

Fig. 2.1: Structure of cell

separated from cytoplasm by the nuclear membrane, which is selectively porous allowing substances pass in both directions. Nucleus controls the cell and its activities. The nucleus contains many protein rich threads which are collectively spoken of as chromatin. It contains genetic material in the form of large double chains of molecules (double helix) of deoxyribonucleic acid (DNA) in a spiral arrangement. Chromosomes are cluster of dozens of DNA molecules. These chromosomes are vital to the everyday activities of the cell and are responsible for the hereditary characteristics of the human body. On the chromosomes in linear arrangement, the genetic or hereditary determinants are the genes. Each cell contains the total complement of genes required to synthesise all proteins in the body, but most cells only synthesise the defined range of proteins to their own specialised functions. This means that only part of the Genome or Genetic code is used by each cell. In human beings, there are 44 autosomes, and two sex chromosomes having the total of 46 chromosomes. The transfer of information from nuclear DNA to the site where proteins are synthesised in the cytoplasm is the function of ribonucleic acid (RNA). The formation of RNA is controlled by genes in the DNA, i.e. genetic information passes from DNA promoting protein synthesis.

CYTOPLASM

It consists of:

1. **Endoplasmic reticulum** (ER) is a series of tubules having 2 types, smooth and rough; smooth ER synthesises specialised

1. Keratinised stratified squamous epithelium, lining skin;
2. Non-keratinised stratified squamous epithelium lining the oesophagus.

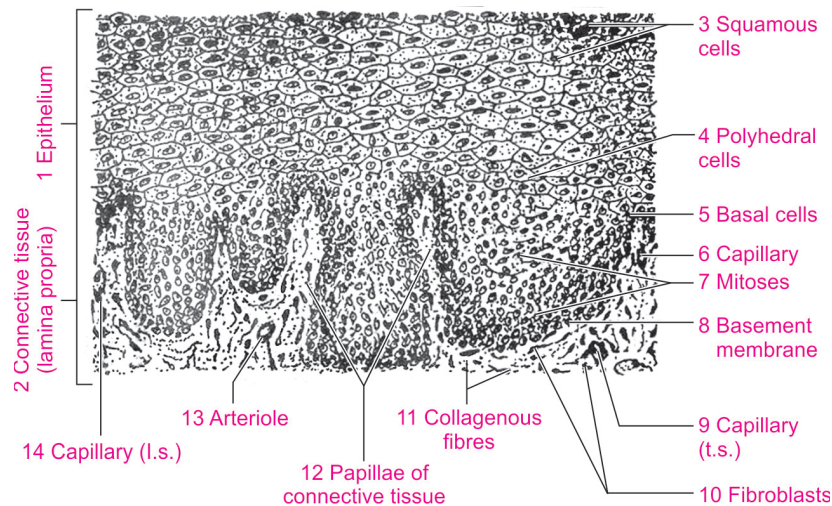


Fig. 2.5: Stratified squamous epithelium

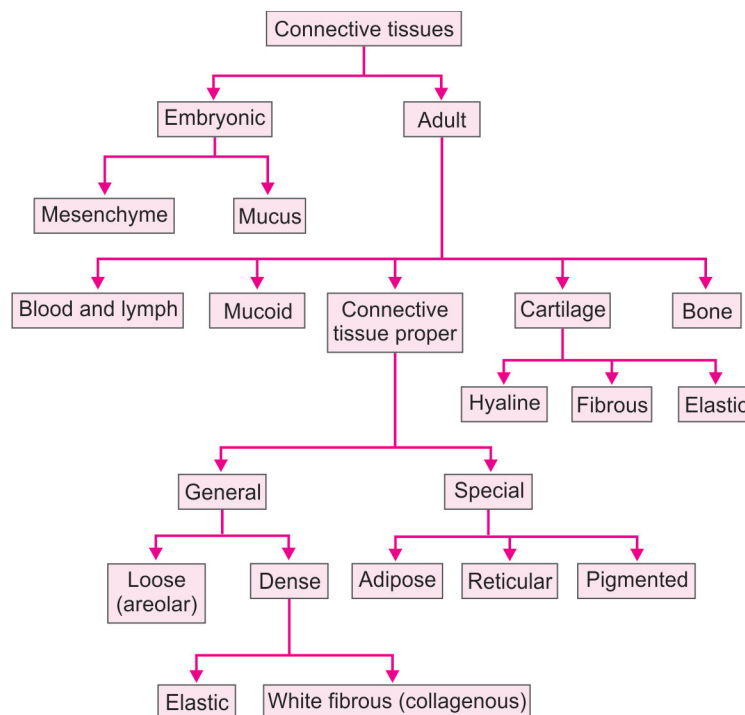
2. **Stratified cuboidal epithelium** consists of several layers of cells of which the superficial ones are cuboidal and the rest are polyhedral, e.g., ducts of sweat glands and in the male urethra.
3. **Stratified columnar epithelium:** The deeper layers consist of polyhedral cells, only the surface layer possesses columnar cells.
4. **Transitional epithelium:** It is a stratified epithelium having the capacity of being stretched to a considerable extent. In the unstretched condition, it is five to six layers thick, the surface cells are umbrella shaped, the intermediate cells are pear shaped, the basal cells are columnar. For example, found in the lining of urinary bladder, parts of ureters and urethra.
5. **Pseudo-stratified epithelium:** Name suggests being stratified but actually is of the simple type. All cells touch the basal lamina but all of them may not reach the surface, because some cells are taller than others although both are columnar, the nuclei of the cells are situated at different levels which is responsible for the erroneous impression of stratification.

2. **Serous membranes:** They are found in the peritoneum, pleura and pericardium. They secrete serous fluid which lubricates the surfaces.
3. **Synovial membranes:** They line the cavities of freely movable joints except over the articular cartilage. They secrete synovial fluid which lubricates the cartilage at the ends bones during their movements and nourishes the cartilage covering the bones at joints.
4. **Cutaneous membrane,** i.e. skin.

CONNECTIVE TISSUES

The connective tissues of the body form a type of basic tissue which is designed to withstand various types of mechanical stress and strain and which bind, connect and support tissues including its own kind.

Flowchart 2.1: Classification of connective tissues



contains capillaries and nerves. Each Haversian canal is surrounded by lamellae of bone tissue which appear as concentric rings of 3–7 layers thick. On an average, there are 6 lamellae around each canal. Between these lamellae are small spaces known as lacunae. This space contains bone cells or osteocytes. Each such unit consisting of Haversian canal, surrounding lamella, lacunae with osteocytes are known as Haversian system or Osteon. The two Haversian canals are connected by a transverse canal known as Volkmann's canal.

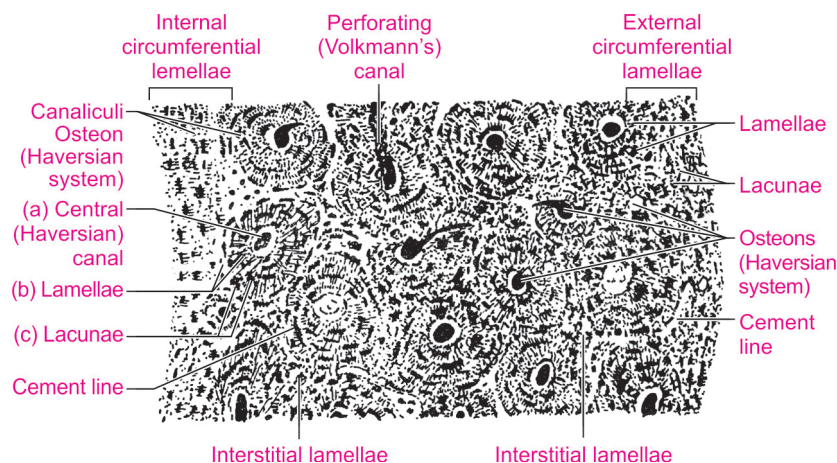


Fig. 2.17: Compact bone

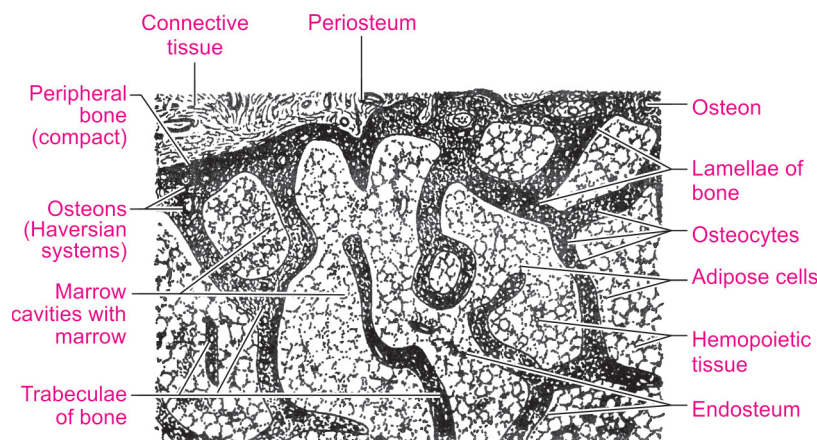


Fig. 2.18: Cancellous bone