Types of plant cells and their functions

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Parenchyma cells are one of the three main types of plant cells. They are the general and multifunctional cells that make up much of a plant (Dengler, Nancy). Within the Parenchyma genre, there are several different varieties of the cell. Some Parenchyma cells are called Chlorenchyma cells (“ Parenchyma Cells and Tissues”). Chlorenchyma cells are filled with chloroplasts. Other variations of the Parenchyma cell are filled with air, giving the leaves of the plants they make up buoyancy. These cells are referred to as Aerenchyma cells. Stellate Parenchyma cells are located in the petioles of some plants, including banana plants (“ Plant Anatomy”). These cells are special because they are in the shape of a star. The living Xylem cells are also forms of Parenchyma cells called Xylem Parenchyma. Xylem Parenchyma cells are designed for storing starch and conducting water. There are also special Parenchyma cells called Companion cells. Companion cells are found only in angiosperms. Their main purpose is to assist the sieve tubes in “ conducting food.” The final type of Parenchyma cell is the Phloem Parenchyma cell. These cells store fats, starches, resins and tannins and are not usually seen in monocots.

While Parenchyma cells can be found all throughout a plant, there is an abundance of them located in the cortex, pith of the stem, roots and leaves of a plant (“ Plant Cell Anatomy”). The epidermis of the plant is also made with Parenchyma cells (“ Plant Anatomy”). It is a single layer of Parenchyma cells that do not have intracellular space but tiny pore-like holes called stomata. Stomata allow the plant to take in and release air, water, etc. Parenchyma cells surround the vascular bundles of a plant and make up the cortex as well. The flesh of fruits and vegetables also consists largely of

Parenchyma cells (“ Changes in Water Potential during Ripening and Storage of Fruits and Vegetable”).

The function and purpose of the Parenchyma cell is to carry on photosynthesis. The design of their thin outer walls makes Parenchyma cells conducive for photosynthesis (“ Parenchyma Cells and Tissue”). Sunlight can easily reach the inside of the cell and water and other necessary minerals can easily enter and exit the cell because of God’s flawless design of the cell wall. Parenchyma cells also function as storage containers (“ Parenchyma Cells and Tissues”). Many of the Parenchyma cells of a plant are responsible for storing starch.

Because of the many varieties of Parenchyma cells, there are also several different designs. Some Parenchyma cells, specifically the Chlorenchyma cells, are oblong and packed tightly together (Kantharaj, Dr. G. R.). These types are referred to as Palisade cells. Palisade cells are the cells responsible for carrying out photosynthesis. Other Chlorenchyma cells have “ irregular” shapes that are not as tightly packed. These types of Chlorenchyma cells are called spongy cells. Since they are not squished together, spongy Chlorenchyma cells have space in between them. This space is called intracellular space (Plant Anatomy”).

Parenchyma cell also have organelles. Organelles are tiny little organs busily working inside the cell. One of the organelles of the Parenchyma cell is the cell membrane. The cell membrane is also commonly referred to as the plasma membrane (“ The Cell Organelles”). This membrane acts as a package so to speak. It keeps all the contents of the cell together. The cell

membrane also controls what substances are allowed to enter and exit the cell. Outside the cell membrane is the cell wall. This structure is made up of fibers containing cellulose. Theses sturdy fibers give the cell structure and stability. Cells can also fill with water and become turgid because of the cell wall. Another vital part of the cell is the cytoskeleton. The cytoskeleton is also an important structure that gives the cell support. It consists of a combination of protein fibers, microtubules and microfilaments that allow the cytoskeleton to be structurally sound. The microtubules not only provide support for the cell, but they also provide a means of transportation (“ Plant Cell Structure”). Parenchyma cells also have tiny tubes that connect cells to each other. These “ living bridges” are called plasmodesmatas (Davidson, Michael and the Florida State University). Also found inside a Parenchyma cell is cytoplasm. Cytoplasm is a “ gel-like” fluid that surrounds and supports all the organelles (“ The Cell: The Plant Cell”). It consists of water and many different chemicals.

Moving inside the cell, through the cell wall, cytoskeleton and cell membrane, a vast number of organelles are discovered. One of these organelles is the nucleus (“ Plant Cell Structure”). It is the main control unit of the cell coordinating the cells activities. Surrounding the nucleus is the nuclear membrane (“ Plant Cell Anatomy”). It is a double layered membrane that protects the nucleus. Tiny pores cover the nuclear membrane allowing items to enter and exit the nucleus. Inside the nucleus is the nucleolus. It stores deoxyribonucleic acid, DNA, ribonucleic acid, RNA, and proteins.

The Parenchyma cell also has an organelle by the name of the endoplasmic reticulum. There are two types of endoplasmic reticulum, ER for short. One

version is called rough endoplasmic reticulum and the other version is called smooth endoplasmic reticulum (“ Plant Cell Anatomy”). Both are made of folded sacs of membrane and transport materials throughout the cell. However, the rough endoplasmic reticulum is different from the smooth endoplasmic reticulum. Rough ER is covered with ribosomes which give it its rough appearance. Ribosomes store RNA and carry proteins (“ Plant Cell Structure”). On the other hand, smooth ER is ribosome free and dissolves lipids (“ Plant Cell Anatomy”).

Another organelle of the Parenchyma cell is the Golgi apparatus. The Golgi apparatus is the shipping center of the cell (“ Plant Cell Anatomy”). It receives items to ship to other parts of the cell or to another part of the plant in a membrane bound vesicle. Some of the items it receives are modified before they are sent out (Davidson, Michael and the Florida State University).

The “ power house” of the cell is the mitochondria (“ The Cell: The Plant Cell”). The mitochondria break down glucose to form ATP, which is a form of energy for the plant. Peroxisomes are also organelles of the Parenchyma cells. They are a common micro body found in the cell’s cytoplasm and have a somewhat spherical shape to them (Davidson, Michael and the Florida State University). Another organelle of the Parenchyma cell is the centrosome. Centrosomes are in a Parenchyma cell for the sole purpose of producing microtubules (“ Plant Cell Anatomy”).

Chloroplasts are also important organelles in the Parenchyma cell. These organelles are in the shape of a “ disk.” Inside the chloroplasts are granums (K. Sarah). Granums are stacks of thylakoid disks. Inside the thylakoid disks

is chlorophyll, a substance that is necessary for photosynthesis to take place (“ Plant Cell Anatomy”). Because the chlorophyll is in the thylakoid disks, photosynthesis takes place on them.

There are also several organelles dedicated strictly to storage. The first is the amyloplast. Amyloplasts function only to store starch (“ Plant Cell Anatomy”). Another storage container inside the cell is the pinocytic vesicle which stores water (“ The Cell: The Plant Cell”). Plastids are also storage containers for the cell. They store either starch, pigment molecules or chloroplasts. The final storage organelle and final organelle of the Parenchyma cell is the vacuole (“ The Cell Organelles”). The large vacuole is not only a useful container for the Parenchyma cell, but it also helps the cell maintain its proper form and pressure.