

# **INTEGUMENTARY SYSTEM**



- Dermatology
- Dermatologist
- Structure and functions of skin
- Layers of skin
- Glands of the skin
- Hair and Nails
- Skin lesions
- Burns and frost bites
- Rule of Nine
- Neoplasm
- Diseases and conditions of the skin
- Procedures
- Terms and abbreviations

# INTEGUMENTARY SYSTEM

- The skin and its accessory structures (hair, nails, and glands) make up the integumentary system of the body
- Integument means **covering**
- extending over an area of **22 square feet in an average adult**
- Largest organ in the body
- Second largest is liver

- The longest bone in the human body is the **femur**.
- The largest artery is the **aorta** and the largest vein is the **inferior vena cava**.
- The largest internal organ is the **liver**. It is also the heaviest organ.
- The largest external organ, which is also the largest organ in general, is **the skin**.
- The longest muscle is the **sartorius muscle** in the thigh.

# ANATOMY & PHYSIOLOGY

## STRUCTURE

**Epidermis**

- Thinner superficial layer of skin /  
Epithelium - **keratin**

**Dermis / corium**

- Dense fibrous connective tissue layer-  
**collagen**

**Hypodermis**

- Subcutaneous layer - **fat containing tissue**

## FUNCTIONS

**1. Protection**

- Physical barrier that protects underlying tissues from injury, UV light and bacterial invasion.

## 2 Regulation of body temperature

-High temperature or strenuous exercise; sweat is evaporated from the skin surface to cool it down.

- **vasodilation** (increased blood flow) and **vasoconstriction** (decreased in blood flow) regulates body temp.

## 3 Sensation

-Nerve endings and receptor cells that detect stimuli to temp., pain, pressure and touch.

## 4 Excretion

- Sweat removes water and small amounts of salt, uric acid and ammonia from the body surface

## 5 Blood reservoir

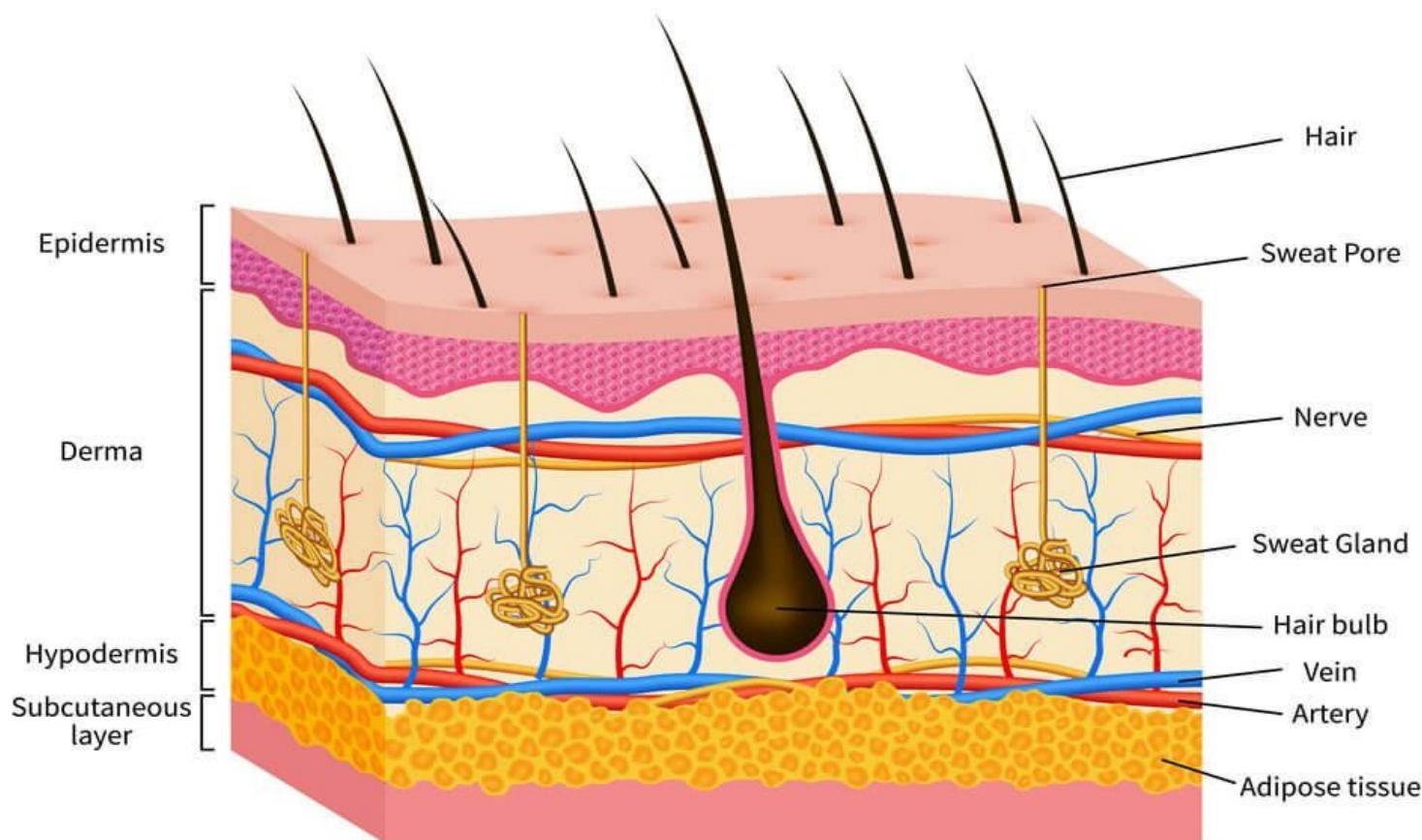
- Dermis houses an extensive network of blood vessels carrying 8-10% of total blood flow in a resting adult.

## 6 Synthesis of Vitamin D (**cholecalciferol**)

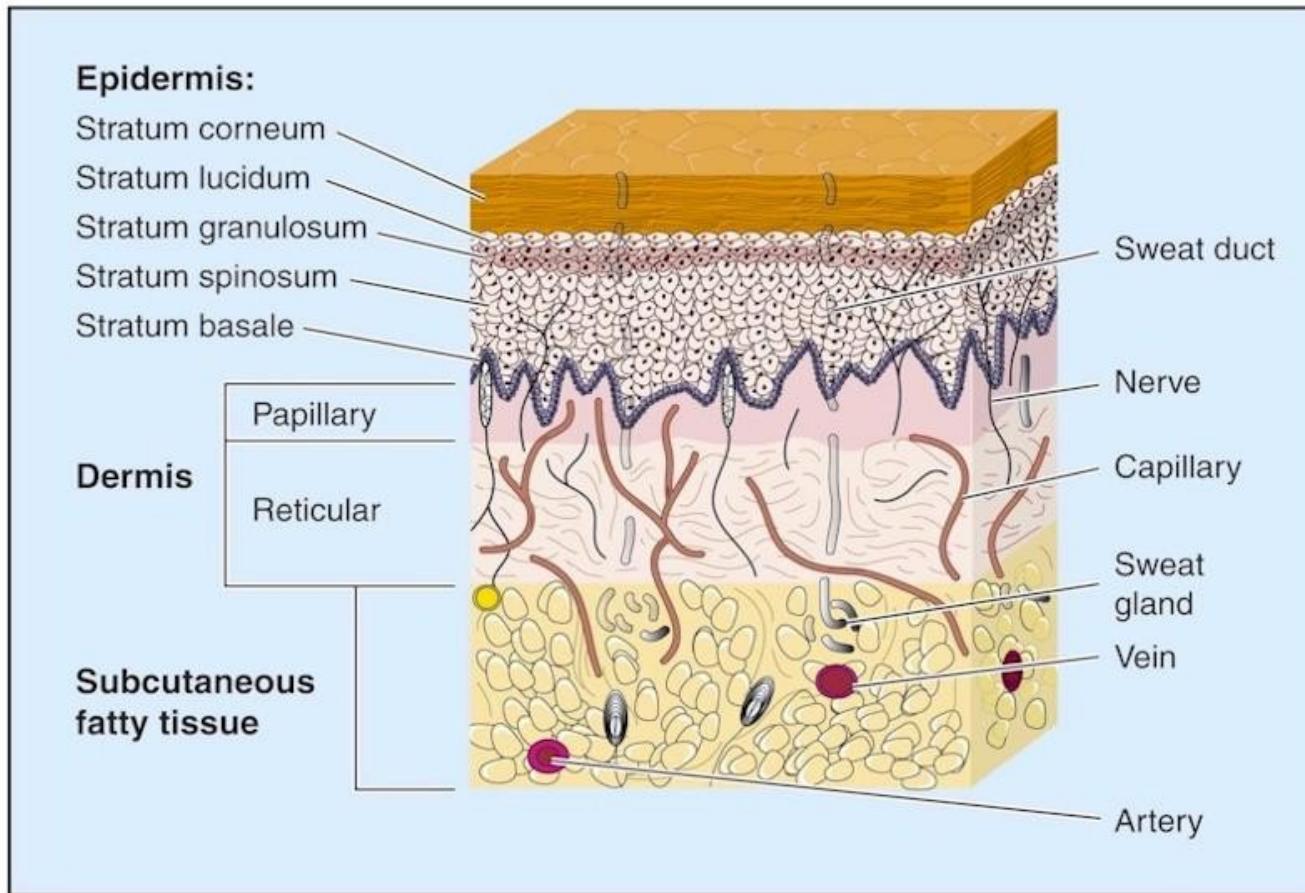
- UV rays in sunlight stimulate the production of Vit. D. Enzymes in the kidney and liver modify and convert to final form; **calcitriol** (most active form of Vit. D.) Calcitriol aids in absorption of calcium from foods and is considered a hormone.

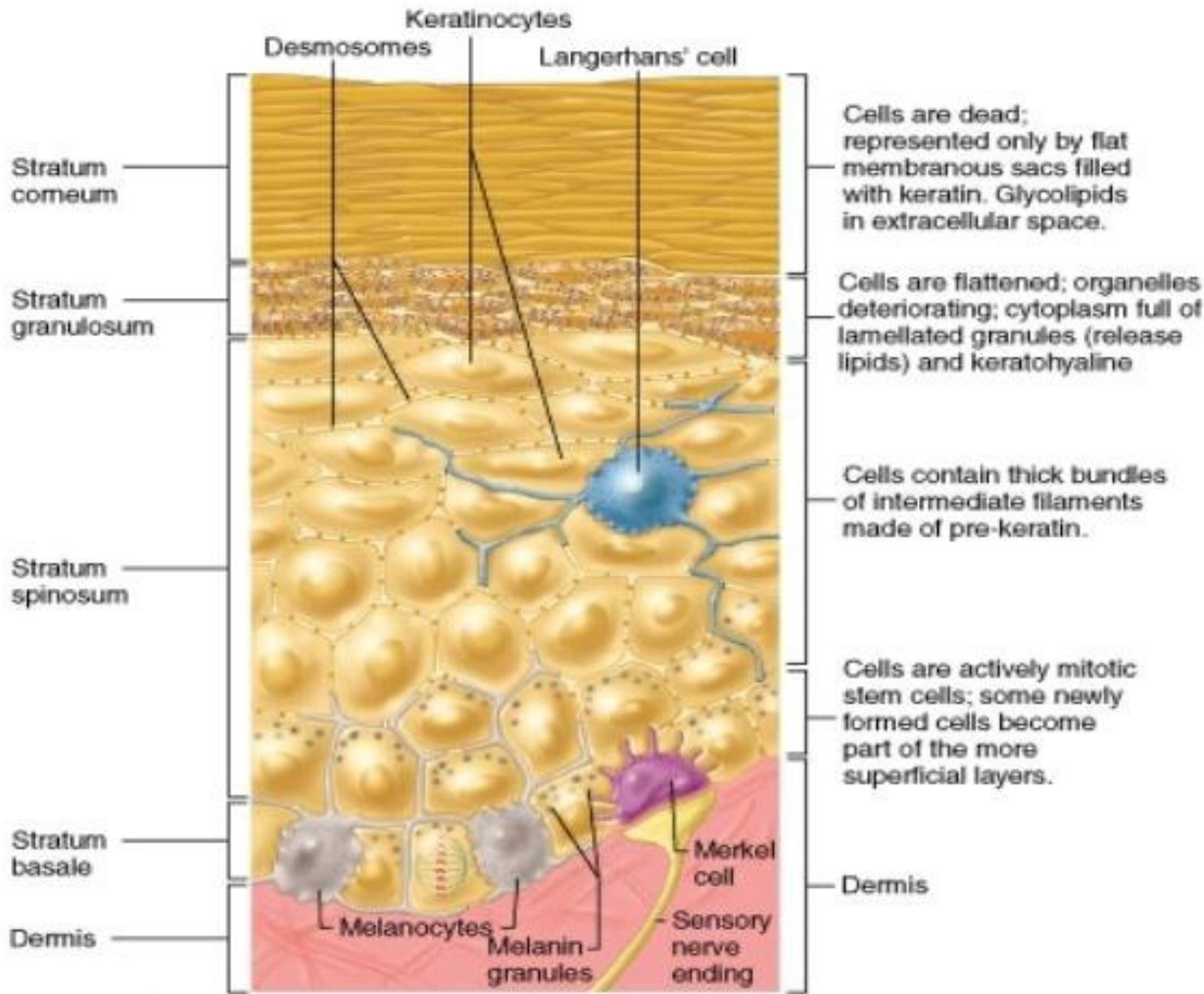
# SKIN

## SKIN ANATOMY



# LAYERS OF EPIDERMIS





# 5 layers of the epidermis

## 1- **Stratum corneum**

- layer has many rows of **dead cells filled with keratin**
- continuously shed and replaced (**desquamation**) – shedding / peeling
- effective barrier against light, heat and bacteria
- 20-30 cell layers thick
- dandruff and flakes
- 40 lbs. of skin flakes in a lifetime

## 2- **Stratum lucidum**

- seen in thick skin **of the palms and soles of feet.**
- 3-5 rows of clear flat dead cells
- keratohyalin (precursor) to keratin

### 3- **Stratum granulosum**

- 3-5 rows of flattened cells
- nuclei of cells flatten out
- organelles disintegrate cells eventually die
- **keratohyalin granules**
- lamellated granules secrete glycolipids into extracellular spaces to slow water loss in the epidermis

### 4- **Stratum spinosum:** “spiny layer”

- 8-10 rows of polyhedral (many sided) cells
- appearance of prickly spines
- **melanin granules and Langerhans' cell** predominate

## **5- Stratum basale / Stratum Germinatum:**

- deepest epidermal layer
- attached to dermis
- single row of cells
- mostly **columnar keratinocytes**
- with rapid mitotic division
- contain **merkel cells and melanocytes - 10-25%**

## Cells in the epidermis:

- keratinocytes
- melanocytes
- Merkel cells
- Langerhans' cells

### 1 Keratinocytes: most abundant

- produce keratin (fibrous protein)
- protective; waterproofing the skin
- continuous mitosis
- form in the deepest layer called **the stratum basale**
- cells push their way up to the surface where they are dead cells filled with keratin; will slough off. Regenerates every 25-45 days.

## **2- Melanocytes:**

- cells produce **brownish/black pigment** called **melanin**. (8% of epidermal cells)
- **stratum basale**
- branching processes (dendrites)
- melanin accumulates in melanosomes and transported along dendrites of the melanocytes to keratinocytes.
- melanin accumulates on the superficial aspect of the keratinocyte shielding its nucleus from harmful UV light.
- lack of melanin: **albino**

### **3 Merkel cells:**

- stratum basale
- epidermis of hairless skin
- attach to keratinocytes by desmosomes
- make contact with a sensory neuron ending called a Merkel disc (touch).

### **4 Langerhans' cells:**

- star-shaped cells arising from bone marrow that migrate to epidermis.
- epidermal dendritic cells (**macrophages**)
- interact with a WBC called a T- helper cell
- easily damaged by UV light.

# DERMIS

- flexible and strong connective tissue
- elastic, reticular and collagen fibers
- cells: **fibroblasts, macrophages (WBC), mast cells**
- **nerves, blood and lymphatic vessels**
- oil and sweat glands
- Two layers: **papillary and reticular**

# LAYERS OF DERMIS

## 1 Papillary layer:

- loose connective tissue with nipple like surface projection called dermal papilla.
- capillaries
- contain pain receptors
- contain touch receptors (Meissner's corpuscles)
- dermal ridges- epidermal ridges- pattern called fingerprints

## 2 Reticular layer:

- dense irregular
- collagen fibers offer strength
- holds water
- dermal tearing causes stretch marks.
  - striae

- Skin color: attributed to melanin, hemoglobin and carotene.
- Race is determined by amount of melanin not of melanocytes.
- Local accumulation of melanin will result in freckles and pigmented moles.
- Melanin is made through interaction with tyrosinase present in melanocytes
- UV light stimulates melanin production. Excessive UV light can damage DNA and cause solar elastosis (elastin fibers clump)
- Carotene is formed from Vit. A and deposits in stratum corneum and imparts an orange tone to skin

# **HYPODERMIS**

- called subcutaneous, Sub-Q or superficial fascia
- anchors skin to underlying structures
- contains **adipose tissue and blood vessels**
- common site for injection

# **GLANDS OF SKIN**

**Two types of glands exist in the integument.**

- Sebaceous glands (oil glands)
- Sudoriferous glands (sweat glands)

**Sebaceous glands: (holocrine glands)**

- connected to hair follicle
- not found on palms and soles of feet
- secretes sebum (fats, cholesterol and proteins)
- keep hair from drying out, keeps skin moist
- whiteheads, blackheads and acne

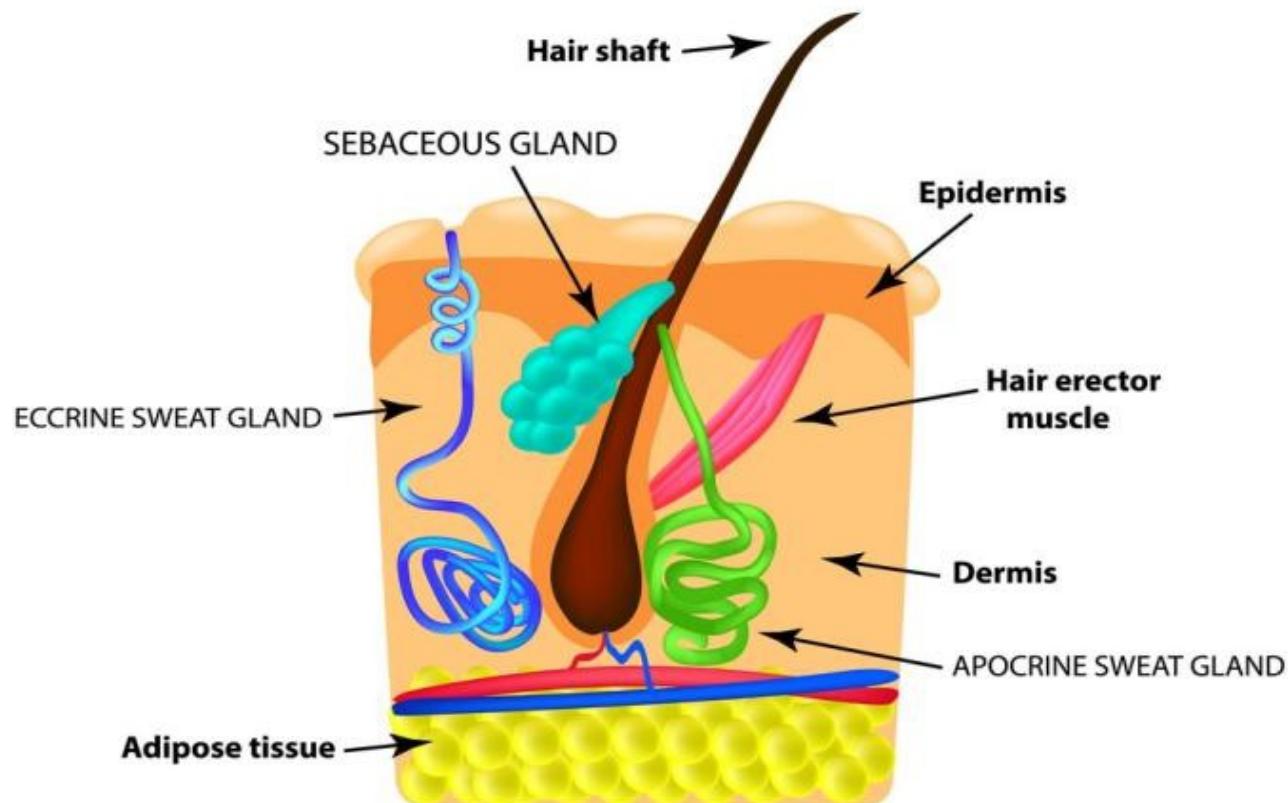
## **Sudoriferous glands: exocrine glands**

- millions located throughout the skin
- two types:
  - **eccrine**: more common (merocrine)
    - originate in subQ layer
    - duct empties on skin surface
    - palms and soles of feet
    - sweat is watery (99% H<sub>2</sub>O)
    - sweating regulated by sympathetic nervous system

## **Apocrine: axillary and pubic region**

- duct empties onto hair follicle
- viscous fluid
- causes body odor when bacteria break it down

# GLANDS OF THE SKIN



## **Ceruminous glands:** located in ear only

- modified apocrine glands
- originate in Sub Q layer
- ducts open onto External auditory meatus
- produces cerumen (ear wax) : brown sticky substance that prevents foreign material from entering.

# HAIR AND NAILS

- Both made up of keratin
  - Hair – over entire body except palm and soles
    - ✓ Concentrated in the scalp – 100,000 hairs
    - ✓ HAIR FOLLICLE – Cavity where hair shaft develops
    - ✓ HAIR SHAFT – Part of the hair that protrudes
    - ✓ HAIR ROOT – Part of the hair embedded in the follicle
    - ✓ HAIR GROWTH – 2 phases – Anagen / growth phase  
Telogen / resting phase
  - Nails – Hardened keratin
    - ✓ Protect the ends of fingers and toes from injury
    - ✓ Nail plate (body): visible portion
    - ✓ Nail root: located under cuticle
    - ✓ Lunula – arch shaped white area (half moon crescent shaped) at the base of nail bed
    - ✓ Nail bed: located under nail plate

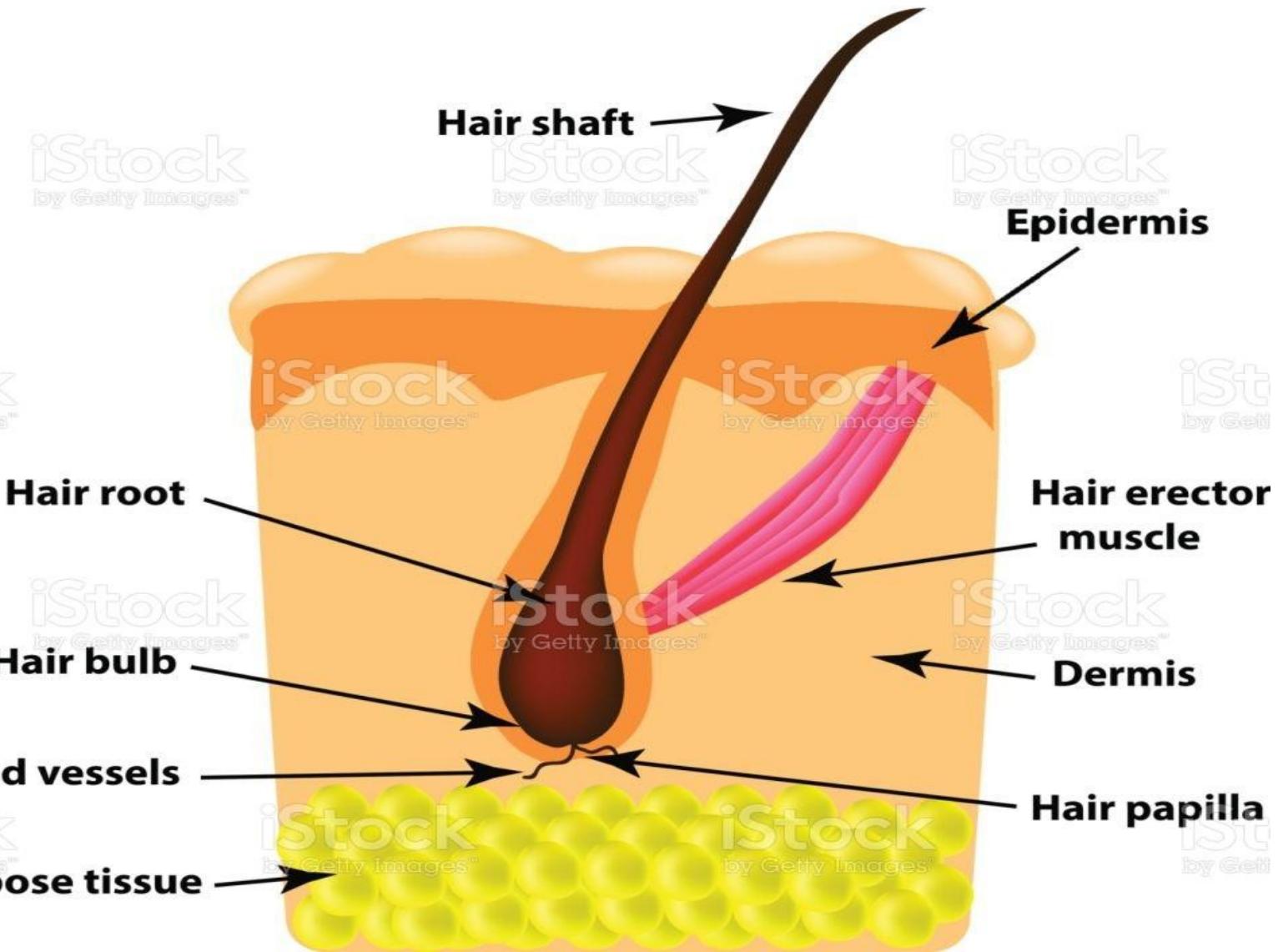
# HAIR STRUCTURE

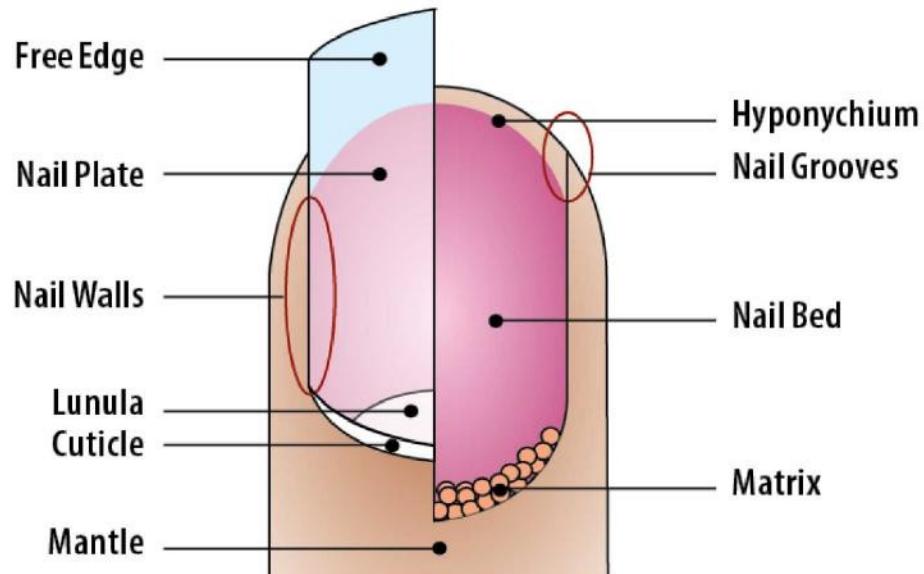
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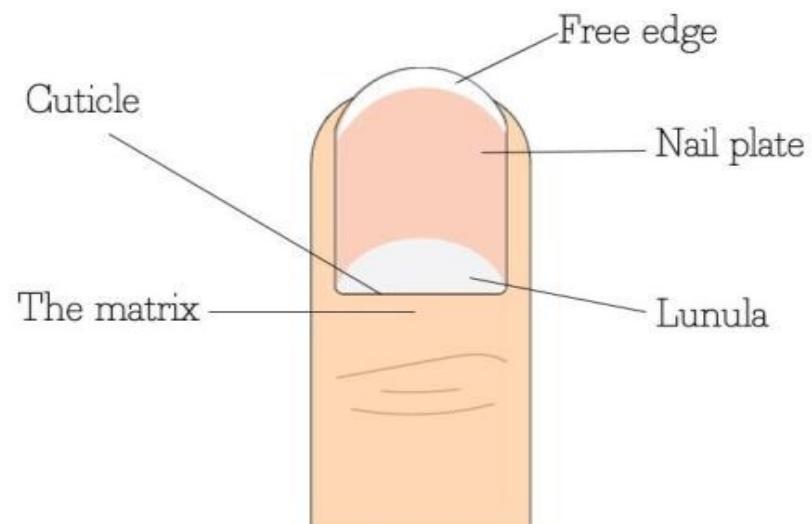
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## Basic anatomy of the nail

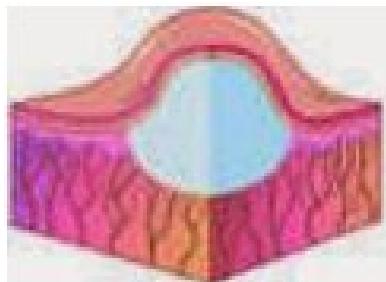


# SKIN LESIONS

- Any pathological change in tissue called lesions.
- Causes
  - ✓ Injury
  - ✓ Parasitic infections
  - ✓ Allergy
  - ✓ Bacterial, fungal , viral , yeast infection (Eg **Staphylococcus aureus, Streptococcus pyogenes**)

# TYPES OF SKIN LESIONS

- **Bulla:** A large blister containing clear fluid – Vesicle - greater than or equal to 5mm.
- **Vesicle :** A small elevation of the skin containing clear fluid - less than 5 mm; a blister - chickenpox.
- **Cyst :** A sealed sac containing fluid or semisolid material - has a membrane lining.
- **Fissure:** A deep furrow, slit, or cracklike sore.
- **Macule :** Discolored flat lesion (freckle or flat mole) less than 10 mm
- **Papule :** A small solid elevation of the skin - less than 10 mm
- **Nodule :** A solid elevation of the skin - more than 10 mm – palpable
- **Polyp:** A mushroom like growth - projects outward from the surface
- **Pustule:** A small elevation of the skin containing pus
- **Wheal :** A discolored swollen area of the skin; it is slightly elevated (hives)
- **Ulcer :** A deep open sore on the surface of the skin or mucous membrane -may lead to bleeding and scarring.



Cyst



Fissure



Macule



Nodule



Papule



Polyp



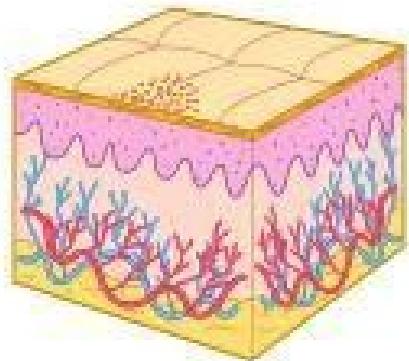
Pustule



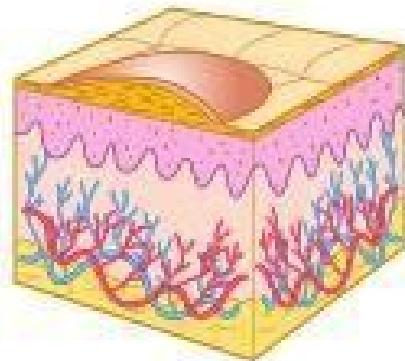
Vesicle



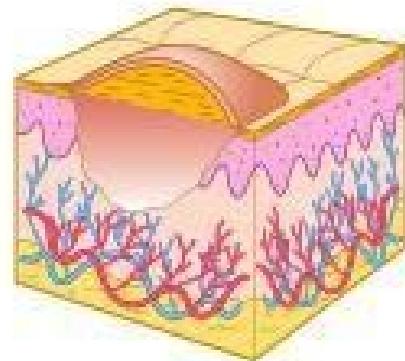
Wheal



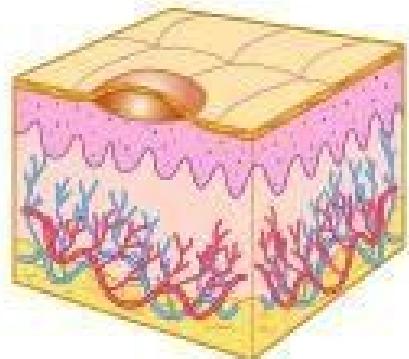
Macule



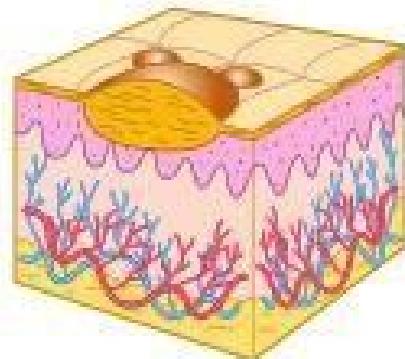
Papule



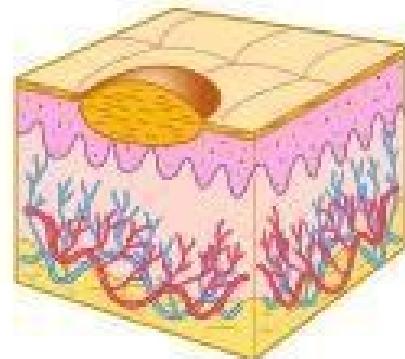
Nodule



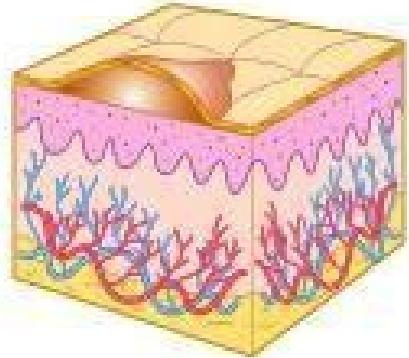
Vesicle



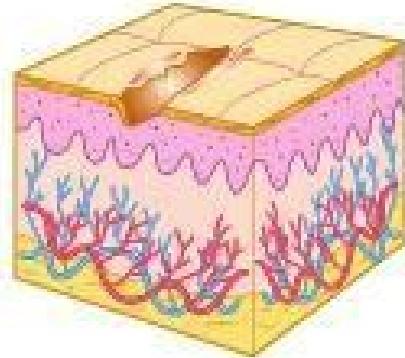
Bulla



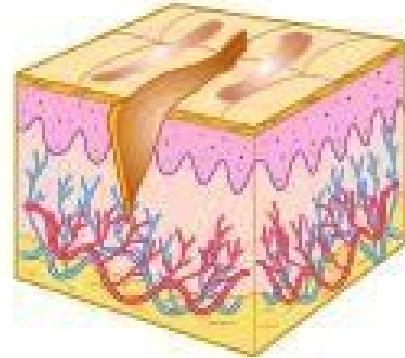
Pustule



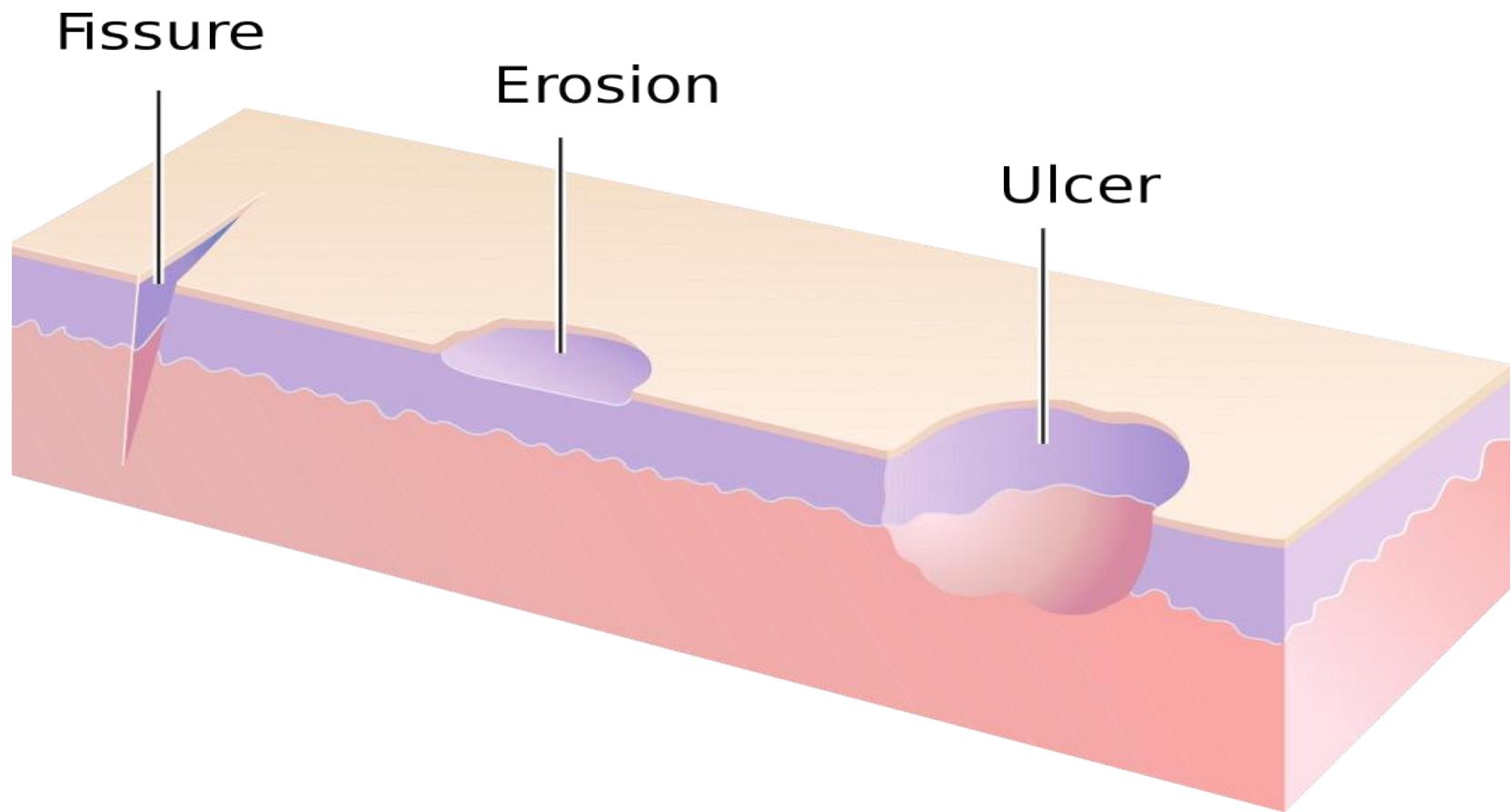
Wheal



Excoriations



Fissure



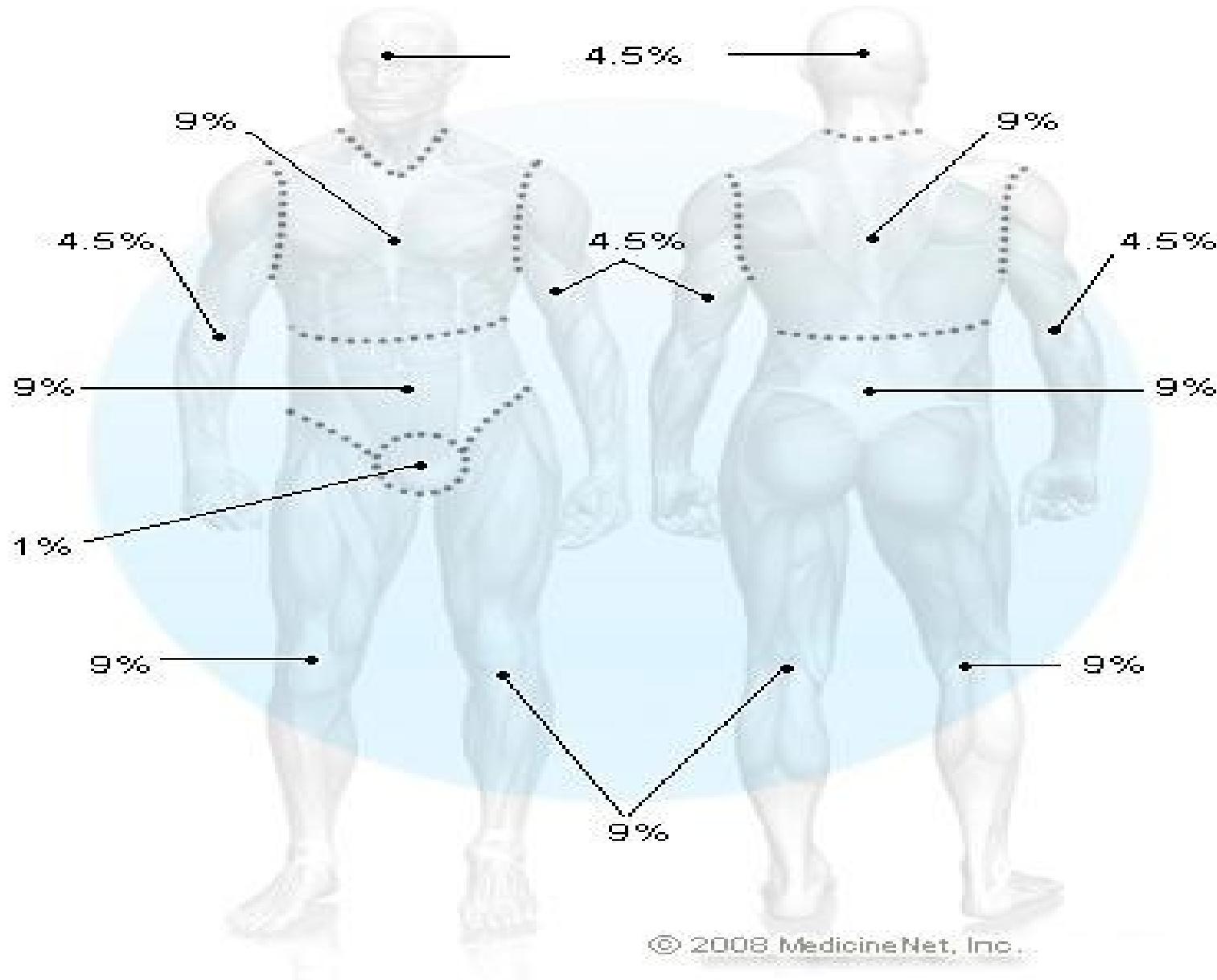
# BURNS AND FROST BITES

- A burn is any injury **caused by heat**
- Burns are one of the most common household injuries
- Burns are characterized by severe skin damage that causes **the affected skin cells /tissues to die**
- **Frostbite** is a skin condition caused
- by excessive exposure to cold temperatures. Frostbite damage is divided into three categories of degrees, just like burn damage.
- Burns are categorized on the basis of severity as follows

# RULE OF NINE

- “Rule of nine” is used to calculate the large proportion of total burn surface area
- Total is 99% with 1% genetalia coverage
- Head 9%
- Each arm 9%
- Each leg (front and rear) 9%
- Upper torso 9%
- Lower torso 9%
- Genitalia 1%

# Burn Percentage in Adults: Rule of Nines



**first-degree burns**—superficial epidermal lesions, erythema, hyperesthesia, and no blisters.

**second-degree burns (partial-thickness burn injury)**—epidermal and dermal lesions, erythema, blisters, and hyperesthesia (Figure 16-11A).

**third-degree burns (full-thickness burn injury)**—epidermis and dermis are destroyed (necrosis of skin), and subcutaneous layer is damaged, leaving charred, white tissue (Figure 16-11B).



**FIGURE 16-11 Burns.** **A, Second-degree burn.** Wound is painful and very sensitive to touch and air currents. **B, Third-degree burn** showing variable color (deep-red, white, black, and brown). The wound itself is insensate (patient does not respond to pinprick).

# **NEOPLASM**

- Any abnormal growth is a neoplasm
- 2 types of neoplasm→benign (non cancerous)



**malignant (cancerous)**

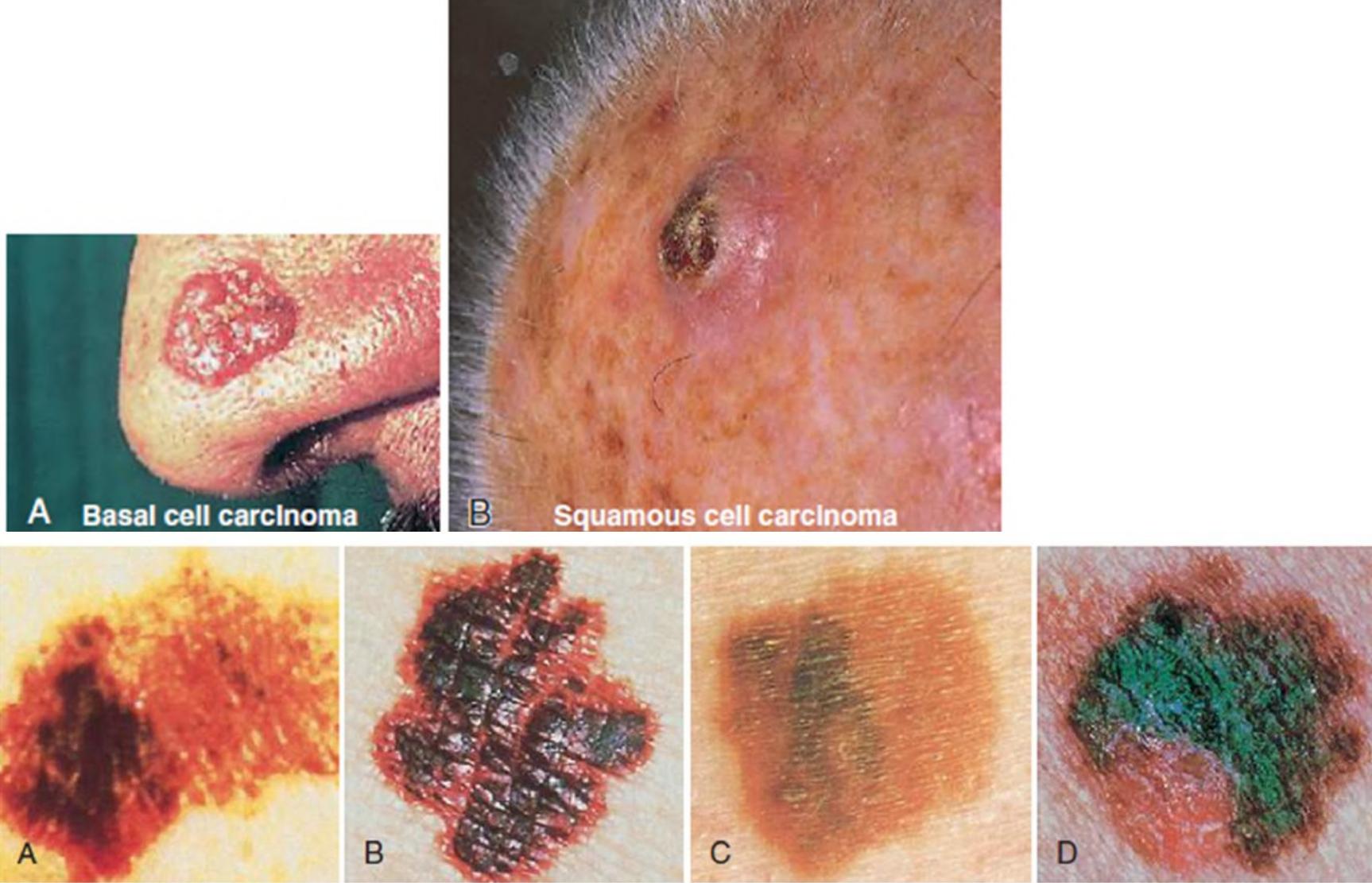
- Benign neoplasm does not spread to surrounding tissues
- Malignant neoplasm spread to the surrounding tissues  
These growths are termed **as carcinomas**
- Carcinomas are malignant growths composed of mainly epithelial cells
- Skin cancer is one of the most common cancer in humans

# Clark Level Classification of Malignant Melanomas

Level	Description
I	Tumour is confined to the epidermis
II	Tumour has invaded underlying papillary dermis
III	Tumour has invaded the junction of papillary and reticular dermis
IV	Tumour has invaded the reticular dermis
V	Tumour has invaded the sub Q fat

# Cancerous Skin Lesions

- **Basal cell carcinoma-** a malignant tumour of the basal cell layer(stratum germinativum) of the epidermis. It is slow growing and rarely metasizes.
- **Kaposi sarcoma-** a malignant growth characterized by nodules ranging in colour from pink to purple/dark blue. It can invade internal organs and be fatal. Primarily associated with AIDS.
- **Malignant melanoma-** a malignant growth that is composed of melanocytes. It can metasize to internal organs such as lungs and brain.
- **Squamous cell carcinoma-** a malignant tumour of the squamous epithelial cells. It can occur *in situ* or can be invasive.



**FIGURE 16-22** The ABCDEs of Melanoma:

Asymmetry: one half unlike the other half

Border: irregular or poorly circumscribed border

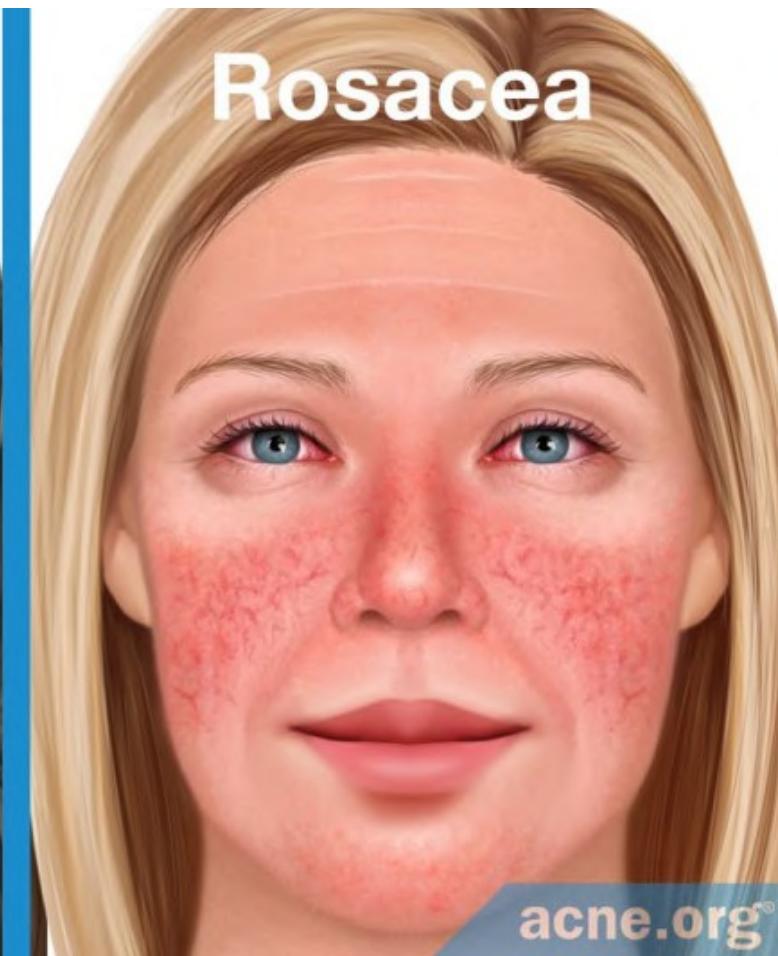
Color: varies from one area to another; shades of tan and brown, black, and sometimes white, red, or blue

Diameter: usually larger than 6 mm (diameter of a pencil eraser)

Evolution: change in the lesion over time

# Dermatologic Diseases and Conditions

- **Abrasions** - Removal or scraping away
- **Abscess** - A cavity filled with purulent matter (**Pus**)
- **Acne rosacea** - inflammatory disorder characterized by papules, pustules, erythema - dilation of small blood vessels on the face – middle age
- **Acne vulgaris** -inflammatory disorder characterized by papules, pustules, and comedones - excessive secretion of sebum and irritation - skin bacteria – puberty & adolescence
- **Actinic lentigines** - Small discolored lesions - by longterm exposure to ultraviolet light or rays - *liver spots*
- **Albinism** - inherited disorder in which the body is unable to produce melanin - skin and hair - white



[acne.org](https://acne.org)<sup>®</sup>



**ACTINIC LENTIGINES**

**ALBINISM**



- Alopecia - Loss of hair (total or partial)
- Angioma - swelling or tumor - blood vessels
- Anhidrosis - inability to tolerate heat -lack of sweat glands or malfunctioning sweat glands
- Asteatosis - Dry skin - flaking and itching.
- athlete foot - fungal infection of the foot - *tinea pedis* or *ringworm*
- atopic dermatitis -Inflammation of the skin -from hypersensitivity to an environmental substance – genetic
- Atrophy - decline in the functioning of tissues - wrinkled, thin skin
- Birthmark - A persistent colored lesion noted at or near birth
- cafe au lait spot - A patch of skin having light-brown pigmentation.
- Callus - thickening of the skin that develops - pressure or friction is applied to it over a period of time - often develop on the palms - and soles and can protect the skin from damage. *Callus* also refers to tissue that forms at the ends of a broken bone and eventually binds them together.





**CALLUS**



**KELOID**

**CAFÉ AU LAIT SPOT**



B

Keloid

- **Candida** - genus of yeast like fungi that can cause rashes and itching- diaper rash and vaginitis
- **Carbuncle** - deep-seated pus-forming staphylococcal infection (several furuncles) -heals slowly and results in a large scar
- **Caruncle** - small, fleshy growth (*caruncula*)
- **Cellulitis** -Spreading inflammation of cellular or connective tissue (increased blood flow, presence of white blood cells and edema, and a lack of pus formation.)
- **Chancre** - hard sore that breaks down into an ulcer, heals over a period of several weeks - primary lesion associated with syphilis
- **Chickenpox** -contagious disease primarily occurring in children - skin eruptions in the forms of vesicles, papules, macules, crusting and accompanied by severe itching
- **Chloasma** - Irregularly shaped brown patches – face - during pregnancy or as a result of using oral contraceptives -*moth patch or mask of pregnancy*
- **Cicatrix** – scar



**CHANCRE**

**FURUNCLE**

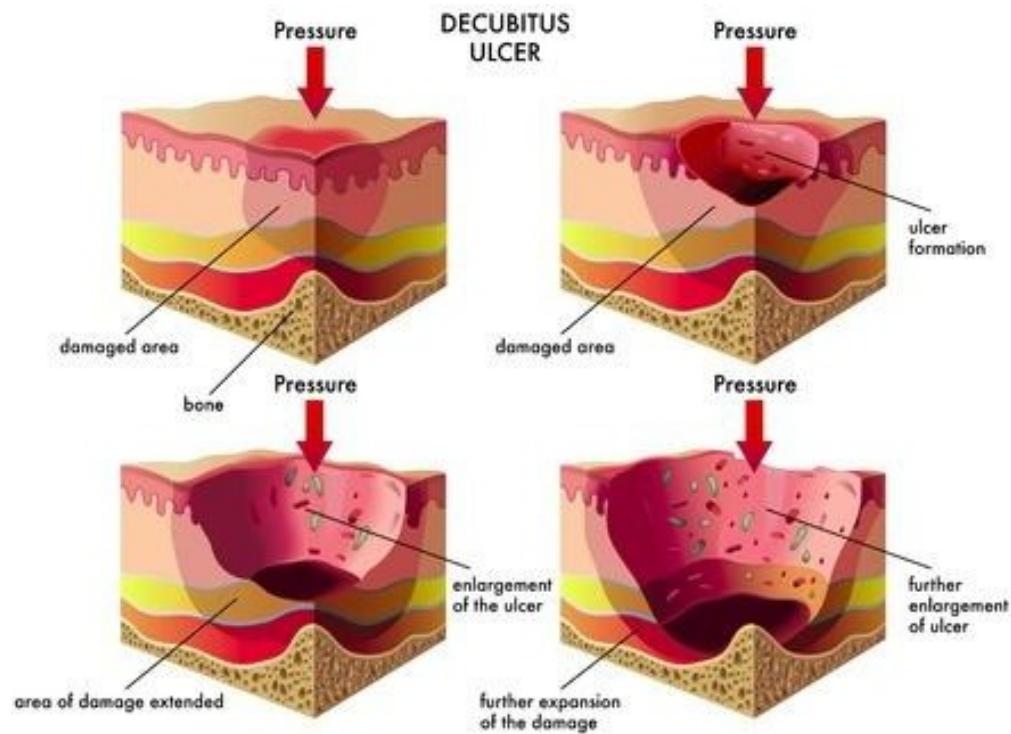


Petechia

Ecchymosis

- **comedo, comedos /comedones** -A dilated hair follicle filled with dead cells and oily secretions - **acne vulgaris** - closed(white heads)- open ( black heads )
- **contact dermatitis** -localized inflammation -caused by an allergy to poison, ivy, food, soap, skin care products, etc.
- **Contusion** -hemorrhage that occurs beneath unbroken skin (**bruise**)
- **Crust** – scab (dried blood, lymph, and/or pus)
- **Cyanosis** - dark blue or purplish coloration to the skin due to lack of oxygen.
- **decubitus ulcer** -A skin lesion caused by pressure being placed on the skin over an extended period of time (a *bedsore*)
- **Ecchymosis** -irregularly shaped area of discolored tissue -by blood hemorrhaging into the skin.

# DECUBITUS ULCER



- Eczema -inflammatory skin disease typically with redness of the skin, vesicles and crusting.
- Erosion - loss of all or part of the epidermis
- Erythema - Reddish skin (dilation of underlying capillaries)
- Erythema infectiosum - mild infectious disease, usually occurring in childhood - reddish rash (*fifth disease*)
- Erythroderma – abnormal, widespread reddening of the skin due to dilation of underlying capillaries. Sunburn is one cause of erythroderma
- Excoriation - scratch or scrape mark on the skin - covered with a crust
- Fistula -abnormal channel or tube that connects two hollow organs / leads from an organ to the skin's surface.
- Folliculitis - infection and inflammation of the hair follicles
- Freckle - small yellow or brown macule (individuals with light complexions) *ephelis* (pl. *ephelides*).
- Furuncle -pus-forming nodular infection originating deep in a hair follicle (a *boil*)

- Gangrene -death of tissue (lack of blood supply)
- Hemangioma -congenital benign (noncancerous) tumor that consists of a mass of blood vessels
- Hematoma -localized mass of blood outside the blood vessel and under the skin's surface
- herpes simplex (HSV-1) (HSV-2) - herpes viruses - Type 1 causes the eruption of vesicles on the borders of the lips or nose (cold sores)  
Type 2 causes genital lesions (Both types are recurring)
- herpes zoster - viral infection characterized by painful vesicles (blisters) along the path of an inflamed nerve (shingles)
- Hirsutism - Excessive facial and body hair, usually in a female
- Hyperhidrosis - Excessive sweating.
- Diaphoresis?

- Ichthyosis - Dryness of the skin with scales and flaking - become disfiguring
- Impetigo - contagious inflammatory skin disease – bacteria - vesicles and lesions - thick, yellowish crust
- Jaundice - skin, whites of the eyes, and associated tissues take on a yellowish color
- Keloid - firm, movable mass of scar tissue – trauma, surgery, burns, etc
- Keratosis - An abnormal thickening of the skin - by excessive keratin
- Lentigo - A brown or black macule - sharp margins ranging from 2 to 4 mm - A type of mole
- lichen planus - inflammatory eruption of papules and sometimes bullae - form scaly pruritic patches.
- Lichenification - Thickening and hardening of the skin
- Lipoma - A benign neoplasm of fat cells
- Melitis - An inflammation of the cheek
- Miliaria - eruption of tiny vesicles- by the retention of fluid in sweat glands (*heat rash.*)

- **Milium, milia** - keratin cyst caused by blockage of a hair follicle or sweat gland (*whitehead*)
- **Mole** - A localized growth of hyperpigmented skin
- **Mycosis** - any fungus disease.
- **nevus, nevi (plural)** -A congenital discoloration of the skin such as a mole or birthmark.
- **Onycholysis** - A condition in which the nails are loosened from the nailbed.
- **Paronychia** - An inflammation of the skin around the nail  
-bacteria or fungi.
- **Patch** - A flat discolored area of skin greater than 10 mm  
- large macule.
- **Pediculosis** - Infestation by lice causing severe itching.
- **Pemphigus** - A group of distinctive diseases characterized by successive outbreaks of vesicles, bullae, or blisters.

- **petechia** - Minute hemorrhages of the skin - tiny purple or red spots.
- **pityriasis rosea** - An inflammatory skin disease - scaly plaques and patches.
- **plaque** - A slightly elevated lesion greater than 10 mm. It is larger than a papule and can be a group of papules.
- **pruritus** - Itching.
- **Psoriasis** - A chronic, recurrent, inflammatory skin disease resulting in dry scaly red patches covered by silvery-gray scales. The epithelial cells divide at an abnormally rapid rate. The cause is unknown, but a family history of the disease is common. Age of onset is typically 10 to 40.
- **Purpura** - An area in which blood vessels have hemorrhaged into the skin.
- **Rhinophyma** - Enlargement of the nose characterized by dilated follicles and caused by overgrowth of sebaceous glands.
- **Ringworm** - A fungal infection, tinea.
- **Rubella** - An infectious viral disease accompanied by fever and a red rash. It can cause birth defects in pregnant women - *German measles*.



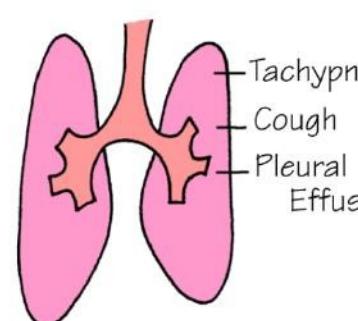
PSORIASIS

- **Scabies** - A transmissible skin infection caused by a parasite's (a mite) burrowing into the skin. It is accompanied by extreme itching.
- **Scale** - A raised plate of epithelium that is abundantly filled with keratin.
- **Scar** - An area of fibrous tissue that has replaced normal skin after some form of destruction of the dermis.
- **Scleroderma** - A chronic disease in which the connective tissue hardens and shrinks, causing thickening of the skin.
- **Seborrhea** - Overactivity of the oil glands leading to excessive sebum.

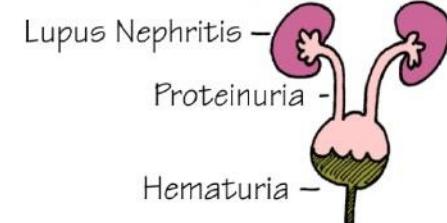
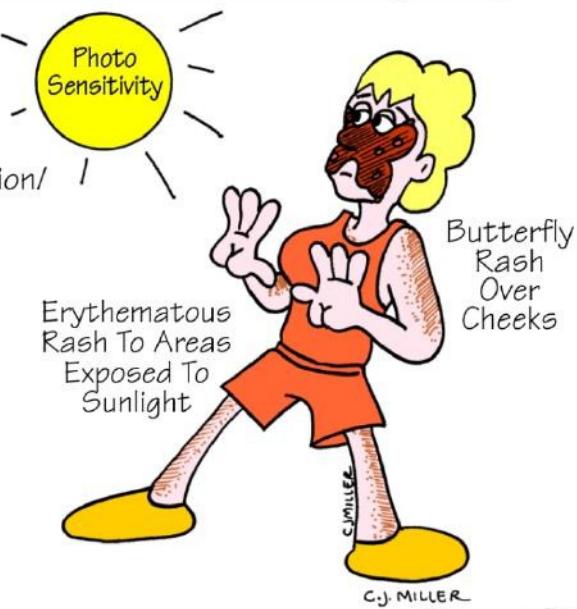
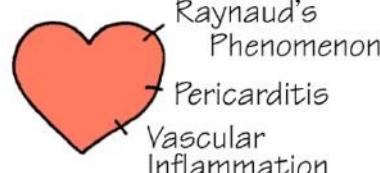
- **Systemic lupus erythematosus (SLE)** -A chronic systemic inflammatory disease affecting the connective tissues in the skin, joints, and internal organs. Dermal lesions include an erythema in the shape of butterfly wings across the cheekbones of the face.
- **Telangiectasia** - Dilation of superficial blood vessels.
- **Tinea** - A fungal infection. There are several types including tinea corporis (ringworm of the body), tinea capitis (ringworm of the scalp), tinea pedis (athlete foot), tinea barbae (ringworm of the beard), and onychomycosis (ringworm of the nails)
- **Tumor** - A large nodule or swelling generally greater than 20 mm.
- **Urticaria** - An allergic reaction that results in the eruption of small itchy patches called wheals. Also called *hives*.



## SYSTEMIC LUPUS ERYTHEMATOSUS (SLE)

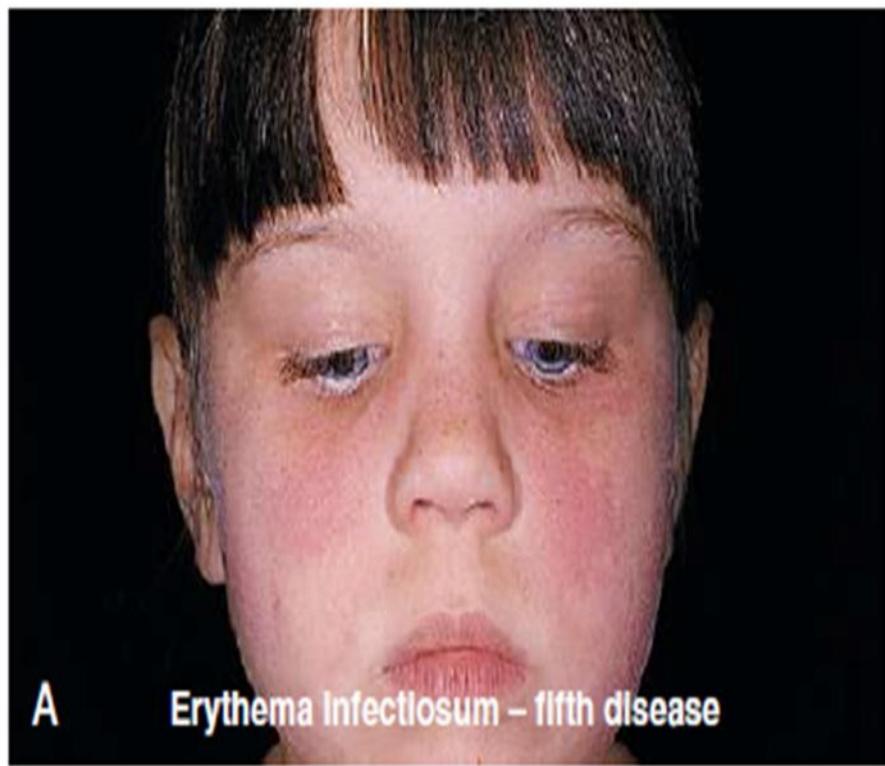


- Weight Loss
- Fatigue
- Fever ↑ Infection
- Arthritis
- Emotional Lability
- Hematologic Disorders
- Neurologic Disorders



- **Varicella** - An infectious viral disease most commonly occurring in children. It causes pustules and itching and is commonly referred to as chickenpox.
- **Vitiligo** - Irregularly shaped patches of milky-white nonpigmented skin surrounded by skin with normal pigmentation.
- **Wart** - A thickening of the epidermis caused by a virus. Warts typically have a round shape.
- **Xanthoma** - A yellowish nodule on the skin composed of fat - on the eyelids.
- **Xeroderma** - Excessive dryness of the skin.

- **leukoplakia** - White, thickened patches on mucous membrane tissue of the tongue or cheek (evolves to squamous cell carcinoma).
- **nevus, nevi** - Pigmented lesion of the skin (MOLES)
- **verruca, verrucae** - Epidermal growth (wart) caused by a virus.



A      Erythema Infectiosum – fifth disease



B      Hand-foot-and-mouth disease

**FIGURE 16-13** A, Erythema infectiosum - fifth disease. It is marked by fever and an erythematous rash that has a “slapped cheek” appearance on the face and later involving the arms, buttocks, and trunk. It is caused by a parvovirus. B, Hand-foot-and-mouth disease. It is caused by an enterovirus.

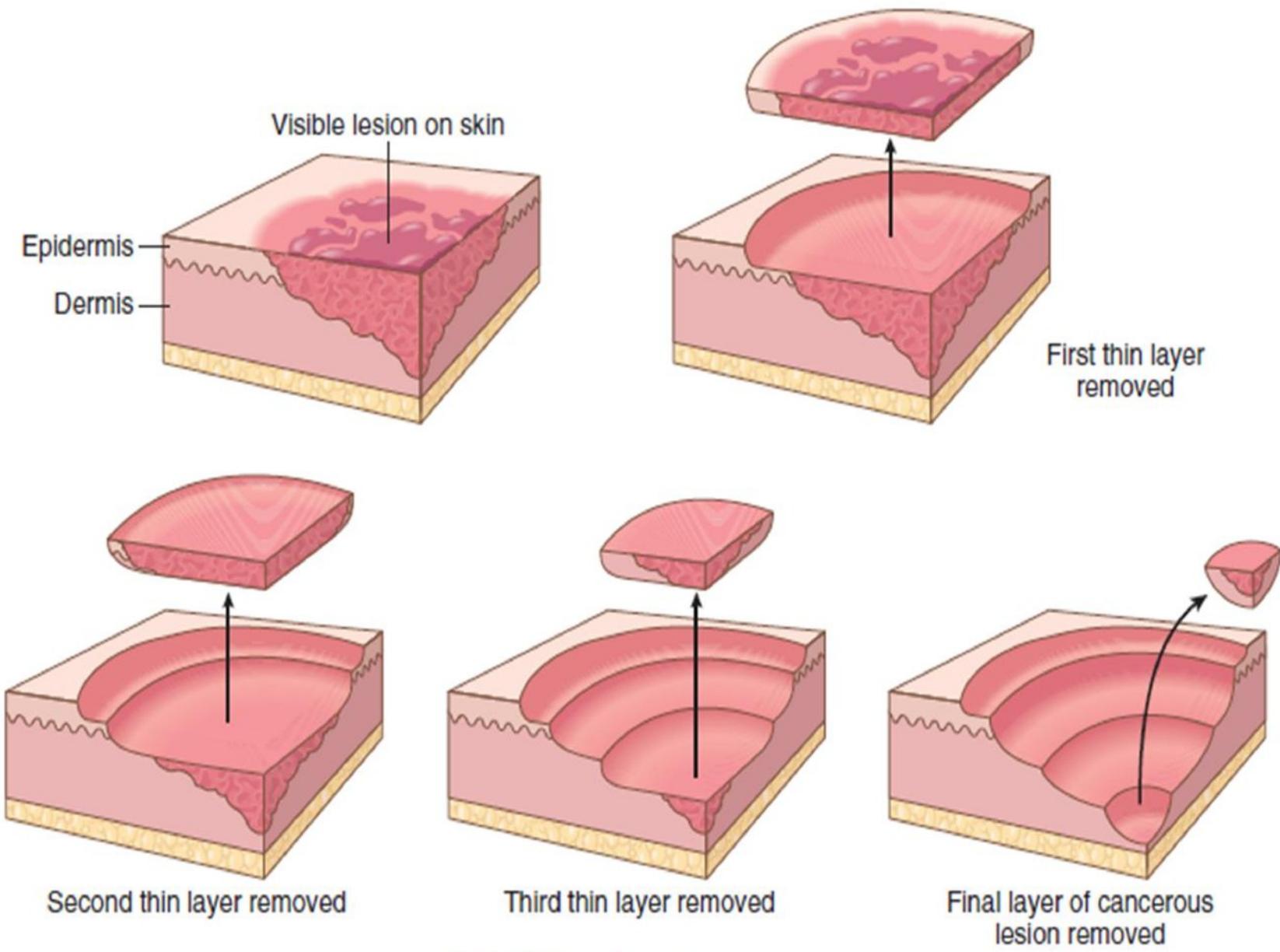
# THERAPEUTIC PROCEDURES

Procedure	Description
allografting	Transplanting a graft (tissue or organ) obtained from one individual of a species to another individual of the same species.
autografting	Transplanting a graft obtained from one area of the body to another area of the same individual.
chemotherapy	Treating a neoplasm by using drugs in an attempt to eradicate it or reduce its size.
cryosurgery	Using liquid nitrogen or carbon dioxide to achieve freezing temperatures that destroy tissue.
curettage	Scraping an area to remove abnormal tissue or new growths.
debridement	Excising dead tissue from a wound and/or removing any foreign matter.
dermabrasion	Using special sandpaper, wire brushes, or other abrasive materials to remove fine wrinkles, acne scars, tattoos, etc.
electrodesiccation	Using electric current to destroy tissue or close blood vessels in the skin or mucous membranes.
excision	Surgically cutting out all or part of a structure. Tumors are frequently excised.
fulguration	Destroying tissue by using high-frequency electric sparks.

grafting	Transplanting tissue to replace tissue that has been damaged or destroyed due to disease or injury.
incision and drainage (I&D)	Cutting open a lesion and draining its contents.
laser surgery	Using high-energy light beams to remove birthmarks, scars, wrinkles, etc.
Mohs surgery	Microscopically controlled excising in which superficial cancers are removed following rapid killing of the tissue by chemicals.
radiotherapy	Using radiation to treat a disease. In the case of a neoplasm, radiotherapy may be used in an attempt to eradicate it or reduce its size.
skin grafting	Transplanting skin from one area of a patient's or donor's body to a denuded or traumatized area on the patient.
xenografting	Transplanting a graft obtained from an animal of one species to an animal of a different species.

# MOHS SURGERY

- Mohs surgery is a precise surgical technique used to **treat skin cancer**. During Mohs surgery, thin layers of cancer-containing skin are progressively removed and examined until only cancer-free tissue remains.
- During the surgery, after each removal of tissue and while **the patient waits, the tissue is examined for cancer cells**. That examination dictates the decision for additional tissue removal. Mohs surgery is the gold standard method for obtaining complete margin control during removal of a skin cancer (complete circumferential peripheral and deep margin assessment - [CCPDMA](#)) using [frozen section histology](#).
- Mohs surgery is also known as **Mohs micrographic surgery**.



**FIGURE 16-23** Mohs surgery.

# TERMS

<b>Form</b>	<b>Meaning</b>	<b>Example(s)</b>
adip/o	fat (see also lip/o)	adipose, adipocyte
albin/o	white	albinism
angi/o	blood or lymph vessels	angioma, angioedema
cutane/o	skin (see also derm/o and dermat/o)	subcutaneous
derm/o	skin (see also cutane/o and dermat/o)	dermis, hypodermic
dermat/o	skin (see also cutane/o and derm/o)	dermatitis, dermatology
hemangi/o	blood vessel (see also angi/o)	hemangioma, hemangiectasis
hydr/o	water; watery	hydrate, dehydration
kerat/o	hard; horny tissue	keratin, keratosis
lip/o	lipid; fat (see also adip/o)	lipocyte, liposuction
melan/o	black	melanin, melanocyte, melanoma
myc/o	fungus	mycosis, mycodermatitis
onych/o	fingernail; toenail	onychomycosis, onychoclasis
phor/o	carrying; a carrier	diaphoresis, diaphoretic
scler/o	hardening	scleroderma
seb/o	sebum (see also sebace/o)	sebum, seborrhea
sebace/o	sebum (see also seb/o)	sebaceous
squam/o	scalelike	squamous
sudo/r	sweat; perspiration	sudoriferous, sudor, sudation
xer/o	dry	xeroderma

COMBINING FORM	MEANING	TERMINOLOGY	MEANING
adip/o	fat (see <b>lip/o</b> and <b>steat/o</b> )	<u>adipose</u> _____	
albin/o	white	<u>albinism</u> _____	<i>Table 16-1 lists combining forms for colors and examples of terms using those combining forms.</i>
caus/o	burn, burning	<u>causalgia</u> _____	<i>Intensely unpleasant burning sensation in skin and muscles when there is damage to nerves.</i>
cauter/o	heat, burn	<u>electrocautery</u> _____	<i>An instrument containing a needle or blade used during surgery to burn through tissue by means of an electrical current. Electrocautery is very effective in minimizing blood loss.</i>
cutane/o	skin (see <b>derm/o</b> )	<u>subcutaneous</u> _____	<i>Epidermis and dermis are the cutaneous layers of the skin.</i>
<b>derm/o, dermat/o</b>	skin	<u>epidermis</u> _____	
		<u>dermatitis</u> _____	
		<u>dermatologist</u> _____	
		<u>dermabrasion</u> _____	<i>Abrasions means a scraping away. Dermabrasion using a sandpaper-like material removes acne scars and fine wrinkles.</i>
		<u>epidermolysis</u> _____	<i>Loosening of the epidermis with the development of large blisters; occurs after injury, or with blister-producing diseases.</i>

<b>diaphor/o</b>	profuse sweating (see <b>hidr/o</b> )	<b>diaphoresis</b> _____ <i>Commonly called sweating.</i>
<b>erythem/o,</b> <b>erythemat/o</b>	redness	<b>erythema</b> _____ <i>Flushing; widespread redness of the skin. Pronunciation is ēr-Y-THĒ-mă. Erythematous means pertaining to erythema.</i>
<b>hidr/o</b>	sweat	<b>anhidrosis</b> _____ <i>Do not confuse hidr/o with hydr/o (water)!</i>
<b>ichthy/o</b>	dry, scaly (fish-like)	<b>ichthyosis</b> _____ <i>This is usually a hereditary condition in which the skin is dry, rough, and scaly (resembling fish scales) because of a defect in keratinization. Ichthyosis also can be acquired, appearing with malignancies such as lymphomas and multiple myeloma. Greek ichthys means fish (Figure 16-5A).</i>

COMBINING FORM	MEANING	TERMINOLOGY	MEANING
kerat/o	hard	<u>keratosis</u> _____ <i>See page 670.</i>	
leuk/o	white	<u>leukoplakia</u> _____ <i>The suffix -plakia means plaques (Figure 16-5B).</i>	
lip/o	fat	<u>lipoma</u> _____  <u>liposuction</u> _____ <i>Removal of subcutaneous fat tissue through a tube that is introduced into the fatty area via a small incision. The fat is aspirated (suctioned out).</i>	
melan/o	black	<u>melanocyte</u> _____  <u>melanoma</u> _____ <i>This is a malignant skin tumor. See page 672.</i>	

COMBINING FORM	MEANING	TERMINOLOGY	MEANING
myc/o	fungus (fungi include yeasts, molds, and mushrooms)	<u>mycosis</u> _____ <i>An example of a mycosis (fungal infection) is <b>tinea pedis</b>, commonly called "athlete's foot" (Figure 16-6A). Another fungal infection is <b>tinea corporis</b> (ringworm). See page 669.</i>	
onych/o	nail (see <b>ungu/o</b> )	<u>onycholysis</u> _____ <i>Separation of the nail plate from the nail bed in fungal infections after trauma. See Figure 16-3, page 665. Onycholysis is often seen in psoriasis.</i>	
		<u>onychomycosis</u> _____ <i>Fungal infection of the nails, which become white, opaque, thick, and brittle.</i>	
		<u>paronychia</u> _____ <i>Par- means near or beside. Paronychia is inflammation and swelling of the soft tissue around the nail and is associated with torn cuticles or ingrown nails (Figure 16-6B).</i>	
phyt/o	plant	<u>dermatophytosis</u> _____ <i>Examples are fungal infections (mycoses) (see Figure 16-6A).</i>	

**pil/o**

hair (see **trich/o**),  
hair follicle

**pilosebaceous**

*Sebace/o indicates a gland that secretes sebum. The pilosebaceous unit is the combination of the hair follicle and attached sebaceous gland.*

**py/o**

pus

**pyoderma**

*Pus within the skin (-derma). **Impetigo** is a purulent (pus-containing) skin disease caused by bacterial infection. See page 667.*

**rhytid/o**

wrinkle

**rhytidectomy**

*Cosmetic plastic surgery to remove wrinkles and excess skin; also called rhytidoplasty or face lift. Laser treatments, **Botox Cosmetic** (purified botulinum toxin) injections, and injectable fillers are used to soften facial lines and wrinkles.* 

**seb/o**

sebum (oily  
secretion from  
sebaceous glands)

**seborrhea**

*Excessive secretion from sebaceous glands. **Seborrhelic dermatitis** commonly is known as **dandruff**.*

**squam/o**

scale-like

**squamous epithelium**

*Cells are flat and scale-like; pavement epithelium.*

COMBINING FORM	MEANING	TERMINOLOGY	MEANING
steat/o	fat	<u>steatoma</u> _____	<i>Cystic collection of sebum (fatty material) that forms in a sebaceous gland and can become infected; sebaceous cyst. See Figure 16-7A.</i>
trich/o	hair	<u>hypertrichosis</u> _____	
ungu/o	nail	<u>subungual</u> _____	
xanth/o	yellow	<u>xanthoma</u> _____	<i>Nodules develop under the skin owing to excess lipid deposits and can be associated with a high cholesterol level. A xanthoma that appears on the eyelids is a <b>xanthelasma</b> (-elasma = a flat plate) (Figure 16-7B).</i>
xer/o	dry	<u>xerosis</u> _____	<i>This is very dry skin.</i>

# ABBREVIATIONS

Abbreviation	Meaning
Bx	biopsy
derm	dermatology
FS	frozen section
HSV-1	herpes simplex virus type 1
HSV-2	herpes simplex virus type 2
I&D	incision and drainage irrigation and debridement irrigation and drainage
KOH	potassium hydroxide
SLE	systemic lupus erythematosus
SQ, subcu	subcutaneous
ung	ointment
UV	ultraviolet



## ABBREVIATIONS

ABCDE	asymmetry (of shape), border (irregularity), color (variation within one lesion), diameter (greater than 6 mm), evolution (change)—characteristics associated with melanoma	PPD	purified protein derivative—used in skin test for tuberculosis
Bx	biopsy	PUVA	psoralen-ultraviolet A light therapy; treatment for psoriasis and other skin conditions
Derm	dermatology	SLE	systemic lupus erythematosus
DLE	discoid lupus erythematosus	SC	subcutaneous

**THANK YOU**