Skin = Integument = Cutaneous Membrane

7 Functions:

1. Protective covering
2. Regulates body temperature
3. Manufactures Vitamin D
4. Sensory function
5. Temporary storage of fat, glucose, water and salts
6. Screens out harmful ultraviolet radiation
7. Absorbs certain drugs
STRUCTURE OF THE SKIN

2 basic layers

Epidermis
- Outermost covering
- Epithelial cells
- Avascular

Dermis
- True skin
- Connective tissue
- Vascular

EPIDERMIS

2 (of 3) epidermal layers are:

- Stratum corneum
- Stratum germinativum
STRATUM CORNEUM

♦ Outermost layer
♦ In cells, cytoplasm replaced by KERATIN – making them waterproof.
♦ Flat and scale-like cells that flake off
♦ First line of defense against surface bacteria
♦ Thickest ⇔ palms of hands, soles of feet

STRATUM GERMINATIVUM

♦ Innermost epidermal layer
♦ Reproductive layer – cells form and push their way up, become keratinized, and replace the top layer
♦ Contains MELANOCYTES – cells that contain a pigment = MELANIN

Melanin

★ Black, brown, or has a yellow tint – depending on racial origin
★ The more melanin, the darker the skin
★ Caucasians don’t have much melanin in their melanocytes.
★ Freckles = patches of melanin
★ Albinism = no melanin
Tanning

Sunlight stimulates melanocytes to make more melanin

Tanning produced by UV rays.

Prolonged exposure may lead to skin cancer!

PAPILLAE

- Ridges in stratum germinativum that arise from dermis
- Create permanent ridges in fingers, palms and soles of feet
- These “friction ridges” help with grip
- Cause “fingerprints”
DERMIS

Thicker inner layer that contains:

- Connective tissue
- Blood vessels
- Nerve endings
- Muscles
- Hair follicles
- Oil and sweat glands
- Fat cells
Nerve Receptors in Dermis

- Sensory nerves – heat, cold, touch, pain and pressure
- Touch receptors close to the surface
- Pressure receptors are deeper

Subcutaneous Layer

- Lies under the dermis (not really part of integumentary system)
- Made up of loose connective tissue
- Contains half of the body’s stored fat

Appendages of the Skin

HAIR

- Almost everywhere on the body
- Length, thickness, type and color varies

Outer layer = CORTEX
Inner layer = MEDULLA
Part under the skin = ROOT
Part outside the skin = SHAFT
FOLLICLE = pocket in epidermis, hair inside
PAPILLA = tuft of tissue in root, contains capillaries
ARRECTOR PILI MUSCLE = smooth muscle attached to follicle. How does this muscle cause goose bumps?
NAILS

- Nail is formed in the nail bed or MATRIX
- Epidermal cells fused together and fill with keratin

SWEAT GLANDS

- Perspiration is 99% water
- **SUDORIFEROUS GLANDS**
- Distributed over the entire skin surface
- Large numbers under the arms, palms of hands, soles of feet and forehead
- Duct extends to form a pore in the skin, perspiration excreted through the pores
- May be activated by heat, pain, fever and nervousness
- Average fluid loss is 500 ml per day

SEBACEOUS GLANDS

- Secret oil *(SEBUM)* that protects and lubricates the skin
Skin and Microorganisms

♦ Intact skin = best protection against pathogens, toxins and water loss

♦ Skin generally too dry for microbial growth – they do grow in moist areas

♦ Most skin bacteria associated with hair follicles or sweat glands

♦ Underarm perspiration odor caused by bacteria and perspiration

The best way to prevent the spread of disease is by hand washing.
Disorders of the Skin

ACNE VULGARIS
♦ Common and chronic disorder of sebaceous glands
♦ Sebum plugs pores ➔area fills with leukocytes
♦ Also – blackheads, cysts, pimples and scarring

ATHLETE’S FOOT
♦ Contagious fungal infection
♦ Usually contracted in public baths and showers
♦ Rx – antifungal agents

DERMATITIS
♦ Non-specific inflammation of skin
♦ Can be rash – reaction to soap, plants, etc.
♦ Can be emotional – stress can cause skin blotches

ECZEMA
♦ Acute or chronic, inflammatory skin disease
♦ Dry, red, itchy and scaly
♦ Rx – remove or avoid causative agent, hydrocortisone to help alleviate the symptoms

WARTS (VERRUCAE)
♦ Caused by virus
♦ Some disappear spontaneously, others removed with liquid nitrogen, chemicals or laser
IMPETIGO
- Acute, inflammatory and contagious
- Seen in babies and young children
- Caused by staphylococcus or streptococcus
- Characterized by the appearance of vesicles which rupture and develop distinct yellow crusts

PSORIASIS
- Chronic inflammatory skin disease
- Characterized by dry reddish patches which are covered with silvery-white scales
- Affects the skin surface over elbows, knees, shins, scalp and lower back
- Cause – unknown
- Onsets triggered by stress, trauma or infection

RINGWORM
- Highly contagious fungal infection
- Raised, itchy circular patches with crusts
- Skin, scalp or underneath nails
- Rx – griseofulvin (drug)

URTICARIA or HIVES
- Itchy wheals or welts
- Usually an allergic reaction to drugs, food, etc.
- Rx – avoid allergen
BOILS (CARBUNCLES)
♦ Painful, bacterial infection of hair follicle or sebaceous glands
♦ Caused by staphylococcus organism
♦ Rx – antibiotics, excision and drainage of affected area

SHINGLES (HERPES ZOSTER)
♦ Viral infection of nerve endings
♦ Chest or abdomen, accompanied by severe pain
♦ Rx – medication for pain and itching

HERPES SIMPLEX I
♦ Viral
♦ Fever blister or cold sore

GENITAL HERPES
♦ Viral
♦ Blister in genital area
♦ Spread through sexual contact
♦ Periods of remission and exacerbation
♦ Rx – Acyclovir
♦ Can be passed to newborn during vaginal delivery

SCABIES
♦ Communicable, severe itching
♦ Mite burrows in skin, lays eggs, eggs hatch
SKIN CANCER
◆ Associated with exposure to sun (UV rays)
◆ Most common type of cancer in people

BASAL CELL CARCINOMA
◆ Most common, least malignant skin cancer
◆ Usually occurs on face
◆ Rx – surgical removal or radiation

SQUAMOUS CELL CARCINOMA
◆ Mostly scalp and lower lip
◆ Grows rapidly and metastasizes to lymph nodes
◆ Rx – surgical removal or radiation
◆ Prognosis good with early diagnosis

MALIGNANT MELANOMA
◆ Occurs in melanocytes
◆ Metastasizes to other areas quickly
◆ Appears as brown or black irregular patch that occurs suddenly
◆ A change in an existing wart or mole may indicate melanoma
◆ Rx – surgical removal of melanoma and surrounding area and chemotherapy
BURNS
◆ Caused by radiation, sun, boiling water, chemicals, fire or electricity
◆ RULE OF NINES – Measures percent of body burned. Body divided into 11 area, each is 9% of body surface.

FIRST DEGREE
◆ Superficial
◆ Skin red and dry
◆ Involves only epidermis
◆ Rx – cold water
◆ Healing within one week

SECOND DEGREE
◆ Epidermis and dermis
◆ Pain, swelling, redness and blistering
◆ Skin may be exposed to infection
◆ Rx – pain medication, dry sterile dressing
◆ Healing within 2 weeks

THIRD DEGREE
◆ Epidermis, dermis and subcutaneous layers
◆ Symptoms – loss of skin, blackened skin (ESCHAR)
◆ May be life threatening
◆ Rx – prevention of infection and contracture, fluid replacement, skin graft
SKIN LESIONS

- **BULLA** – large blister
- **MACULE** – freckle, petechia
- **NODULE** - wart
- **PAPULE** – elevated nevus
- **PUSTULE** - acne
- **ULCER** – venous stasis ulcer (superficial or decubitus)
- **TUMOR** – benign epidermal tumor, basal cell carcinoma
- **VESICLE** – chickenpox, herpes simplex
- **WHEAL** – hives, insect bites

Terms

**ALBINISM** – absence of melanin
**ALOPECIA** – baldness
**EXCORIATION** - abrasion
**PRURITIS** – itching
**URTICARIA** - hives