

Diploma in Pharmacy 1st Year

Human Anatomy & Physiology Practical

To perform the microscopic examination of the given connective tissue slide.

Aim:

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Reference :

Dr. Gupta G.D , Dr. Sharma Shailesh , Dr. Sharma Rahul Kumar ,“Practical Manual of Human Anatomy and Physiology” Published by Nirali Prakashan , Pg.No 25- 29

Theory :

Different organs or distinct parts of an organ are connected or bound together with the help of connective tissue. They contain a matrix, which is an intercellular material and that helps in binding and supporting the cells.

Connective tissues are classified as:

- 1) **Areolar Tissues (Loose Connective Tissue) :** It is the most widely distributed tissue in the body. Being a loose irregular connective tissue it connects the skin to the structures beneath it. It also fills the empty area between organs. It can be found in the spaces between muscles, blood vessels, and nerves.

- 2) **Adipose Tissue (Fatty Tissue) :** It has huge, spherical cells with a lot of fat in the cytoplasm. The nucleus of the cell is pushed towards the periphery, for example, subcutaneous tissue of the skin.
- 3) **Reticular Connective Tissue :** This tissue resembles areolar connective tissue, but the reticular fibres, which create a fine network, are the only fibres in its matrix. Internal frameworks that can support lymph nodes, spleen, and bone marrow are some of the locations where reticular tissue can be found. Short, tiny collagenous threads that can branch out to form a delicate network are known as reticular fibres.
- 4) **Dense Fibrous Tissue :** This tissue has tightly packed fibres with a small interspace between them. The cells are less in number than those found in areolar tissue. The dermis of the skin contains this sort of tissue.
- I. **Dense Regular Connective Tissue :** This is made up of tightly packed collagen fibre bundles that run in the same direction. These collagen fibres are slightly wavy and stretchable. Along with the tensile strength of collagen, this tissue creates tendons, aponeurosis, and ligaments. The fascia (a fibrous membrane) that wraps around the muscles, blood vessels, and nerves, is made up of this tissue.

- a) **Elastic Tissue** : This tissue is yellow in colour and has large number elastic fibres. It is found in tissues that require both strength and flexibility. For example, the trachea and bronchi.
- b) **Collagen** : These fibres are the most abundant and strongest of all connective tissue fibres. These are fibrous proteins that are secreted into the extracellular space providing great tensile strength to the matrix.

II. Dense Irregular Tissue : The collagen fibre bundles are substantially thicker and are organised unevenly in this tissue, similar to the structural features as dense regular tissue.

This tissue is found in the areas where there is a lot of tension coming from multiple directions. For example, part of the skin dermis area and the joint capsules of the limbs.

5) **Bone** : It is the hardest connective tissue among all body tissue. Salts such as calcium phosphate and calcium carbonate are abundant in bones. A bone generally consists:

- I. **Periosteum** : It is a fibrous tissue membrane that covers the surface of a bone.
- II. **Compact Bone** : It is a hard, dense substance found below the periosteum.
- III. **Cancellous or Spongy Bone** : It is a spongy, porous tissue. It forms the interior of mature bone.
- IV. **Bone Marrow** : It is a soft material which fills the hollow interior of a mature bone. It is of two types:
 - a) Yellow bone marrow which is a fatty tissue.
 - b) Red bone marrow from the cells of blood are developed.

Microscopic Structure of Bone

- I. A central haversian canal is present in which nerves, blood vessels and lymphatics are found.
 - II. Lamellae, which are layers of bone that surround the haversian canal except the concentric circles.
 - III. Lacunae are little canals that connect two lamellae and also interconnect with the central Haversian canal.
- All of these structures work together to form a single unit and is called as haversian system.

- 6) **Cartilage** : It possesses a chondrin matrix that is stiff, gelatinous, and elastic. The cells are spherical in shape and are arranged in groups of four in the matrix. There are three forms of cartilage:
- i. **Hyaline Cartilage**: The matrix is transparent and free from fibres. In this type of cartilage the cells are organised in small groups, for example, trachea and tip of nose.
 - ii. **Fibro Cartilage**: This type of cartilage is made up of a dense bundle of collagen fibres. It is found in inter-vertebral disc.
 - iii. **Elastic Cartilage**: It resembles hyaline cartilage in appearance. However, it contains a network of branching and re-joining collagenous fibres, for example, epiglottis and laryngeal cartilage.

7) **Blood** : This is a type of connective tissue that is more specialised. It is a connective fluid found in animals that transfers metabolic waste products away from cells after delivering vital substances such as nutrition and oxygen to the same cell. As it does not bind, attach, or link with any body cells, it is an atypical connective tissue. It is made up of blood cells and is surrounded by plasma, which is a non-living fluid.

Result:

The microscopic examination of the given Connective tissue slide was performed.