

Permanent Tissue

Permanent tissues are a group of living or dead cells which are formed by meristematic tissues that have lost their ability to divide.

These tissues have undergone differentiation and are incapable of meristematic activities.

Permanent tissues may be classified into two main groups:

1. Simple

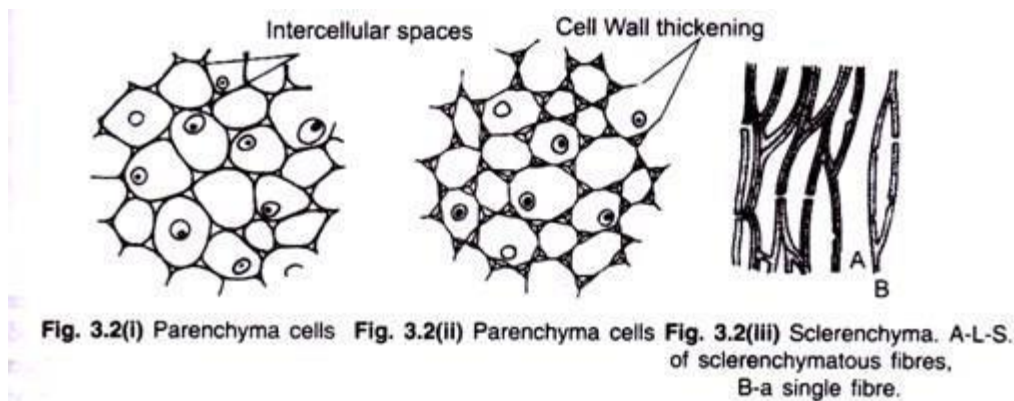
2. Complex

I. Simple Tissues:

Simple tissues are homogenous and composed of structurally and functionally similar cells.

These are of three types:

Parenchyma, collenchyma and sclerenchyma.



(i) Parenchyma:

Parenchymatous tissue is usually made of isodiametric cells with intercellular spaces. The cells are living and contain vacuolated protoplast. The cell wall is thin, homogeneous and made up of cellulose. Only the parenchyma cells of epidermis or outermost skin of aerial organs have cuticularised outer walls. Their main function is the manufacture and storage of food matters, which is referred to as vital function. In the aquatic plants the parenchyma cells often assume stellate (star-like) or armed appearance due to presence of abundant air chambers. These cells, also called aerenchyma, give buoyancy to the plants.

(ii) Collenchyma:

Collenchymatous tissue is composed of somewhat elongate cells with peculiar thickenings, confined to the corners of the cells. They often remain interlocked. The cells have protoplast. Chloroplasts are, normally absent, but may be present in some cells. They usually do not manufacture food. The soft and plastic walls are made up of cellulose and pectin. Extra-deposition of cellulose on walls abutting on intercellular spaces gives them characteristic thickened corners. Though soft, it is a mechanical or strength-giving tissue, particularly meant for the support of growing organs. It is called a temporary supporting tissue.

(iii) Sclerenchyma:

Sclerenchymatous tissue consists of long needle-like cells with pointed ends. As the cells are much longer than their breadth they are also called fibres. They gradually lose protoplasm and become dead. In cross-section they look typically angular. The walls are hard and lignified. Simple pits are present.

Types of Sclerenchyma:

Sclerenchyma cells occur in many different shapes and sizes, but two main types occur

- **Fibres**
- **Sclereids**

Types of Sclerenchyma

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1. Fibres

- a) Surface fibres
- b) Xylary fibres or wood fibres
- c) Extraxylary fibres or bast fibres

2. Sclereids

- a) Macrosclereids
- b) Osteosclereids
- c) Astrosclereids
- d) Brachysclereids
- e) Trichosclereids
- f) Filiform sclereids

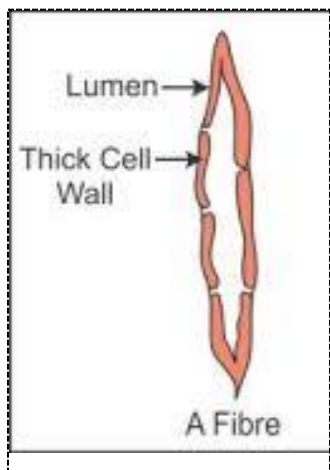
Fibres:

Fibres are greatly elongated cells whose long, tapering ends interlock, thus providing maximum support to a plant. They often occur in bundles or strands and can be found almost anywhere in the plant body, including the stem, the roots, and the vascular bundles in leaves. Thick elongated, spindle shape cell with pointed tips. Narrow lumen with simple rounded pits & lignified secondary wall

Distributed in cortex, pericycle xylem & phloem

Types Of Fibres

- ▶ Surface Fibres: Found on fruit wall & seed coat (coconut)
- ▶ Xylary & wood fibres: Associated with Xylem
- ▶ Extraxylary & Bast Fibres: Associated with cortex, pericycle & phloem



Sclereids:

These are widely distributed in plant body and are variable in shape. They occur singly or group as hard masses within soft parenchyma tissue, Usually these are isodiametric, but some are elongated too. They are commonly found in the cortex and pith of gymnosperms and dicotyledon, sclereids of peculiar shape are found in the leaves of various plants. The fruits, they are disposed in the pulp single or groups .The hardness and strength of the seed coat is due to the presence of abundant sclereids.

Types of Sclereids:

- ▶ Brachysclereids: Isodiametric sclereids called stone cells present in pulp of fruits, cortex, pith & pericarp of coconut shell
- ▶ Macrochysclereids: Rod like sclereids present in bark of seed coat of Leguminous plants
- ▶ Osteosclereids: Bone like sclereids with lobed end presents in seed coat & fruit wall
- ▶ Astrosclereids: Star shape present in dicot leaves and gymnosperms

