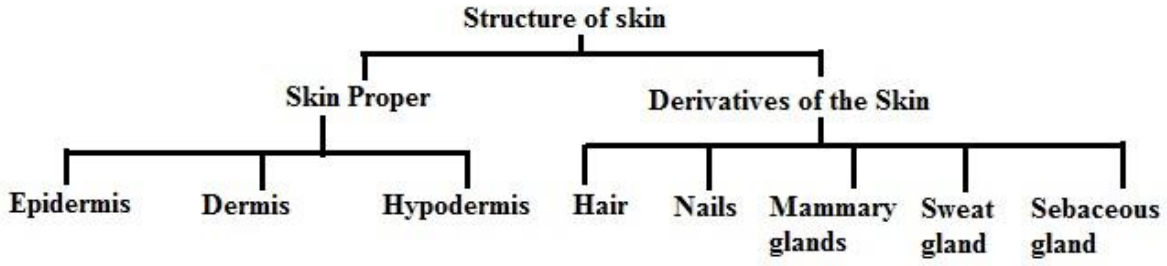
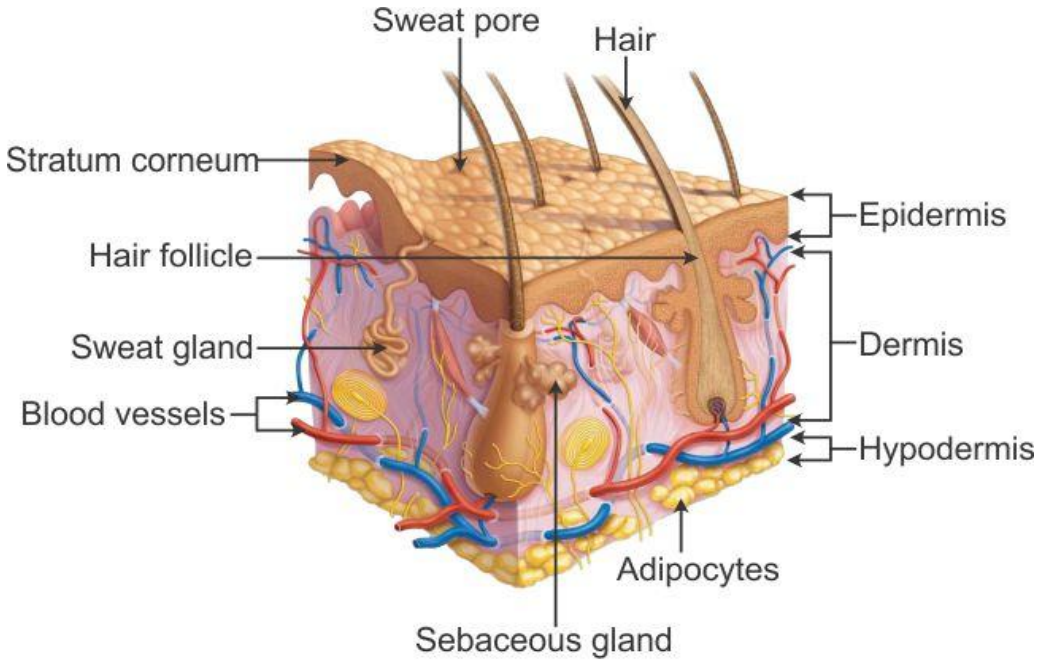
Skin – 'The Jack Of All Trades'

- The skin is the largest organ of the body.

- **Functions of the Skin**
  a. Protection
  b. Sensation
  c. Temperature regulation
  d. Synthesis of vitamin D
  e. Excretion





Structure of skin

COMPONENT OF SKIN	DESCRIPTION
Epidermis	Outermost layer of the skin, made up of epithelial cells. Contains melanocytes which are responsible for imparting colour to the skin.
Dermis	Middle layer of the skin. Made up of collagen and elastic fibres which provide strength and elasticity to the skin.
Hypodermis	Lowermost layer of the skin which contains adipose tissue. Insulates the skin, acts as a shock absorber and anchors the skin to the underlying bones and muscles. Common route for administration of injections.
Hair	Filamentous structure which grows from the hair follicles found in the dermis. Consists of three parts—hair shaft, hair root and hair bulb. Provides protection, regulates body temperature and acts as a sense organ.
Nails	Hardened structures which grow as dead cells from the nail root. Consist of three parts—nail plate, nail bed and matrix. Protect the sensitive tips of the digits
Sebaceous glands	Small sac-like glands situated in the dermis associated with the hair follicle. Secretes sebum which makes hair and outer surface of the skin oily and waterproof, to prevent the loss of water due to evaporation.
Sweat glands	Small tubular structures on the skin which are made up of two parts—secretory part and excretory part Separates sweat from blood.
Mammary glands	Modified sweat glands. The activity of mammary glands is related to reproductive hormones—prolactin, oestrogen and progesterone, which are prominently secreted during pregnancy.

- Mammals and birds are **warm-blooded** or **endothermic** animals, which can maintain a more or less constant body temperature, irrespective of the surrounding temperature.

- An optimum temperature of 35-40°C is necessary for the body to function properly. Low body temperature slows down the activity of the enzymes, while high temperature destroys them completely.

- **Sources of heat production**
  a. Chemical reactions take place in all body cells, especially the oxidation of glucose in liver.
  b. Vigorous activity of muscles.
  c. Ingestion of hot foods and beverages.

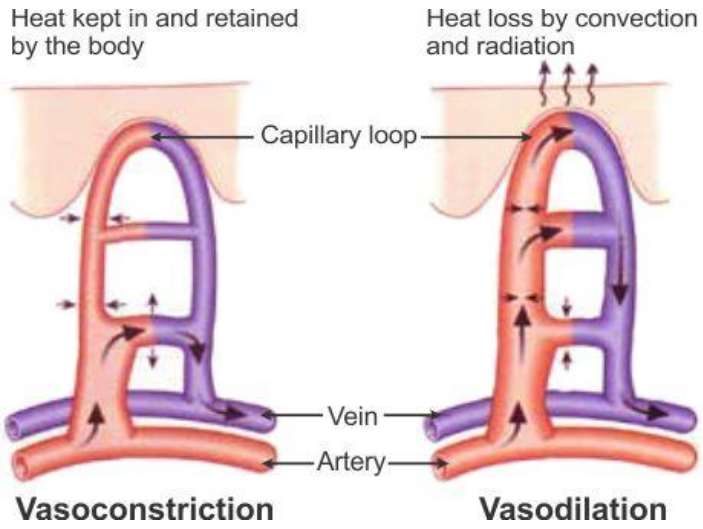
- **Sources of heat loss**
    a. **Skin:** About 85% of body heat is lost through the skin by convection, conduction, radiation and evaporation of sweat.
    b. **Lungs:** Heat is lost from the body when we expire or give out air. Some heat is also lost during vapourisation of water from the lungs.
    c. **Urine and faeces:** Elimination of these substances takes place at body temperature.
    d. **Foods:** Heat is also lost when cold food, water or cold beverages are consumed.

Temperature Regulation

- The hypothalamus, a portion of the forebrain, is the principal heat-regulating centre of the body.
- It acts like a thermostat. When the body tends to cool below the normal temperature, it switches on or speeds up the heat-producing process. When the body tends to get overheated, it accelerates the cooling process and switches off the heat-producing process.

Temperature regulation in cold weather

- At low temperatures, the blood vessels get narrowed or vasoconstricted. This reduces the blood supply to the skin.
- There is less loss of heat by convection, conduction and radiation. There is less loss of heat through vapourisation as reduced blood supply lowers the secretion of sweat by sweat glands.
- The person looks pale or bluish because of the reduced blood supply to the skin.
- The amount of heat produced is increased by increased metabolic rate and muscular activity, which occurs in the form of shivering.



Temperature regulation in hot weather

- At high temperature, the blood supply to the skin is increased by vasodilation or dilation of blood vessels in the skin.
- This results in greater loss of heat by convection, conduction and radiation. There is more loss of heat through vapourisation as more sweat is secreted due to the rich supply of blood to the skin.
- A heatstroke or sunstroke is a condition in which the sweat production is unable to keep pace with its evaporation in very hot winds. This results in an increase in the body temperature which may prove to be fatal.
- Drinking a lot of water and consuming more salt in summer is a good precaution against sunstroke.