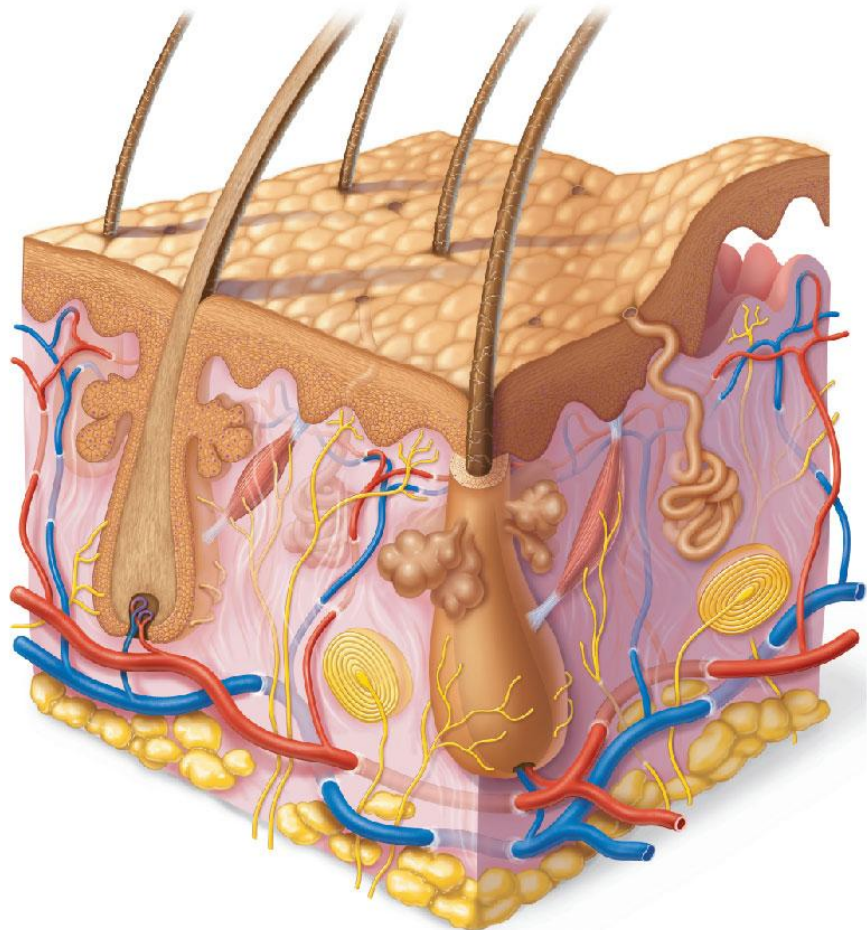
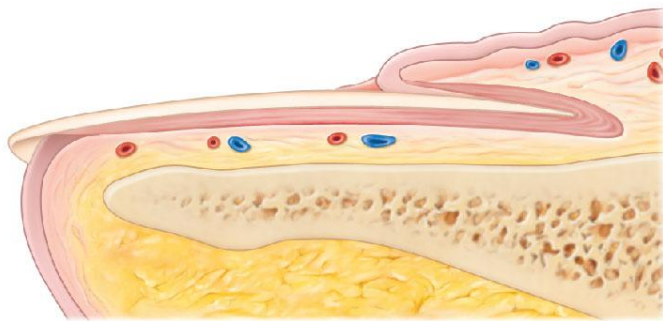


Structures of the Integumentary System

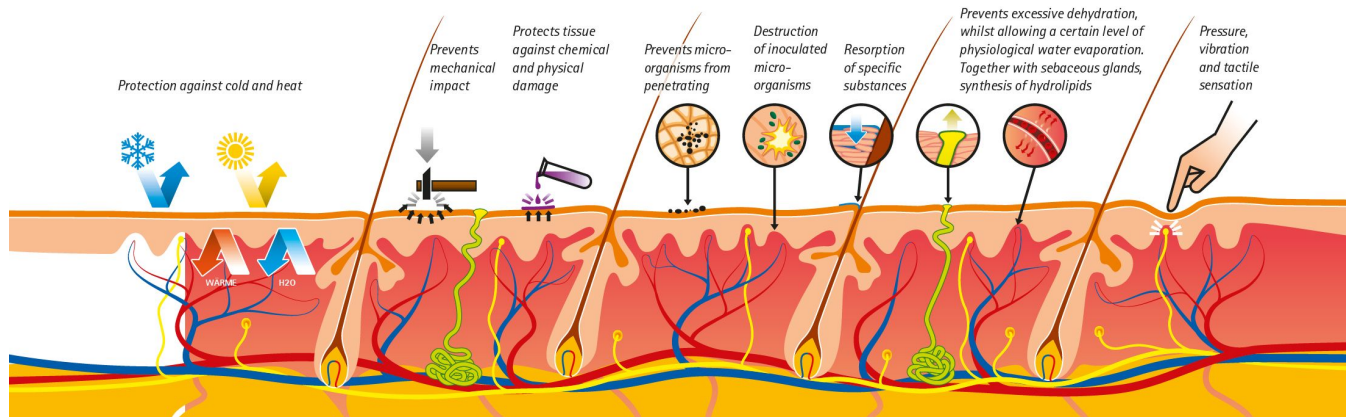
Integumentary system consists of the:

- **Skin**
- Skin appendages
 - ✓ **Sweat glands**
 - ✓ **Oil glands**
 - ✓ **Hair**
 - ✓ **Nails**



Functions of the Integumentary System

- **Insulates and cushions deeper body organs**
- **Protection (protects deeper tissues from):**
 - ✓ **Mechanical damage** (bumps and cuts)
 - ✓ **Chemical damage** (acids and bases)
 - ✓ **Thermal damage** (heat or cold)
 - ✓ **Ultraviolet (UV) radiation** (sunlight)
 - ✓ **Microbes** (bacteria)
 - ✓ **Desiccation** (drying out)



Functions of the Integumentary System

- Protection against **mechanical damage (bumps and cuts)**
 - **Physical barrier contains keratin**, which toughens cells
 - **Fat cells** to cushion blows
 - **Contains pressure and pain receptors**, which alert the nervous system to possible damage
- Protection against **chemical damage (acids and bases)**
 - Has relatively **impermeable keratinized cells**
 - **Contains pain receptors**, which alert the nervous system to possible damage

Functions of the Integumentary System

- ✓ Protection against **microbe damage**
 - Has an **unbroken surface** and “**acid mantle**” (skin secretions are acidic and thus inhibit microbes, such as bacteria)
 - **Macrophages ingest foreign substances and pathogens**, preventing them from penetrating into deeper body tissues
- ✓ Protection against **ultraviolet (UV) radiation (damaging effects of sunlight or tanning beds)**
 - **Melanin** produced by melanocytes offers protection from UV damage

Functions of the Integumentary System

- ✓ Protection against **thermal (heat or cold) damage**
 - **Contains (heat/cold) thermoreceptors** that detect temperature changes and initiate feedback loops **to maintain homeostasis**
- ✓ Protection against **desiccation (drying out)**
 - **Contains a water-resistant glycolipid and keratin** to prevent water and water-soluble substances from leaving or entering into the body through the skin

Functions of the Integumentary System

- **Aids in body heat loss or heat retention (controlled by the nervous system)**
 - Heat loss: By activating **sweat glands** and by **allowing blood to flush into skin capillary beds** so that heat can radiate from the skin surface
 - Heat retention: By **not allowing blood to flush into skin capillary beds**
- **Aids in excretion of urea and uric acid**
 - Contained in **perspiration** produced by sweat glands
- **Synthesizes vitamin D**
 - Modified **cholesterol** molecules in skin converted to **vitamin D** in the presence of sunlight
 - Important for **calcium metabolism**