CHAPTER 5 INTEGUMENTARY

Integumentary System

• skin cutaneous layer

• under the skin hypodermis (subcutaneous)

• other stuff accessory structures

Integumentary System

• Cutaneous layer = skin
  • epithelial layers = epidermis
  • connective tissue layer = dermis

• Subcutaneous layer = connective tissues
  • adipose c.t.
  • areolar c.t.

Integumentary System

• Accessory structures = appendages
  • hair
  • nails
  • glands
  • nerve endings
  • blood vessels

Functions

Protection
  • barrier against foreign body, water loss, dirt
  • defenses WBC
  • chemical pH (urea) ; antibiotics

Temperature regulation
  • sweat
  • blood flow
  • adipose

Sensation information from environment

Cushion

epidermis

• stratified squamous epithelium
• mostly keratinocytes
  • produce keratin - protective protein
• keratinized stratified squamous epithelium
• no capillaries

epidermis

• layers :
  • stratum corneum
  • stratum lucidum (palms and soles only)
  • stratum granulosum
  • stratum spinosum
  • stratum basale


epidermis

• **stratum basale** = basal layer = **stratum germinativum**
  
  — Merkel cells
  
  — melanocytes
  
  — basal cells

epidermis

• **stratum spinosum**
  
  — keratinocytes
  
  — Langerhan’s cells

epidermis

• **stratum granulosum**
  
  — keratinocytes
  
  — squamous cells
  
  — thickened cell membrane
  
  — dying

epidermis

• **stratum corneum**
  
  — dead cells
  
  — thick keratin coat
  
  — waterproof

• **thick skin** palm and sole
  
  — thick stratum corneum + stratum lucidum + keratin

• **thin skin**
  
  — thin stratum corneum

Cancer

• - **oma** tumor, mass
• **carcin/o** cancerous epithelial tissue
• **sarc/o** connective tissue (flesh)
• **carcinoma** cancerous tumor of epithelial tissue
• **sarcoma** cancerous tumor of connective tissue
• basal cell carcinoma
• squamous cell carcinoma
• malignant melanoma
• hematoma

dermis

• connective tissue layer
• papillary layer areolar c.t.
  
  — dermal papillae
  
  — capillaries
• reticular layer dense irregular c.t.
  
  — blood supply 5% of body’s blood
  
  — temperature control
  
  — nerves
hypodermis
• = subcutaneous layer = superficial fascia
• adipose + areolar c.t.
• insulation
• cushion

skin color
• melanin made from tyrosine (amino acid)
  reflects UV rays
  various colors and amounts
• carotene carrots, tomatoes Vit A
• hemoglobin reddish when oxygenated
• darker skin to reflect increased UV
• lighter skin to allow more Vit D production

hair
• hair = hard keratin + dead keratinocytes
  — root below skin
  — shaft above skin
  — medulla inner core of keratinocytes + air
  — cortex several layers of keratinocytes
  — melanin various colors of hair
• function touch
  temperature control

hair
• hair follicle epidermal tissue
  — internal root sheath = matrix — mitotic cells
  — external root sheath — continuation of epidermis
  — connective tissue root sheath — dermis
    • papilla — capillaries
• hair follicle receptor nerves at hair bulb
• arrector pili muscle

sebaceous glands
• secrete sebum (oil)
  • prevents drying of skin and hair
• most secrete into hair follicle
• covers entire body, except palms and soles WHY?
sweat glands = sudoriferous glands

- sweat
  - blood filtrate
  - 99% water
  - urea waste product of AA
    - kills bacteria
- temperature control
- 2 types
  - eccrine (merocrine) = most body areas
    - ducts to sweat pore
  - apocrine
    - axilla, genital area
    - duct to hair follicle
    - sweat + fats

modified sweat glands

- ceruminous glands
  - ear canal
  - cerumen waxy substance

- mammary glands
  - produce milk

nail
  - hard, clear keratin

body
  - root under skin, proximal
  - nail bed epidermis
  - nail matrix basal cells, produce keratin
  - nail folds skin over edges
    - eponychium = cuticle proximal fold
  - lunula white area extension of matrix (avascular)

nerves

- sensations
  - pain
  - temperature
  - touch
  - pressure

- nerve endings
  - free
    - pain
    - temperature
  - encapsulated
    - Meissner’s touch
    - Pacinian pressure

blood vessels

- arteries, venules
  - vasodilate increase blood flow
    - heat loss
  - vasoconstrict decrease blood flow
    - conserve heat

- capillaries
  - dermal papillae
What could go wrong?

- blister
  - friction separate st corneum
  - water protects deep layers
- callus
  - chronic friction or pressure
  - mitosis
  - increase thickness of stratum corneum
- dehydration - profuse sweating
- burns
- cancer

- damage from heat, electricity, radiation, chemicals

- risks:
  - dehydration
  - circulatory shock
  - infection

1st degree burn:
  - superficial layers
  - vasodilation
    - mild swelling
    - redness
  - drying

2nd degree burn:
  - entire epidermis
  - vasodilation
  - histamine \( \rightarrow \) fluid + blister

3rd degree burn:
  - through dermis
  - loss of protective function
  - loss of sensation
  - infection \(-\) septicemia
  - dehydration \(-\) circulatory shock