

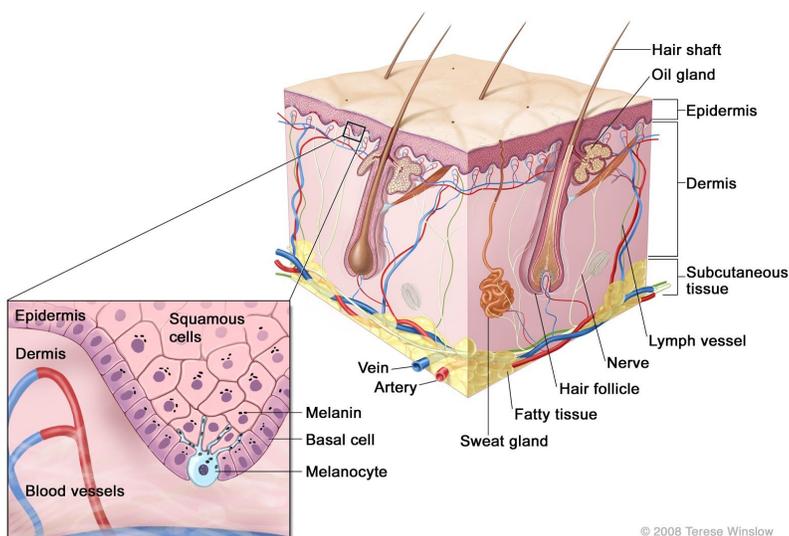
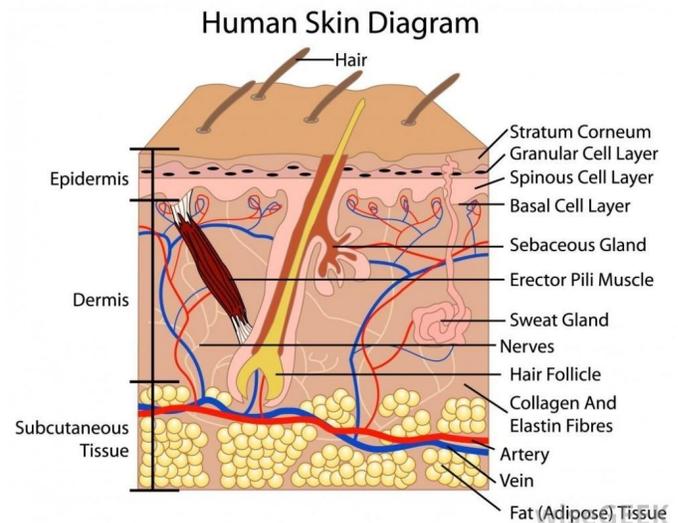
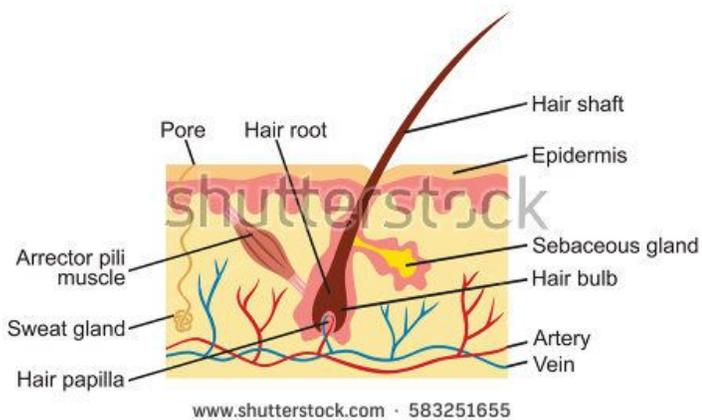
## Integumentary System

“Clothe me with skin and flesh, And knit me together with bones and sinews” Job 10:11

- homeostasis: maintenance of stable internal environment
- integumentary system: skin; includes hair follicles, sweat glands, sebaceous glands
- total surface area of 20–25 ft<sup>2</sup> → largest and most visible organ of body

### Purposes

- 1) communication: sense receptors in skin notify brain of conditions affecting the body (temp, pressure, pain)
- 2) secretion: provides moisture/sweat to cool body and oil to keep it from drying out
- 3) protection: prevents harmful microorganisms and chemicals from reaching tissues underneath



## Layers

- epidermis: outermost layer of skin; outermost squamous cells dead  
germinative cells replace surface cells daily, stimulated by rubbing which  
causes a callus; all epidermal cells replaced every 27 days
- psoriasis: epidermal cells formed and discarded too rapidly, causing dandruff
- keratin: protein fiber manufactured in cytoplasm and the source of protective upper  
epidermis; fingernails and toenails have undergone most keratinization
- melanin: main pigment responsible for skin color in melanocytes within  
germinative layer; transferred to keratinocytes; carotenoids give olive tint and  
hemoglobin give red/pink tint
- dermis: elastin and collagen are two protein fibers produced by connective tissue  
which give skin elasticity; also houses nerve endings, blood vessels, hair follicles,  
sebaceous (oil) glands
- subcutaneous layer: fatty layer of loose connective tissue which binds skin to  
underlying organs; insulates and absorbs shock

## Tanning and sunburn

- tanning: natural process of body to protect itself from harmful UV rays by  
temporarily producing more melanin when exposed to sunlight; overexposure =  
sunburn in which skin cells become inflamed
- skin cancer: possible that UV not absorbed by melanin causes deep epidermis cells  
to mutate

## Hair

- hair grows from hair follicle - tube lying vertically in dermis and designed to  
manufacture hair; hair shaft built from epidermal cells that fully keratinize
- epidermal cells that line hair root reproduce rapidly, mature, then die, pushing dead  
cells up through follicle; hair grows as more length is added
- hair color determined by amount of melanin and other pigments produced in  
melanocytes
- hair aids homeostasis by protecting parts of body from unwanted particles and  
aiding in sense of touch
- hair follicle is also attachment for arrector pili which are muscles that contract  
when the body is cold, giving goose bumps and helps warm skin

## Sebaceous glands

- sebum: oil that waterproofs skin and ensures that it remains soft and flexible
- may produce too much oil which clogs hair follicle opening

## Regulation of body temperature

- sweat glands regulate body temperature and help remove nitrogenous wastes  
and mineral salts from blood

- normal loss of 100–600mL of water and dissolved wastes each day through sweat
- pores: openings in skin connected to sweat glands by sweat ducts; each sweat gland surrounded by network of capillaries which allows water, NaCl and other salts to diffuse out of blood into sweat glands
- hypothalamus signals sweat glands to produce sweat when body temp rises above normal 98.6°
- as perspiration evaporates from surface, body is cooled
- when body must conserve heat, blood vessels in dermis constrict, reducing blood flow near surface and preventing excessive loss of heat from blood