

Hole's Human Anatomy and Physiology

www.fisiokinesiterapia.biz

Chapter 6

Skin and the Integumentary System

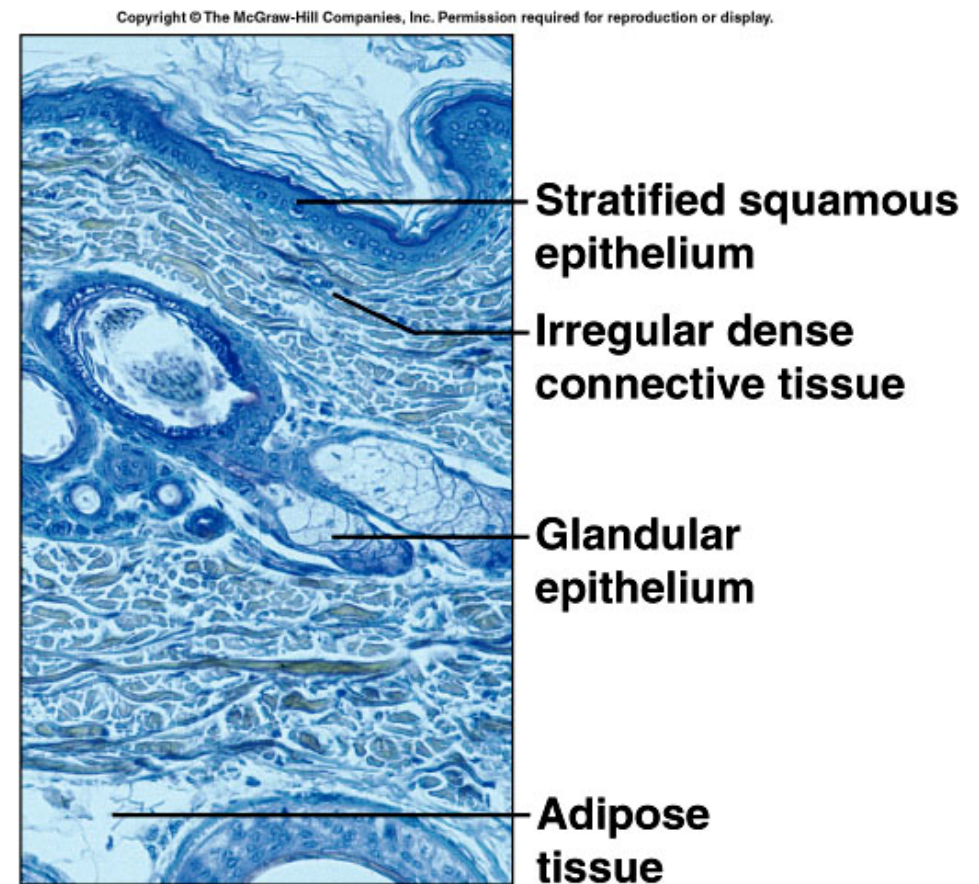
- **Composed of several tissues**
- **Maintains homeostasis**
- **Protective covering**
- **Retards water loss**
- **Regulates body temperature**
- **Houses sensory receptors**
- **Contains immune system cells**
- **Synthesizes chemicals**
- **Excretes small amounts of waste**

Skin Cells

- **help produce Vitamin D needed for normal bone and tooth development**
- **some cells (keratinocytes) produce substances that simulate development of some WBCs**

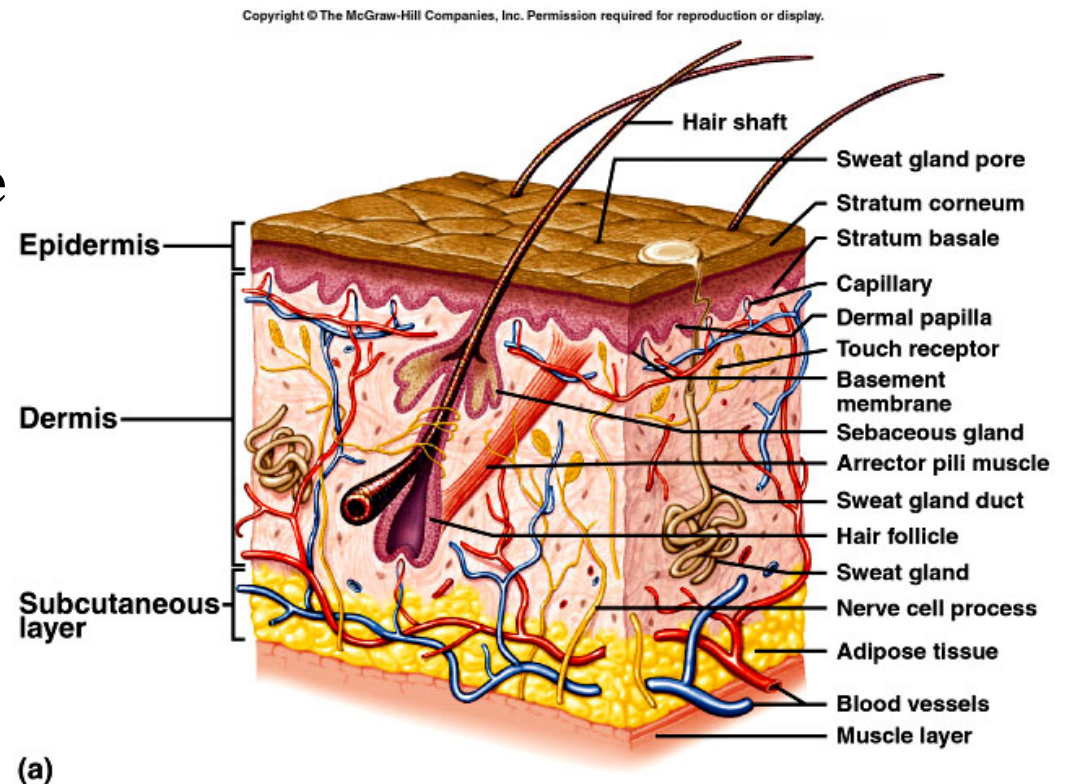
Layers of Skin

- **Epidermis**
- **Dermis**
- **Subcutaneous layer**
 - beneath dermis
 - not part of skin



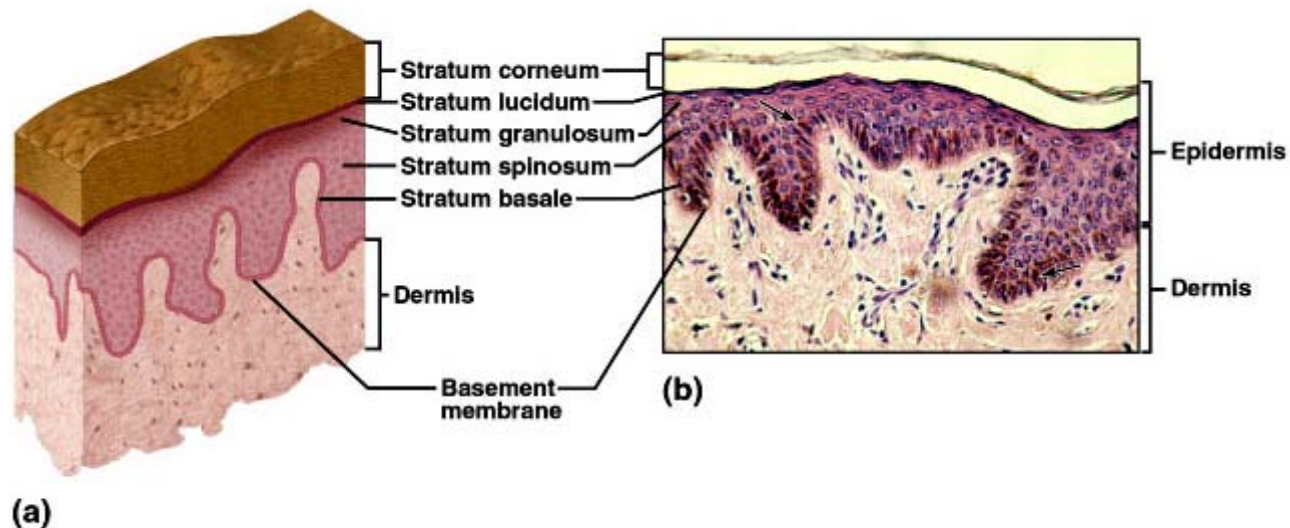
Subcutaneous Layer

- hypodermis
- loose connective tissue
- adipose tissue
- insulates
- major blood vessels



Epidermis

- lacks blood vessels
- **keratinized**
- thickest on palms and soles (0.8-1.4mm)
- **melanocytes** provide melanin
- rests on **basement membrane**
- stratified squamous

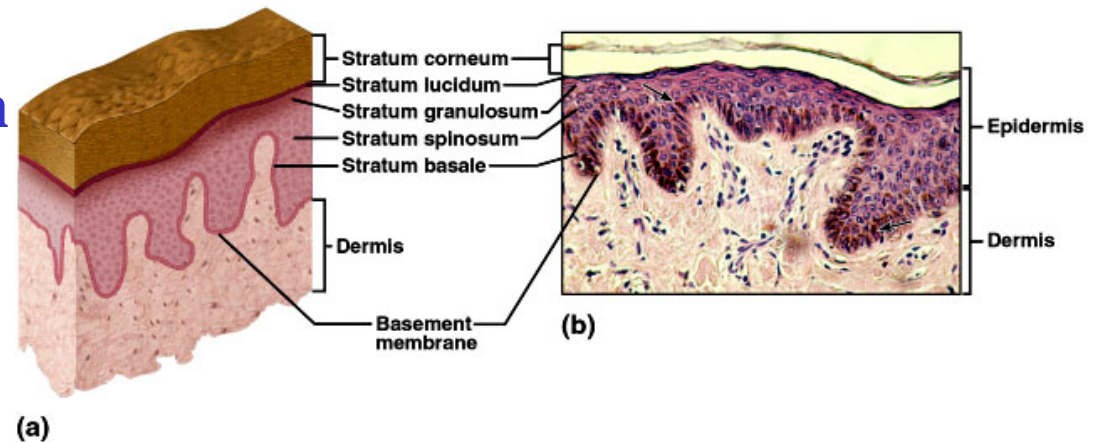


Epidermis

Layers of Epidermis

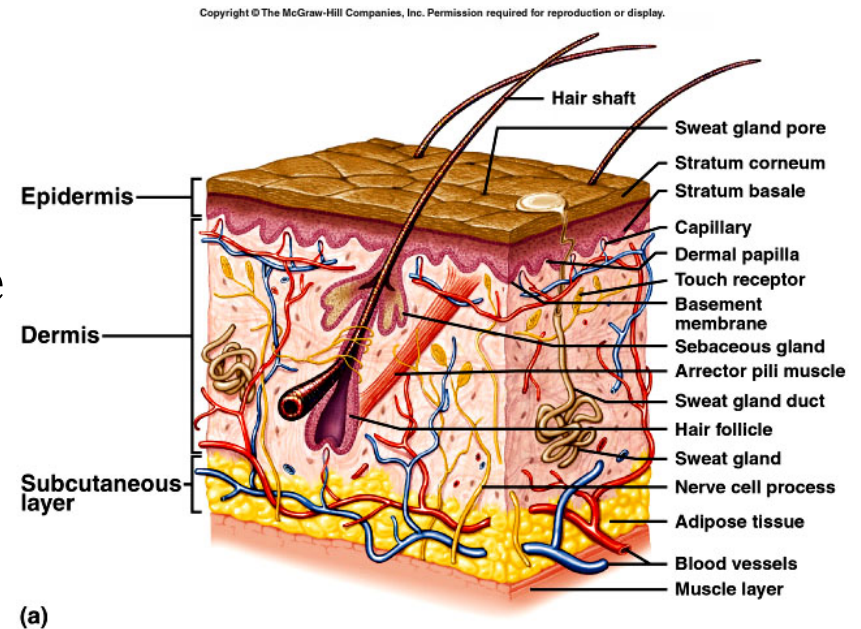
- stratum **corneum**
- stratum **lucidum**
- stratum **granulosum**
- stratum **spinosum**
- stratum **basale**

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



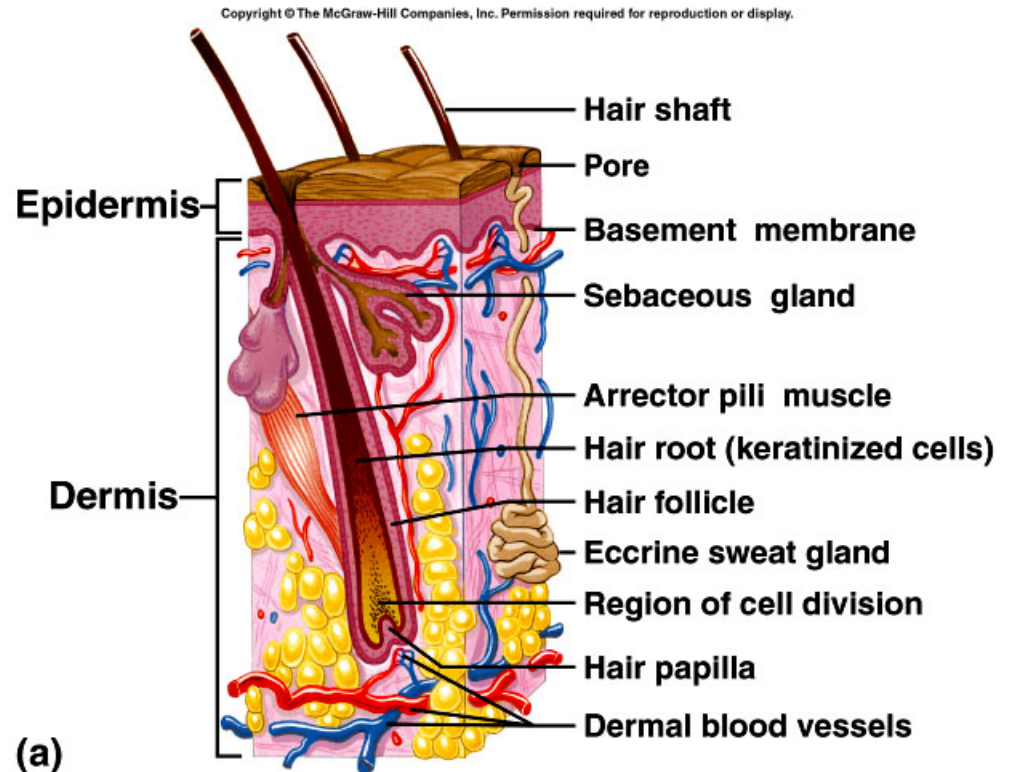
Dermis

- on average 1.0-2.0mm thick
- contains **dermal papillae**
- binds epidermis to underlying tissues
- irregular dense connective tissue
- muscle cells
- nerve cell processes
- specialized sensory receptors
- blood vessels
- hair follicles
- glands



Hair Follicles

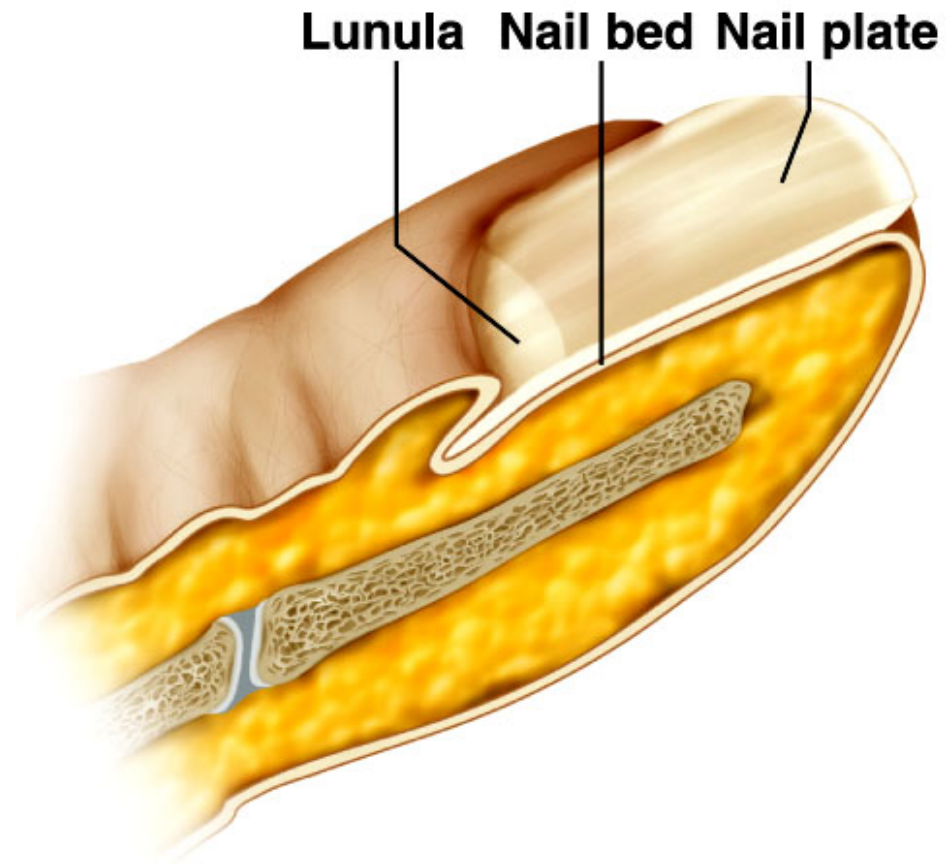
- epidermal cells
- tube-like depression
- extends into dermis
- hair root
- hair shaft
- hair papilla
- dead epidermal cells
- melanin
- arrector pili muscle



Nails

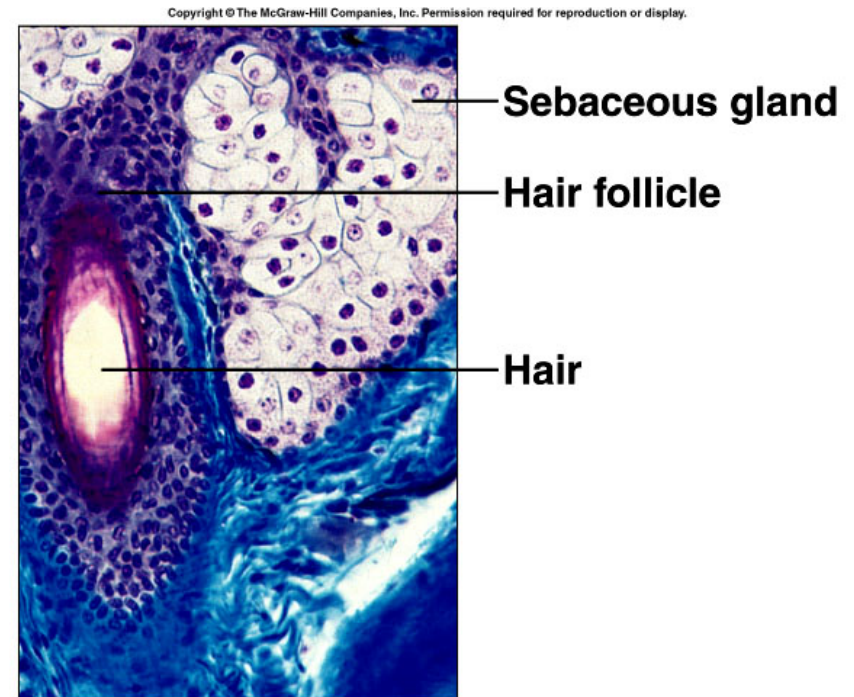
- protective coverings
- **nail plate**
- **nail bed**
- **lunula**

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



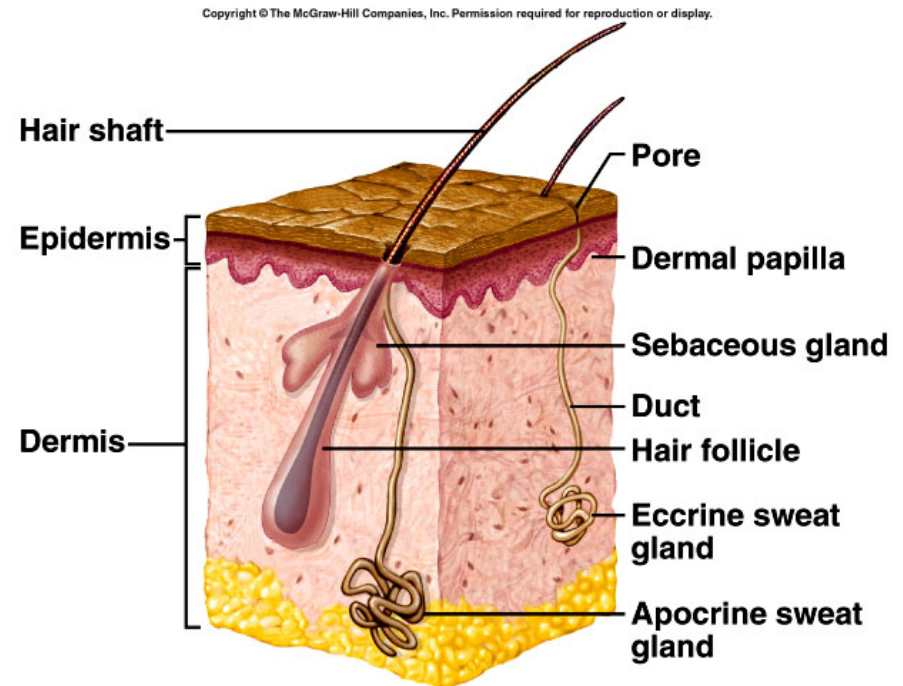
Sebaceous Glands

- usually associated with hair follicles
- holocrine glands
- secrete **sebum**
- absent on palms and soles



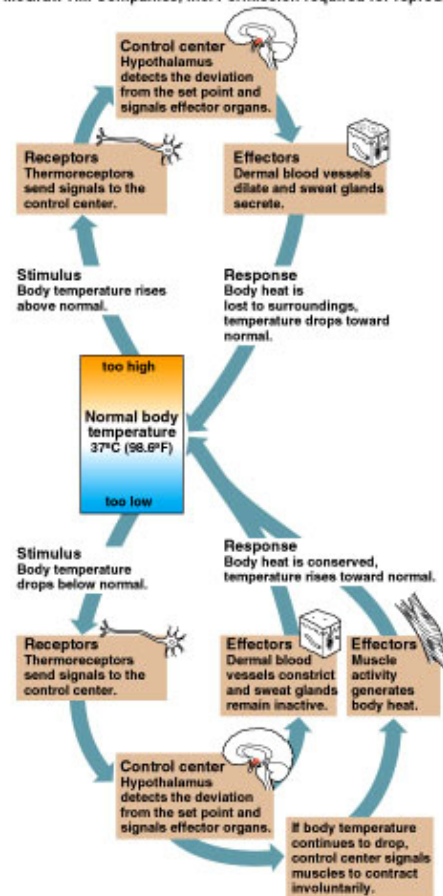
Sweat Glands

- sudoriferous glands
- widespread in skin
- originates in deeper dermis or hypodermis
- **eccrine** glands
- **apocrine** glands
- **ceruminous** glands
- **mammary** glands



Regulation of Body Temperature

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



Problems in Temperature Regulation

Hyperthermia – abnormally high body temperature

Hypothermia – abnormally low body temperature

Skin Color

Genetic Factors

- varying amounts of melanin
- varying size of melanin granules
- albinos lack melanin

Physiological Factors

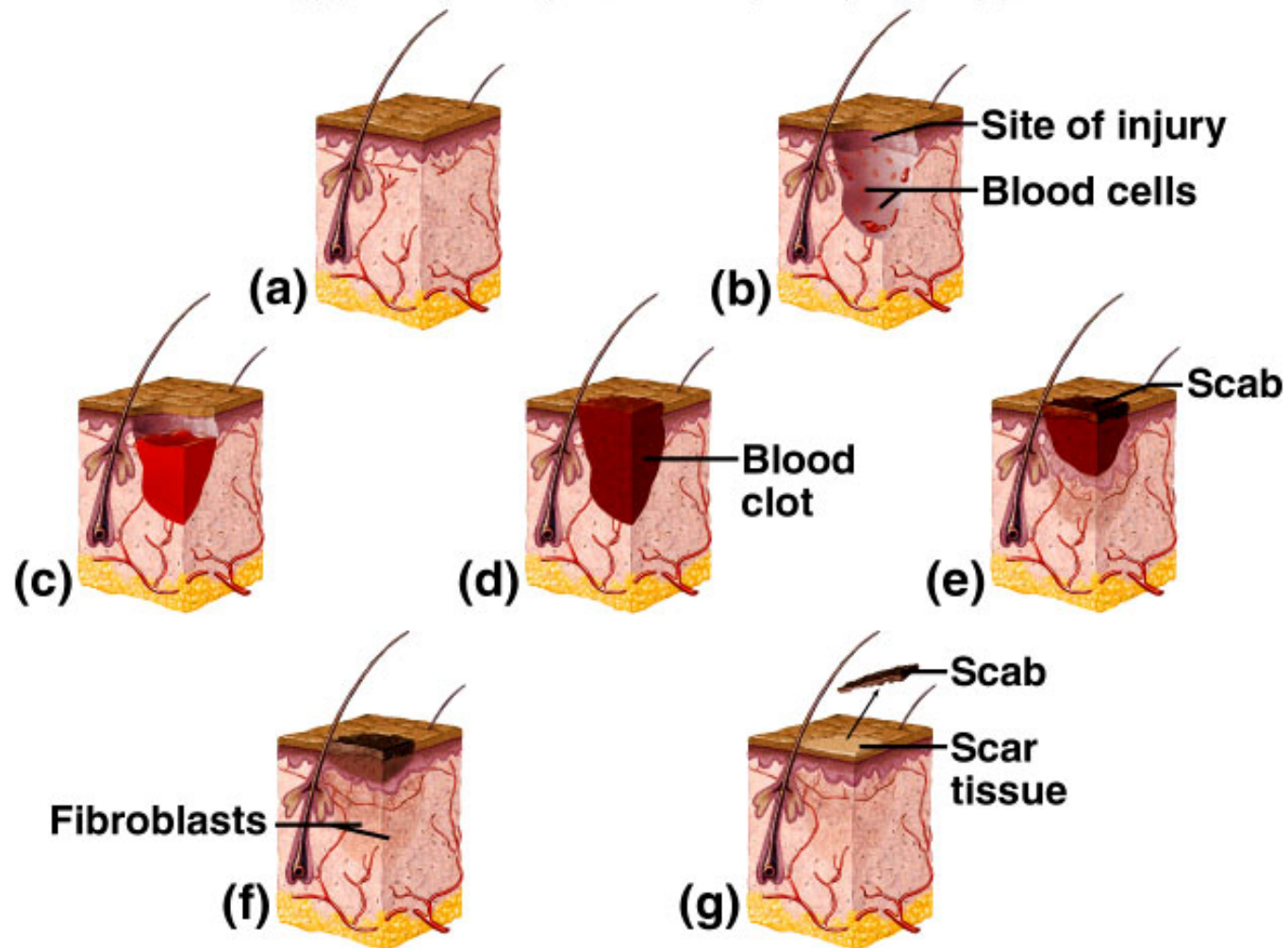
- dilation of dermal blood vessels
- constriction of dermal blood vessels
- accumulation of carotene
- jaundice

Environmental Factors

- sunlight
- UV light from sunlamps
- X rays
- darkens melanin

Healing of Cuts

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



Healing of Burns

First degree burn – superficial partial-thickness

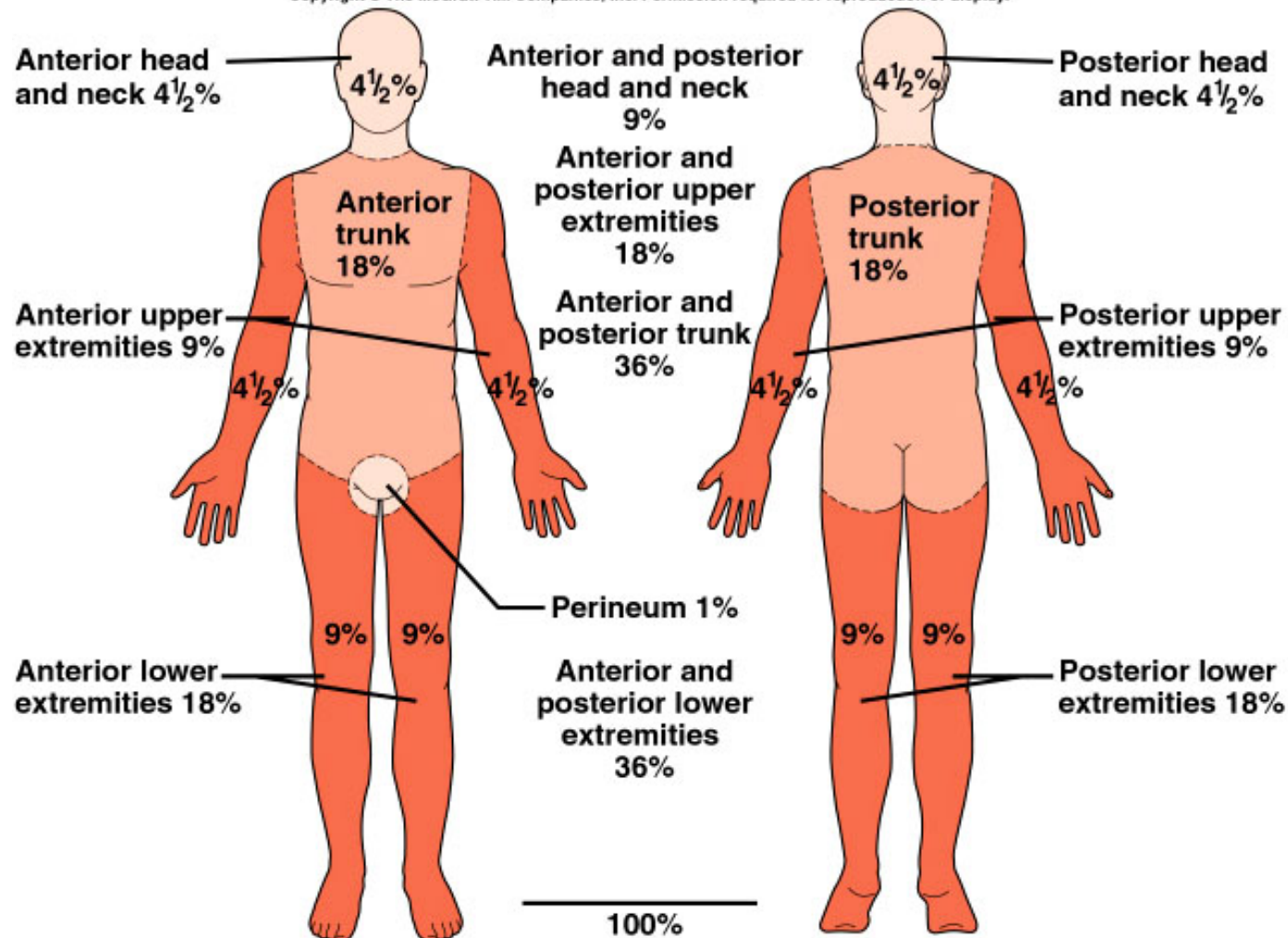
Second degree burn – deep partial-thickness

Third degree burn – full-thickness

- autograft
- homograft
- various skin substitutes

Rule of Nines

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



Life Span Changes

- Skin becomes scaly
- Age spots appear
- Epidermis thins
- Dermis becomes reduced
- Loss of fat
- Wrinkling
- Sagging
- Sebaceous glands secrete less oil
- Melanin production slows
- Hair thins
- Number of hair follicles decrease
- Nail growth becomes impaired
- Sensory receptors decline
- Body temperature unable to be controlled
- Diminished ability to activate Vitamin D

Clinical Application

Acne Vulgaris

- **most common skin disorder**
- **sebum and epithelial cells clog glands**
- **produces whitheads and blackheads (comedones)**
- **anaerobic bacteria trigger inflammation (pimple)**
- **largely hormonally induced**
- **androgens stimulate sebum production**
- **treatments include antibiotics, topical creams, birth control pills**