8. Our Skeletal System and the Skin

Types of bones:

- Flat bones- They are somewhat flattened and thin and their principle function is to provide protection to the internal organs. For example, cranial bones.
- Short bones- They are smaller in size and their main function is to provide support and stability with little movement. Wrist and ankle bones are categorised as short bones.
- Long Bones- They are longer in length than their width with growth plates at either end. Leg bones are long bones.
- Irregular bones- They vary in shape and structure due to which they do not fall into any category and are irregular in shape. Bones in vertebral column vary in shape.

- **Human Skeletal system**
  - The bony framework of our body is called skeleton
  - The human skeleton is made up of bones and cartilages.
  - Cartilage is the additional part of the skeleton which is not as hard as bone and which can be bent. E.g. Upper part of an ear.
  - The human skeleton is classified as **Axial Skeletal** (consists of the skull, rib cage, and backbone) and **Appendicular Skeletal** (consists of upper limbs, lower limbs, girdles- shoulder bones, and pelvic bones).
  - It protects many internal organs.
  - It gives shape to the body and helps in movement.

- **Joints**
  - The places where two parts of our body seem to be joined are known as joints. For example, elbow, shoulder, neck, etc.
  - There are different types of joints in our body that help in movement.

- **Ball and socket joint**
  - This joint allows movement in all directions.
  - Example - shoulder joint

- **Pivotal joint**
  - This joint allows only rotating movements i.e. one bone rotates over other in a ring fashion.
  - Example - neck joint

- **Hinge joint**
  - This joint allows only back and forth movement.
  - Example - knee joint

- **Fixed joint**
  - The bones at this joint cannot move.
  - Example - skull joint

Skin

- Skin is the outer most covering of the body and covers the entire body.

- It has a surface area of 1.5-2 meters and accounts for 12-15% of the total body weight.
- The skin along its derivatives constitutes the integumentary system.

Structure of the Skin

Skin is made up of two main components they are

- Skin proper
- Skin derivatives
- Skin Proper

The skin is composed of two layers

- Epidermis
- Dermis
- The epidermis is the outer layer of the skin which is formed by stratified squamous epithelium layers which are arranged in horizontal layers.

1. **Outermost cornified layer**
2. **Granular layer**
3. **Malpighian layer**

- Dermis is the innermost layer of the skin
- The dermis consists of the elastic connective tissue
- It is made up of blood vessels, sweat glands, oil glands and nerve endings

Functions of the Skin

- Protection – The skin provides protection to the body from mechanical injury, ultraviolet rays, from disease causing microbes and prevents desiccation.
- Temperature regulation – The skin helps in the maintenance of body temperature at a constant.
- The skin contains numerous sense receptors which help in perceiving the surroundings.
- The skin also synthesizes vitamins like vitamin D.
- The skin also helps in disposing of the excess water and salt by evaporation.

Melanin is the pigment present in the cells of the epidermis that decides the skin colour.

Derivatives are structures which are formed from the same precursors. Some of the derivatives of skin are

- Hair: Hair is formed in the hair follicles, which are the invaginations of the dermis.
- Sebaceous glands: The sebaceous glands produce oil and they open into the hair follicles.

- Sweat glands: They produce sweat, which is a weak solution of sodium chloride with some urea and lactic acid. The sweat produced is passed on to the epidermis, where it evaporates.

- Nails: Keratinous structures, which arise from the nail root, which lies in the dermis.

- Mammary glands: They are modified sweat glands, which produce milk.
- Meibomian glands: Modified sebaceous glands that are found at the margins of the eyelids. They lubricate margins of the eyelids and prevent the overflow of the tears.
- Ceruminous glands: Another modification of sebaceous glands which are found in the auditory canal. They secrete earwax or cerumen, which lubricates and protects the delicate parts of the ear.