



CMG GardenNotes #131

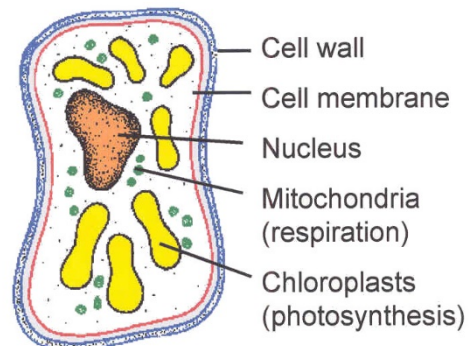
Plant Structures: Cells, Tissues, and Structures

Outline: Cells, Tissues, and Structures

Plant cells are grouped into tissues based on similar characteristics, then into five distinct structures (organs).

Cells – Individual building blocks for life processes and growth. Common cells contain genetic matter (deoxyribonucleic acid, or DNA) and metabolic organelles but they are mostly water. In green plants, they are the site of sugar production (photosynthesis). [Figure 1]

Figure 1.
Plant cell



Tissues – Groups of cells that are similar in appearance and function, for example:

- **Epidermis** is the single exterior layer that protects the stems, leaves, flowers, and roots. The outside surface of the epidermis tissue is usually covered with a waxy substance called cutin, which reduces water loss.
- **Parenchyma** tissues are made of simple, thin-walled cells. In a carrot, for example, the parenchyma cells become a storage unit called the cortex. In leaves, a layer of parenchyma tissues under the epidermis is active in photosynthesis. When wounded, parenchyma cells can become meristematic and proliferate to grow over the wound.

- **Meristematic** tissues are comprised of actively dividing cells.
- **Sclerenchyma** tissues are thick-walled support cells found throughout the plant as fiber.
- **Xylem** is a structurally complex tissue that conducts water and nutrients from the roots to all parts of the plant. In woody plants, the xylem tissue becomes the wood.
- **Phloem** tissue conducts food and metabolites from photosynthesis throughout the plant, including down to the roots.

Structures (organs) – Groups of tissues working together with a common function, (e.g., **roots, stems, leaves, flowers, fruits, and seeds**).

Plant – Made up of a number of coordinated structures to form a working unit.

Additional Information – *CMG GardenNotes* on Botany:

#121	Horticulture Classification Terms	#136	Plant Structures: Fruit
#122	Taxonomic Classification	#137	Plant Structures: Seeds
#131	Plant Structures: Cells, Tissues, and Structures	#141	Plant Growth Factors: Photosynthesis, Respiration and Transpiration
#132	Plant Structures: Roots	#142	Plant Growth Factors: Light
#133	Plant Structures: Stems	#143	Plant Growth Factors: Temperature
#134	Plant Structures: Leaves	#144	Plant Growth Factors: Water
#135	Plant Structures: Flowers	#145	Plant Growth Factors: Hormones

Authors: David Whiting, Consumer Horticulture Specialist (retired), Colorado State University Extension; with Michael Roll and Larry Vickerman (former CSU Extension employees). Line drawings by Scott Johnson and David Whiting. Revised by Patti O'Neal, Roberta Tolan and Mary Small, CSU Extension.

- Colorado Master Gardener *GardenNotes* are available online at www.cmg.colostate.edu.
- Colorado Master Gardener training is made possible, in part, by a grant from the *Colorado Garden Show, Inc.*
- Colorado State University, U.S. Department of Agriculture and Colorado counties cooperating.
- Extension programs are available to all without discrimination.
- No endorsement of products mentioned is intended nor is criticism implied of products not mentioned.
- Copyright 2003-2018. Colorado State University Extension. All Rights Reserved. *CMG GardenNotes* may be reproduced, without change or additions, for nonprofit educational use.

Revised July 2016