The Integumentary System

Skin, Hair, and Nails

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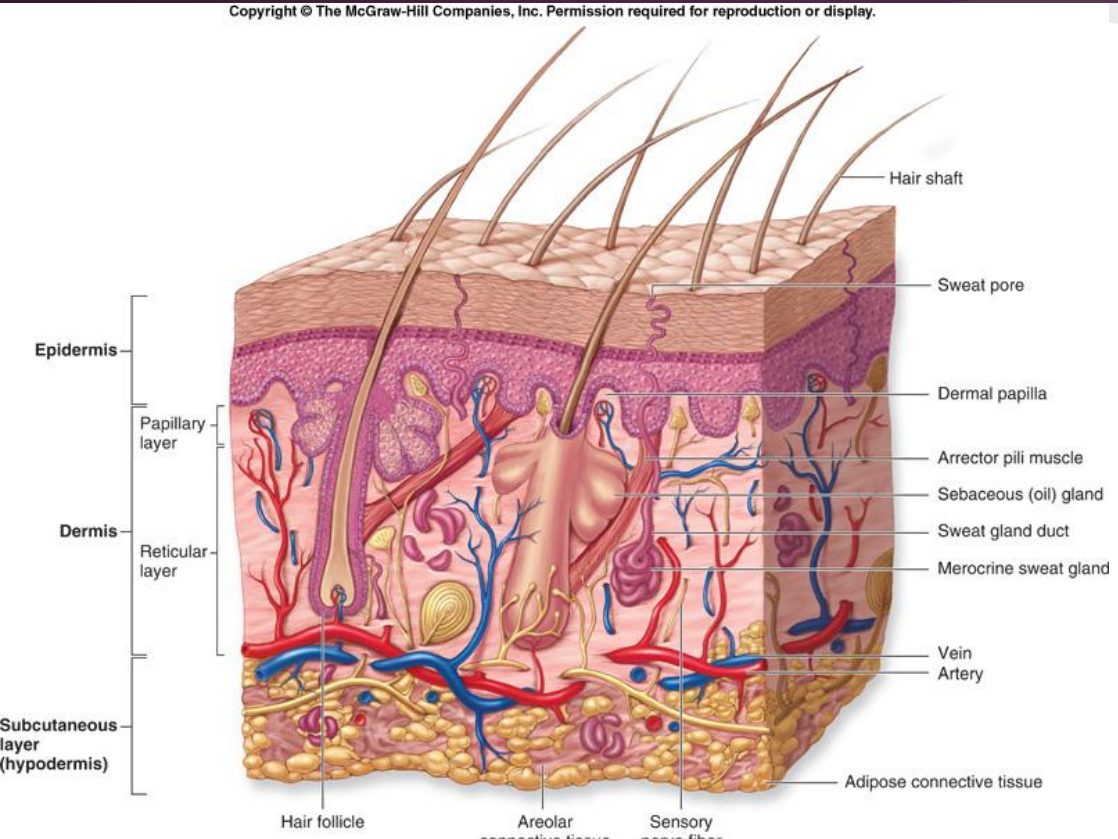
What is the Integumentary System?

- The integumentary system is the organ system that protect the internal organs from various diseases and attacks.
- This system consists of the hair, skin , and nails. The skin is only a few millimeters thick but is by far the largest organ in the human body.
- The skin acts like a forcefield barrier the protects the physical organs and tissue beneath the skin. The skin protects from chemicals, diseases, UV light, and physical damage.
- The skin and nails extend from the skin to reinforce the skin and protect the skin from environmental damage such as temperature changes.

Function

- The main function of the Integumentary system is is for protection
- It protects the internal organs and protects against infectious disease in the skin
- The Integumentary system also has other jobs including; insulating the body and maintains the temperature, prevents dehydration, stores water and fat, acts as a nerve receptor, and helps dispose of bodily waste

Organization



Skin:

Outer Epidermis → Inner Epidermis → Dermis → Subcutaneous Layer (Hypodermis)

Skin Appendages = Hair and Nails

Specialized Cells and Tissues

- **Skin:**

Epidermis - The epidermis is the outer layer of cells covering the internal organs.

Outer - made up of dead cells(exposed to environment)

Inner - made up of living cells, and make keratin

Keratin - a tough, fibrous protein found in skin

Melanocytes - cells that produced melanin

Melanin - dark brown pigment found in skin(different amounts of melanin the melanocytes produce and where they are distributed determines differences of skin color

Specialized Cells and Tissues(Cont'd)

- **Skin**

  Dermis - inner layer of skin

  Contains: collagen fibers, blood vessels, nerve endings, glands, sense organs, smooth muscles, and hair follicles

  Glands:

  Sweat Glands: openings in the epidermis; stimulated by nerve impulses when the body's temperature rises above the normal range

  Sebaceous(oil) Glands: produce sebum that spreads out along the skin's surface and keeps the epidermis flexible and waterproof

Specialized Cells and Tissues(Cont'd)

- **Hair**

  Hair Follicles - tubelike pockets of epidermal cells that extend to the dermis (produces hair)

  Sebaceous Glands - help maintain condition of hair

  Stem Cells - give rise to epidermal cells

  Exocrine - gland that produce sweat, wax, oils to cool, protect, and moisturize the skin

- **Nails**

  Nail Root - area of rapidly dividing cells that nails grow from

    Cell Division: cells of nail root fill with keratin and produce the tough cover that we see

  Nails - protect our nerve sensors in our fingers

Relations with Other Systems

- **Skeletal System** - IS protects the bones and makes the vitamin D that bones need for calcium absorption/makes them stronger
- **Muscular System** - IS protects the muscles → MS produces heat → increases blood flow to skin → promotes activation of sweat glands
- **Nervous System** - cutaneous sensory receptors in skin help nervous system regulate diameter of blood vessels, activate sweat glands, + contribute to thermoregulation(maintenance of body temperature)
- **Endocrine System** - IS converts hormones to active form/androgens produced by endocrine system activate glands + regulate hair growth
- **Cardiovascular System** - IS prevents fluid loss/Cardio system transports oxygen + nutrients to skin + removes waste from skin/provides substances needed by skin glands

Relations with Other Systems

- **Lymphatic System** - IS helps prevent pathogen invasion/lymphatic system prevents edema by picking up excessive fluid
- **Respiratory System** - gives oxygen to skin cells + removes CO_2 and gas exchange with blood
- **Digestive System** - IS provides vitamin D , and performs the same chemical conversions as liver cells/DS provides nutrients to the skin
- **Urinary System** - IS excretes salts + nitrogenous wastes in sweat/urinary system activates vitamin D made by skin cells + disposes nitrogenous wastes of skin's metabolism
- **Reproductive System** - cutaneous receptors respond to stimuli/has modified sweat glands

Diseases in the Integumentary System

Ways the Integumentary System can get diseases:

- Viral, bacterial, and fungal infections- Skin comes into contact with these infections
- Compression of the tissue- Body weight can destruct the tissue causing a reduction of circulation
- Inflammation after tissue is damaged- Damaged tissue can cause an inflammation and other diseases
- Irritation of outside sources like the sun, allergens, chemical exposure, and temperature- the skin can become irritated through sources causing inflammation or mutations in skin replication.

Sources

- Biology Text Book
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- http://www.mhhe.com/biosci/ap/foxhumphys/student/olc/h-reading4.html
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Final Thoughts

Thanks for listening!! Questions?