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| [**Home**](http://docs.google.com/home.htm)  [**Abstract**](http://docs.google.com/abstract.htm)  [**Introduction**](http://docs.google.com/introduction.htm)  [**Review of Literature**](http://docs.google.com/literature_review.htm)  [**Procedure**](http://docs.google.com/procedure.htm)  [**Data**](http://docs.google.com/data.htm)  [**Conclusion**](http://docs.google.com/conclusion.htm)  [**Cross Sections**](http://docs.google.com/cross_sections.htm)  [**Journal**](http://docs.google.com/journal.htm)  [**References**](http://docs.google.com/references.htm)  [**bonus..**](http://docs.google.com/bonus.htm)**.** |  | The problem of food dispersal in vascular plants is met by its vascular system, but in order for plants to grow as high as three hundred seventy feet as is seen with the coastal redwood, vascular plants must have tissues that provide support. There are three general tissue systems in angiosperm plants: ground tissue, vascular tissue, and dermal tissue. The ground system is the primary source of structure and support for the plant and it consists of three different types of tissues: parenchyma, collenchyma, and sclerenchyma. Parenchyma are undifferentiated cells and are the most prevalent cells in the plant. Parenchyma cells are involved in photosynthesis, storage, and secretion. Because parenchyma are undiffrentiated, all specialized, differentiated cells, like collenchyma and sclerencyhma, arise from parenchyma.  Collenchyma, which always occurs just below the epidermis of the cell, is one of the tissues that provides the most support for plants. The strength of collenchyma can be found in their cell walls. Collenchyma cells lack secondary cell walls, and thus are unlignified, but they do have primary cell walls, which gain their strength from large deposits of cellulose and a pectin coating. Collenchyma cells have an isodiametric shape, and, unlike other strengthening cells, are alive when they reach maturity. Because of this feature, as the plant grows, the collenchyma cells can grow with it, maintaining their strength through adding to their cell walls as they elongate. This feature makes collenchyma a very common tissue in young plants. In 1890, German botanist C. Muller classified the tree different types of collenchyma based on their differences in cell wall thickness. Firstly, angular collenchyma is when the cell walls thicken at corners of the adjacent cells. Secondly, tangential collenchyma is when the cell walls are thickened parallel to the surface of adjacent cells. Thirdly, in both angular collenchyma and tangential collenchyma there is very little intercellular space, but in lacunar collenchyma there is a relatively large amount of intercellular space.  Sclerenchyma are in many ways very different than collenchyma. Collenchyma cells have no secondary cell walls, but secondary cell walls are probably schlerenchyma cells’ most defining feature. Another feature that is different between collenchyma and sclerenchyma is that at maturity collenchyma cells are alive and can still grow, which schlerenchyma at maturity are simply cell walls without any living protoplasm. Due to their thick cell walls and their inability to divide at maturity, schlerenchyma cells are commonly found in and provide support for areas of the plant that are no longer growing. Schlerenchyma cells’ strength comes from their lignified secondary cell walls, which can make up as much as 90% of the cell’s total volume (Botany online). There are two different types of schlerenchyma cells: fibers and sclereids. Fibers are long thin cells that often occur in bundles especially near the phloem and the xylem. Schereids are cells of various different shapes and can be found throughout the plant.  [previous page...](http://docs.google.com/literature_review.htm)  [more...](http://docs.google.com/literature_review_3.htm)  [works cited...](http://docs.google.com/works_cited.htm) |