

# Plant Histology

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(5)

# Permanent tissues



**Simple tissues**  
(one cell type)

**Complex tissues**  
(more than one cell type)

**Ground tissue**  
Parenchyma

**Supporting tissue**  
Colenchyma

Cells can divide

**Protection**

Epidermis Peridermis

**Support**

Sclerenchyma

**Vascular**

Phloem Xylem

Cells can not divide

# SIMPLE TISSUES

**Simple tissues** are made up of one cell type. Hence, simple tissue show homogeneous.

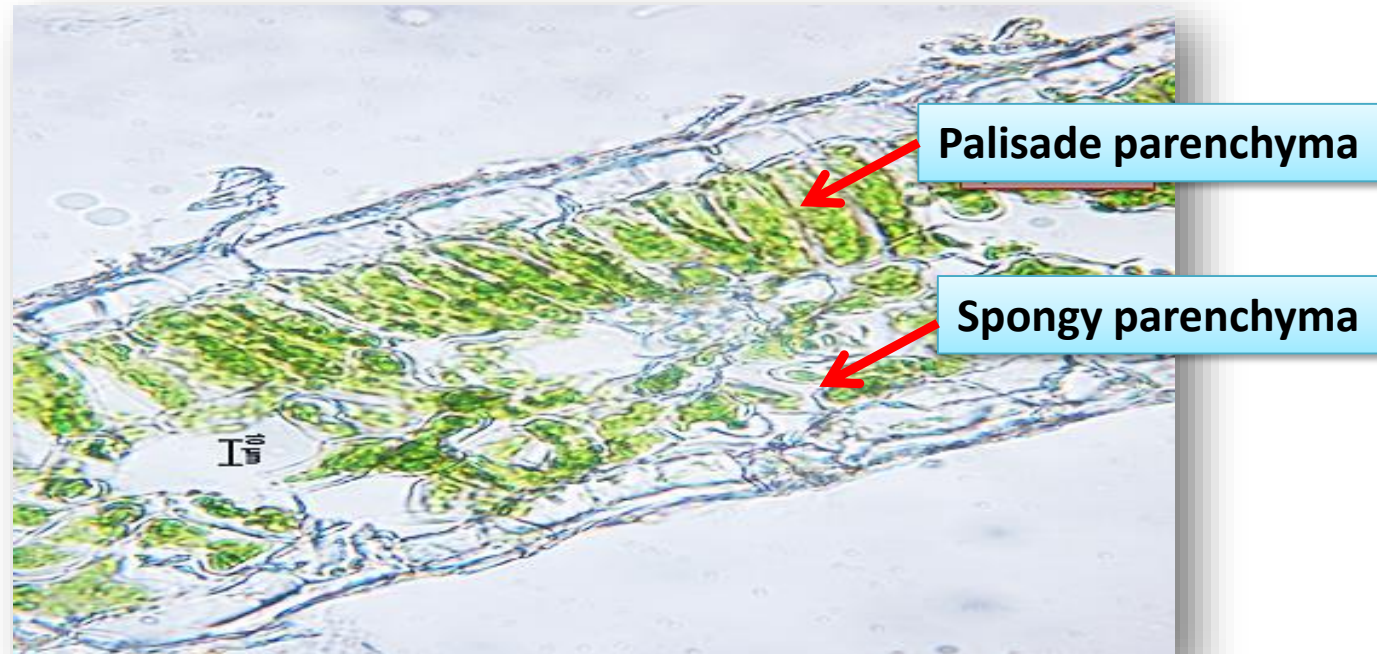
# 1. PARENCHYMA

The term *parenchyma* (Para means “beside” and chyma means “infilling”) was first introduced by *Nehemiah Grew* (1682). They are a simple permanent tissue. They have living cells. They are found in the cortex, pith of roots and stems, mesophyll of leaves, succulent roots, endosperm. Parenchyma cells are generally polyhedral in shape. Parenchyma cells may be elongated columnar in shape as found in palisade tissue of the leaf. Stems of plants shows well-developed air spaces with their stretched arms, such parenchymatous cells are called *stellate parenchyma*. Parenchyma cells can be variously lobed in spongy mesophyll. Some parenchyma cells shows inner walls protuberance for short distance transfer of solutes called as *transfer cell*. Parenchyma cells usually have thin primary walls and simple pits.

Parenchyma cells shows various functions and structural modification these can be classified into various types:

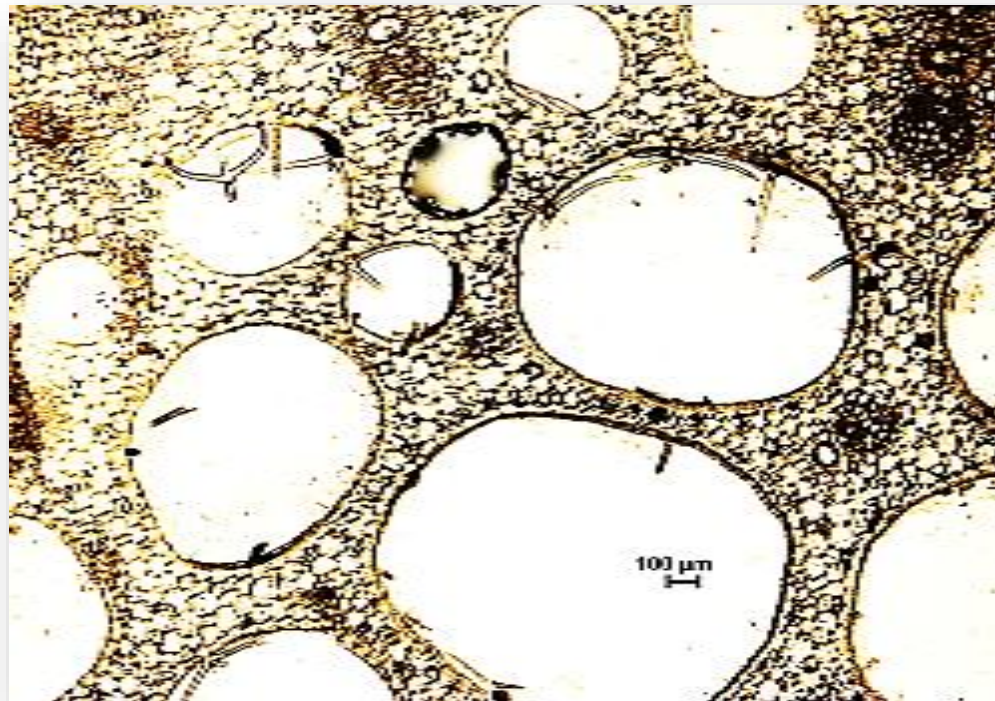
### 1. Synthetic parenchyma

It is generally found in the mesophyll tissues of leaves. Mesophyll tissue is differentiated into compactly arranged columnar cells called as *palisade* and loosely arranged tissue called *spongy parenchyma*. These are chlorophyll containing cells so known as *chlrenchyma*.



## 2. Aerenchyma

*Aerenchyma* generally is found in aquatic plants. Parenchyma cells have a lot of intercellular spaces and intercellular spaces appear as large air cavities. *Aerenchyma* provide buoyancy to balance and assists in floating in water. They supported to exchange CO<sub>2</sub> and O<sub>2</sub>



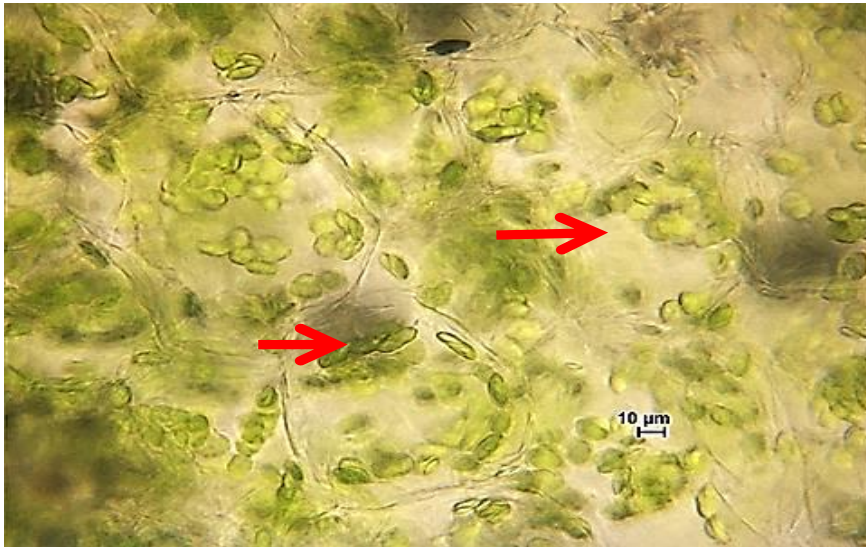
*Nymphaea* leaf showing aerenchyma tissue

### 3. Transport parenchyma

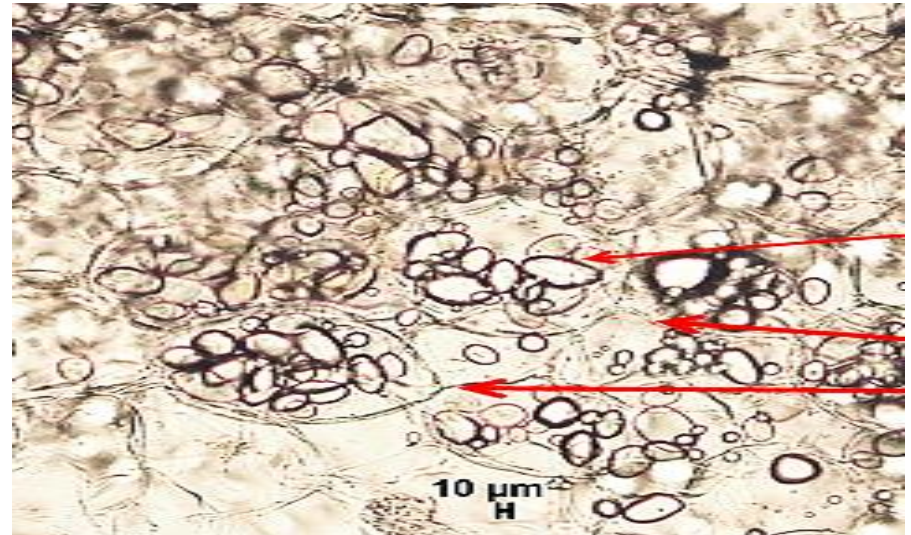
The parenchymatous cells in xylem or phloem is meant for the transportation of water, minerals and food particles are called as *transport parenchyma*.

### 4. Storage parenchyma

Reserve materials are stored in the cytoplasm and vacuoles of storage parenchyma cells in form of fluid ( amides and proteins) or in the form of small solid particles (starch, proteins, oils, fats) or liquid. Cotyledonary cells of legumes show proteins and starch grains in the cytoplasm. Parenchyma cells may be involved in the storage of water as in succulent plants as like cactus or arid plants.



Water Storage parenchyma in *Opuntia ficus-indica*



Food Storage parenchyma in *Solanum tuberosum*