**LESSON 5 – INTEGUMENTARY SYSTEM**

**The integumentary system consists of the skin and its accessory structures and the subcutaneous tissue. The two major layers of the skin are the outer epidermis and the inner dermis.**

* **EPIDERMIS is made of stratified squamous epithelium; no capillaries; cells called keratinocytes**

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1. **Stratum germinativum**—the innermost layer where mitosis takes place; new cells produce keratin and die as they are pushed toward the surface. Defensins are antimicrobial peptides produced when the skin is injured. Vitamin D is formed from cholesterol on exposure to the UV rays of sunlight.

2. **Stratum corneum**—the outermost layers of dead cells; keratin prevents loss and entry of water and resists entry of pathogens and chemicals.

3. **Langerhans cells**—phagocytize foreign material, take it to lymph nodes, and stimulate an immune response by lymphocytes.

4. **Melanocytes**—in the lower epidermis, produce melanin. UV rays stimulate melanin production; melanin prevents further exposure of the stratum germinativum to UV rays by darkening the skin.

* **Dermis—made of irregular fibrous connective tissue; collagen provides strength, and elastin provides elasticity; capillaries in the papillary layer nourish the stratum germinativum**

1. **Hair follicles**—mitosis takes place in the hair root; new cells produce keratin, die, and become the hair shaft. Hair of the scalp provides insulation from cold for the head; eyelashes keep dust out of eyes; nostril hairs keep dust out of nasal cavities

2. **Nail follicles**—at the ends of fingers and toes; mitosis takes place in the nail root; the nail itself is dead, keratinized cells. Nails protect the ends of the fingers and toes, enable the fingers to pick up small objects, and provide for efficient scratching (see Fig. 5–4).

3. **Receptors**—detect changes in the skin: touch, pressure, heat, cold, and pain; provide information about the external environment that initiates appropriate responses; sensitivity of the skin depends on the number of receptors present.

4. **Sebaceous glands**—secrete sebum into hair follicles or to the skin surface; sebum inhibits the growth of bacteria and prevents drying of skin and hair.

5. **Ceruminous glands**—secrete cerumen in the ear canals; cerumen prevents drying of the eardrum

6. **Apocrine sweat glands**—modified scent glands in axillae and genital area; activated by stress and emotions.

7. **Eccrine sweat glands**—most numerous on face, palms, soles. Activated by high external temperature or exercise; sweat on skin surface is evaporated by excess body heat; potential disadvantage is dehydration. Excretion of small amounts of NaCl and urea is a very minor function.

8. **Arterioles**—smooth muscle permits constriction or dilation. Vasoconstriction in cold temperatures decreases dermal blood flow to conserve heat in the body core. Vasodilation in warm temperatures increases dermal blood flow to bring heat to the surface to be lost. Vasoconstriction during stress shunts blood away from the skin to more vital organs, such as muscles, to permit a physical response, if necessary.

* **Subcutaneous Tissue—also called the superficial fascia; connects skin to muscles**

1. **Areolar tissue**—also called loose connective tissue; the matrix contains tissue fluid and WBCs that destroy pathogens that get through breaks in the skin; mast cells produce chemicals that bring about inflammation.

2. **Adipose tissue**—stores fat as potential energy; cushions bony prominences; provides some insulation from cold. Other functions: contributes to appetite, the use of insulin, and the activation of WBCs.

**Summary of the Physiology of the Skin**

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