Resource For A&P

- **The following source of information will help you master the the basics of anatomy and physiology**

1. Body Smart http://www.getbodysmart.com/ which has animations to help you learn the basic components of the body's systems

Skin and the Integumentary System

Section (chapter) 5.6

- Read 5.6 and describe the four major membranes. Be able to list what tissues are found in each and where they are found in the body.

✪ Types of Membranes

A. Serous membranes line body cavities that lack openings to the outside.

1. They line the thorax and abdomen and cover the organs within these cavities.
2. Serous membranes are made up of epithelium and loose connective tissue and secrete serous fluid that acts as a lubricant.

B. Mucous membranes line the cavities and openings that lead to the outside of the body, including the oral and nasal cavities, and openings of the digestive,reproductive, respiratory, and urinary systems.

1. They consist of epithelium and connective tissue with specialized cells that secrete mucus.

C. Synovial membranes line the joint cavities.

1. These membranes consist of only connective tissues and they secrete lubricating synovial fluid.

D. The cutaneous membrane (skin) consists of epithelial tissue, and connective tissue and is the subject of the remainder of this chapter.

- **Skin Introduction:**

A. Structural Organization of the Organism. Chemicals, cells, tissues, organs, and finally organ systems build the human body.

B. Organs are body structures composed of two or more different tissues.

C. The skin (cutaneous membrane) and its accessory organs make up the integumentary system.

Section 6.1

- Read 6.1 and describe the layers of the skin- epidermis, dermis and hypodermis and what structure/tissue is found in each.
- List the general function of each layer of skin.
- Summarize the factors that determine skin color.

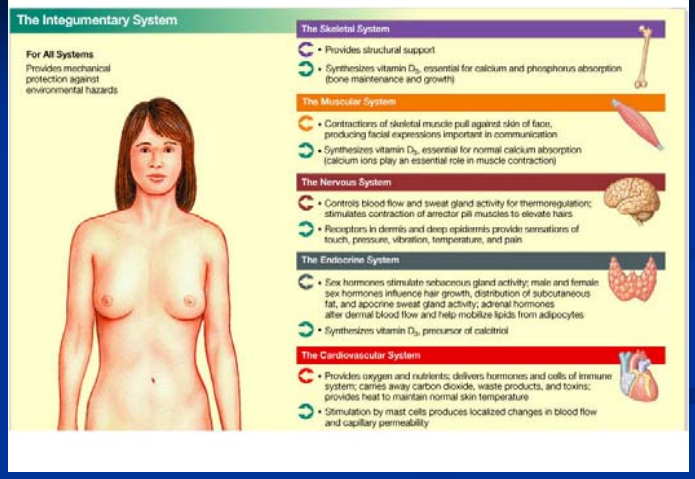
✪ Skin and Its Tissues

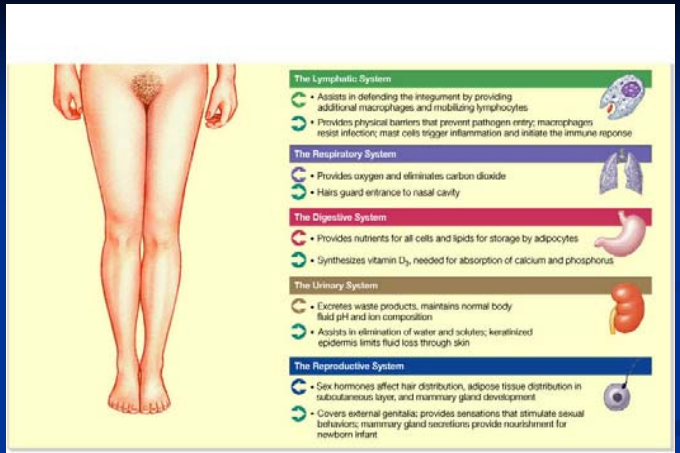
A. The skin is a large organ responsible for:

1. **protection of underlying tissues,**
2. **retardation of water loss,**
3. **maintaining homeostasis through temperature regulation – *regulating blood flow to skin***
4. **housing sensory receptors,**
5. **synthesizing certain chemicals,**
6. **excreting wastes**

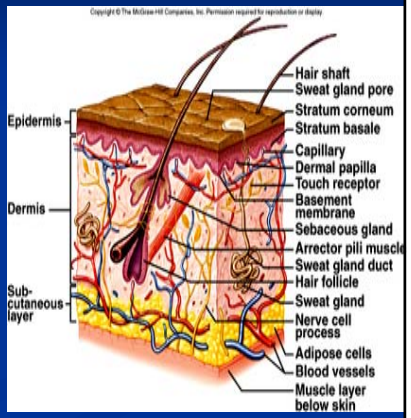
Do now- List the general function of each layer

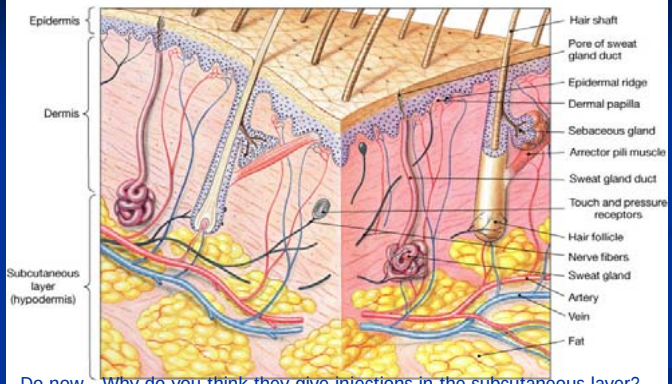
Integumentary system interaction with other systems





B. **The skin consists of an outer epidermis and a dermis, connected to underlying tissue by the subcutaneous layer (hypodermis).**





Do now- Why do you think they give injections in the subcutaneous layer?
Hint: its highly vascularized- contains lots of blood vessels!

C. **Epidermis**

1. The epidermis is made up of stratified squamous epithelium and lacks blood vessels.

2. The layer of reproducing cells (the stratum basale), which lies at the base of the epidermis, is well-nourished by dermal blood vessels.

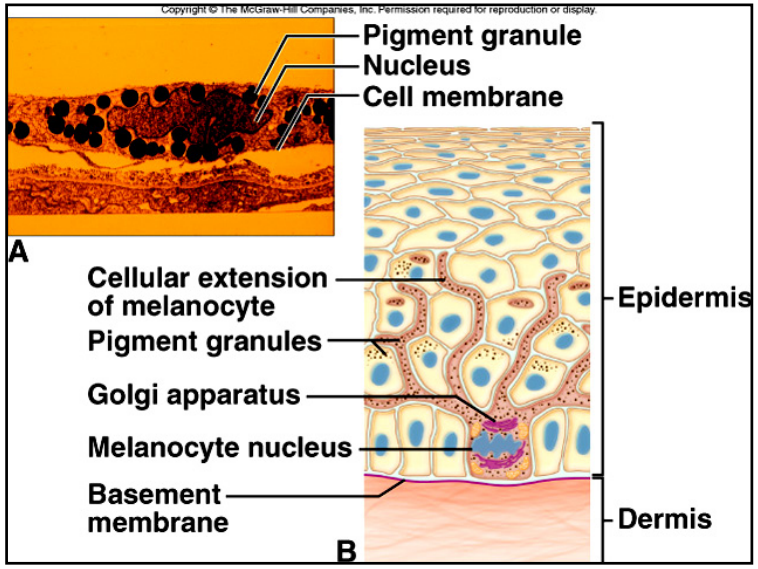
3. Cells are pushed outward as new cells are formed, and become ***keratinized*** as they die.
   a. The process of keratinization- the cytoplasm fills with tough protein fibers called keratin.

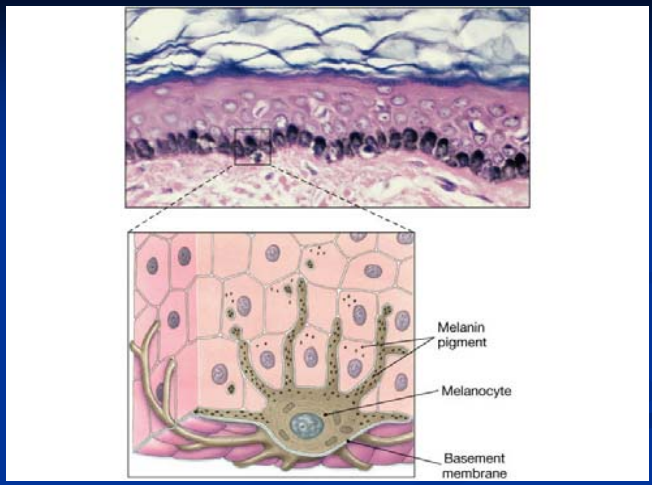
4. Four or five layers may be seen: Four layers in "soft" skin Five in "rough callous skin.
   a. stratum basale, stratum spinosum, stratum granulosum, and stratum corneum are always present and the stratum lucidum is found in the thicker palms and soles.

6. The epidermis is important because it protects against water loss, mechanical injury, chemicals, and microorganism

7. Melanocytes, which lie deep in the epidermis and underlying dermis, produce a pigment called ***melanin*** that protects deeper cells from the sun's ultraviolet rays.

8. Melanocytes pass melanin to nearby cells through cytocrine secretion.





D. **Skin Color**

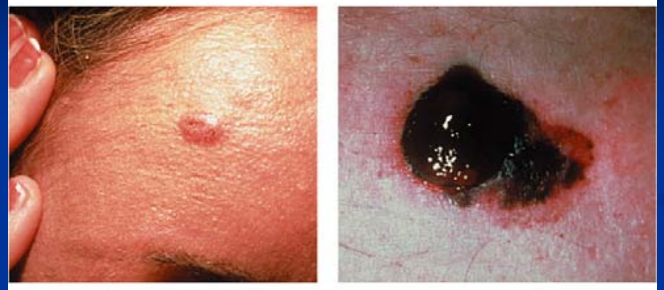
1. Skin color results from a combination of genetic, environmental, and physiological factors.
2. Genetic differences in skin color result from differing amounts of melanin and in the size of melanin granules.

Do now- Define Cyanosis and when it occurs.

Eating too many carrots may turn your skin orange!- why?

What is juandice and why does skin color change?

3. Exposure to sunlight causes darkening of skin as melanin production increases.
4. Circulation within dermal blood vessels affects skin color.



(a) Basal cell carcinoma (b) Melanoma

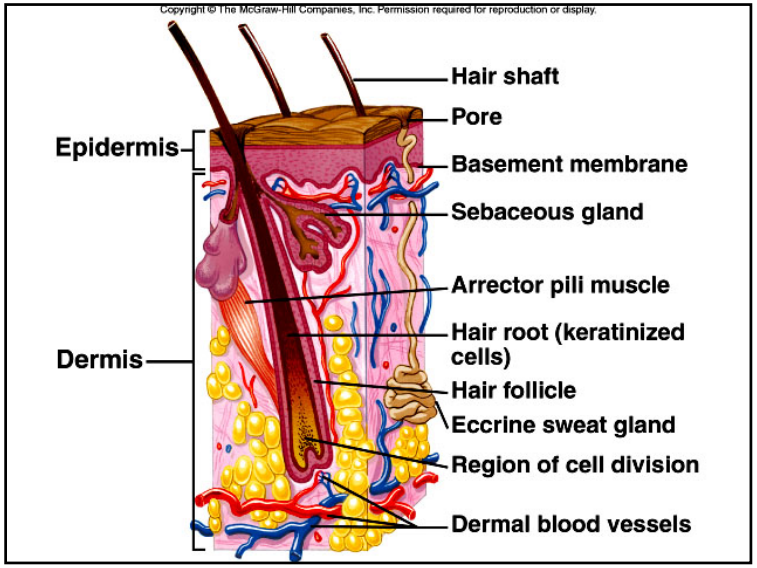
Do now- In what part of the skin do these cancers occur?
Hint: read page 119 Topic of interest Skin Cancer.

E. **Dermis**

1. The dermis binds the epidermis to underlying tissues. A basement membrane anchors the epidermis to the dermis. Epidermal ridges and dermal papillae cause the border to be uneven.
2. The dermis consists of connective tissue with collagen and elastic fibers within a gel-like ground substance.

3. Dermal blood vessels carry nutrients to upper layers of skin and help to regulate temperature.
   a. Vasodialation- blood vessels increase diameter to increase blood flow (increase blood flow increase the dissipation of heat)
   b. Vasocontriction- blood vessels decrease diameter to decrease blood flow

4. The dermis also contains nerve fibers, sensory fibers, hair follicles, sebaceous glands, and sweat glands.



F. Subcutaneous Layer
   1. The subcutaneous layer (hypodermis) is composed of loose connective tissue and insulating adipose tissue.
   2. It binds the skin to underlying organs and contains the blood vessels that supply the skin.
   3. No sharp boundary exists between the dermis and subcutaneous layer.

Section 6.2

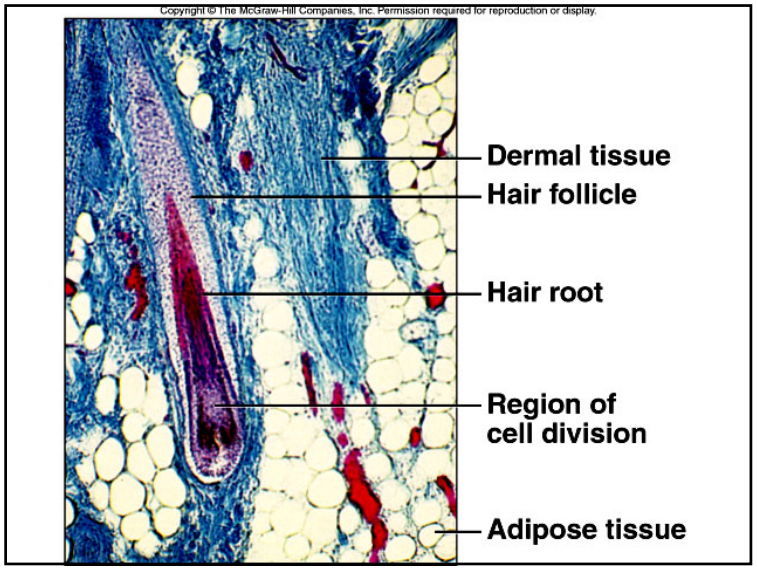
- Read 6.2 and describe the accessory organ associated with the skin.

✪ Accessory Organs of the Skin

Recall that the skin and ceratin accessory organs make up the Integumentary system

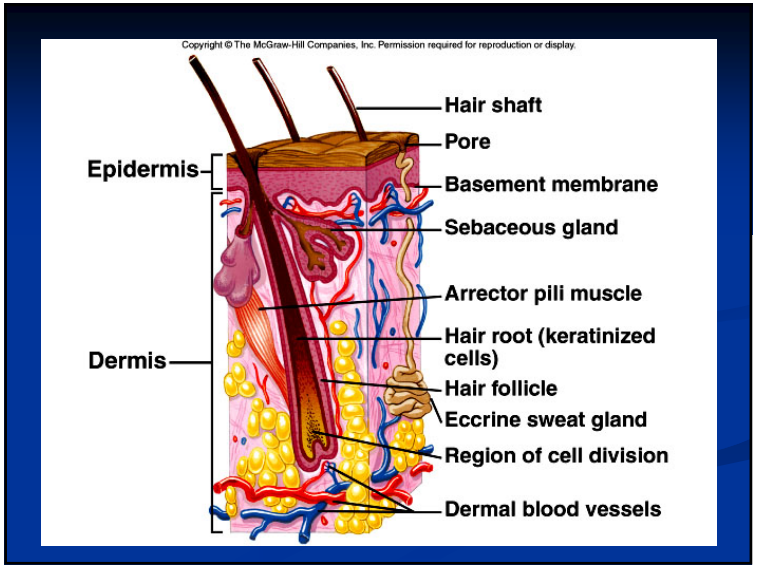
A. Hair Follicles

1. Hair can be found in nearly all regions of the skin.

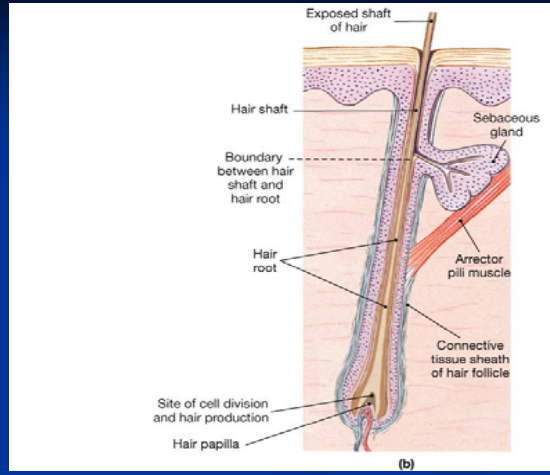


2. Individual hairs develop from cells at the base of the hair follicle, an invagination of the lower epidermis that dips down into the dermis.

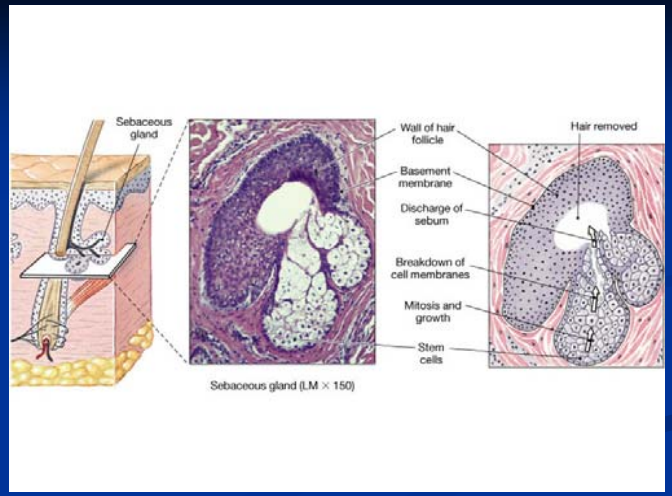
3. As new cells are formed, old cells are pushed outward and become keratinized, and die forming the hair shaft.

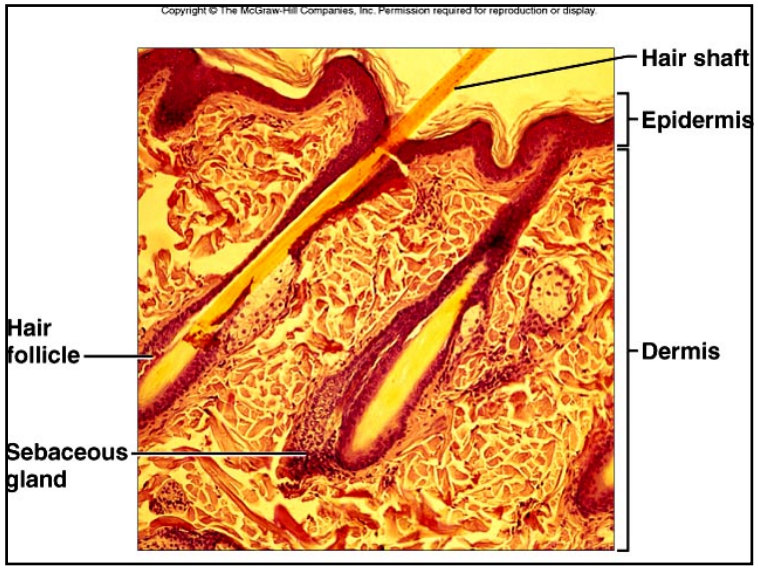


4. A bundle of smooth muscle cells, called the arrector pili muscle, attaches to each hair follicle. These muscles cause goose bumps when cold or frightened.
5. Hair color is determined by genetics; melanin from melanocytes is responsible for most hair colors, but red hair also contains the pigment trichosiderin.



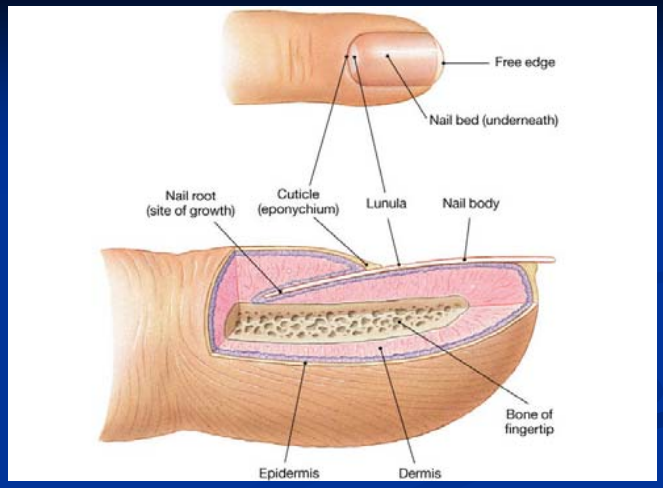
B. Sebaceous Glands
   1. Sebaceous glands (holocrine glands) are associated with hair follicles and secrete sebum that waterproofs and moisturizes the hair shafts.





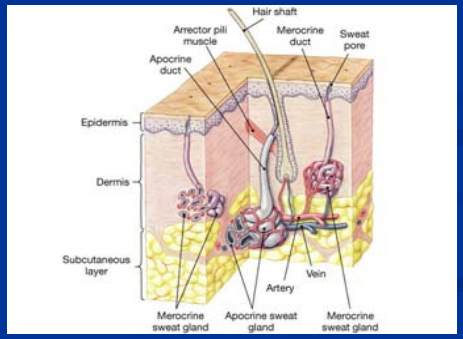
C. Nails

1. Nails are protective coverings over the ends of fingers and toes.
2. Nails consist of stratified squamous epithelial cells overlying the nail bed, with the lunula as the most actively growing region of the nail root.
3. As new cells are produced, older ones are pushed outward and become keratinized.



D. Sweat Glands

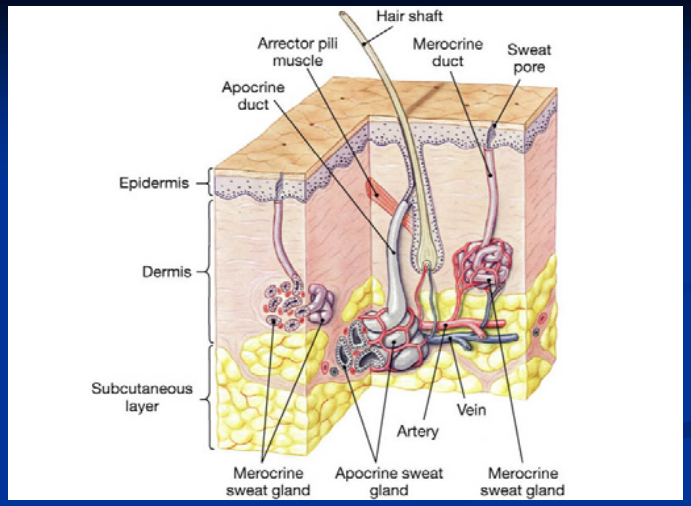
1. Sweat glands (sudoriferous glands) are either eccrine, which respond to body temperature, or apocrine, which respond to body temperature, stress, and sexual arousal.



2. Modified sweat glands, called ceruminous glands, secrete wax in the ear canal.
3. Mammary glands, another modified type of sweat glands, secrete milk.

Section 6.3

- Read 6.3 and be able to explain how the skin helps regulate body temperature.

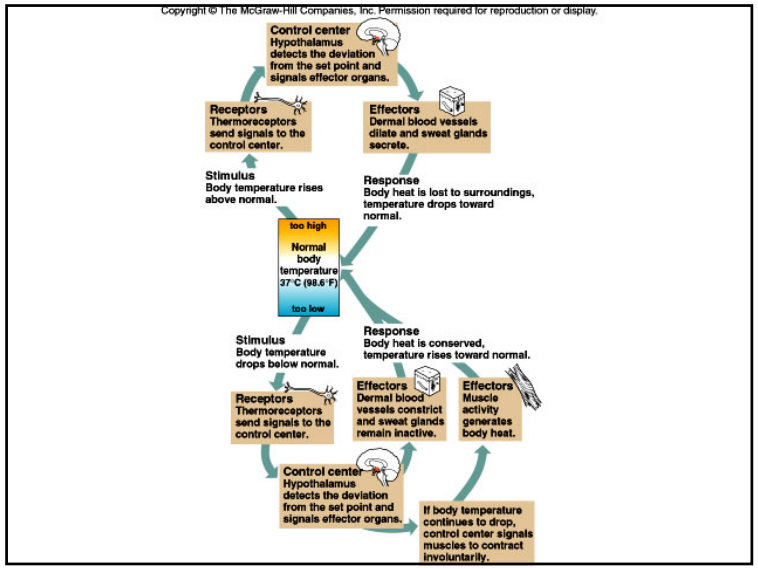


✪Regulation of Body Temperature

A. Proper temperature regulation is vital to maintaining metabolic reactions.

B. The skin plays a major role in temperature regulation with the Brain (hypothalamus) controlling the vasodialation/vasoconstriction of blood vessels.

C. Active cells, such as those of the heart and skeletal muscle, produce heat.



D. Heat may be lost to the surroundings from the skin through radiation.

E. The body responds to excessive heat by dilation of dermal blood vessels and sweating.

F. The body responds to excessive cooling by constricting dermal blood vessels, inactivating sweat glands, and shivering.

Section 6.4

- Read 6.4 and describe the events that are part of wound healing.

✪ Healing of Wounds and Burns

A. Inflammation, in which blood vessels dilate and become more permeable, causing tissues to become red and swollen, is the body's normal response to injury.

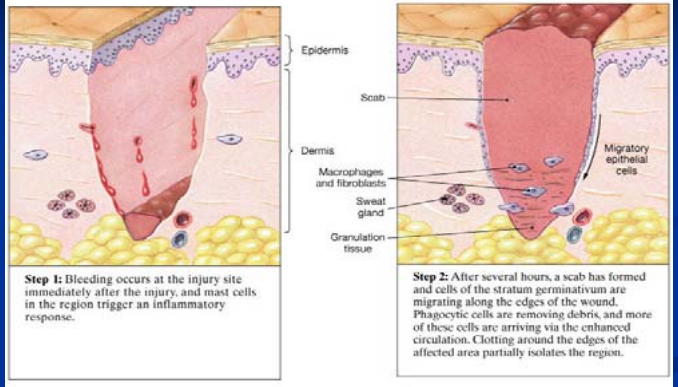
B. Superficial cuts are filled in by reproducing epithelial cells.

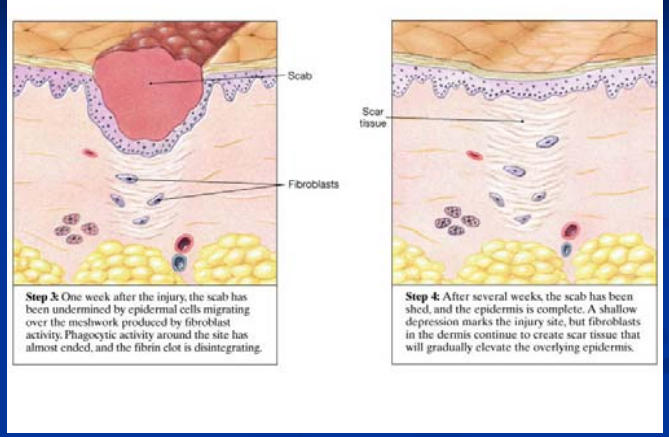
TABLE 6.1 INFLAMMATION

SYMPTOM	CAUSE
Redness	Increased vasodilation, more blood in area
Heat	By-product of increased metabolic activity in tissue as white blood cells attempt to destroy invaders
Swelling	Increased interstitial fluid in area due to change in osmotic pressure of tissues caused by increased numbers of white blood cells
Pain	Swelling puts pressure on nerve endings in area

C. Deeper cuts are closed off by clots, covered by scabs, and eventually filled in by ***fibroblasts***, making connective tissue. Blood vessels extend into the area, injured tissues are replaced, and the scab falls off.

D. Large wounds leave scars and healing may be accompanied by the formation of granulations.





Topic of interest-*Burns*

- Read topic of interest burns on page 121 and relate what you just learned to this passage.