

## Structures of the skin

- ◆ **Epidermis**
  - Skin cells in epidermis
    - Keratinocytes
    - Melanocytes
    - Merkel cells
    - Langerhans cells
  - Layers of epidermis
    - Stratum corneum
    - Stratum lucidum
    - Stratum granulosum
    - Stratum spinosum
    - Stratum germinativum
- ◆ **Dermis**
  - Papillary layer
  - Reticular layer
- ◆ **Hypodermis**
- ◆ **Nerve supply**
  - Autonomic nerves
  - Sensory receptors
    - Touch
    - Pressure
    - Pain
    - Cold
    - Warmth
  - Dermatome: area of skin supplied by nerves from particular spinal segment
- ◆ **Blood circulation**
  - Cutaneous plexus
  - Papillary plexus

## Functions of the skin

- ◆ *Protects internal organs & tissues from abrasion, sunlight, & pathogens*
- ◆ *Excretes salt, water, & wastes through sweat*
- ◆ *Maintains body temperature*
- ◆ *Detects changes in environment through senses*
- ◆ *Synthesizes vitamin D*
- ◆ *Stores nutrients*
  - ◆ *Stores blood in vessels*

## Factors determining skin color

- ◆ **Rate of melanin synthesis and size of melanosomes (light-skinned vs. dark)**
- ◆ **Blood flow**
  - Consumption of carotene (causes orange hue)

## Accessory structures

- ◆ **Glands**
  - Sweat (sudoriferous) glands
    - Coiled, tubular; surrounded by capillaries
    - Located in dermis
    - Discharge secretions (sweat) onto surface of skin or hair follicles
    - Sweat: 99% water, 1% sodium chloride & other substances
    - Sweat cools surface of skin
    - Acidic pH deters growth of microorganisms
    - Eliminates wastes
  - Sebaceous (oil) glands
    - Located near hair follicles
    - Secrete oily substance (sebum) that lubricates, protects hair, conditions skin, & prevents too much evaporation of water
  - Ceruminous glands
    - Located in ear canal
    - Secrete cerumen (earwax)
    - Protects ear from foreign particles
- ◆ **Hair (pili)**
  - Vellus: fine, fuzzy
  - Terminal: heavier, deeply pigmented
  - Protects head from UV
  - Insulates head
  - Prevents entry of particles & insects into nose, ears, eyes
- ◆ **Nails**
  - Protect tips of fingers & toes

## Microorganisms on the skin

- ◆ **Resident flora on skin:**
  - Prevent harmful bacteria from thriving by:
    - Directly inhibiting them
    - Competing with them for nutrients
  - Can be infective & harmful:
    - If introduced in large numbers to bloodstream (as in injury or surgery)
    - In those with significantly suppressed immunity
    - Are not altered by profuse sweating, washing, & bathing

## Inflammation: a healing response to injury

### ◆ Reaction of living tissue to injury

#### ◆ White blood cells:

- Accumulate along blood vessel walls (margination)
- Are attracted to injured tissue (chemotaxis)
- Squeeze through gap between cells of capillary wall (emigration)
- Move to injured region
- Destroy nonself cells (phagocytosis)

#### ◆ Causes

- Physical: burns, extreme cold, trauma
- Chemical: poisons, either acidic or organic
- Infection: bacteria, viruses, fungi, or parasites
- Immunologic circumstances
- Vascular or hormonal disturbances

#### ◆ Signs & symptoms

- Redness
- Heat
- Swelling
- Pain
- Loss of function

#### ◆ Healing & repair

- Depends on extent of injury & properties of cells in tissue
- Types of cells, based on capacity to regenerate
  - Labile: can regenerate throughout life; quickly multiply & produce new cells to replace injured or dead tissue
  - Stable: low rate of division, but can regenerate if injured
  - Permanent: cannot divide; injured & dead cells are replaced by fibrous tissue & scar formation

## ❖ THE MASSAGE CONNECTION

### Massage techniques and the effects on the body

#### ◆ Techniques

- Superficial reflex
- Superficial fluid
- Neuromuscular
- Connective tissue
- Passive movement
- Percussive

#### ◆ Effects on body

- Mechanical: physically moving tissues (compression, stretch)
- Reflex: changes in function caused by nervous system
- Physiologic: changes in body processes caused by nerves, hormones, & chemicals
- Psychological: emotional or behavioral changes

- Psychoneuroimmunologic: changes in hormone levels & function through stimulation of neurohormonal system

## Massage and therapeutic applications

### ◆ Heat

- Forms
  - Poulitices
  - Hot water packs
  - Hot water bottles
  - Electric pads
  - Electric lamps
  - Chemical pads
  - Paraffin baths
  - Diathermy
  - Hot water baths
  - Steam baths
  - Vapor baths
  - Dry thermal cabinets
  - Electric blankets
- Short-term effects
  - Peripheral vasodilation
  - Redness of skin
  - Muscle relaxation
  - Increase in pulse & respiratory rates
  - Shallow respiration
  - Decrease in blood pressure
  - Decrease in heat production
  - Softens tissues
  - Stimulates circulation
  - Hastens waste removal
  - Relieves pain, swelling, & spasm

### ◆ Cold

- Causes peripheral vasoconstriction & pallor
- Decreases skin temp, edema, muscle spasm, further hemorrhage
- Relieves pain below 56.5°F
- Systemic reactions
  - Shivering
  - Increased heart rate
  - Increased respiratory rate
  - Increased blood pressure
- Following cold application
  - Vasodilation
  - Redness of skin

- Feeling of warmth
- Slowing of pulse & respiratory rates
- Relaxation
- ◆ **Water (hydrotherapy)**
  - Flexible therapeutic agent
  - Liquid, solid (ice), gas (steam)
  - Effective heating & cooling agent
  - Buoyancy
- ◆ **Body wraps**
  - Sheets or towels wrapped around body in conjunction with:
    - Herbs
    - Clay
    - Mud
    - Paraffin
    - Volcanic ash
    - Seaweed
  - Used to treat muscle & joint disorders
  - Used to beautify & smooth the skin