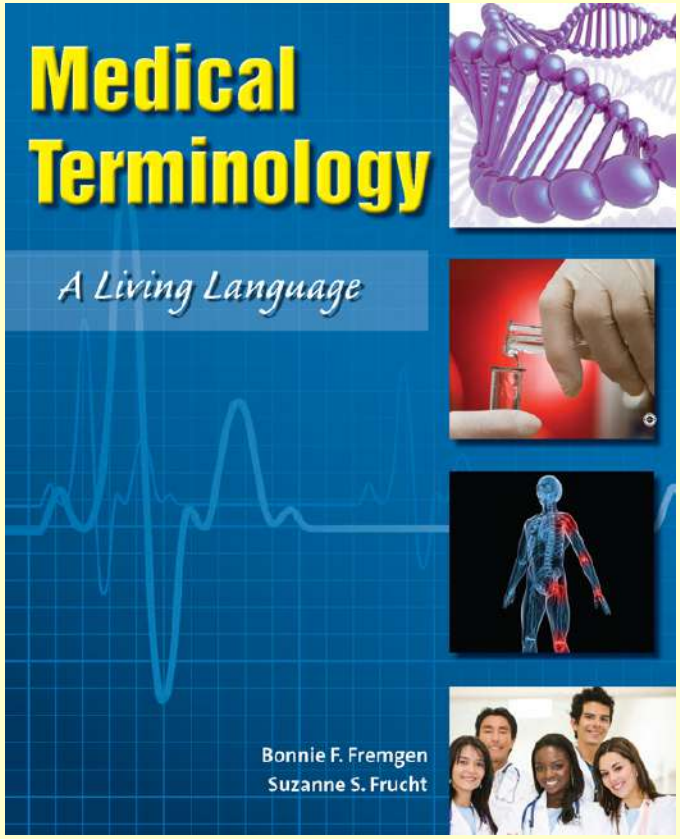
Medical Terminology
A Living Language



Chapter 3

Integumentary System

PEARSON Education

Medical Terminology: A Living Language, Fourth Edition
Bonnie F. Fremgen and Suzanne S. Frucht

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Multimedia Directory

Slide 38Skin Anatomy Exercise

Slide 77Decubitus Ulcers Video

Slide 78Eczema Video

Slide 83Skin Cancer Video

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Integumentary System at a Glance

- Functions of Integumentary System
  - Two-way protective barrier
  - Temperature regulation
  - Houses sensory receptors
  - Secretes important fluids

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Integumentary System at a Glance

- Organs of Integumentary System
  - Skin
  - Hair
  - Nails
  - Sebaceous glands
  - Sweat glands

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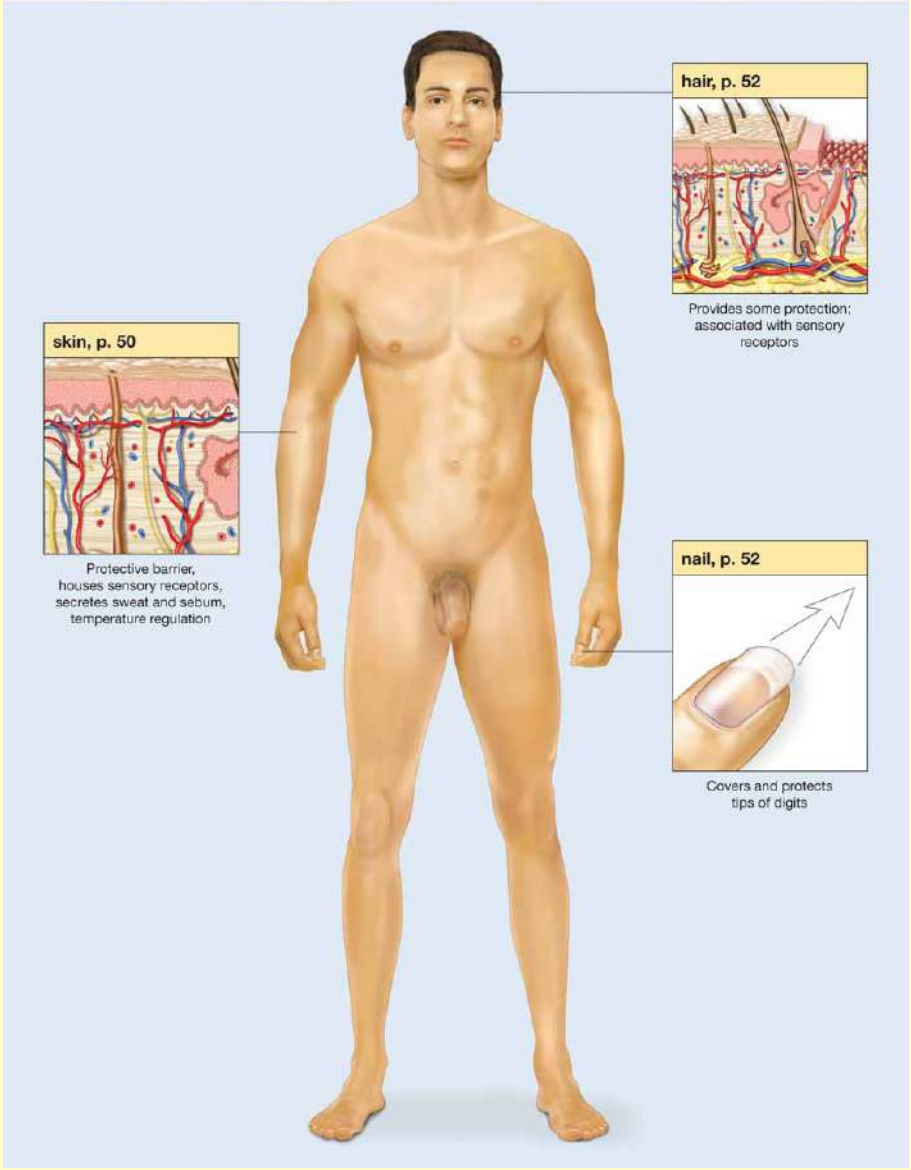
Integumentary System Illustrated



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Integumentary Combining Forms

- albin/owhite
- bi/olife
- cry/ocold
- cutane/oskin
- cyan/oblue
- derm/oskin
- dermat/oskin
- diaphor/oprofuse sweating
- electr/oelectricity
- erythr/ored
- hidr/osweat
- ichthy/oscaly, dry
- kerat/ohard, horny

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Integumentary Combining Forms

- leuk/owhite
- lip/ofat
- melan/oblack
- myc/ofungus
- necr/odeath
- onych/onail
- pil/ohair
- phot/olight
- py/opus
- rhytid/owrinkle
- scler/ohard
- seb/ooil
- trich/ohair
- ungu/onail
- vesic/obladder
- xer/odry

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Integumentary System Suffixes

- –dermaskin
- –opsyview
- –tomeinstrument to use to cut

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Integumentary System Prefixes

- allo –other, different from usual
- xeno–strange, foreign

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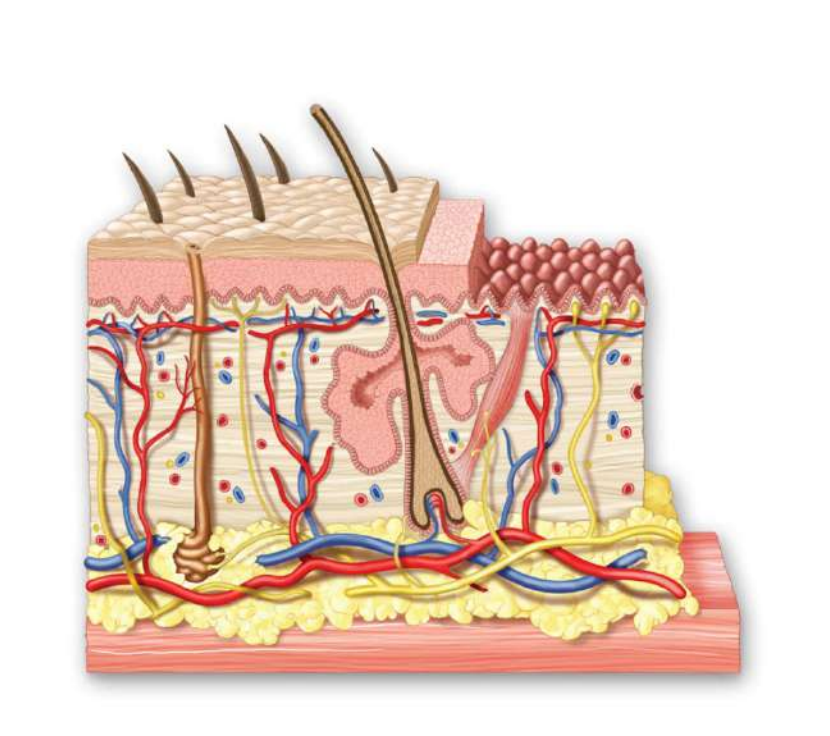
Anatomy and Physiology

- Skin
- Accessory organs
  - **Sweat glands**
  - **Sebaceous glands**
  - **Hair**
  - **Nails**



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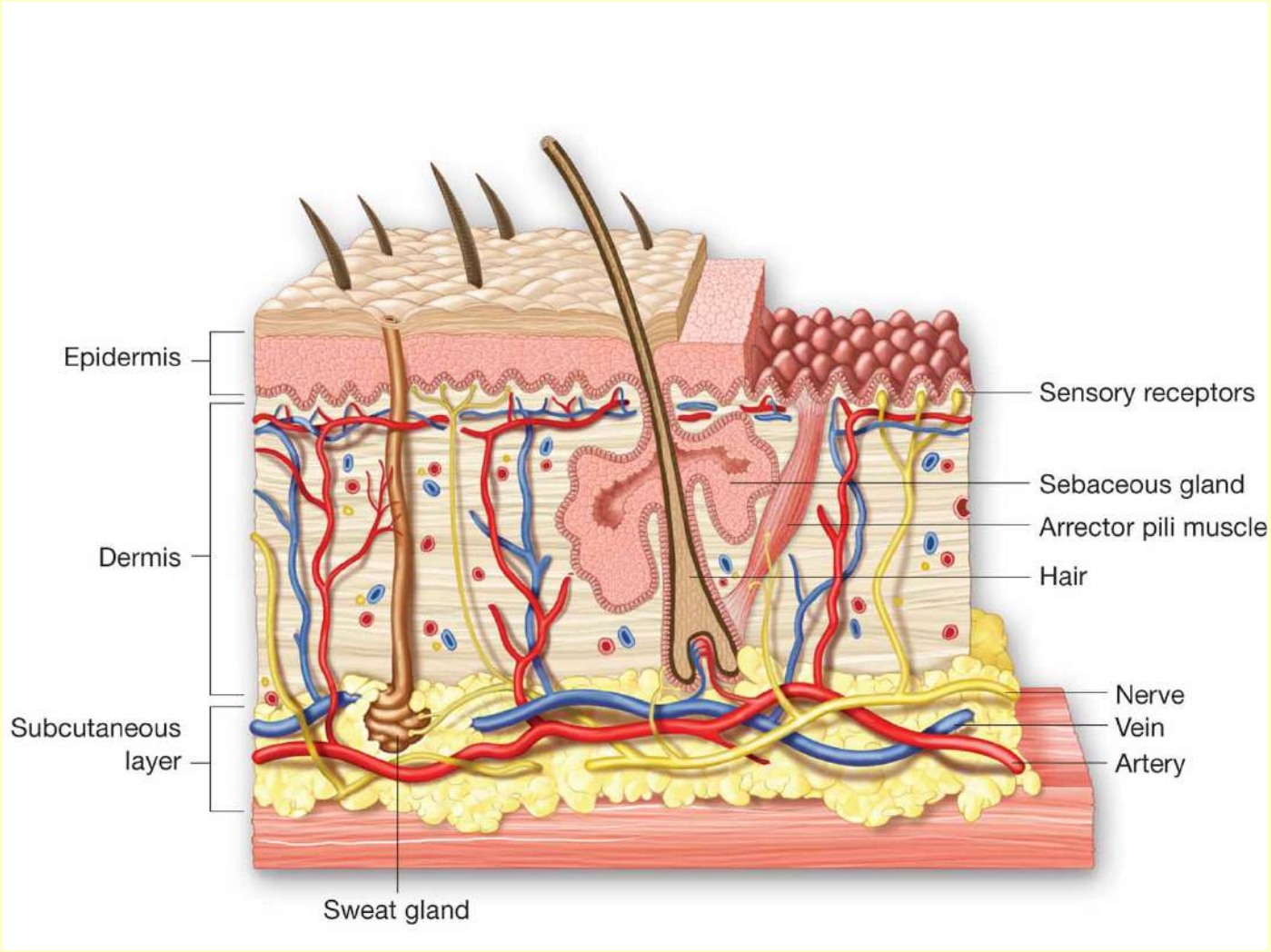

Figure 3.1 – Skin structure, including the three layers of the skin and the accessory organs: sweat glands, sebaceous glands, and hair.

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Anatomy and Physiology

- Largest organ in body
- Weighs more than 20 pounds (in adult)
- Skin also called:
  - **Integument**
  - **Cutaneous membrane**

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Functions

- Protection
- House nerve receptors
- Secrete fluids
- Regulate temperature

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Protection

- Primary function
- Forms 2-way barrier
  - Keeps out pathogens and harmful substances
  - Prevents critical body fluids from escaping
- Protects underlying tissues

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Sensory Receptors

- Located within middle layer of skin
- Detect:
  - Temperature
  - Pain
  - Touch
  - Pressure
- Nerve endings convey messages to brain and spinal cord

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Fluids Produced

- Sweat glands:
  - Assist body in maintaining internal temperature
  - Create cooling effect when sweat evaporates
- Sebaceous glands:
  - Oil glands
  - Produce **sebum**
  - Lubricates the skin surface

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Temperature Regulation

- To cool skin:
  - Sweat evaporation
  - Dilate superficial blood vessels to release heat
- To conserve heat
  - Constrict superficial blood vessels to keep warm blood away from surface
  - Continuous fat layer acts as insulation

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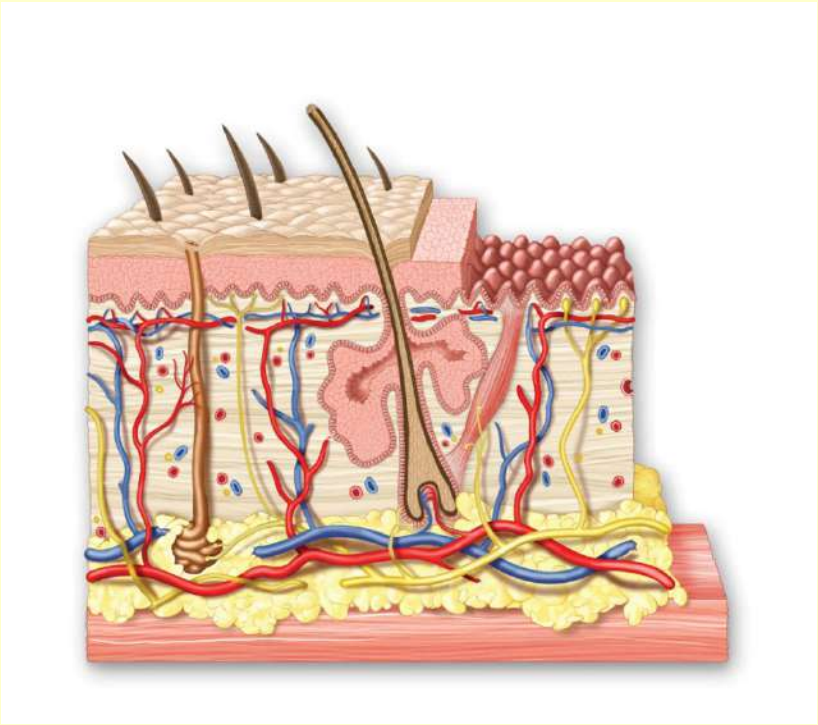
The Skin

- Three layers
  - **Epidermis** – thin, outer membrane layer
  - **Dermis** – middle, fibrous connective tissue layer
  - **Subcutaneous layer** – innermost layer of fatty tissue



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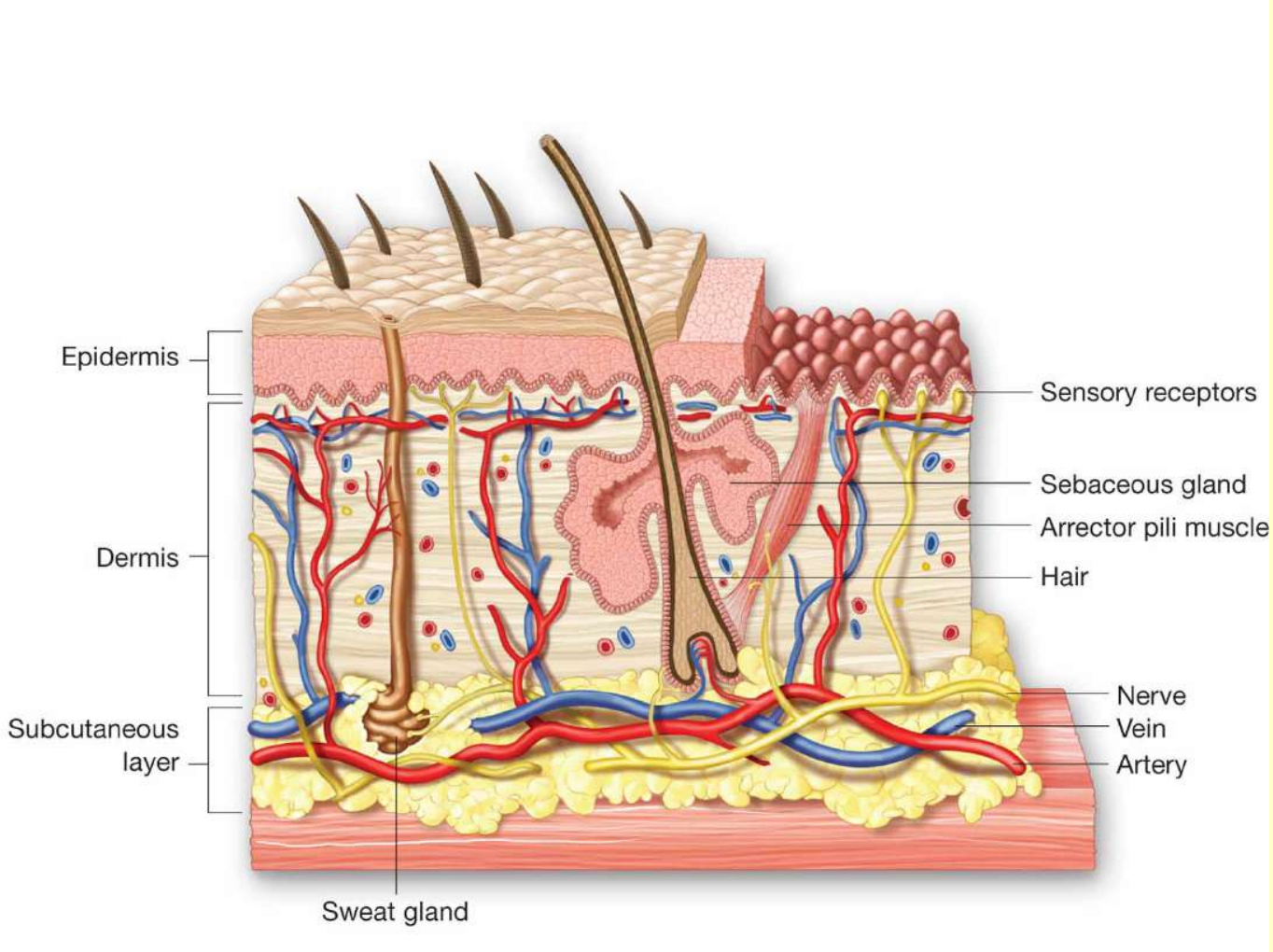

Figure 3.1 – Skin structure, including the three layers of the skin and the accessory organs: sweat glands, sebaceous glands, and hair.

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Epidermis

- Composed of **stratified squamous epithelium**
  - Flat scale-like cells
  - Arranged in overlapping layers called strata
- Has no blood supply or connective tissue
  - Depends on deeper layers of skin for nourishment
- **Basal layer** the deepest layer

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Basal Layer of Epidermis

- Cells continuously grow and push old cells toward surface
- During this process
  - Cells shrink, die, and fill with hard protein called **keratin**
- Keratinized cells allow skin to act as barrier to infection

- **Melanocytes**
  - Special cells of basal layer
  - Produce black pigment **melanin**
  - Gives skin color
  - Protects against ultraviolet rays of sun

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Figure 3.2 – Photomicrograph of the epidermis layer of the skin.

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Dermis

- Also called **corium**
- Located between epidermis and subcutaneous layer
- Name means *"true skin"*
- Is living tissue with very good blood supply

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Dermis

- Composed of:
  - Connective tissue and **collagen** fibers
  - Strong fibrous proteins give dermis flexible strength
- Houses:
  - Hair follicles
  - Sweat glands
  - Sebaceous glands
  - Blood vessels
  - Lymph vessels
  - Sensory receptors
  - Nerve fibers
  - Muscle fibers

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Subcutaneous Layer

- Also called **hypodermis**
- Third and deepest layer
- Composed of fat cells called **lipocytes**
- Protects the deeper tissues of body
- Acts as insulation for heat and cold

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Accessory Organs

- Located within dermis
- Include:
  - Hair
  - Nails
  - Sweat glands
  - Sebaceous glands

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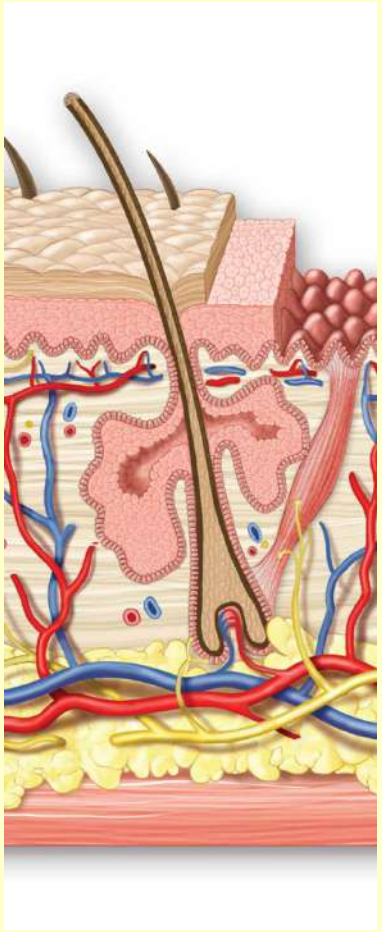
Hair

- Hair follicle
- Hair root
- Hair shaft
- Arrector pili muscle



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Hair

- Grows longer from the root
  - Deep cells of hair root force older cells to move upward
  - This forms hair shaft
  - Grows towards surface within hair follicle
- Melanin gives hair its color
- Arrector pili
  - Slip of smooth muscle
  - Causes hairs to “stand up”

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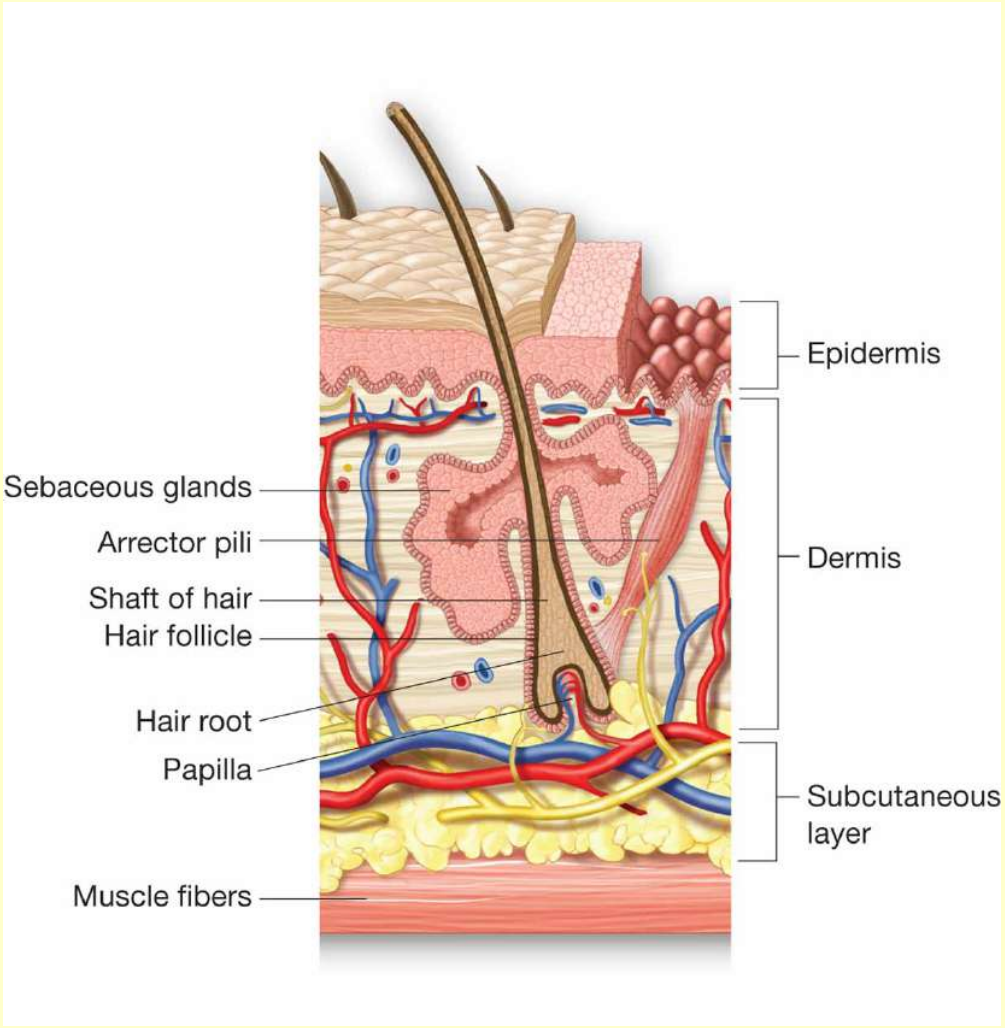

Figure 3.3 – Structure of a hair and its associated sebaceous gland.

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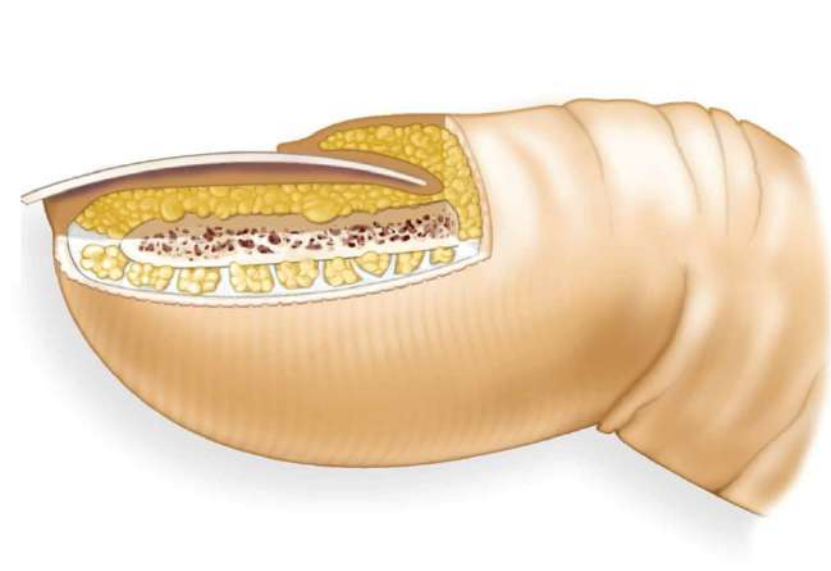
Nails

- **Nail body**
  - Flat plate of keratin
- **Nail bed**
  - Connects nail body to underlying tissue
- **Lunula**
  - Half-moon white area at base of nail



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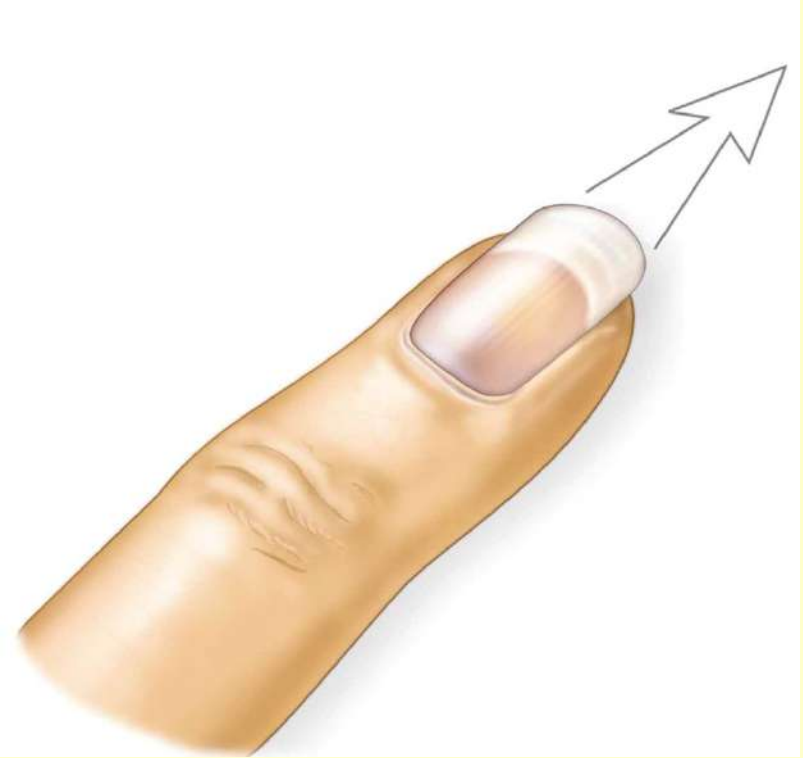
Nails

- Grow longer from **nail root**
- **Cuticle**
  - Soft tissue that covers nail root
- **Free edge**
  - Exposed edge



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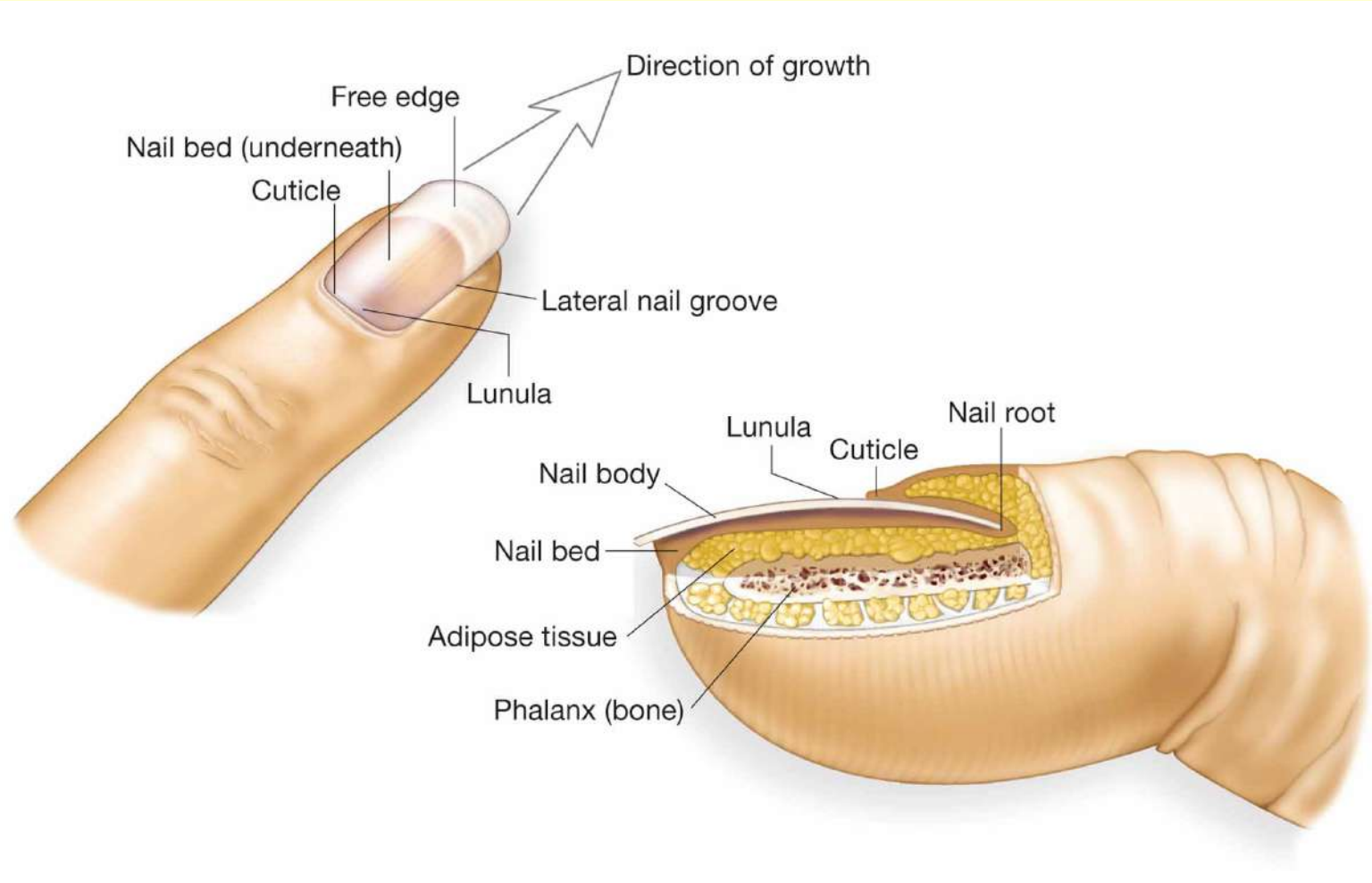

Figure 3.4 – External and internal structures of nails.

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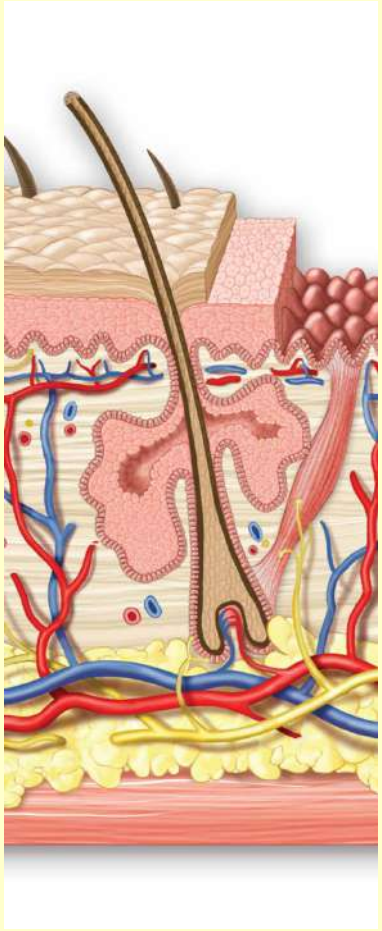
Sebaceous Glands

- Open into hair follicles
- Secrete the oil **sebum**
  - Lubricates hair and skin
  - Prevents drying and cracking



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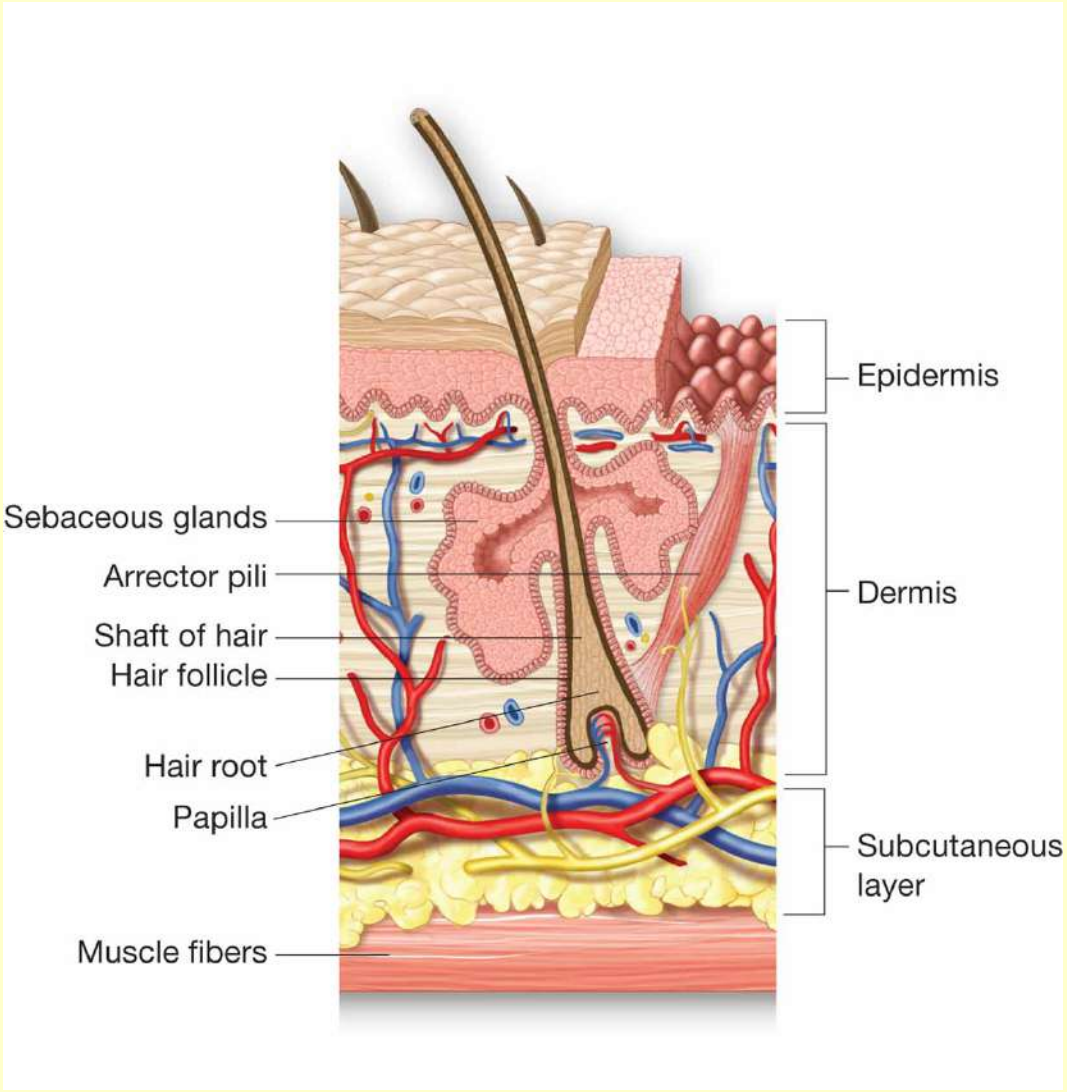

Figure 3.3 – Structure of a hair and its associated sebaceous gland.

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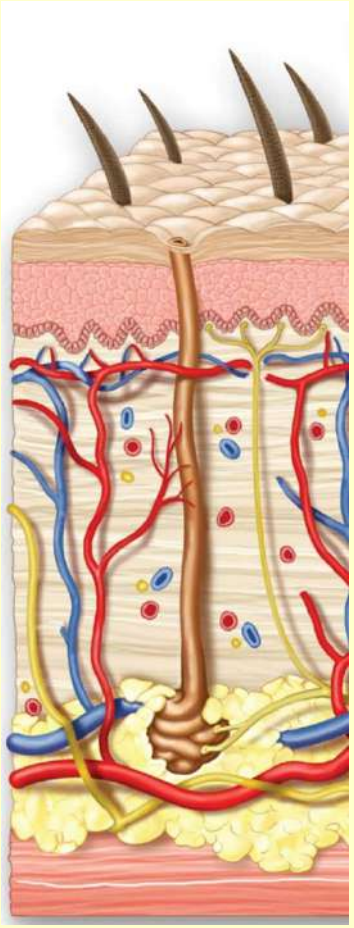
Sweat Glands

- Also called **sudoriferous glands**
- Coiled gland in dermis
- Sweat travels to surface in **sweat duct**
- **Sweat pore** – surface opening



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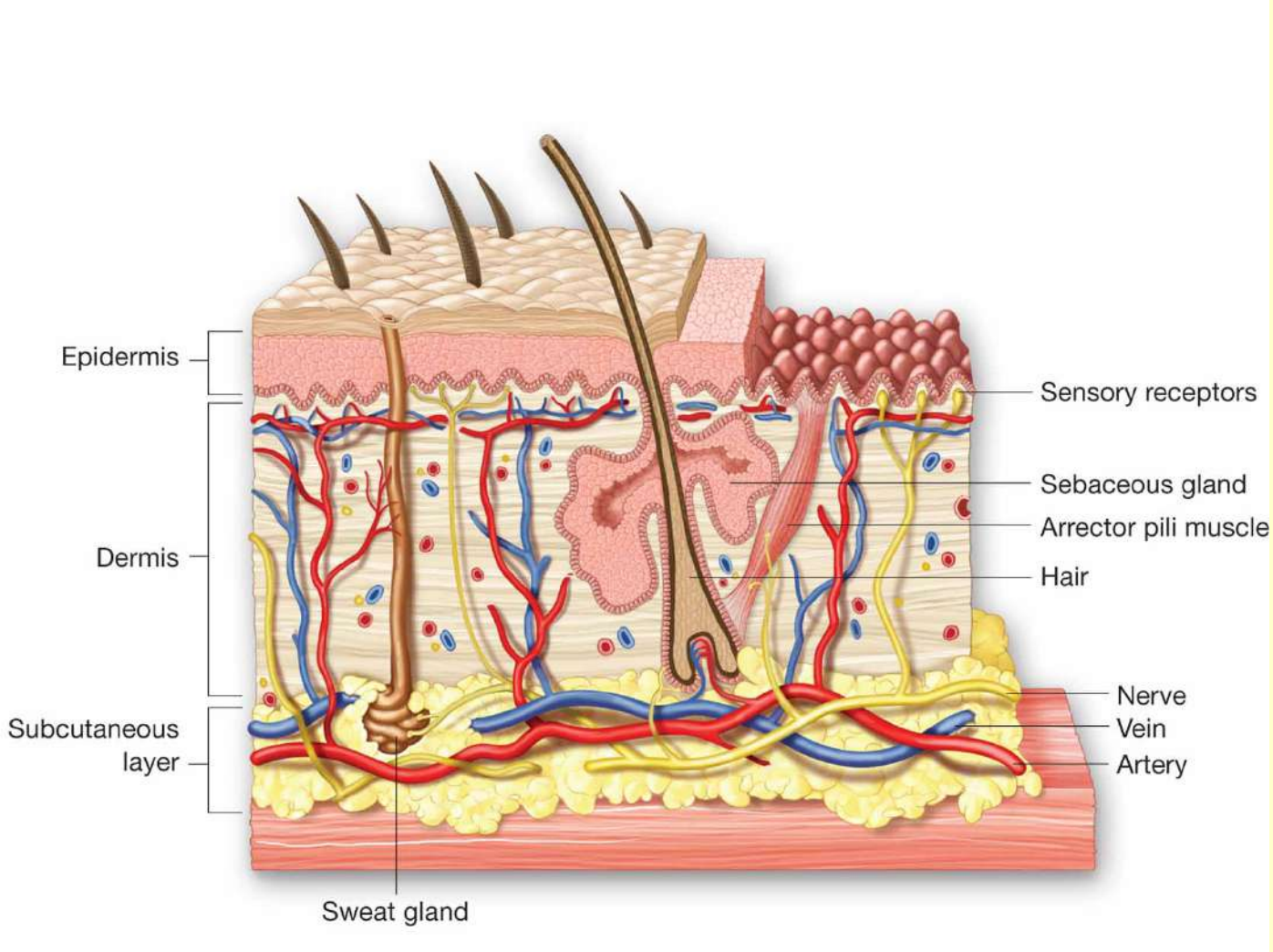

Figure 3.1 – Skin structure, including the three layers of the skin and the accessory organs: sweat gland, sebaceous glands, and hair.

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Sweat Glands

- 2 million throughout body
- Sweat or **perspiration**
  - Cools body as evaporates
  - Contains small amount of waste product
  - Normal colorless and odorless
- **Apocrine glands**
  - Found in pubic and underarm areas
  - Thicker sweat that can produce an odor

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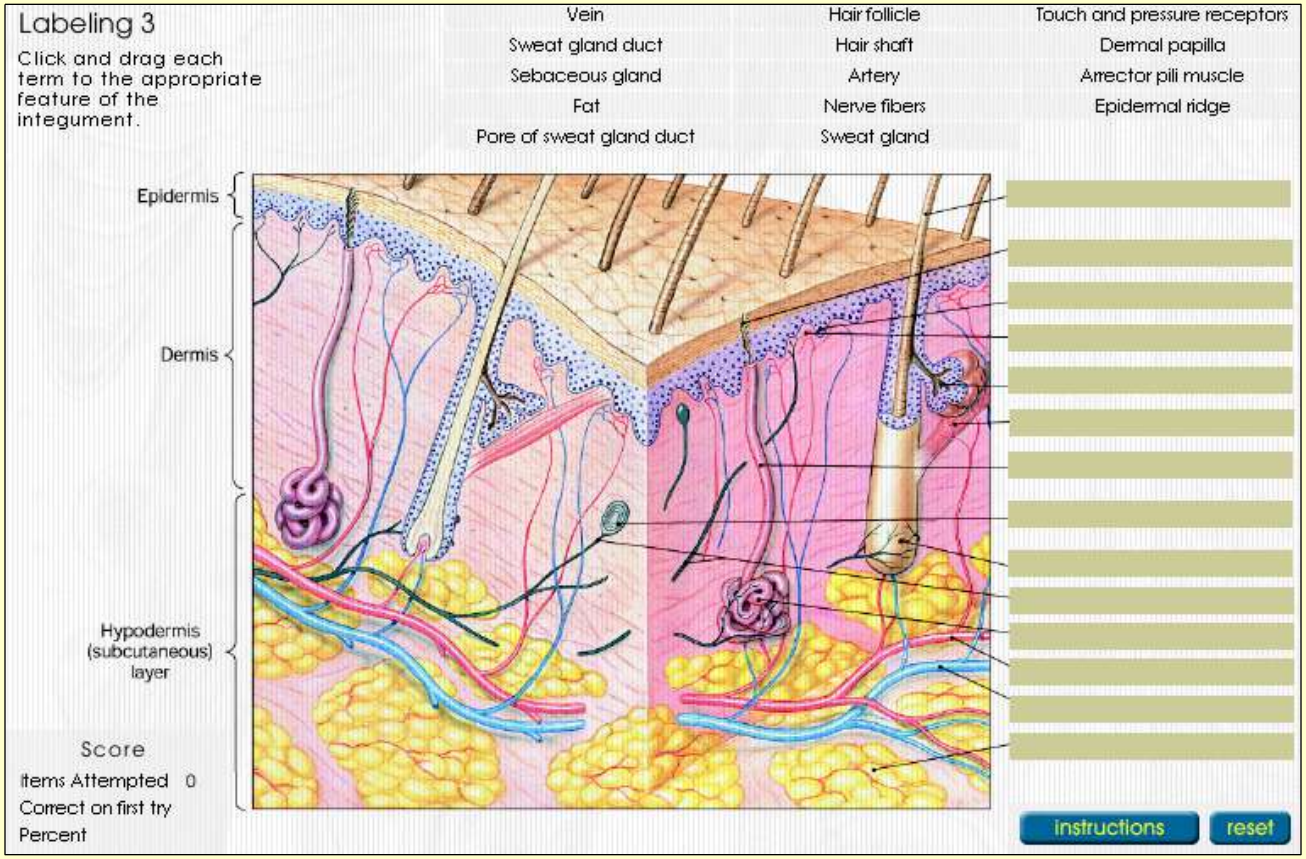
Skin Anatomy Exercise



Click here to view an interactive exercise on skin anatomy.

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Word Building with cutane/o & derm/o

sub– –ous	subcutaneous	pertaining to under skin

epi– –al	epidermal	pertaining to upon skin
hypo– –ic	hypodermic	pertaining to under skin
intra– –al	intradermal	pertaining to within skin

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Word Building with dermat/o

–itis	dermatitis	inflammation of skin
–logist	dermatologist	skin specialist
–osis	dermatosis	abnormal skin condition
–pathy	dermatopathy	skin disease
–plasty	dermatoplasty	surgical repair of skin

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Word Building with hidr/o and lip/o

an– –osis	anhidrosis	abnormal condition of no sweat
hyper– –osis	hyperhidrosis	abnormal condition of excessive sweat

–ectomy	lipectomy	surgical removal of fat
–oma	lipoma	fat tumor/growth

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Word Building with melan/o & necr/o

–oma	melanoma	black tumor
–cyte	melanocyte	black cell

–osis	necrosis	abnormal condition of death

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Word Building with onych/o and py/o

–ectomy	onychectomy	surgical removal of nail
–malacia	onychomalacia	nail softening
myc/o –osis	onychomycosis	abnormal condition of nail fungus
–phagia	onychophagia	nail eating (nail biting)

–genic	pyogenic	pus producing

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Word Building with rhytid/o and seb/o

–ectomy	rhytidectomy	surgical removal of wrinkles
–plasty	rhytidoplasty	surgical repair of wrinkles

–rrhea	seborrhea	oil discharge

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Word Building with trich/o and ungu/o

myc/o -osis	trichomycosis	abnormal condition of hair fungus

–al	ungual	pertaining to nail

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Word Building with –derma

erythr/o	erythroderma	red skin
ichthy/o	ichthyoderma	Scaly, dry skin
leuk/o	leukoderma	white skin
py/o	pyoderma	pus skin
scler/o	scleroderma	hard skin
xer/o	xeroderma	dry skin

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Integumentary Vocabulary

abrasion	friction scraping away skin surface
cicatrix	normal scar
comedo	hardened sebum in hair follicle; blackhead
contusion	injury caused by a blow; causes swelling, pain, and bruising
cyanosis	bluish tint to skin caused by deoxygenated blood
depigmentation	loss of normal skin color

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Figure 3.5 – A cyanotic infant. Note the bluish tinge to the skin around the lips, chin, and nose. *(St. Bartholomew's Hospital, London/Photo Researchers, Inc.)*

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Integumentary Vocabulary

dermatology (Derm, derm)	diagnosis and treatment of skin conditions; physician is a dermatologist
diaphoresis	profuse sweating
ecchymosis	blood collecting under skin following blunt trauma; a bruise
erythema	red flushing of skin
eschar	thick layer of dead tissue develops over a deep burn area
hirsutism	excessive hair growth

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Figure 3.6A – Male lying supine with large ecchymosis on lateral rib cage and shoulder.

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Integumentary Vocabulary

hyperemia	redness of skin due to increased blood flow
hyperpigmentation	abnormal amount of pigmentation
keloid	thick hypertrophic scar
keratosis	condition of excessive growth and thickening of epidermis layer
lesion	general term for injury or abnormality
nevus	pigmented skin blemish, birthmark, or mole; usually benign

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Figure 3.7 – Keloids, hypertrophic scarring on the back.

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Integumentary Vocabulary

pallor	abnormal paleness of skin
petechiae	spots from minute hemorrhages under skin
photosensitivity	skin reacts abnormally to light
plastic surgery	repair, reconstruction, or improvement of body structures
pruritus	severe itching
purpura	skin hemorrhage due to fragile blood vessels

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Figure 3.6B – Petechiae, pinpoint skin hemorrhages.

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Figure 3.6C – Purpura, hemorrhaging into the skin due to fragile blood vessels.

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Integumentary Vocabulary

purulent	infection producing pus; dead bacteria, white blood cells, and tissue debris
strawberry hemangioma	congenital collection of dilated blood vessels; birthmark
suppurative	containing or producing pus
urticaria	hives; eruption of wheals with severe itching
verruca	warts; benign growth caused by virus

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Figure 3.8 – Strawberry hemangioma, a birthmark caused by a collection of blood vessels in the skin. *(H.C. Robinson/Science Photo Library/Photo Researchers, Inc.)*

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Pathology – Surface Lesions

cyst	fluid-filled sac under skin
fissure	cracklike lesion on skin
laceration	torn or jagged wound
macule	flat, discolored spot on skin
nodule	firm, solid mass larger than 0.5 cm

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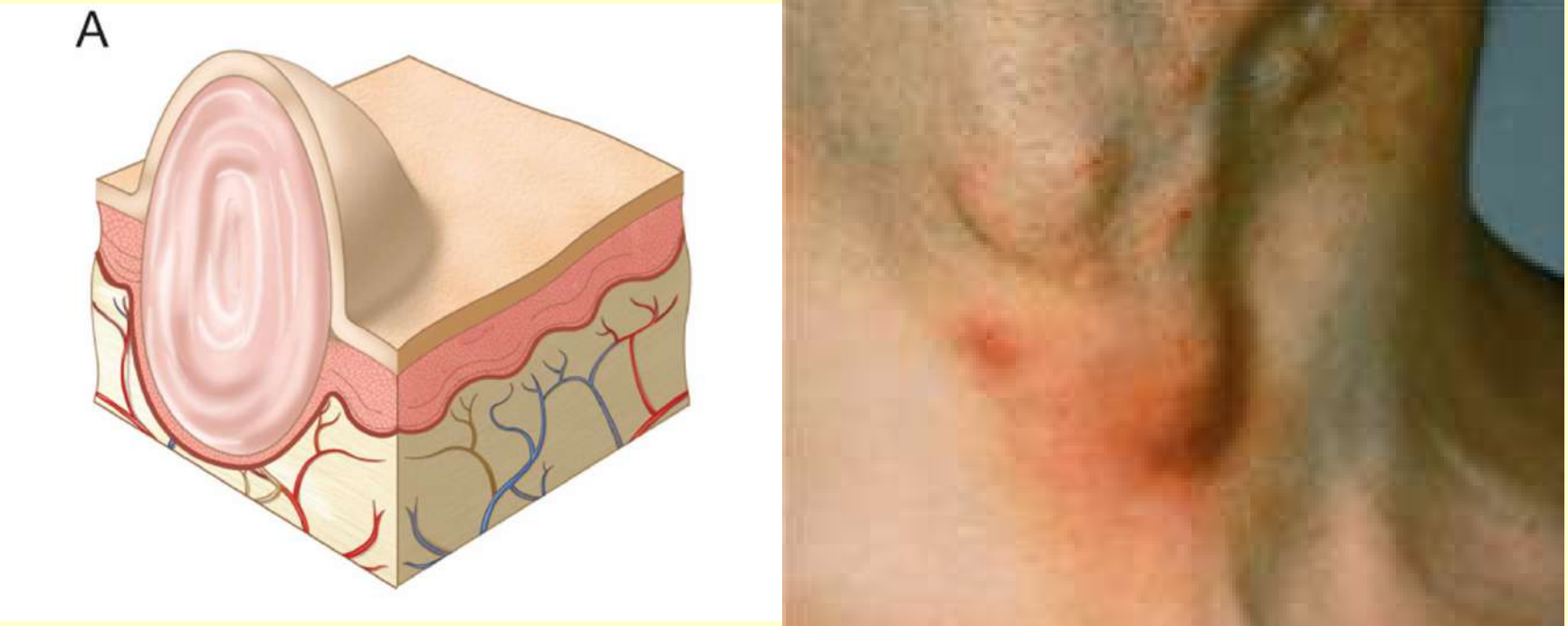

Figure 3.9 A) Cutaway view and B) photograph of a cyst. *(Bart's Medical Library/Phototake NYC)*

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Figure 3.9 C) Cutaway view and D) photograph of a fissure.
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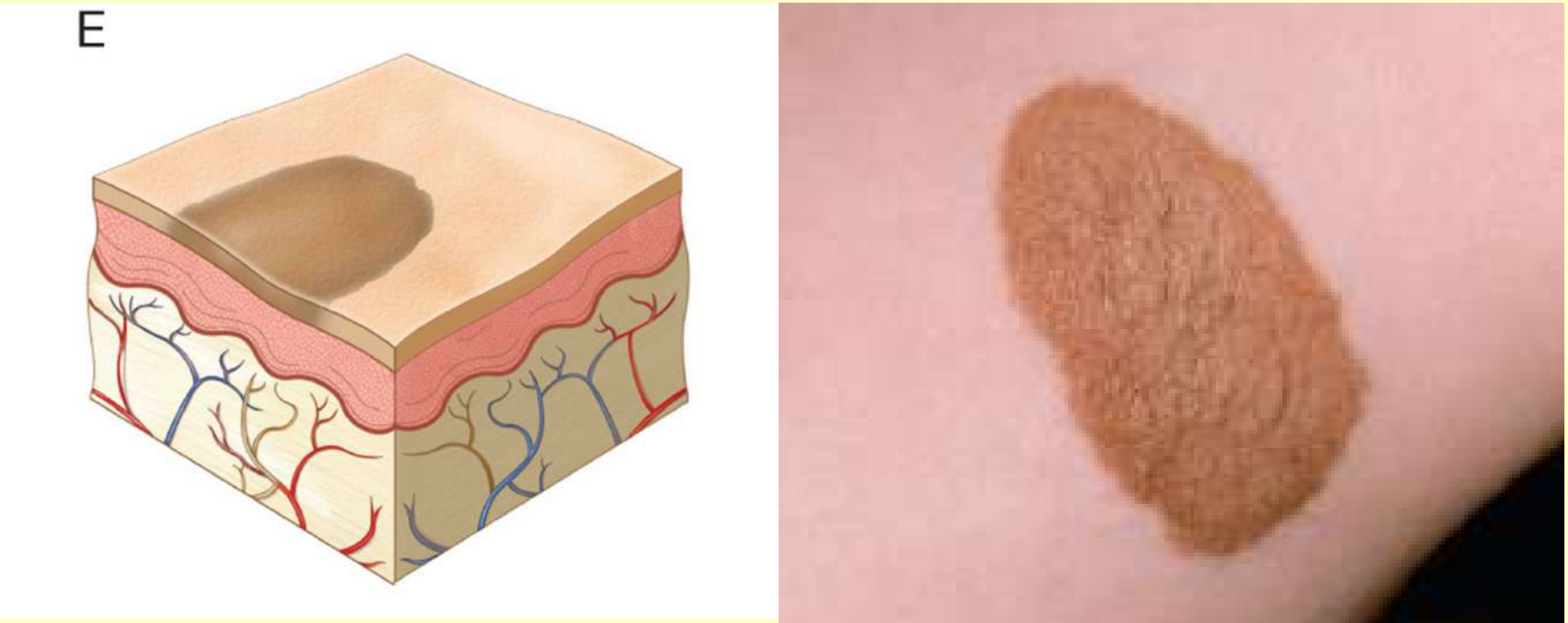

Figure 3.9 E) Cutaway view and F) photograph of a macule. *(Phototake NYC)*

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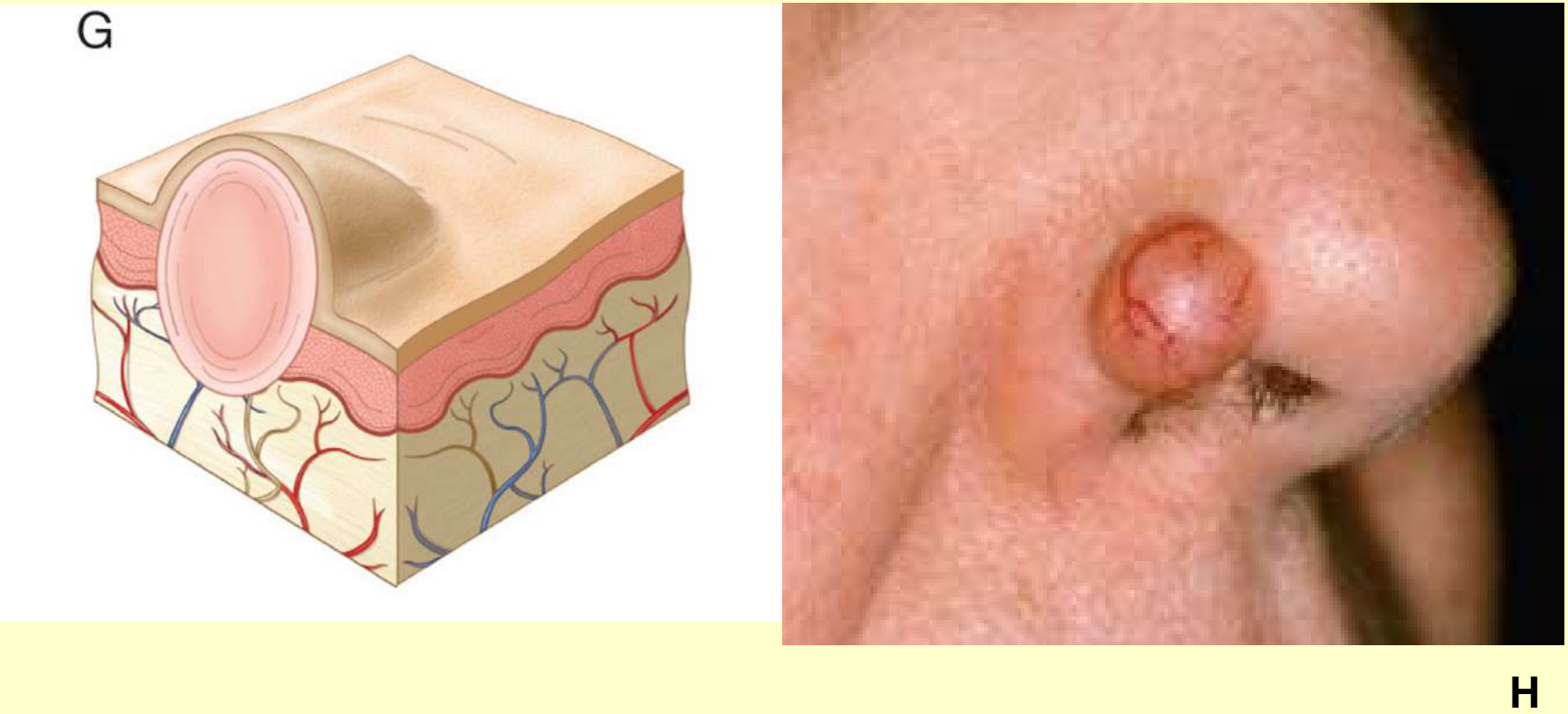

Figure 3.9 G) Cutaway view and H) photograph of a nodule.
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Pathology – Surface Lesions

papule	small, solid raised spot smaller than 0.5 cm
pustule	raised spot on skin containing pus
ulcer	open sore in skin
vesicle	small, fluid-filled, raised spot; blister
wheal	small, round, swollen area; typical of allergic skin reaction

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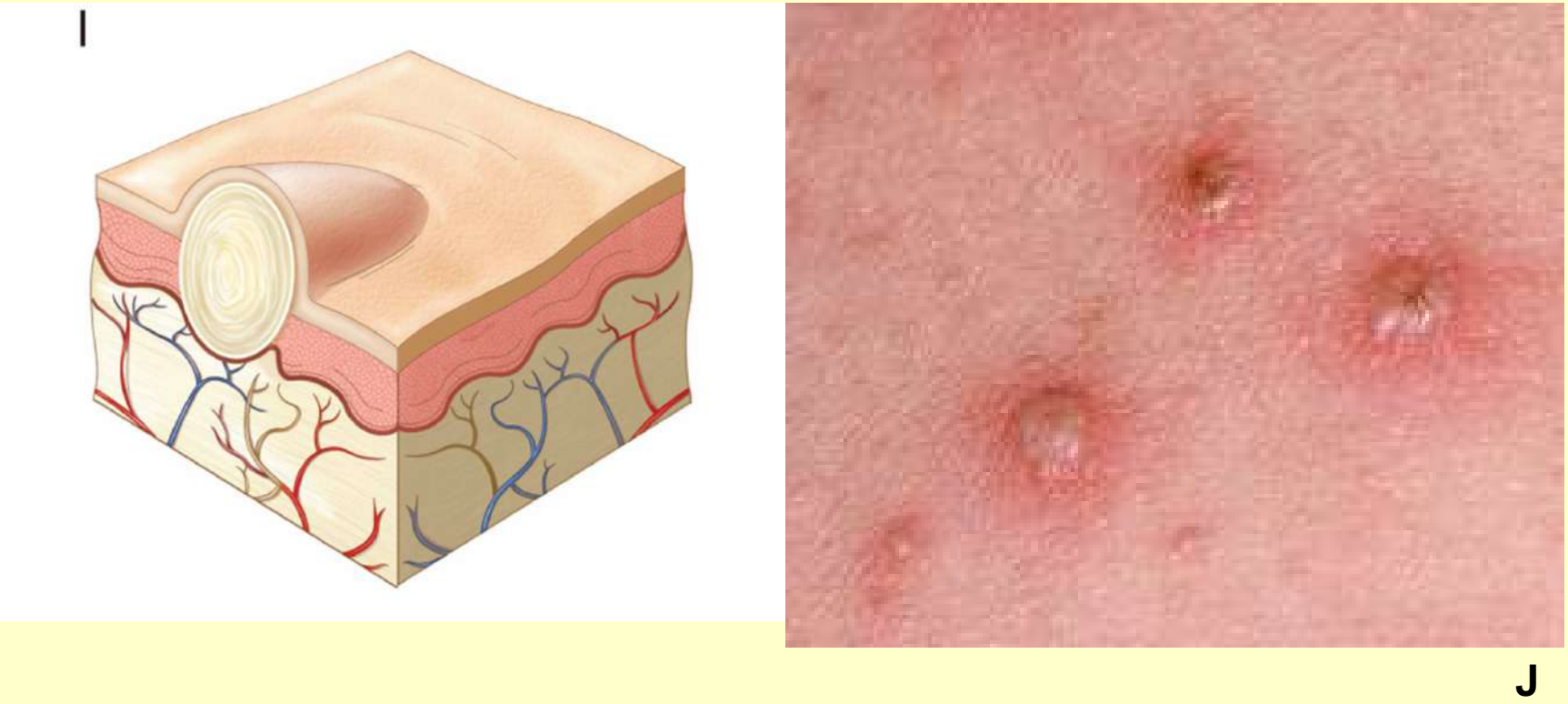

Figure 3.9 I) Cutaway view and J) photograph of a papule.
(ISM/Phototake NYC)

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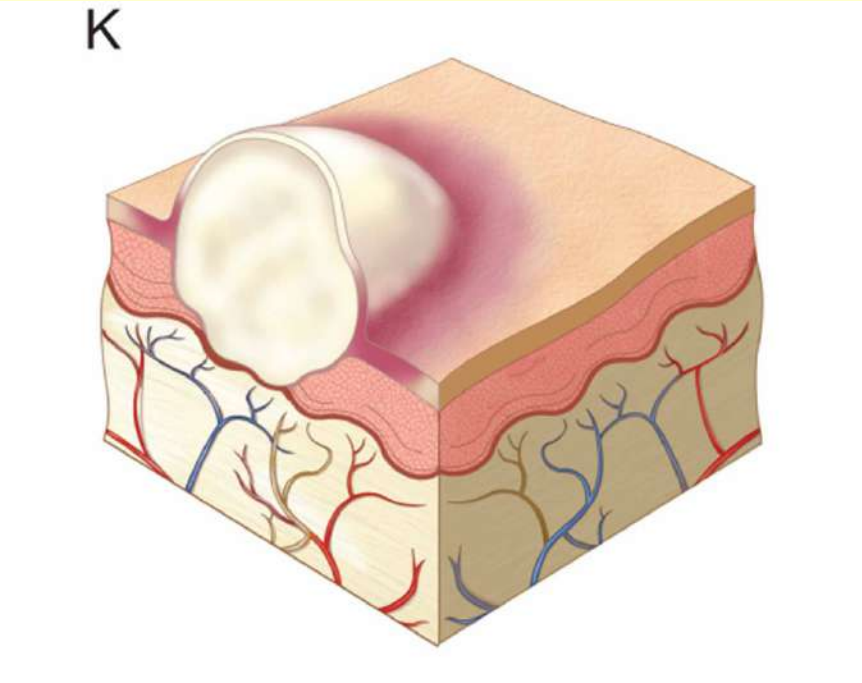

L

Figure 3.9 K) Cutaway view and L) photograph of a pustule.
(P.Marazzi/Science Photo Library/Photo Researchers, Inc.)

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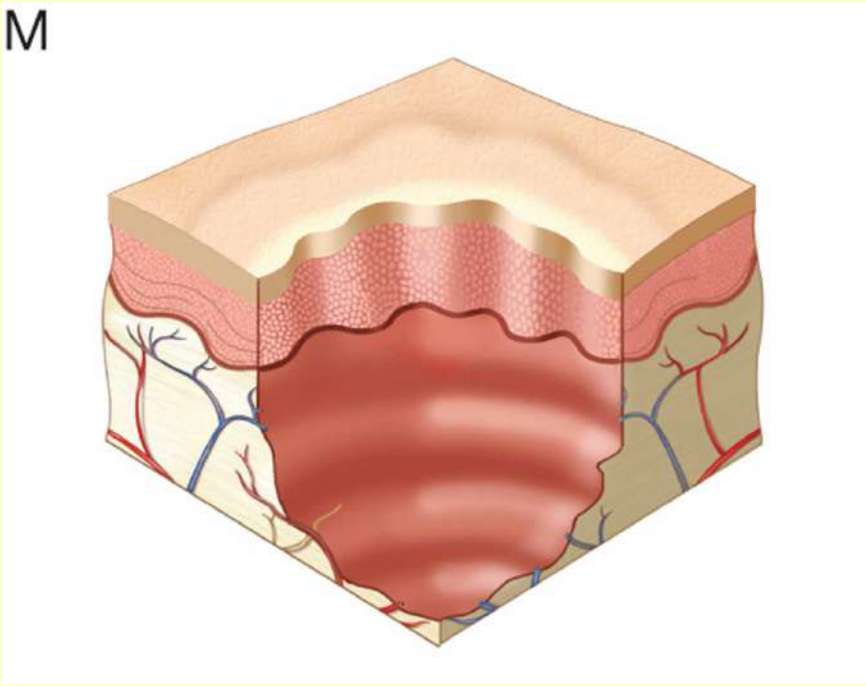

N

Figure 3.9 M) Cutaway view and N) photograph of an ulcer.

(Dr. P.Marazzi/Photo Researchers, Inc.)

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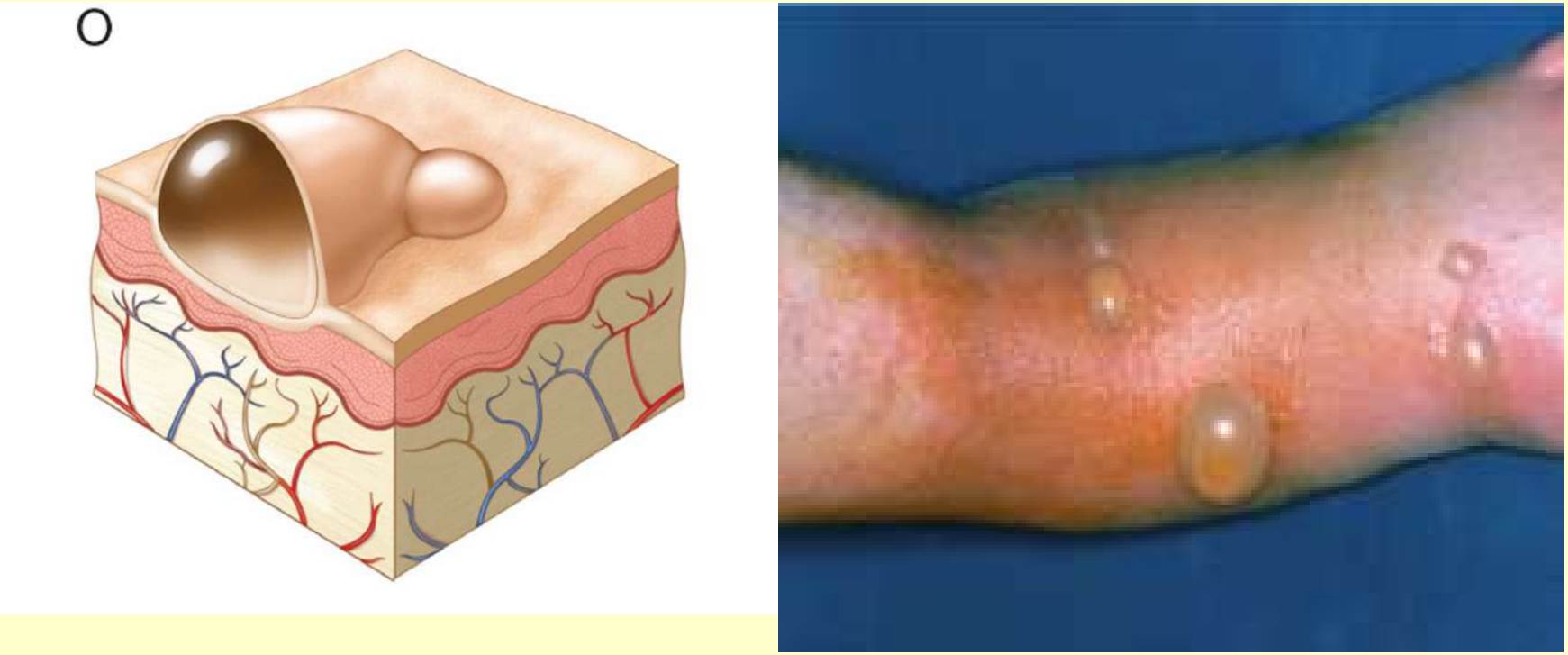

Figure 3.9 O) Cutaway view and P) photograph of a vesicle.
(ISM/Phototake NYC)

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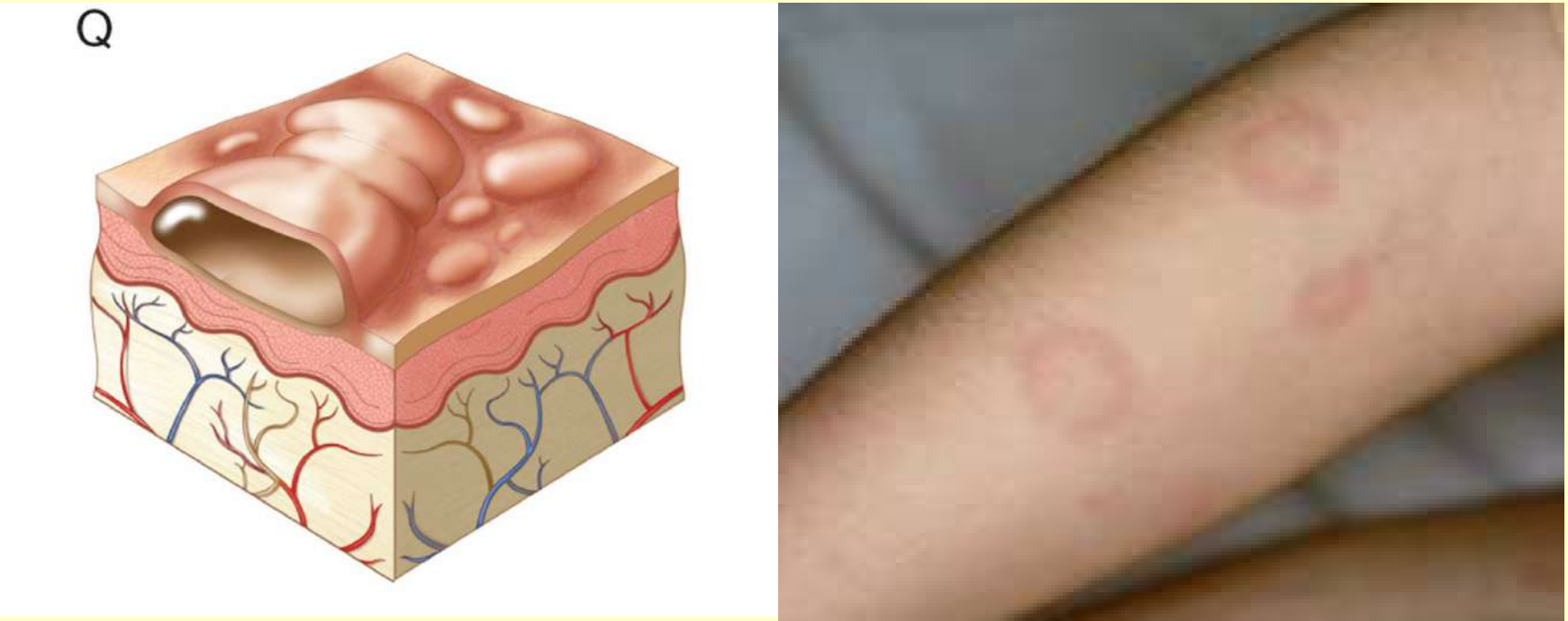

Figure 3.9 Q) Cutaway view and R) photograph of a wheal.

(Charles Stewart MD FACEP, FAAEM)

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Pathology of the Skin

abscess	collection of pus in skin
acne	inflammation of sebaceous glands and hair follicles with papules and pustules
acne rosacea	chronic form of adult acne with redness and tiny pimples, primarily on nose
acne vulgaris	common form of teenage acne with comedo, papules, and pustules
albinism	genetic condition; unable to make melanin; white hair and skin, and red eyes

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Pathology of the Skin

basal cell carcinoma	cancerous tumor in basal cell layer; common cancer; rarely metastasizes
burn	skin damage caused by fire, electricity, ultraviolet light, or caustic chemicals; percentage of skin burned is estimated by Rule of Nines

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Figure 3.10 – Basal cell carcinoma. A frequent type of skin cancer that rarely metastasizes. *(ISM/Phototake NYC)*

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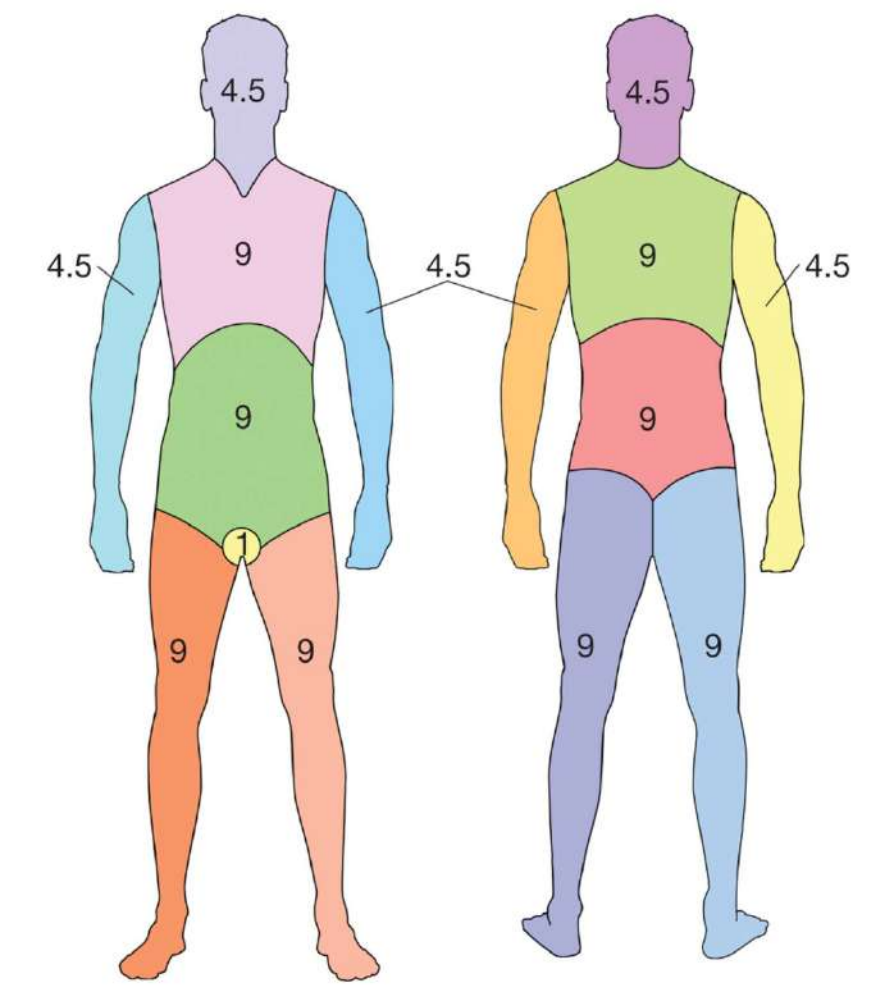

Figure 3.12 – Rule of Nines. A method for determining percentage of body burned. Each differently colored section represents 9% of the body surface.

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First Degree Burn


Skin reddened


(Moynahan Medical Center)

First degree burn	skin reddened and painful; no blisters; damage to epidermis

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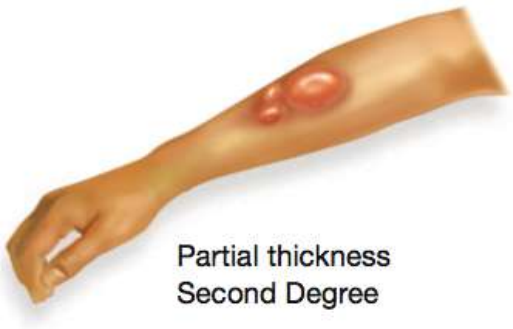
Second Degree Burn




Blisters


(Charles Stewart MD FACEP, FAAEM)

Second degree burn	skin reddened and painful with blisters; damage to epidermis and dermis

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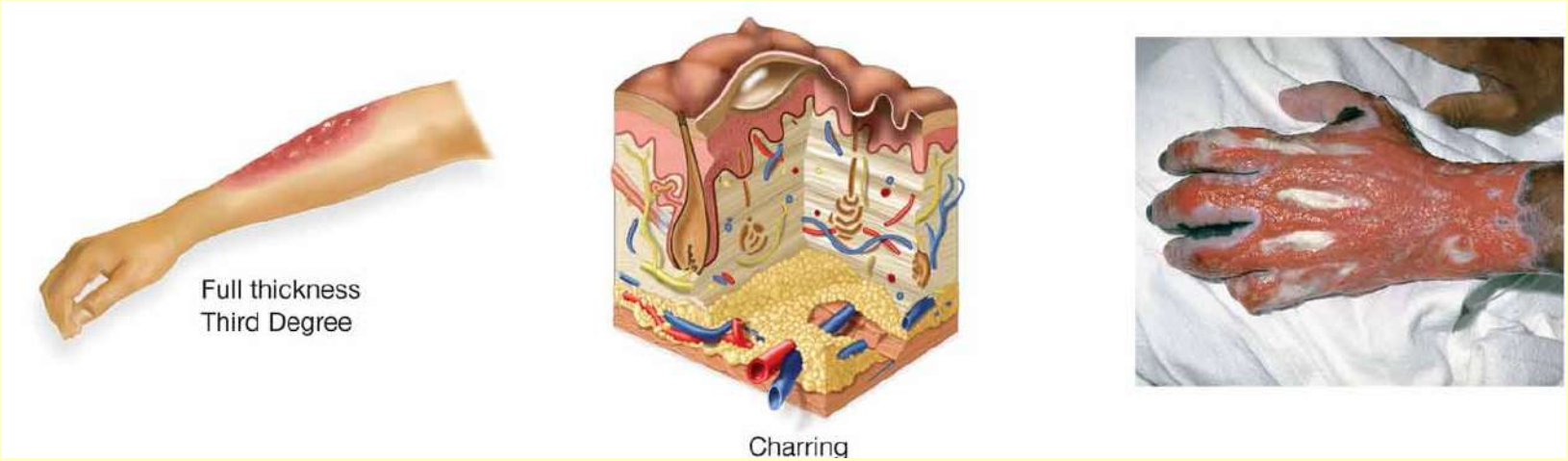
Third Degree Burn



Third degree burn	skin charred; epidermis and dermis burned away; subcutaneous layer exposed

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Pathology of the Skin

cellulitis	diffuse acute infection of connective tissue of skin
decubitus ulcer (decub)	open sore caused by pressure over bony prominences; caused by loss of blood flow to skin
dry gangrene	late stages of gangrene; affected area becomes dried, blackened, and shriveled
eczema	superficial dermatitis; redness, vesicles, itching, and crusting

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Decubitus Ulcer Video

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Eczema Video

Click here to view a video on eczema.

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Pathology of the Skin

gangrene	tissue necrosis due to loss of blood flow
ichthyosis	skin becomes dry, scaly, & keratinized
impetigo	highly infections bacterial infection with pustules that rupture and crust over
Kaposi's sarcoma	skin cancer seen in AIDS patients; brownish-purple lesions

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Figure 3.13 – Impetigo, a highly contagious bacterial infection. Note the extensive crusting around the eye.

(Bart's Medical Library/Phototake NYC)

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Pathology of the Skin

malignant melanoma (MM)	dangerous form of cancer; begins in melanocytes; quickly metastasizes
pediculosis	lice infestation
psoriasis	chronic inflammatory condition with papules forming “silvery scale” patches
rubella	contagious viral infection; German measles
scabies	mite infestation

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Figure 3.14 – Malignant melanoma. This tumor demonstrates the highly characteristic color of this tumor. *(ISM/Phototake NYC)*

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Skin Cancer Video

Click here to view a video on skin cancer.

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Figure 3.15 – Psoriasis. This photograph demonstrates the characteristic white skin patches of this condition.

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Pathology of the Skin

sebaceous cyst	sebum filled sac forms around sebaceous gland
squamous cell carcinoma (SCC)	cancer of epidermis layer; may invade deeper tissue and metastasize
systemic lupus erythematosus (SLE)	chronic disease of connective tissue; injures skin, joints, & kidneys; produces red, scaly butterfly rash across face
tinea	fungal infection; itching & scaling lesions

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Pathology of the Skin

tinea capitis	fungal infection on scalp; ringworm
tinea pedis	fungal infection of foot; athlete's foot
varicella	contagious viral infection; chickenpox
vitiligo	disappearance of pigment from skin in patches; causes milk-white lesions
wet gangrene	area of gangrene with secondary bacterial infection and pus

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Figure 3.16 – Varicella or chickenpox, a viral skin infection. In this photograph, the rash is beginning to form scabs.

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Pathology of the Hair

alopecia	absence or loss of hair; baldness
carbuncle	furuncle involving several hair follicles
furuncle	bacterial infection of hair follicle; redness, pain, and swelling; a boil

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Pathology of the Nails

onychia	infected nail bed
paronychia	infection of skin fold around nail

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Clinical Laboratory Tests

culture & sensitivity (C&S)	grows bacteria removed from infected area to identify infecting bacteria; then determines sensitivity to various antibiotics

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Biopsy Procedures

biopsy (BX, bx)	removal of piece of tissue to examine under a microscope; aids in diagnosis
exfoliative cytology	scraping cells from tissue to examine under microscope
frozen section (FS)	thin piece of tissue is cut from frozen specimen for rapid examination under microscope
fungal scrapings	scrapings from lesion is cultured and then examined under microscope

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Skin Grafting

skin graft (SG)	transfer of skin from normal area to cover another site
allograft	skin graft from one person to another
autograft	skin graft from a person's own body
heterograft	skin graft from an animal of another species; usually a pig; xenograft
xenograft	skin graft from an animal of another species; usually a pig; heterograft

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Figure 3.17 – A freshly applied autograft. Note that the donor skin has been perforated so that it can be stretched to cover a larger exposed area. *(Courtesy of Dr. William Dominic, Community Regional Medical Center)*

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Skin Grafting

dermatome	instrument for cutting skin or for producing thin transplants of skin
dermatoplasty	skin grafting

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Surgical Procedures

cauterization	destruction of tissue by using chemicals, electricity, heat, or freezing
cryosurgery	use of extreme cold to freeze and destroy tissue
curettage	removal of superficial skin lesion with a scraper (curette)
debridement	removal of foreign material & dead or damaged tissue from wound

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Surgical Procedures

electrocautery	using an electric current to destroy tissue
incision & drainage (I&D)	making an incision to drain material such as pus

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Plastic Surgery

chemabrasion	abrasions using chemicals; chemical peel
dermabrasion	abrasion using wire brushes or sandpaper; removes scars, tattoos
laser therapy	removal of lesions using a laser beam
liposuction	removal of fat beneath skin by means of suction
rhytidectomy	surgical removal of excess skin to eliminate wrinkles; face lift

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Integumentary Pharmacology

anesthetics	deaden pain	Xylocaine, Novocain
antibiotics	kill bacteria	Neosporin
antifungals	kill fungi	Monistat, Lotrimin
antiparasitics	kill mites or lice	Kwell, Nix

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Integumentary Pharmacology

antipruritics	reduce severe itching	Benadryl, Caladryl
antiseptics	kill bacteria	isopropyl alcohol, hydrogen peroxide
anti-virals	treat herpes simplex infection	Valtrex, Zovirax
corticosteroid cream	powerful anti-inflammatory	Cortaid; Kenalog

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Integumentary Abbreviations

BCC	basal cell carcinoma
BX, bx	biopsy
C&S	culture and sensitivity
decub	decubitus ulcer
Derm, derm	dermatology
FS	frozen section

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Integumentary Abbreviations

HSV	herpes simplex virus
I&D	incision and drainage
ID	intradermal
MM	malignant melanoma
SCC	squamous cell carcinoma
SG	skin graft

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Integumentary Abbreviations

SLE	systemic lupus erythematosus
STSG	split thickness skin graft
subcu, SC, sc, subq	subcutaneous
UV	ultraviolet

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