

Module 3 LO9

Integumentary System Physiology

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9. Integumentary System Physiology

- A. Thermoregulation
- B. Blood reservoir
- C. Protection
- D. Cutaneous sensations
- E. Excretion and absorption
- F. Synthesis of vitamin D

A. Thermoregulation

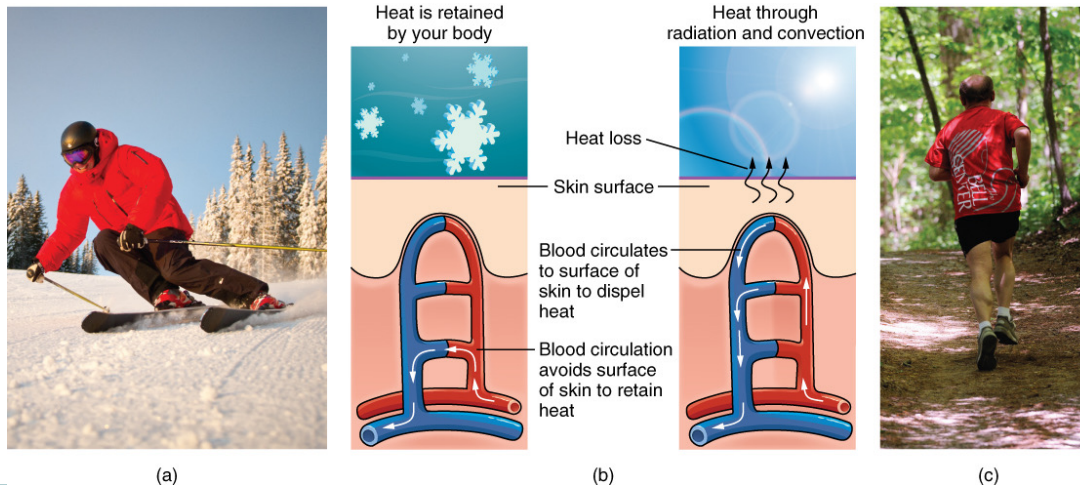
Two ways of temperature regulation

1. Liberating sweat

- Eccrine glands production increases with high body temperature

2. Adjusting blood flow

- Blood vessels in dermis dilates with high temperatures
- Blood vessels in dermis constrict with low temperatures



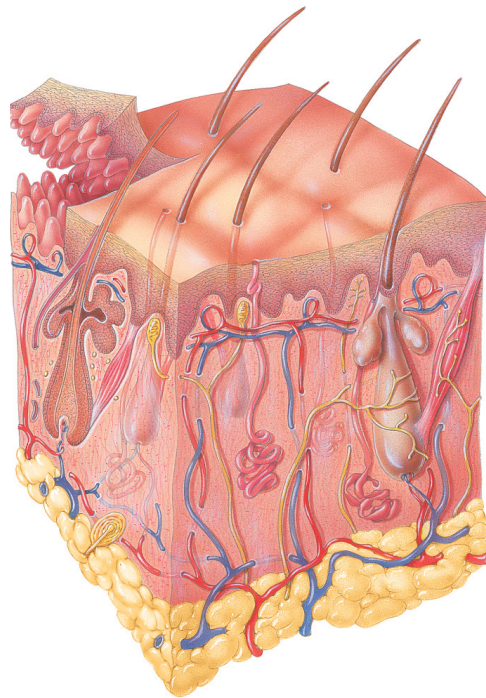
(a)

(b)

(c)

B. Blood Reservoir

- Dermis houses extensive blood vessel network
 - 8-10% of total blood flow in a resting adult



C. Protection

- Keratin
- Lipids
- Sebaceous glands
- Sweat glands
- Melanin
- Macrophages

D. Cutaneous Sensation

- Tactile
 - Touch
 - Pressure
 - Vibration
 - Tickling
- Pain
 - Impending or actual tissue damage



E. Excretion and Absorption

- Excretion
 - Definition: elimination of substances from the body
 - 400mL of water evaporates daily
 - Sweat
 - Water and heat
 - Small amounts of: Salts, carbon dioxide, ammonia and urea
- Absorption
 - Definition: passage of materials from the external environment into body cells
 - Lipid-soluble material:
 - Vitamins (A, D, E, K), drugs, oxygen/carbon dioxide gases
 - Organic solvents – acetone
 - Toxins –poison ivy and oak

F. Synthesis of Vitamin D

- Requires activation of a precursor molecule in the skin by UV rays in sunlight.
- Enzymes in the liver and kidneys – modify the activated molecule producing calcitriol
 - Calcitriol
 - most active form of Vitamin D
 - Aids in absorption of calcium from foods in GI tract