

A decorative vertical bar on the left side of the slide, consisting of several thin, parallel vertical lines in shades of gray. To the right of these lines are five solid blue circles of varying sizes, arranged in a descending staircase pattern from top to bottom.

SKIN AND THE INTEGUMENTARY SYSTEM

Chapter 6

FUNCTIONS OF THE INTEGUMENTARY SYSTEM

- Protection
- Temperature regulation
- Synthesis and storage of nutrients
- Sensory reception
- Excretion and secretion



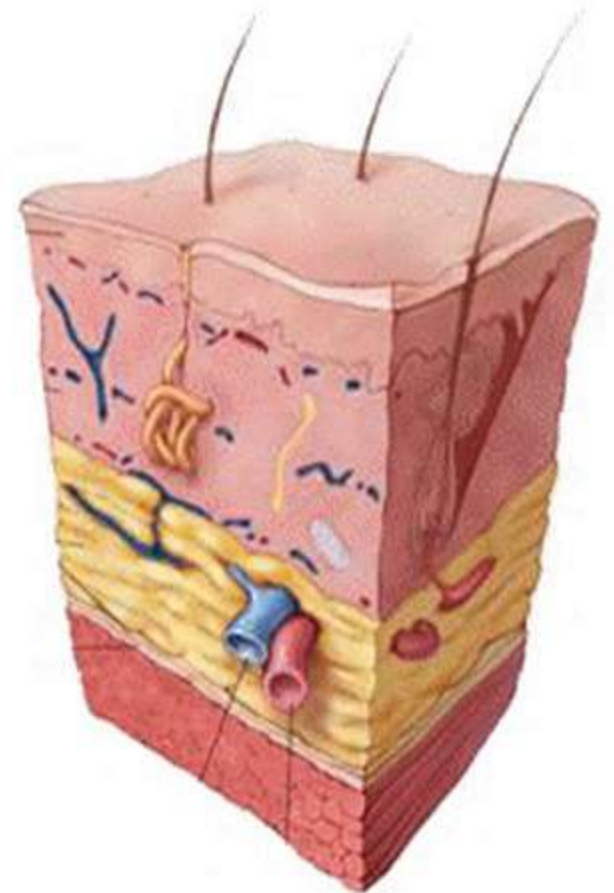
SKIN IS...

- is the largest & heaviest organ in the body.
- covered in hair.
- vital in maintaining homeostasis.
- a protective barrier.

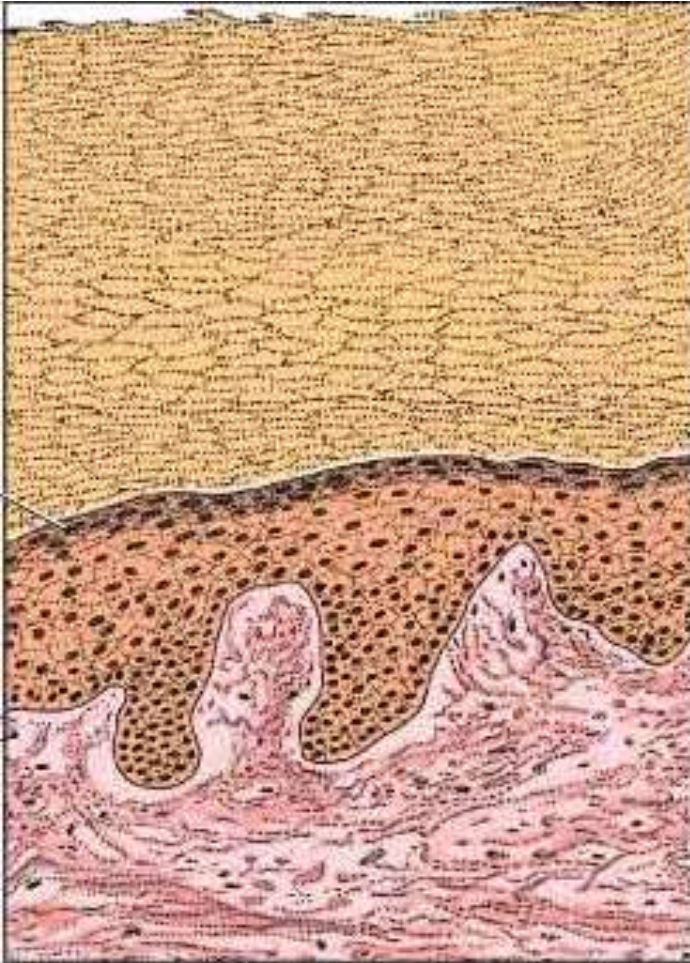


SKIN IS...

- part of the integumentary system
- divided into three distinct layers:
 - **EPIDERMIS** – outer layer
 - **DERMIS** – middle layer
 - **SUBCUTANEOUS** – bottom layer
 - (Not a true skin layer)



WHAT MAKES UP THE EPIDERMIS?



- Stratified squamous epithelium
- Several distinct cell layers
 - Thick skin – Five layers
 - On palms of hands and soles of feet.
 - Thick skin – Four layers
 - On the rest of the body

EPIDERMAL LAYERS

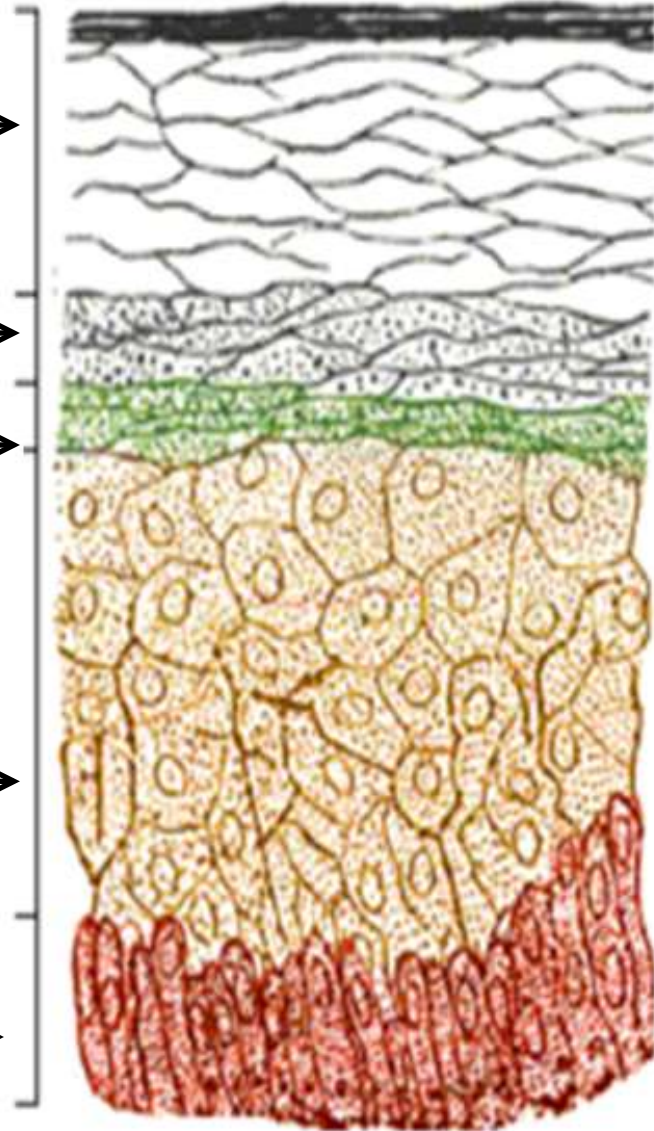
○ *Stratum corneum*
(Dying superficial layer)

○ *Stratum lucidum*
• Only in thick skin

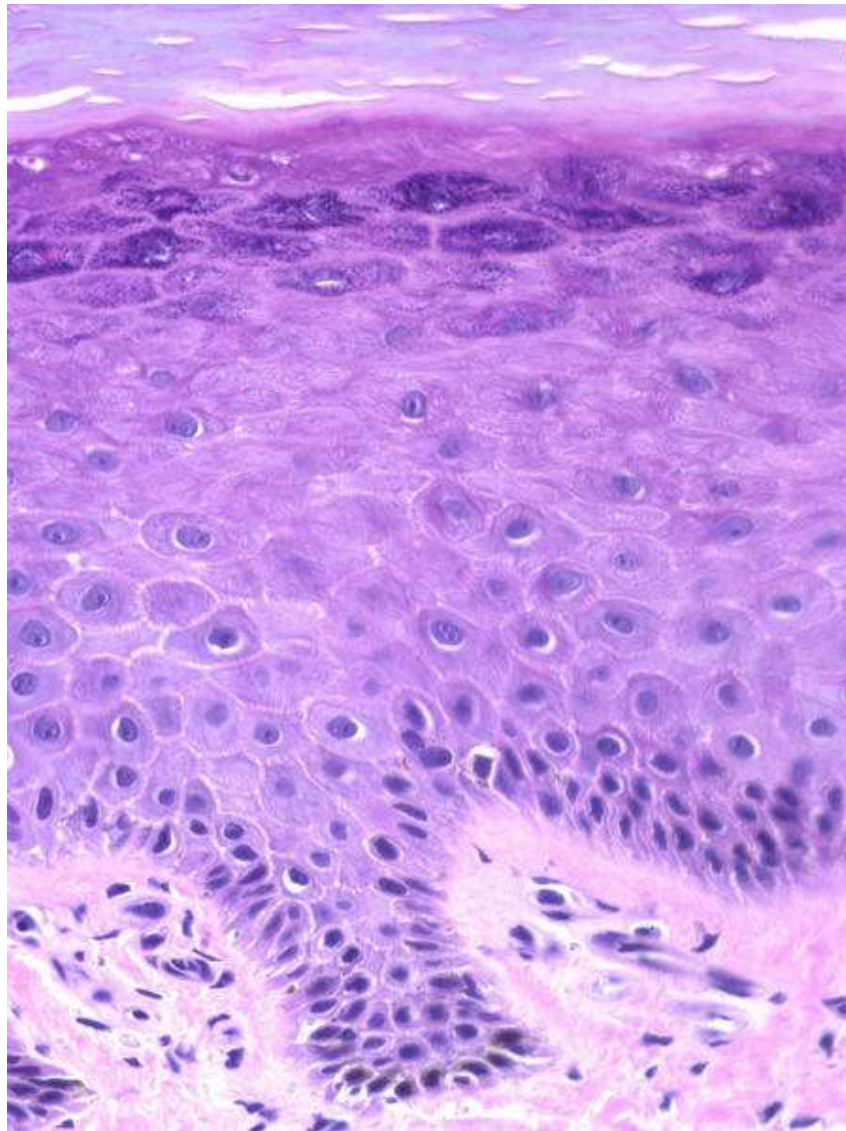
○ *Stratum granulosum*

○ *Stratum spinosum*

○ *Stratum basale*



MICROSCOPIC EPIDERMIS



← Stratum Corneum

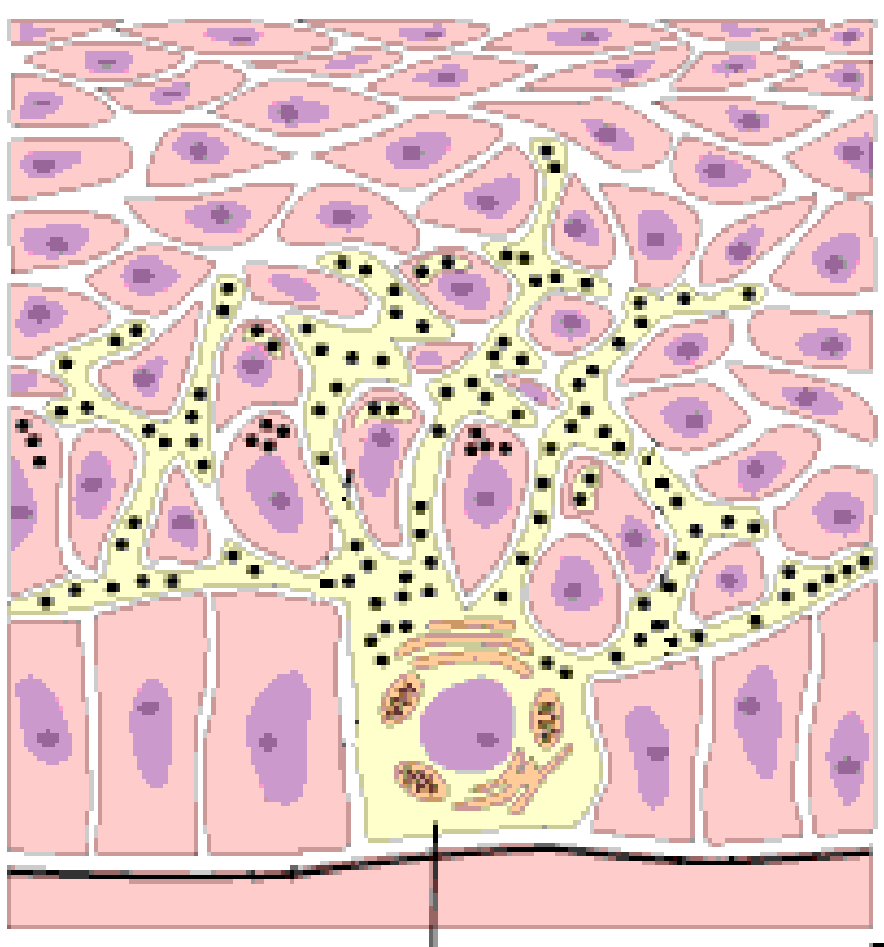
← Stratum granulosum

← Stratum spinosum

← Stratum basale



EPIDERMAL PROTECTION/COLOR



○ *Melanocytes*

- Produce **MELANIN**
- provides UV protection.
- Gives reddish-brown to brown-black color

Carotene

- Contributes orange-yellow color
- Provided from diet (pumpkin and carrots)

Hemoglobin

- Blood Pigment



Melanocyte

EFFECTS OF UV RADIATION ON THE SKIN

Beneficial Effects

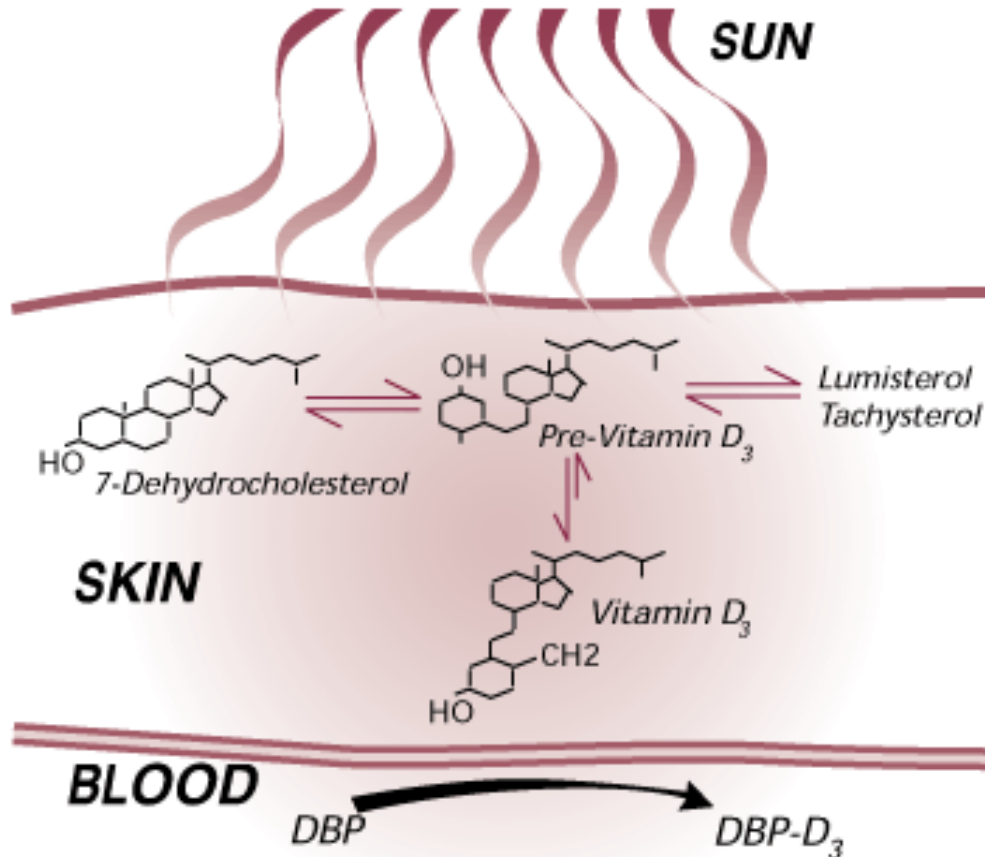
- Activates synthesis of Vitamin D3
- Promotes bone development
- Improves Immune System function

Harmful Effects

- Sun Burn
- Wrinkles, premature aging
- Malignant melanoma
- Basal cell carcinoma



VITAMIN D PRODUCTION



- Skin cells help produce vitamin D
- Dehydrocholesterol made by cells in digestive system
- Reaches skin and is changed to vitamin D when exposed to UV light



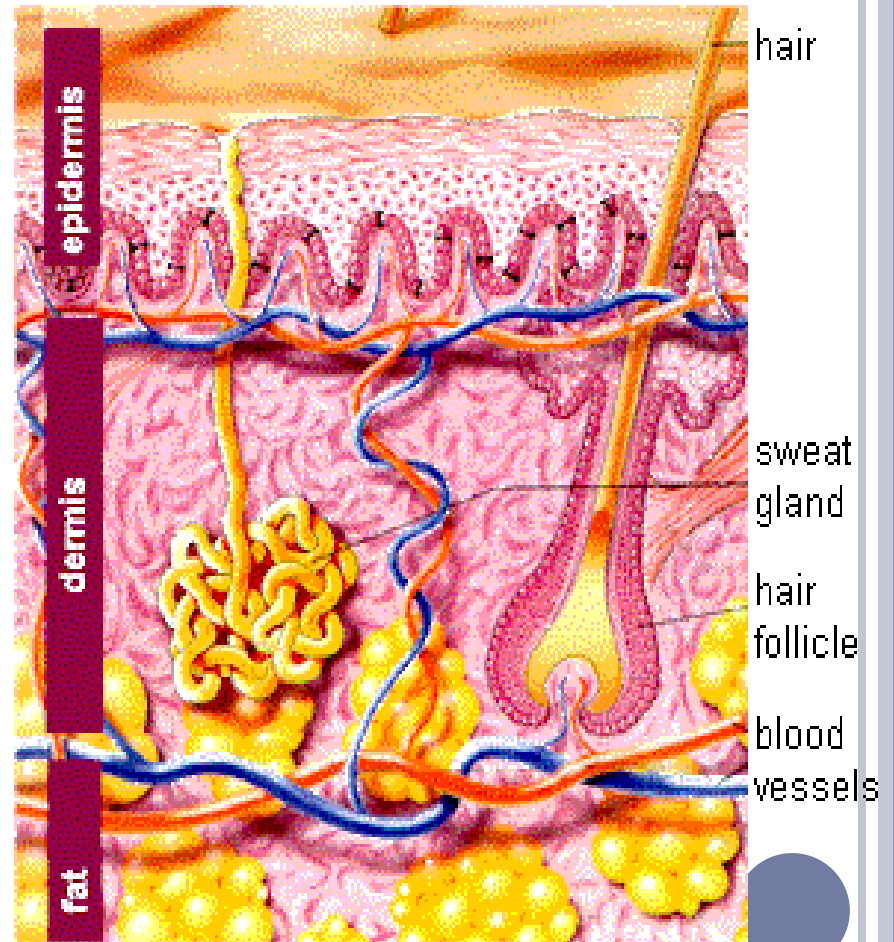
HOW THICK IS YOUR SKIN?

○ Epidermis:

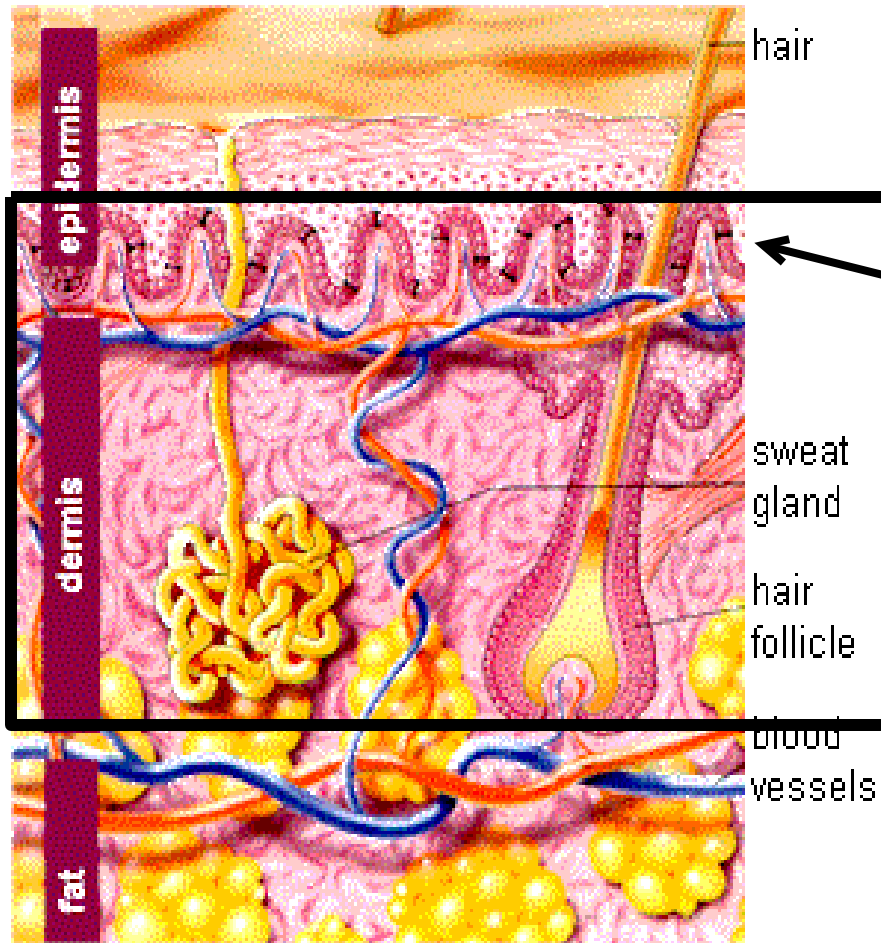
- .5 mm on eyelids
- Up to 1.5 mm on palms/soles

○ Dermis:

- .3mm on eyelids
- 3 mm on upper back



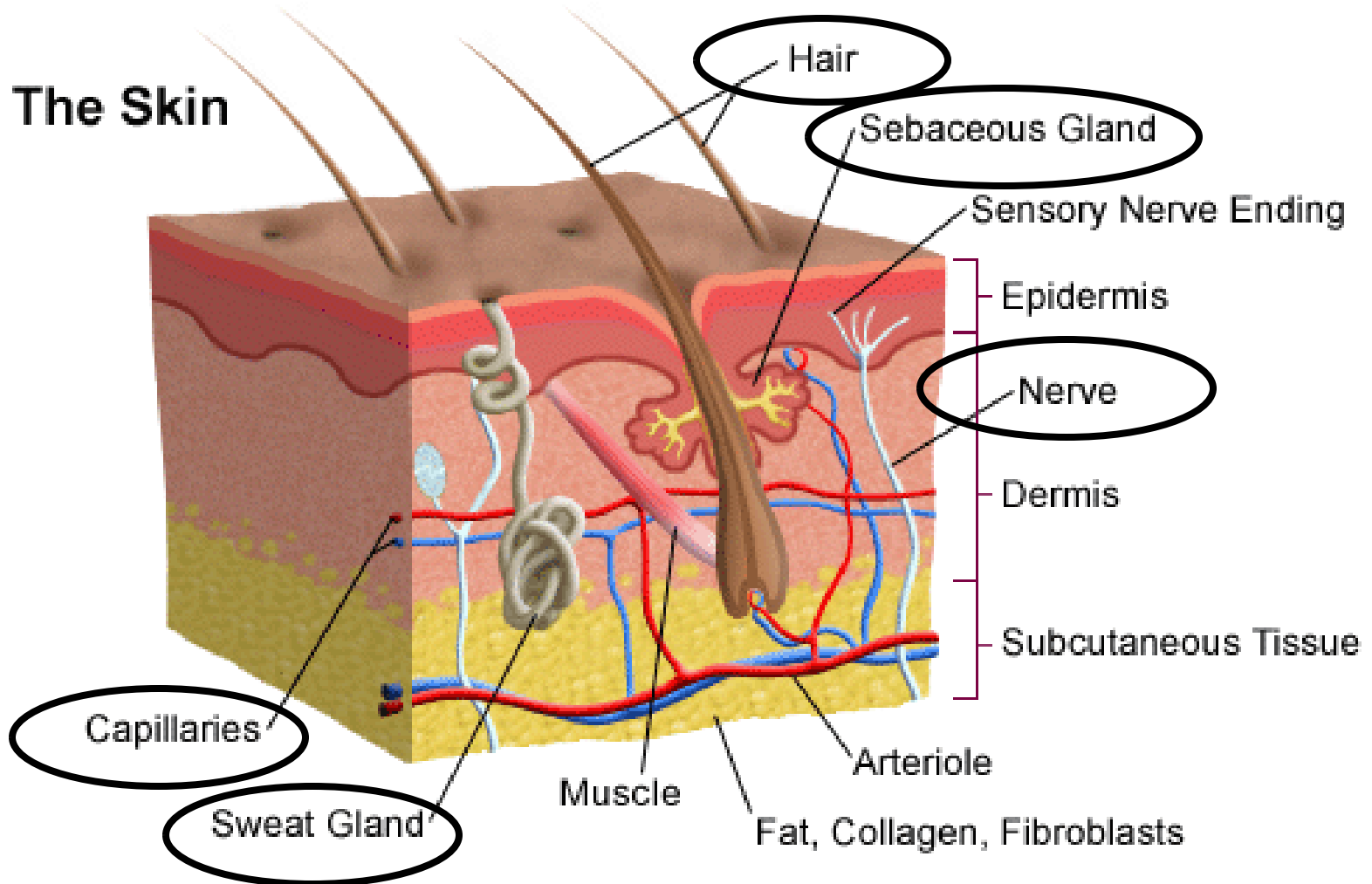
DERMIS



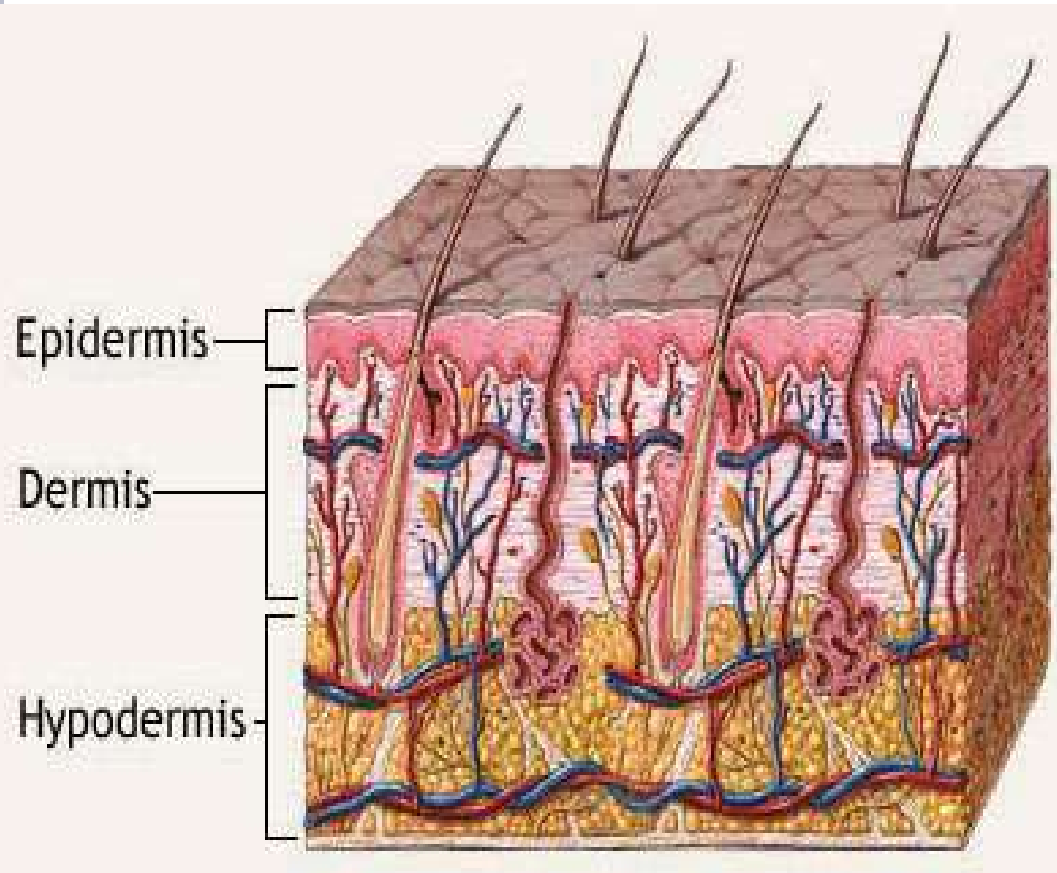
- Directly below epidermis
- Dermal papillae project upwards into epidermis
 - Produce fingerprints
- Made mostly of dense connective tissue



DERMAL STRUCTURES



SUBCUTANEOUS LAYER



○ A.k.a. **HYPODERMIS**

○ Loose connective and adipose tissue

- Insulation

- Major blood supply



INJECTIONS

○ SUBCUTANEOUS INJECTION

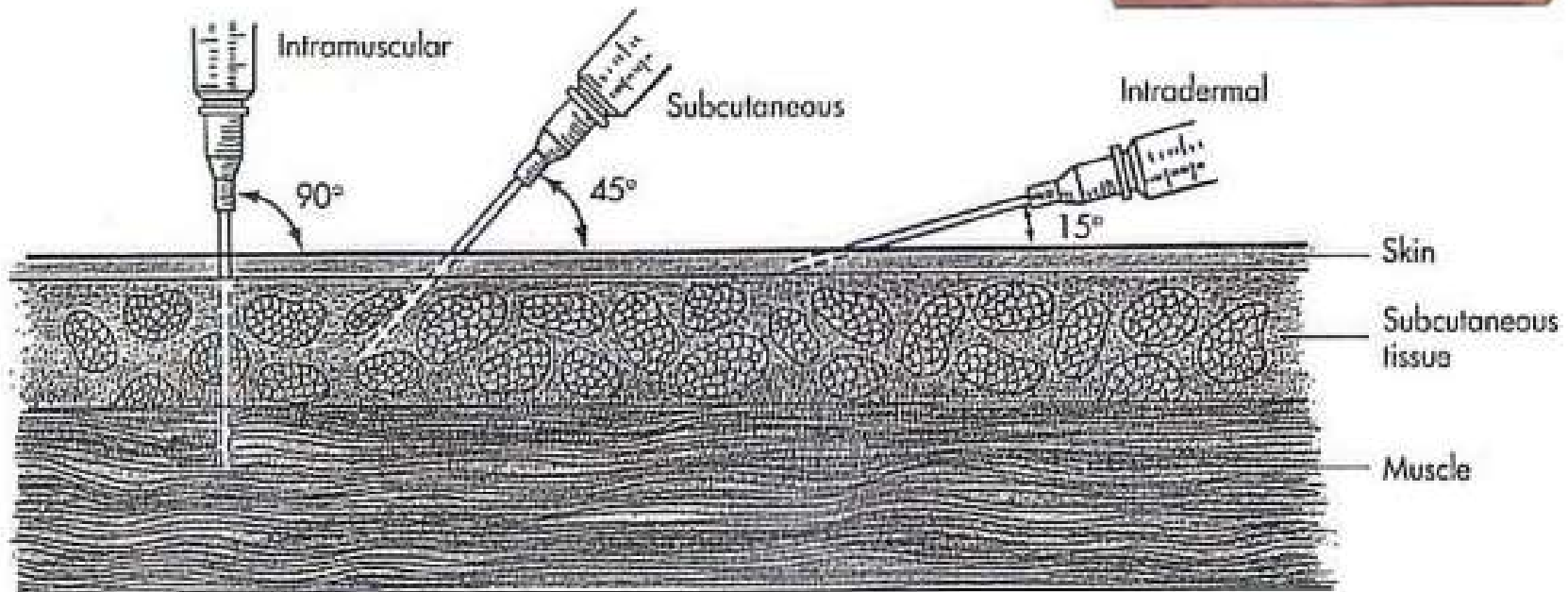
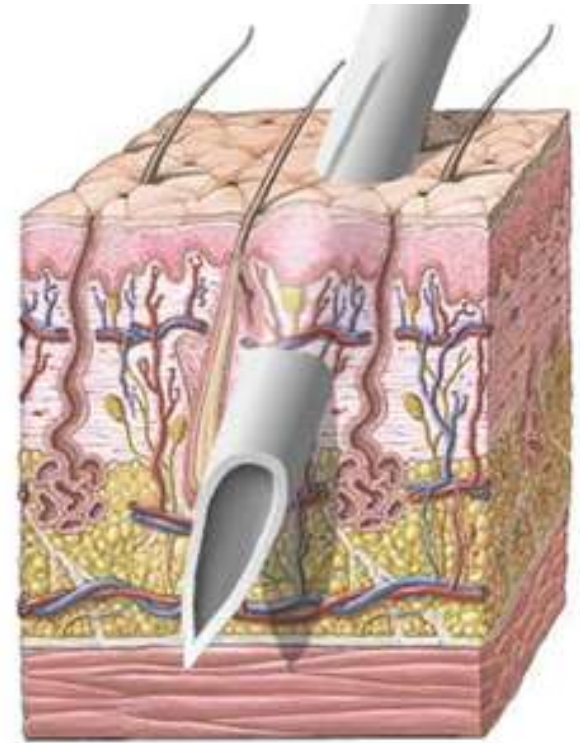
- Flu shot, penicillin

○ INTRADERMAL

- TB test

○ INTRAMUSCULAR

- Epinephrine injection



SEVERITY OF BURNS

Epidermis

Dermis

Subcutaneous

Muscle



Superficial
(first degree)
burn



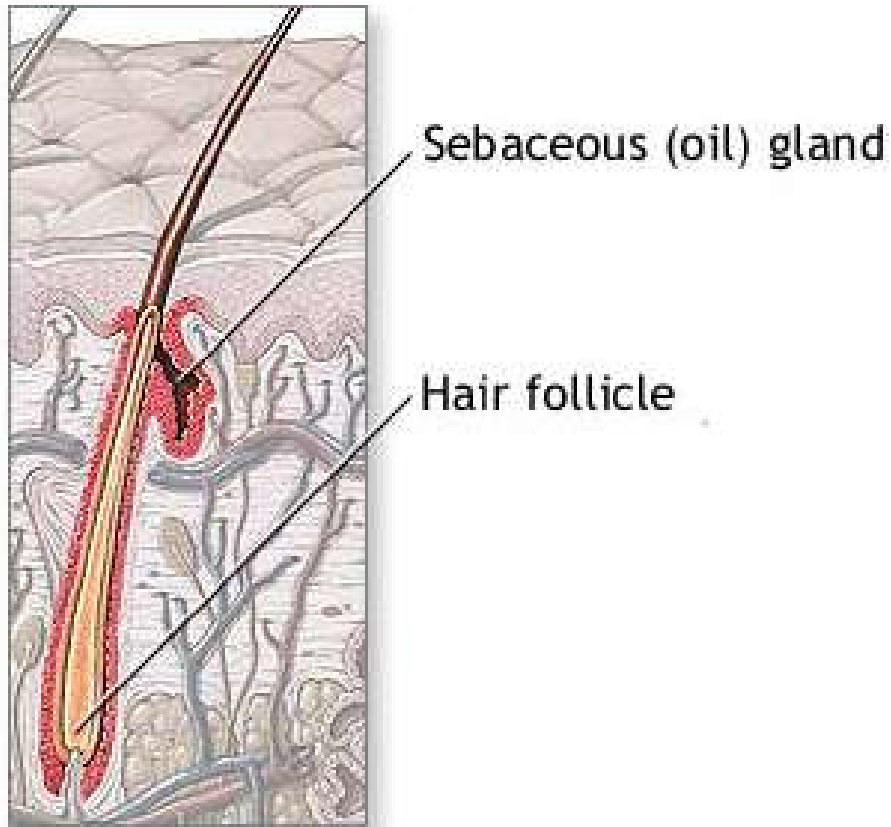
Partial thickness
(second degree)
burn



Full thickness
(third degree)
burn



SEBACEOUS GLAND

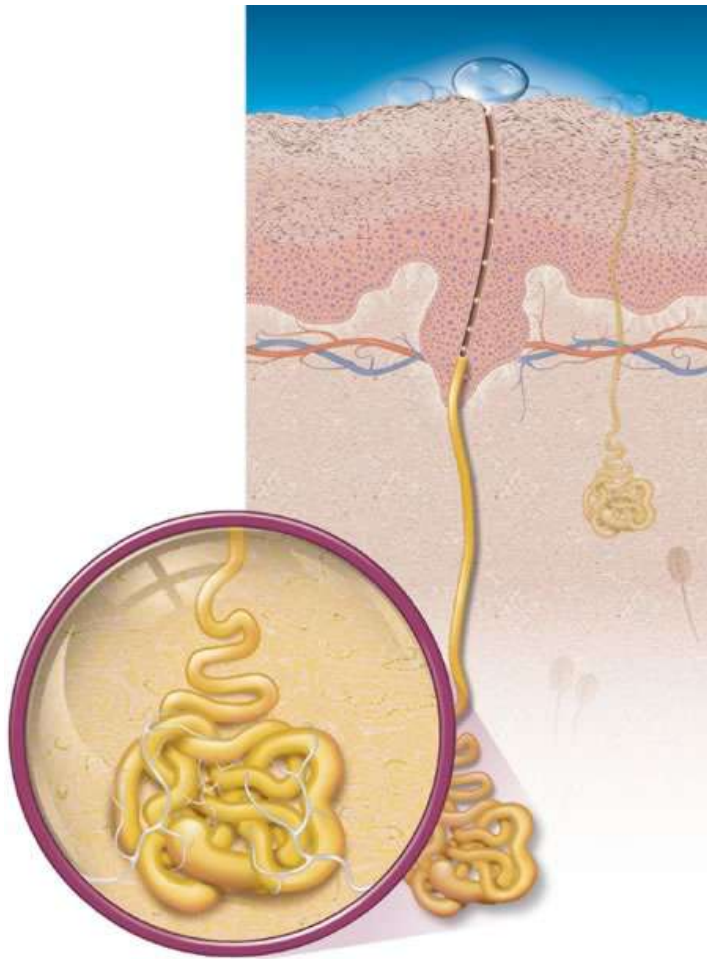


○ Specialized epithelial gland that produces **SEBUM**

- Oily mixture that keeps hair and skin soft, pliable and waterproof
- Attached to follicles



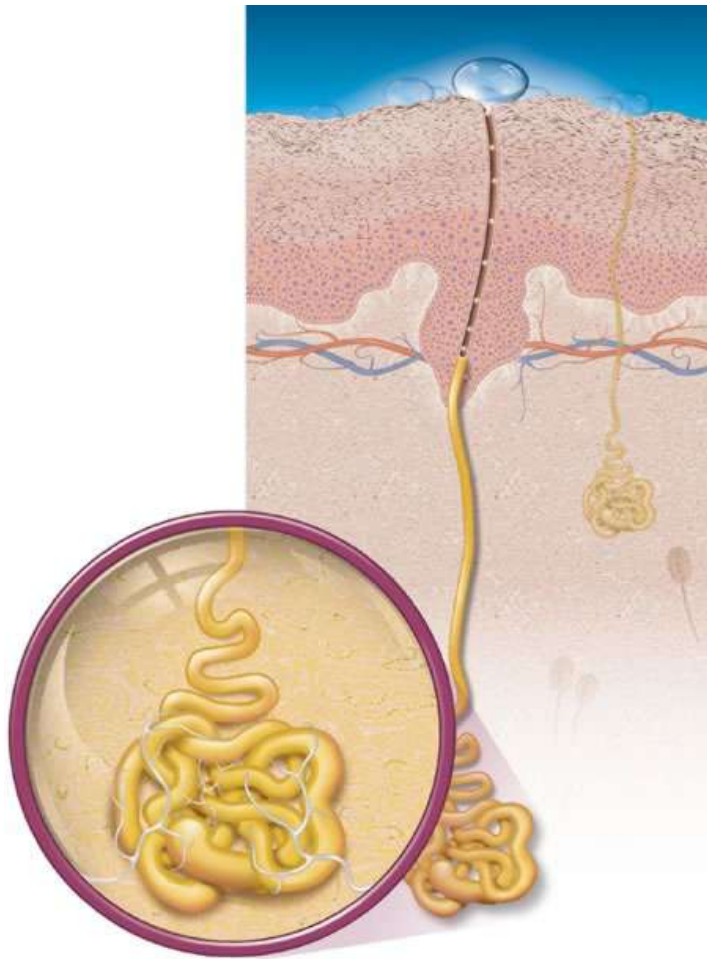
SUDORIFEROUS (SWEAT) GLANDS



- Tiny tube that is attached to a coil in dermis
- **ECCRINE GLANDS** respond to temperature
 - Sweat comes out of **PORE**
 - Forehead, neck, back



SUDOIFEROUS (SWEAT) GLANDS



APOCRINE GLANDS

- Respond to emotions
- Active at puberty
- Groin, axillary regions



Hyperhidrosis

- Overactive sweat glands

- Hands
- Feet
- Armpits



- Caused by overactive nervous system

- Treatment:

- Antiperspirant
- Iontophoresis
- Botox injections



The Skin's Role in Homeostasis

- Vital in maintaining proper body temperature
- Important in the healing of wounds
- Aids in production of Vitamin D



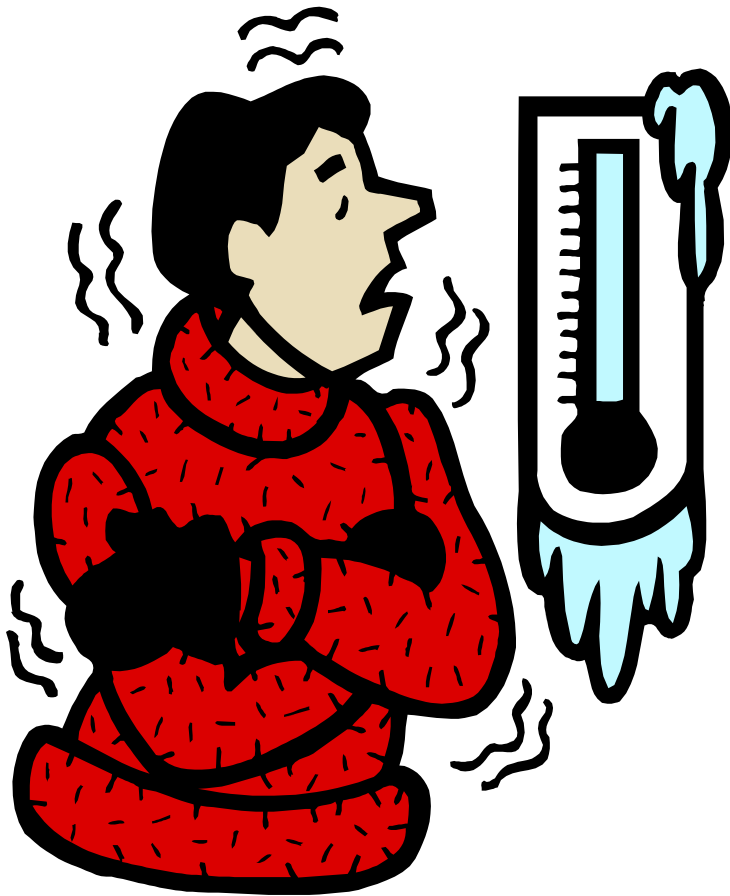
Regulation of Body Temp



- During intense heat, nerve impulses signal the body to release heat
 - Blood vessels dilate, giving off heat through skin
 - Eccrine sweat glands become active
 - Sweat evaporates cooling skin



Regulation of Body Temp



- If too much heat is lost:
 - Muscles in dermal wall contract
 - Decreases blood flow and heat loss
 - Sweat glands inactive
 - Skeletal muscles contract involuntarily
 - Release heat
 - “Shivering”



Healing of Wounds

○ **INFLAMMATION** – wound and surrounding areas become swelled

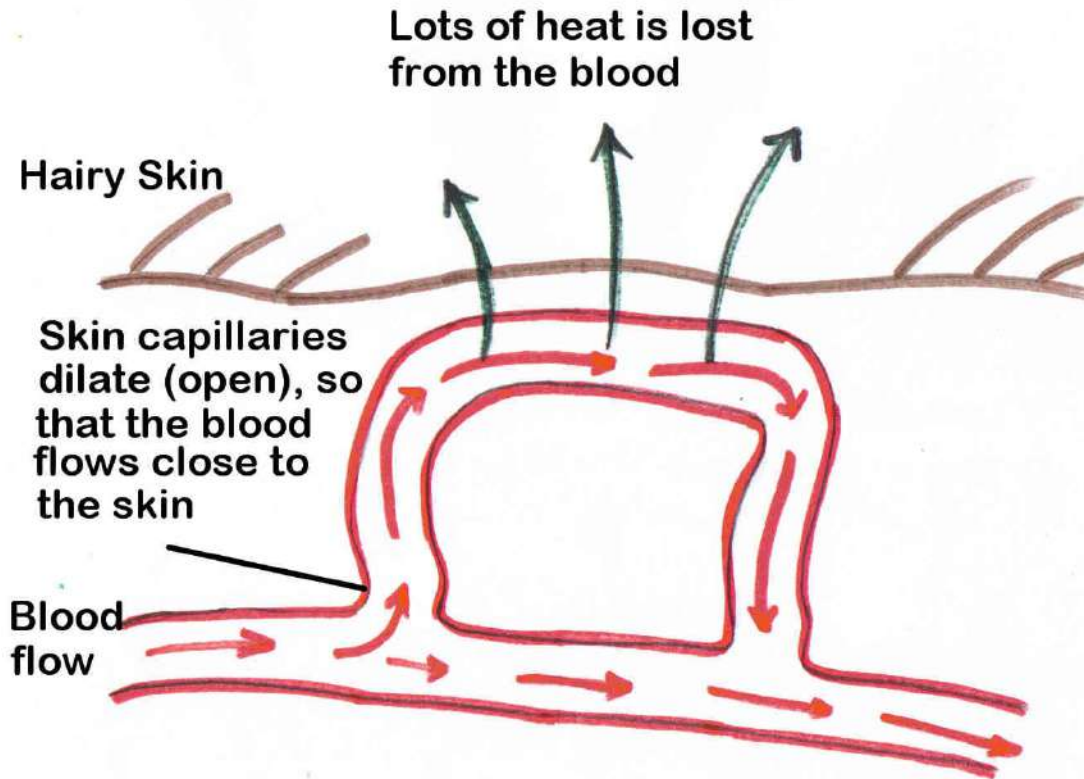
- Response to injury & stress

○ 4 signs of inflammation:

- Redness
- Warmth
- Swelling
- Pain



Inflammation



- **Redness** - caused by increased vasodilatation
 - More blood in area
- **Heat** – increased metabolism; WBC's try to destroy invaders



Inflammation

Normal foot



Foot with edema



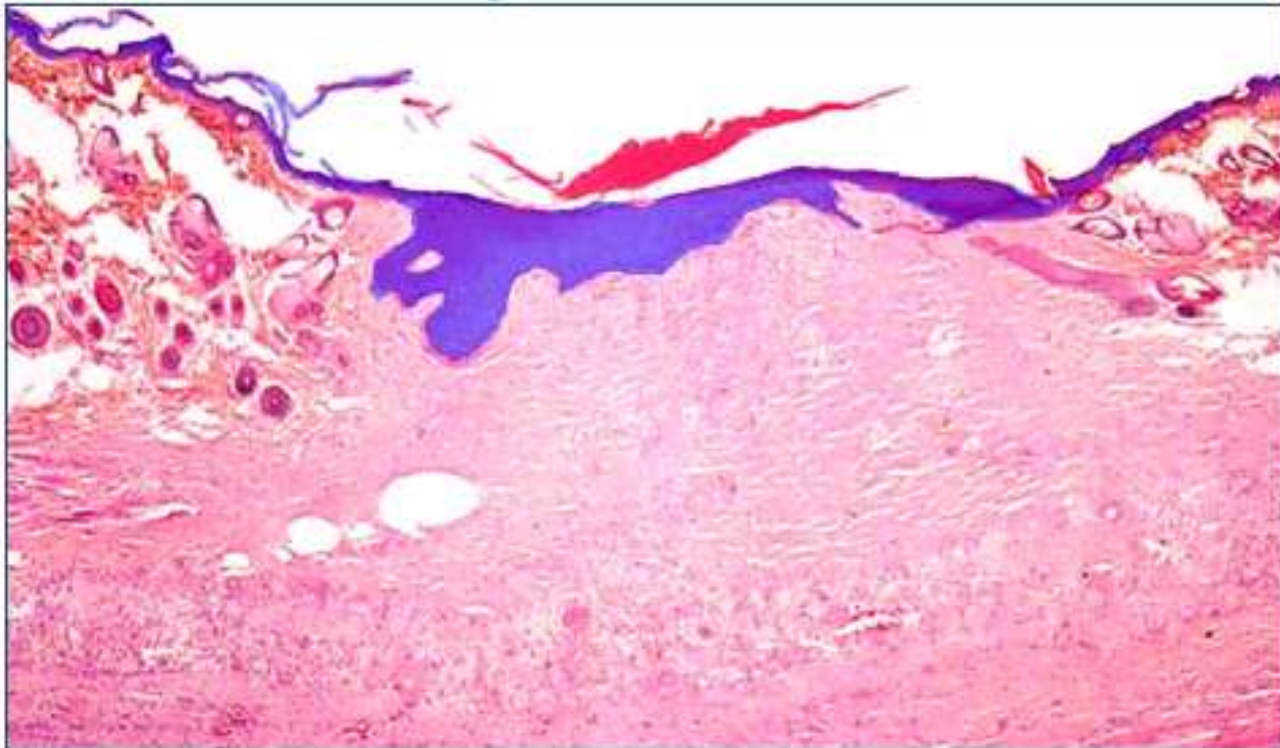
ADAM.

- **Swelling** – Fluid in area due to change in osmotic pressure
 - Abnormal build up of fluid called **EDEMA**
- **Pain** – Pressure on nerve endings from fluid



Healing of Wounds

- Shallow wounds (epidermis)
 - Epithelial cells divide and fill in gap



Healing skin wound after 12 days, medium power view.



Healing of Wounds

- Deep wounds (dermis or subcutaneous layer)
 - Blood vessels broken
 - Clot forms and dries into a scab
 - Fibroblasts lay down collagen fibers forming scar
 - Phagocytes remove foreign particles

