

Structured Notes According to DERMATOLOGY

Revision friendly **Fully Colored Book/Structured Notes**

For Best results, watch the video lectures along with reading notes



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(Author)**

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1. BASICS OF DERMATOLOGY

SKIN AND ITS APPENDAGES

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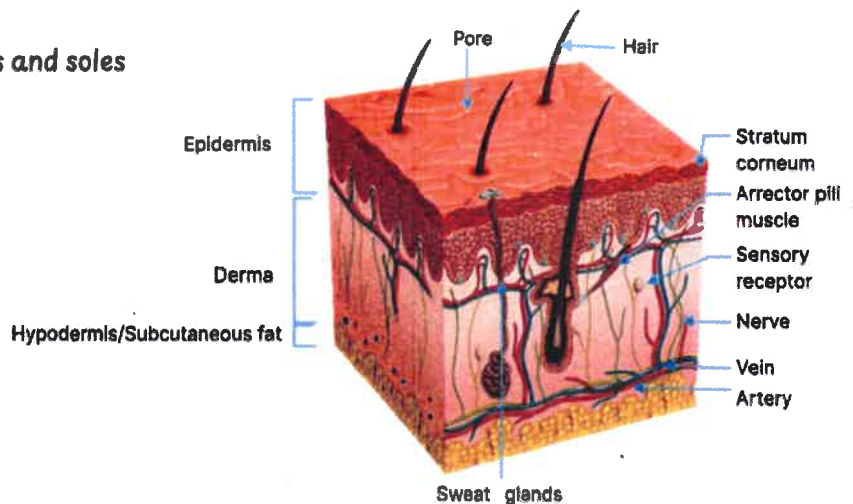
- Skin and its appendages (hair, nails, glands) → Integumentary System
- Skin - Largest organ human body
- Weight : 6-9 kgs
- **Glabrous skin**: Non-hairy skin in palms and soles

LAYERS OF SKIN

→ Epidermis

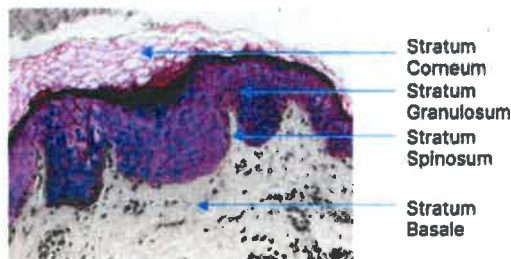
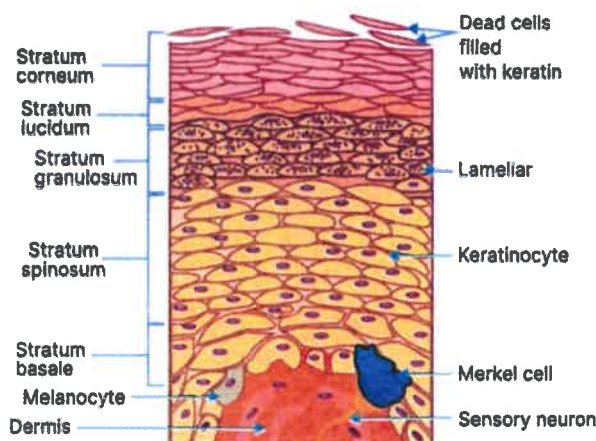
→ Dermis

→ Hypodermis/Subcutaneous fat

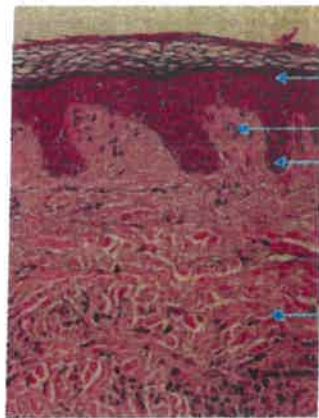


EPIDERMIS

INTRODUCTION



- Topmost layer
- Thickness : [REDACTED]
- Thinnest : Eyelids
- Thickest : Palms and soles
- Main function : Barrier
- Layers of the Epidermis (Mnemonic - COME LET'S GET SUNBURNT)
 - Stratum corneum (Topmost)
 - Stratum lucidum : Only present in palms and soles (Thickest)
 - Stratum granulosum
 - Stratum spinosum
 - Stratum basale (Bottom most): Single cell layer



Epidermis
Papillary Dermis
Rete ridges
Reticular Dermis

- **Rete ridges** : Invaginations of Epidermis into Dermis
- **Dermis**
 - **Papillary dermis** : Invaginations of Dermis into Epidermis
 - **Reticular dermis** : Made of fibrils

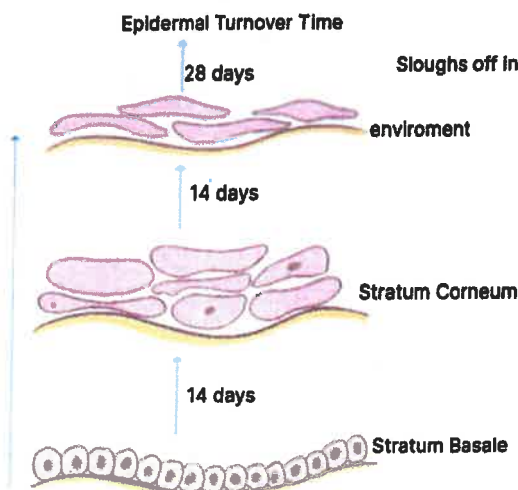
CELL DIFFERENTIATION



Preterm baby

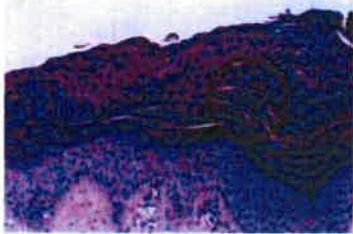
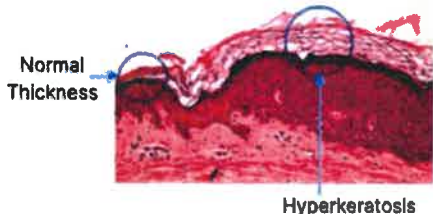

- Bottom to top : **Stratum Basale layer** (First to form) → **Stratum Corneum layer**
- Certain changes : SB → SC
 - Flat cells
 - ↑ Surface area
 - Cells lose nuclei → No mitosis (SB- Most mitotic activity)
 - Dehydrated cells
- In preterm baby, **Stratum Corneum** is absent

CELL KINETICS



- Cell cycle of Keratinocytes - **300 hours**
- Epidermal Turnover time
 - Continuous process of formation of skin - **56 - 75 days**.
 - Cells migrate from SB → SC
 - ↓
 - 14 days** to reach SC
 - ↓
 - Stay there for another **14 days**
 - ↓
 - Slough off - **28 days**
- In Psoriasis
 - Cell kinetics - **36 hours** and Epidermal Turnover time : **4 days**
 - Thus skin multiplies rapidly causing scaling

LAYERS OF EPIDERMIS

LAYERS	HISTOPATHOLOGICAL FINDINGS	CONDITIONS ASSOCIATED
STRATUM CORNEUM <ul style="list-style-type: none"> • Topmost layer • Tight mesh of keratinocytes maintaining integrity • Barrier function • SC-Flat, No Nuclei, no mitosis, dehydrated • Dead layer 	Parakeratosis Retention of Nuclei in Stratum Corneum  Site : Mouth and vagina	<ul style="list-style-type: none"> • Psoriasis • Eczema • Actinic Keratosis • Seborrheic Dermatitis • Squamous Cell Carcinoma
	Hyperkeratosis ↑ Thickness of Stratum Corneum 	<ul style="list-style-type: none"> • Psoriasis • Lichen Planus
STRATUM LUCIDUM	<ul style="list-style-type: none"> • Found in Palms and Soles only • Clear cell layer → Presence of 	
STRATUM GRANULOSUM <ul style="list-style-type: none"> • Keratinisation occurs here • Made up of granules • 2 important granules 1. Keratohyalin Granules (Forming Filaggrin) 2. Odland bodies/ Lipid Coating Granules/ Membrane coated granules 	KERATOHYALIN GRANULES (PROFILAGGRIN) <ul style="list-style-type: none"> • Profilaggrin (SG) → Filaggrin (SC) • Filaggrin : Filament Aggregating Protein (bind keratinocytes) • • Defect cause Ichthyosis vulgaris (Scaly skin) Hypergranulosis ↑ thickness of Stratum granulosum 	ODLAND BODIES/ LIPID COATING GRANULES/ MEMBRANE COATED GRANULES <ul style="list-style-type: none"> • Function : Lubricates skin. • Defect cause dryness of skin → Asteatotic eczema (No fat rash) <ul style="list-style-type: none"> • Lichen planus

Agranulosis

Absent granular layer/Stratum granulosum

- Psoriasis

Dyskeratosis

Disordered Keratinization
(keratinization in other layers
instead of SG)

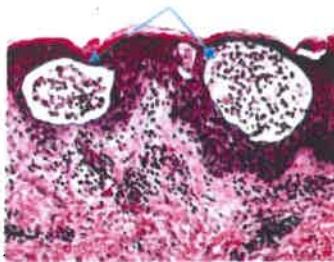
- **Benign** : Hailey hailey disease, Darier's disease
- **Malignant** : Basal cell carcinoma, Squamous cell carcinoma, Paget's disease

STRATUM SPINOSUM

- Prickle cell layer
- **Desmosomes** : Intercellular bridges connecting Keratinocytes
 - Seen clearly in HPE
- **Thickest layer**
- **Malpighian layer** - Viable layer/
Most mitotically active layer
 - Stratum Basale + Stratum Spinosum

Spongiosis

Intercellular Edema



- Acute eczema

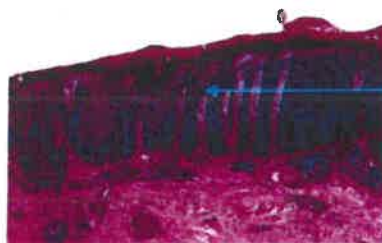
Ballooning



Intracellular edema

- Acute eczema

Acanthosis



↑thickness of stratum spinosum

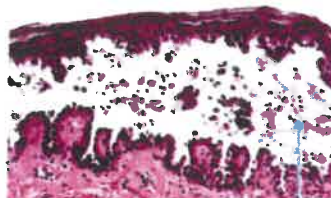
- Chronic eczema

STRATUM BASALE

- Lowest most/Basal layer
- **Most Mitotically Active layer**
- Single layer thickness

Acantholysis

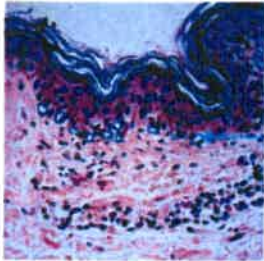
Separation of keratinocytes (acanthocytes)



Separation of Keratinocytes within the epidermis

- Pemphigus group of disorders

Basal cell Degeneration
Degeneration of cells of basal layer



Vacuolar Degeneration of Basal Cells

- Lichen planus.
- Lichenoid dermatitis

MICROABSCCESS

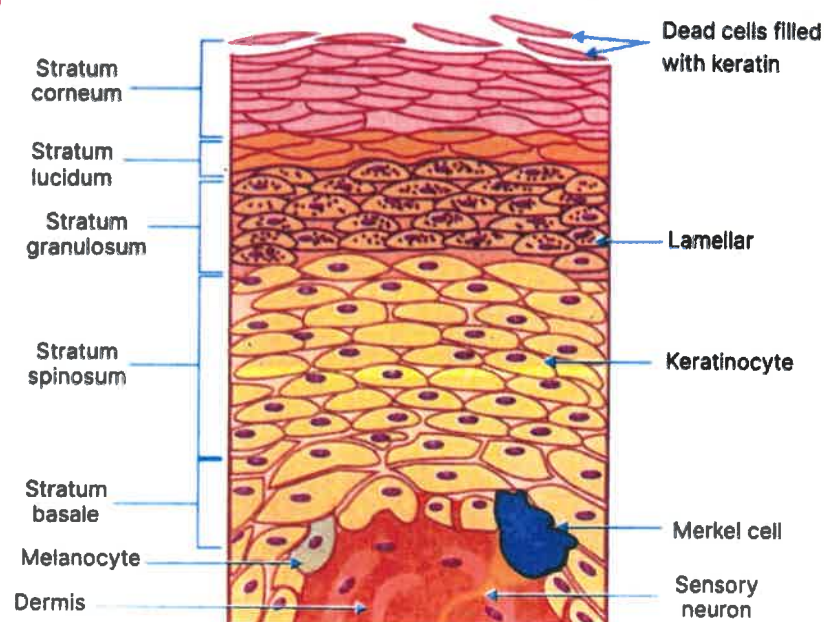
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- Collection of inflammatory cells in different cell layers

TYPES	INFLAMMATORY INFILTRATE	SITE	SEEN IN
Munro's	Neutrophils	Stratum corneum	Psoriasis
Kogoj's Spongiform Pustules	Neutrophils	Stratum spinosum	Psoriasis
Papillary	Neutrophils	Papillary dermis	Dermatitis Herpetiformis
Eosinophilic	Eosinophils	Basement membrane zone, Upper dermis	Bullous pemphigus
Pautrier's	Lymphocytes	Epidermis	Mycosis fungoides

CELLS IN EPIDERMIS

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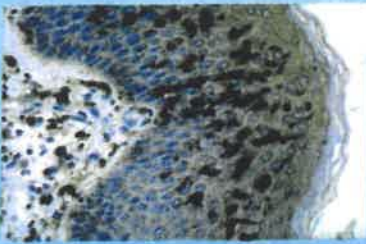
KERATINOCYTES



Intercellular Desmosomes

- Site: **All cell layers** (predominant cells)
- > 90% of Epidermis
- Derived from [redacted]
- Bound by filament aggregating proteins: **Desmosomes** (intercellular bridges)
- Function : Barrier maintenance

LANGERHANS CELLS



IHC Stained Langerhans cells

- Site : **Stratum Spinosum**.
- Type of dendritic cells
- Derived from **Mesenchyme**
- Antigen Presenting cells
- Contain **Birbeck Granules** : Racquet Shaped
- Stains : CD1A, CD207, S100

MELANOCYTES



- Site: **Stratum Basale**
- Derived from **NCC**
- Pigment forming cells
- Dendritic cell
- **Ratio is 1:10** i.e., 1 melanocyte for 10 Keratinocytes.
- Each melanocyte transfers melanin through melanosomes to 36 keratinocytes surrounding it → [redacted]
 - Ratio- 1:36
 - **Responsible for uniform skin color**

MERKEL CELLS

- Site : **Stratum Basale**
- Derived from : **Ectoderm > Neural Crest**
- Slow adapting touch receptors

Important Information

- Change in skin color is due to:
 - Melanosomes
 - Light skin : Distributed as membrane-bound clusters
 - Dark skin : larger and distributed individually
 - Type of melanin
 - Eumelanin (Darker)
 - Pheomelanin (Lighter)

NERVE AND INNERVATION

- Rich network of nerves with 2 types of sensory endings.
 - Mechano-receptors : The corpuscles
 - Nociceptors : Free nerve endings

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MECHANO-RECEPTORS

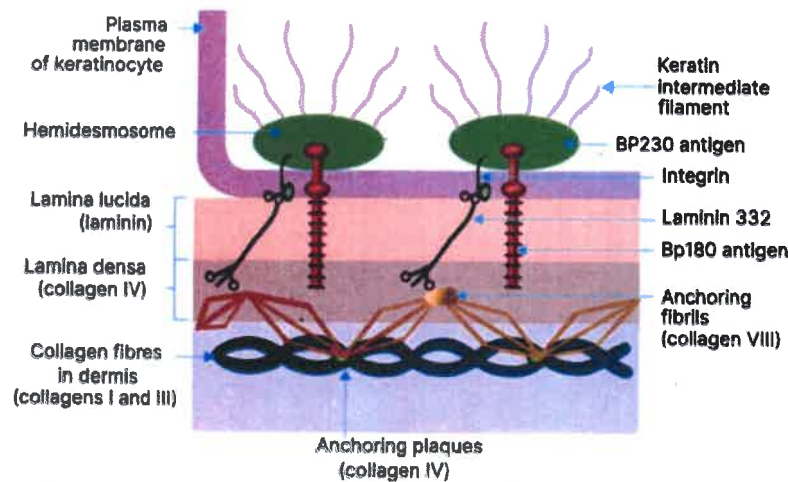
- **Light touch** : Merkel cells of the epidermis, Meissner's corpuscles in dermal papillae
- **Pressure** : Pacinian corpuscles in deep dermis or subcutaneous tissue

NOCICEPTORS

- **Pain and itch** : Transmitted through naked fine free nerve endings
 - In basal layer of the epidermis close to dermo epidermal junction
- **Temperature** : Kruse bulbs (detect cold), Ruffini end organs (detect heat)
 - Heat, cold and proprioception: Located in superficial dermis

DERMO EPIDERMAL JUNCTION

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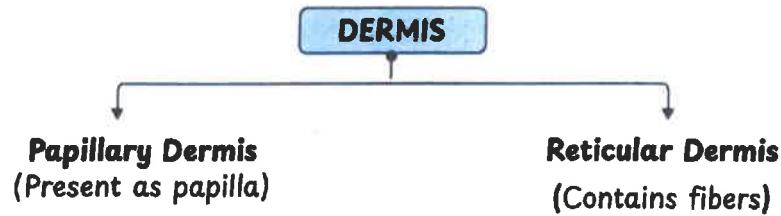
- Structure connecting epidermis to dermis
- Basement membrane zone
- Predominantly formed by **type IV collagen**
- Main function : **Adhesion and Signaling**
- Weakest part of BMZ : Lamina Lucida

PARTS OF BMZ

- **Hemidesmosomes**
 - Connects Keratin intermediate filament and Dermis
 - Formed by **BP 180, BP 230 antigens**
- **Lamina lucida**
 - Formed by Laminin
- **Lamina densa**
 - Anchoring fibrils connecting to Anchoring plaques
 - Made of Collagen IV
- **Anchoring fibrils**
 - Made of Collagen VIII
- **Anchoring plaques**
 - Made of Collagen IV

DERMIS

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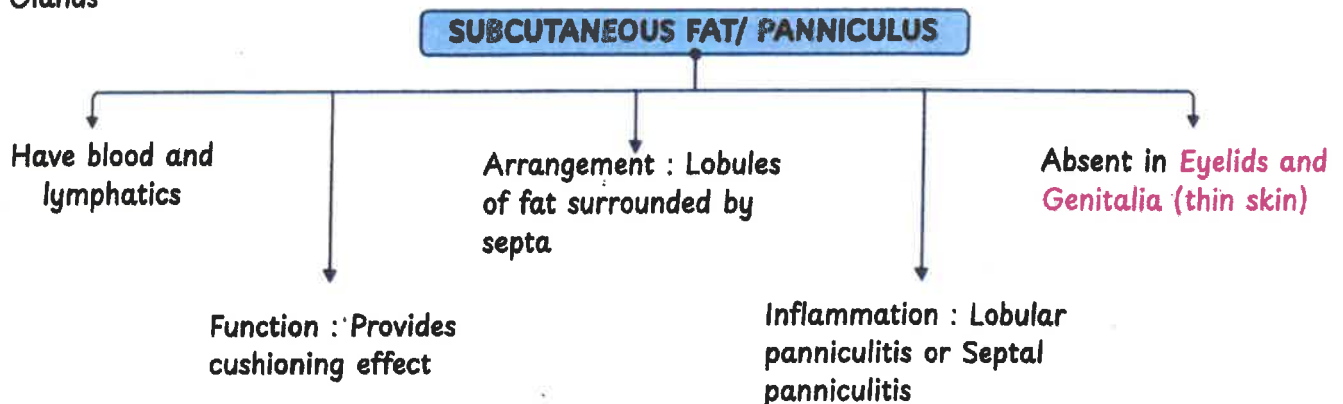
COMPONENTS OF THE DERMIS

CELLS	FIBER	GROUND SUBSTANCE
<ul style="list-style-type: none"> Fibroblast (Predominant cell) Langerhans Cell Mast cell Lymphocytes Phagocyte 	<ul style="list-style-type: none"> Collagen (most abundant) Elastin 	<ul style="list-style-type: none"> Hyaluronic Acid Heparan Sulphate

- Other Components include : blood vessels, nerves, hair follicles, glands

SKIN APPENDAGES

- Hair
- Nails
- Glands



FUNCTIONS OF SKIN

01:06:51

- Most important function: Formation of Vitamin D
 -
- Other functions are
 - Barrier function
 - Thermoregulation
 - Cosmetic purpose
 - Nail bed: Cosmesis
 - Metabolism

MCQ's



Q. Which layer of skin is characterized by the presence of refractile granules of Eleidin?

- a. Stratum Corneum
- b. Stratum Granulosum
- c. Stratum Spinosum
- d. Stratum Lucidum

Ans. (d)

2. SKIN LESIONS IN DERMATOLOGY

TYPES OF SKIN LESION

Primary skin lesion

1st skin lesion formed

Secondary skin lesion

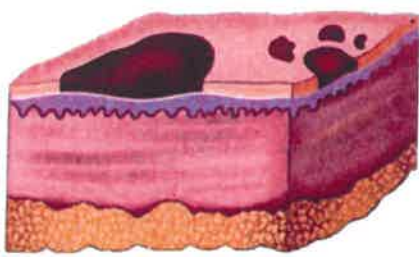








Changes that develop over the primary lesions

Special skin lesion

Characteristics of a particular dermatoses

PRIMARY LESION

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PRIMARY LESION	IMAGE	CHARACTERISTIC LESIONS
Macule and Patch	    <p>Hyperpigmented lesions</p> <p>Depigmented lesions</p>	<ul style="list-style-type: none"> • Change in skin color • Can only be seen, not felt • Neither raised nor depressed <ul style="list-style-type: none"> ◦ If lesion < 0.5 cm = Macule ◦ If lesion > 0.5 cm = Patch • Change in skin color <ul style="list-style-type: none"> ◦ Hyperpigmented : Freckles, Cafe au lait spots/macules ◦ Depigmented (Milky white) : Vitiligo ◦ Depigmented : Leprosy, Pityriasis versicolor
Papule	 <p>Papule</p> <p>Plaque</p> <p>Nodule</p>   <p>Papule</p> <p>Nodule</p>   <p>Multiple Papules</p> <p>Plaque</p>	<ul style="list-style-type: none"> • Circumscribed solid raised lesion • Three types <ul style="list-style-type: none"> ◦ < 0.5 cm = papule ◦ > 0.5 cm = plaque (Change in Skin texture) ◦ > 0.5 cm & more depth than height Nodule (better felt than seen)

Vesicle and Bullae

Fluid-filled lesions



Vesicle and Bullae



Bullae



Vesicles

- Fluid-filled lesions
 - Lesion < 0.5 cm = **Vesicle**
 - Lesion > 0.5 cm = **Bullae**
- Vesicle : Herpes and pemphigus group of disorders
- Bullae : Pemphigus group of disorders and Bullous impetigo

Pustule



Abscess



Pustules

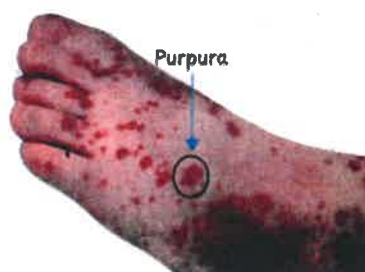


- Pus-filled lesions
- Collection of pus in a cavity : **Abscess**
 - **Neutrophil** collection : Sterile
 - **Microbes** collection : Infected
- Can be
 - Primary Pustules (Pustular psoriasis - Sterile)
 - Secondary Pustules (Infections)

Petechiae, Purpura and Ecchymosis



Petechiae



Ecchymosis

- Non-Blanchable.
- Extravasation of RBCs in skin
 - Lesions 1-2 mm = **Petechiae**
 - Lesions > 3 mm = **Purpura**
 - Palpable purpura (Vasculitis)
 - Non-palpable purpura (Thrombocytopenia, Clotting disorders)
 - Lesions 1-2 cm = **Ecchymosis**
- **Erythema**
 - Occurs because of vasodilation
 - Blanching of lesion

Urticaria And Angioedema



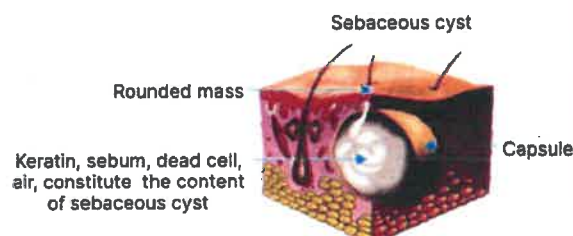
Urticaria



Angioedema

- **Urticaria** - Development of wheals
- Wheal is **erythematous, edematous &**
- Temporary, Raised papules and plaques
- **Angioedema** - Evanescent swelling of mucous membranes

Cyst



Keratin, sebum, dead cell, air, constitute the content of sebaceous cyst








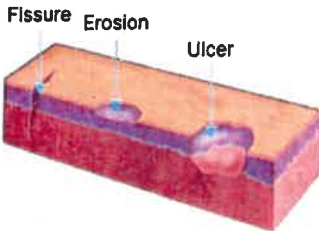

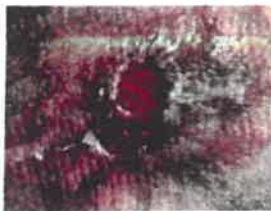

- Enclosed cavity with a lining filled with fluid or semisolid material
- Example - **Epidermal Inclusion Cyst (EIC)**








Epidermal inclusion cyst

SECONDARY SKIN LESIONS

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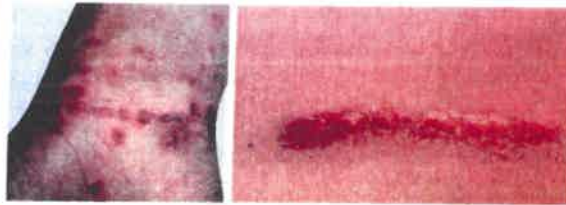
SECONDARY SKIN LESION	IMAGE	CHARACTERISTIC LESIONS
Scale	  <p>Silvery white scales Fish like scales</p>  <p>Greasy scales</p>   <p>Collarette of scales Bran-like scales</p>	<ul style="list-style-type: none"> • Visible exfoliation of stratum corneum • Examples <ul style="list-style-type: none"> ◦ Silvery white scale (Psoriasis) ◦ Fish-like/Plate-like scale (Ichthyosis) ◦ Greasy scales (Seborrheic dermatitis) ◦ Collarette of scales (P. Rosea) ◦ Fine bran-like scales (very thin) - P. vesicolor
Crust	  <p>Honey-colored crust is seen in Non-bullous impetigo</p>	<ul style="list-style-type: none"> • Dried-up exudate (pus, serum, blood) • Honey-coloured crust is seen in Non-bullous impetigo • Hemorrhagic crust : Seen in Herpes
Erosion, Ulcers, and Fissures	  <p>Erosion</p>   <p>Ulcer Fissure</p>	<ul style="list-style-type: none"> • Erosions <ul style="list-style-type: none"> ◦ Denudation of skin/break in continuity of skin limited to epidermis ◦ Superficial → heals without a scar • Ulcer: <ul style="list-style-type: none"> ◦ Denudation + Involvement of dermis(beyond epidermis) ◦ Can even extend up to subcutaneous tissue ◦ Is deep, has a base and an edge • Fissure : Linear cracks in the skin (Soles)

Excoriations		<ul style="list-style-type: none"> • Superficial excavations on the skin (stratum corneum) • Cause : Scratching
Lichenification		<ul style="list-style-type: none"> • Chronic eczema • Histopathology : Acanthosis (↑ Thickness of stratum spinosum) • Features <ul style="list-style-type: none"> ○ Hyperpigmentation ○ ↑ skin markings ○ [Redacted]
Sinus		<ul style="list-style-type: none"> • Blind tract that connects skin to a deeper cavity • Eg:- Hidradenitis suppurativa
Scars	 <p>Hypertrophic scar</p> <p>Atrophic scar</p>	<ul style="list-style-type: none"> • Abnormal proliferation of fibrous tissue replacing normal tissue • Two types <ul style="list-style-type: none"> ○ Hypertrophic : Increased/Raised scarring (Keloid) ○ Atrophic : Decreased/Depressed scarring (Acne)
Atrophy	 <p>Epidermal wrinkling</p> <p>Dermal Atrophy</p>	<ul style="list-style-type: none"> • Loss of portion of skin • Epidermal atrophy : Wrinkled skin (Old age) • Dermal atrophy : Lesion more depressed

SPECIAL SKIN LESIONS

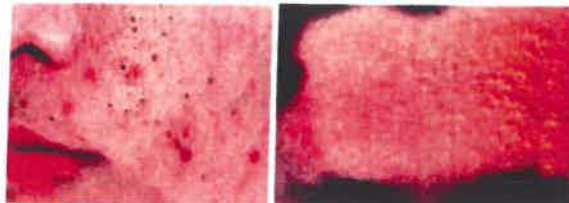
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Burrow



- Linear tract in skin extending upto stratum corneum and stratum malpighii (laid by scabies mite)
- Seen in **Scabies**

Comedones



Open comedones

Closed comedones

- [REDACTED]
- Seen in Acne
- Types
 - Closed comedones are **white**
 - Open comedones are **black**

Telangiectasia



- Visible dilatation of dermal capillaries
- Seen in **poikiloderma**
- Poikiloderma has three components
 - [REDACTED]
 - **Atrophy**
 - **Skin pigmentation**

Sclerosis



- Binding down of skin (Loss of skin elasticity)
- Seen in **Scleroderma**

Milia



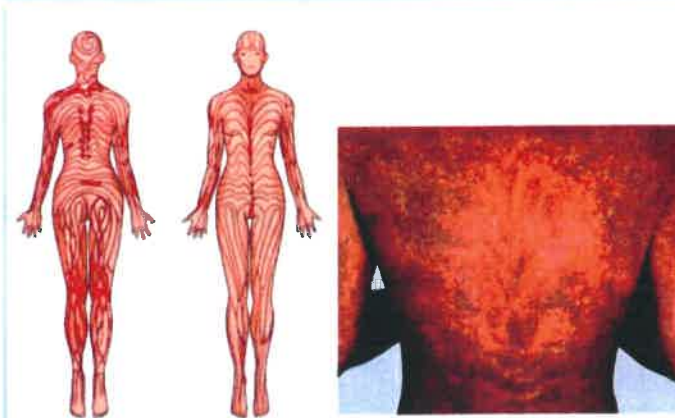
- Keratinous cysts / Keratin-filled cysts
- Appear as white solid papules

Target lesion



- Seen in **Erythema multiforme**
- Has 3 zones
 - Central zone of necrosis
 - Peripheral zone of edema
 - Zone of erythema

BLASCHKO'S LINES





- Lines of **embryonic development**
- Has clear central demarcation
- Constant lines
 - Trunk - curved; Limb - linear ; Abdomen - S-shaped pattern
- Some Examples - **Verrucous epidermal nevus (VEN)**, **Incontinentia Pigmenti**

LANGER'S LINES



- Lines of the **orientation of collagen and muscle fibers**
- Importance
 - Incisions are preferably given along the langer lines
 - Better healing and less damage to collagen and muscle fibers
- **Also known as Relaxed Skin Tension Lines (RSTL)**
- Lines are **not constant**
- No clear central demarcation

Presentation		
	Superficial bulla → hypopyon Rupture → Golden colored crust	Crusted erosions → Honey colored M/c in face and children
Target cell/protein	DSG1 (Desmoglein 1) • Causes subcorneal bulla → Hypopyon	—
Age group	Newborns	Preschoolers/toddlers
Organism	Staphylococcus aureus	Streptococcus > Staphylococcus • Staph - developed nation • Strep - developing nation
Complication	Staphylococcal scalded skin syndrome (SSSS)	

DIAGNOSIS

- Gram stain : Gram positive cocci in clusters
 - Grape like clusters**

Gram +ve cocci in grape like clusters



ECTHYMA

- Non-follicular deep infection- localized
- Streptococcus > Staphylococcus
- On [REDACTED]
- Erythematous plaques → Ulcers
 - covered with necrotic plaques

Ulcers with thick necrotic crusts

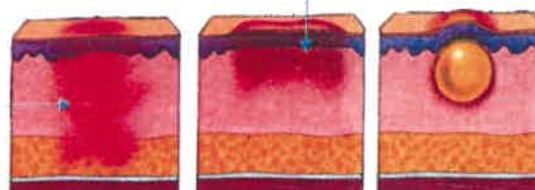


ERYSIPELAS AND CELLULITIS

- Widespread and non-follicular
- Soft tissue infection
- Lower limb > upper limb > Face
- Warm tender plaques, fever and constitutional symptoms

Erysipelas

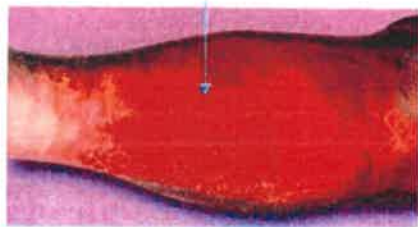
Cellulitis



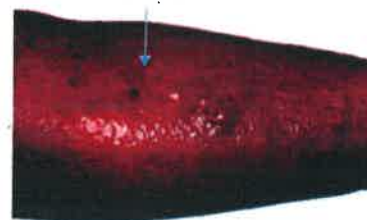
00:11:50

ERYSIPELAS	CELLULITIS
<ul style="list-style-type: none"> Superficial Affects superficial dermis and lymphatics Well demarcated margins M/C Causative agent : Streptococcus 	<ul style="list-style-type: none"> Deeper Involve the whole of the dermis and the subcutaneous tissue Ill-defined margins (diffused) M/C Causative agent : Staphylococcus

Erysipelas



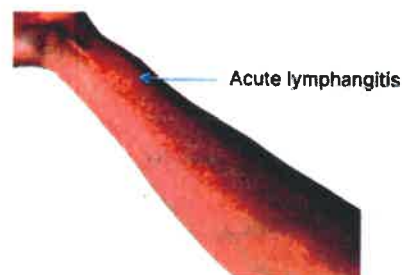
Cellulitis



ACUTE LYMPHANGITIS

00:15:00

- Tender erythematous linear streak of varying width
 - Extending from the local lesion
- From portal of entry of organism towards regional lymph nodes
- Causative agent : **Streptococcus**
- Affects the lymphatic vessels of subcutaneous tissues
- Lymph node : Tender and enlarged



Acute lymphangitis

FOLLICULAR INFECTIONS- PYODERMA

00:16:30

TYPES

FOLLICULITIS	FURUNCLE	CARBUNCLE
<ul style="list-style-type: none"> • Types <ul style="list-style-type: none"> ◦ Superficial folliculitis ◦ Deep folliculitis 	<ul style="list-style-type: none"> • Severe infection • Follicle + Peri follicular area 	<ul style="list-style-type: none"> • Multiple contiguous hair follicles infection



Folliculitis



Furuncle



Carbuncle



FOLLICULITIS

BOCKHART'S IMPETIGO/ SUPERFICIAL FOLLICULITIS	DEEP FOLLICULITIS
<ul style="list-style-type: none"> • Caused by : Staphylococcus • Children - M/c • Pustules in crops • Scalp, hair margin, extremities • Heal in a week • Chemical folliculitis: Irritation from chemicals • Pseudofolliculitis: Improper waxing → leading to ingrown hair, causing irritation to hair follicles 	<ul style="list-style-type: none"> • Beard : Sycosis barbae <ul style="list-style-type: none"> ◦ Misnomer → bacterial infection not fungal infection ◦ Deep painful pustules ◦ Fig tree appearance ◦ Around nose and perioral area ◦ Differential diagnosis : Tinea barbae → Itchy → KOH positivity • Hair : Folliculitis decalvans / Dissecting cellulitis • Face : Lupoid sycosis <ul style="list-style-type: none"> ◦ Severely deep folliculitis ◦ Lupoid/lupus-like scarring