Found in Acne.	
Wheal (Hive)	• Firm, edematous, slightly raised plaque that is evanescent (short lived couple of minutes then disappear) and pruritic. • Characteristically with a pale center and a pink margin • Commonly seen in urticaria, dermatographism.	
Purpura	• Extravasation of red blood cells giving non-blanchable erythema • Small spots called petechiae while large ones called ecchymosis	
Telangiectasia	• Dilated capillaries visible on the skin surface. e.g. Rosacea.	
Tumor	• Solid elevation of the skin more than 2 cm in diameter and has depth. Like large nodule.	



ig. 4.24 Excoriation, erosion, ulcer and fissure

Secondary Skin Lesion result of scratching or infection		
Lesion	**Description**	**Picture**
Erosion	• A partial and superficial focal loss of epidermis that heals without scarring because only the most superficial layer of the skin is removed. • A blister on foot due to shoes, blister bursts open, the wound left is called an erosion	 
Scale	• Thickened stratum corneum outermost layer • Psoriasis (like in the picture) • Scales could be thick or thin.	 This is psoriasis patient and he has a thick scale
Crust	• A collection of cellular debris, dried serum and blood. • Eg. impetigo • Antecedent primary lesion usually a **vesicle, bulla, or pustule** when they dry they form a crust.	 
Ulcer	• A full thickness focal loss of epidermis and dermis • Heals with scarring	
Atrophy	• Thinning of the skin • Chronic use of topical corticosteroid.	
Excoriation	• Linear erosion induced by scratching • Always linear + very superficial	
Fissure	• Vertical loss of **epidermis and Dermis** with sharply defined walls (Cracks in the skin)	
Scar	• A collection of new connective tissue • May be hypertrophic or atrophic • Implies dermoepidermal damage • Sometimes scars are depressed • You can not have a scar without having a primary lesion	
Lichenification	• Thickened and leathery skin which is a result from **continually** rubbing or scratching the skin • Increased skin markings secondary to **chronic** scratching Eg. Eczema	 

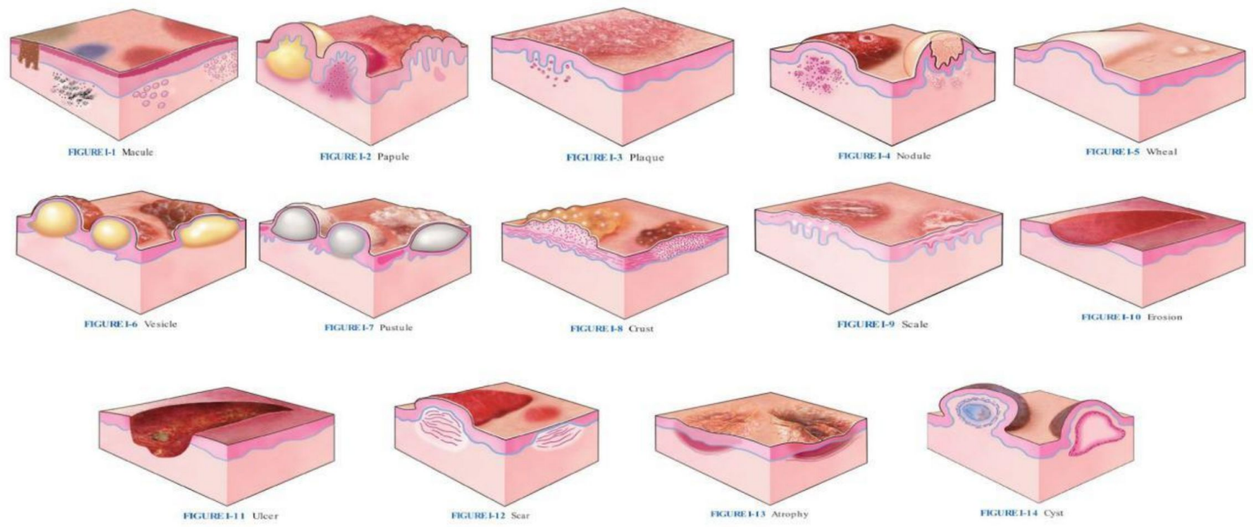
Important Signs in dermatology:

Dermatology Tests

Koebner's phenomenon	• The tendency for certain skin diseases (psoriasis, vitiligo, lichen planus, warts) to develop at sites of trauma.	
Dermographism	• Firm stroking of the skin produces erythema and wheal. • Seen in physical urticaria. • In patient with atopy, stroking produces white dermatographism rather than red. • They come in urticaria you get a tongue depressor and draw a line. If it wheels that's dermatographism	 
Nikolsky Sign	• Rubbing of apparently normal skin induces blistering of the skin. • Seen only in pemphigus vulgaris (Autoimmune blistering disease it happens in epidermis) and toxic epidermal necrolysis (TEN).(could be a side effect of medication.). • Certain autoimmune diseases affect desmosomes or side effect of medication like **Steven-Johnson Syndrome or toxic epidermal necrolysis**. When I touch the skin it comes off thats a positive Nikolsky sign.	Figure 2. A positive Nikolsky's sign in toxic epidermal necrolysis.  Reproduced with permission from: Habif T, ed. *Clinical Dermatology: A Color Guide to Diagnosis and Therapy.* 3rd ed. St. Louis: Mosby; 1996.
AUSPITZ SIGN	• forceful removal of scale on top of a red papule produces bleeding points **(pinpoint bleeding)** • Seen in psoriasis.	

To ace any lesion description in the skin you can follow this : (PBL notes)

1) **Number:** One \ two \ multiple ?
2) differentiated/ non differentiated?
3) **Color:** erythematous ?
4) **Size:** (describe the smallest one and the biggest one)
5) Name the **primary** lesion for ex : Plaques
6) Name the **secondary** lesion.
7) **Location.**



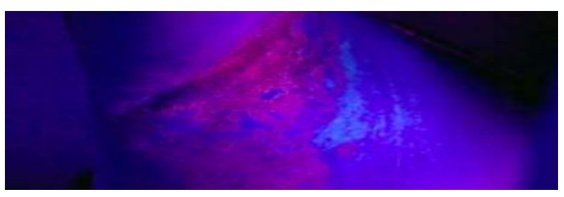
3) Investigations

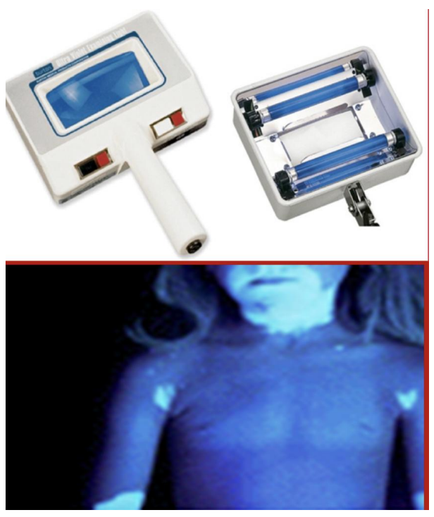
1-Woods lamp

We do it in the clinic to confirm diagnosis of some infectious disease .

Produces long wave UVL (360 nm). Useful in:

- **Tinea Versicolor**
  - yellowish green fluorescence in pityrosporum orbiculare.
    - Superficial fungal infection on the abdomen, gets worse in the summer with sweating and better in winter.
- **Tinea Capitis**
  - Yellow green fluorescence in M. canis, M. audouinii.
    - Fungal infection on the scalp
- **Vitiligo:**
  - Milky white. Woods lamp is always important to diagnose Vitiligo. If its white chalk it is Vitiligo and if it's hypopigmented it is not.
- **Erythrasma**
  - Coral red fluorescence
    - infection over axillary area caused by Corynebacterium minutissimum bacteria
- **Melasma** becomes more intensified
- **Pseudomonas** (green)

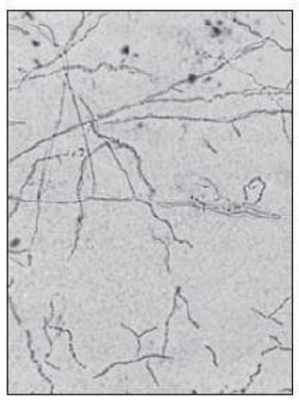


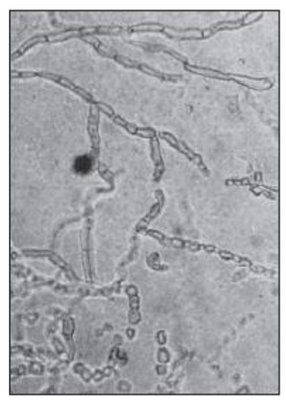


2-KOH preparations for fungus

Very quick easy test in scaly lesions

- Fungal infection.
- Cleanse skin with alcohol Swab to avoid contamination (avoid false results).
- Scrape skin with edge of microscope slide onto a second microscope slide.
  So we take a few scales
- Put on a drop of 10% KOH
- Apply a cover slip and warm gently
- Examine with microscope objective lens
- Sometimes you see hyphae



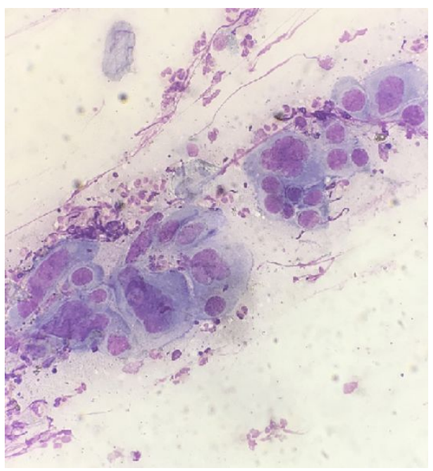


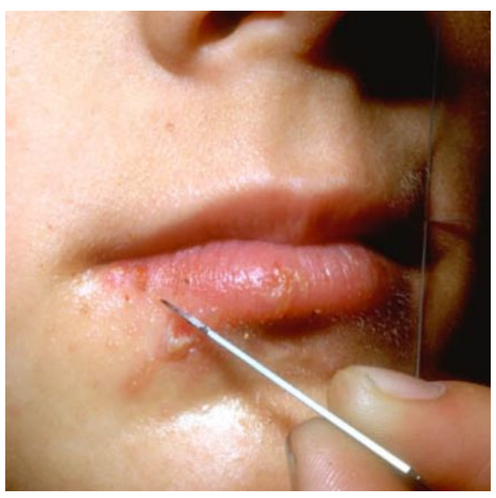
3- Tzanck smear

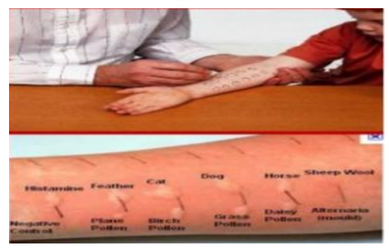
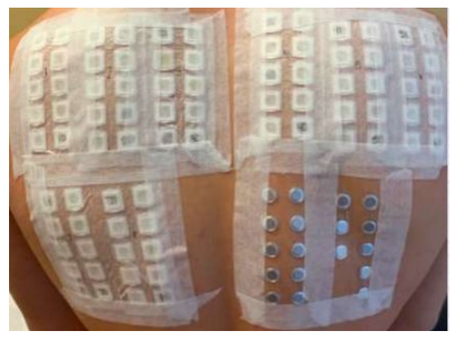
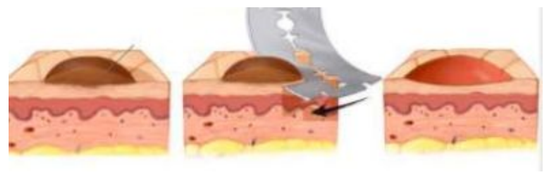
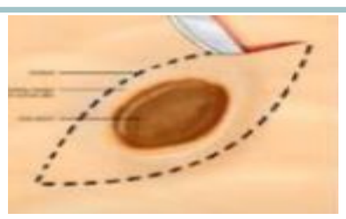
vesicular lesions

Important in diagnosing:

- Herpes simplex or VZV (multinucleated giant cells)
- Pemphigus Vulgaris (acantholytic cells means dead cells).
- Method:
  - Select a fresh vesicle x **De-roof and scrape base of the vesicle**
  - Smear onto a slide
  - Fix with 95% alcohol
  - **Stain with Giemsa stain**
  - Examine under microscope





4-Prick test In the forearm	• For food allergy, drug allergy. • Detects immediate-type IgE mediated reaction (type 1 hypersensitivity reaction) in most allergic diseases. • 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. • A positive test shows urticarial reaction at site of prick. wheeling in the area) • Emergency therapeutic measures should be available in case of anaphylaxis.  
5- Patch skin test	• Important in contact dermatitis. • Delayed immune reaction (type **4** immune reaction). • Select the most probable substances causing dermatitis. • Apply the test material **over the back**. • 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.  
6- Skin punch biopsy Most commonly used	• 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 H&E stain • For Immunofluorescence put in normal saline. • In autoimmune blistering or connective tissue disease we need to do direct immunofluorescence to look for complements or antigens at the basement membrane. We put them in normal saline (very important). • we use an instrument called “punch” to remove a circular section through all layers of the lesion • **Suture if 5 mm punch is used.** 
7- Shave biopsy	• we shave a thin layer from the lesion 
8- Excisional biopsy	• we use a scalpel to take off the entire lesion 
9-Direct immunofluorescence	• 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.

This slide is not in the dr lecture but treatments are part of the objectives

Topical therapy:

"THE ONLY DIFFERENCE IS PERCENTAGE OF WATER IN EACH OF THEM"

- **Solution**: Water or alcoholic lotion containing a dissolved powder
- **Lotion**: thicker than a solution and more likely to contain oil as well as water or alcohol
- **Cream**: thicker than a lotion, a 50/50 emulsion of oil and water
- **Ointment**: nearly water-free (80% oil) "so used in dry lesion" , Greasy, sticky, emollient, protective, occlusive

- 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.

Choosing agent and vehicle depends on :

- Diagnosis
- Location "like in the face don't use potent agent"
- Age "children and elderly use milder agent"
- Type of lesions

Topical steroids:

1. They act as anti-inflammatory, anti-mitotic, and immunosuppressive agent
2. Many topical steroids available, from mild (Hydrocortisone) to very potent (Clobetasol)
3. Successful treatment depends on an accurate diagnosis and consideration of the asteroid's delivery vehicle, potency, frequency of application, duration of treatment, and side effects

- **Examples:**
  - **Ointments**: the most potent / most occlusive (ex: for dry/ thick hyperkeratotic lesions)
  - **Creams**: less potent than ointment but cosmetically more appealing, non-occlusive
  - **Lotions**: less occlusive (ex: work well in hairy regions)
  - **Gels**: like lotions, less occlusive and greasy; (ex: work well in hairy regions; more beneficial for the scalp)

- **Side effects:**

1) Atrophy and striae. Difficult to treat
2) Telangiectasia and purpura.
3) Masking the initial lesion.
4) Perioral dermatitis and rosacea or acne.
5) Systemic absorption.
6) Tachyphylaxis (sudden loss of response).

QUESTIONS:

1) What is a patch ?
A. Solid elevated less than 1 cm
B. Solid elevated less more than
C. Flat circumscribed less than 1 cm
D. Flat circumscribed more than 1 cm

2) A reticular lesion is similar to which of the following?
A. coin like lesion
B. drop like lesion
C. line like lesion
D. Net like lesion

3) Which one of following is a secondary lesion?
A. Plaque
B. Papule
C. Wheal
D. Ulcer

4) A macule is:
A. Well circumscribed elevated lesion, more than 0.5 cm
B. Well circumscribed elevated lesion, less than 0.5 cm
C. Well circumscribed flat lesion, more than 1 cm
D. Well circumscribed flat lesion, less than 1 cm

5) Which one of the following describes the Erythema multiforme configuration?
A. Annular.
B. Discoid.
C. Target.
D. Reticular.

6) which one of the following is a secondary lesion:
A. patch
B. macule
C. papule
D. ulcer

7) Flat discoloration of the skin more than 0.5 cm:
A. Patch
B. Papule
C. Plaque
D. Macule

8) Which one of the following whose greater part lies beneath the surface of the skin?
A-Nodule
B- Papule
C- Pustule
D- Cyst

9) What makes the difference between whites and dark skin?
A- Number if melanocytes.
B- Sizes of melanocytes.
C- Size of melanosomes.
D- Number of melanosomes.

10) Prick test diagnose which type of hypersensitivity reaction?
A- Type I.
B- Type II.
C- Type III.
D- Type IV.

11) Woods lamp is helpful in diagnosing which one of the following?
A- Lichen planus.
B- Tinea capitis.
C- Atopic dermatitis.
D- Psoriasis.

12) Which one is true regarding melanocytes/ Keratinocytes Ratio:
A- 1 Melanocyte to 10 Keratinocytes
B- 1 Melanocyte to 40 Keratinocytes
C- 10 Melanocytes to 10 Keratinocytes
D- 1 Melanocyte to unlimited Keratinocytes

13) Fingertip unit can cover:
A- 1 hand unit
B- 3 hands unit
C- 2 hands unit
D- 4 hands unit

14) Partial focal loss of epidermis and heals without scarring is
A- Excoriation
B- Erosions
C- Lichenification
D- Fissure

15) In bullous pemphigoid, the blisters are arise from?
A- Intraepidermal
B- Subepidermal
C- Subcutaneous
D- Sub-basal

16) What is the type of reaction in patch test?
A- Type I hypersensitivity reaction
B- Type II hypersensitivity reaction
C- Type III hypersensitivity reaction
D- Type IV hypersensitivity reaction

17) Which one of the following diseases has the pathognomic feature of burrows:
A- Scabies
B- Impetigo
C- Herpes zoster
D- Tinea corporis

18) Which layer of the following composed of cells with No nuclei?
A- Granular layer
B- Basal layer
C- Spinous layer
D- Cornified layer

19) Which one of the following has the least number of eccrine glands?
A- Back
B- Sole
C- Palm
D- Face

ANSWERS:

1-D 11-B
2-D 12-A
3-D 13-C
4-D 14-B
5-C 15-B
6-D 16-D
7-A 17-A
8-A 18-D
9-C 19-A
10-A