Chapter I. The structural organization of the plant cell 1.Definition of plant cell Plant cells are the basic unit of life in organisms of the kingdom Plantae.Thallophytes: the name "Thallophyta" comes from the Greek word "Thallos" which means "undifferentiated" and "phyton" which means "plant". Thallophytes can be defined as it is a group of plants or plant-like organisms that lack differentiated stems, leaves, and roots and that were classified as a primary division of the plant kingdom (Fig. 1). Some of the important characteristics of Thallophyta are listed below; ? Their bodies are not differentiated into well-defined stems, roots, and leaves. ? They also lack cellulosic cell walls. ? They are autotrophic and store nutrition in the form of starch. ? They are the most primitive form of plants. Figure 1. Example of Thallophytes A part of the Thallophytes is autotrophic chlorophyll, this group corresponds to algae (Fig. 2a). Another part is devoid of chlorophyll and adapted to heterotrophic nutrition , in this case it is fungi (Fig.2b). Others are adapted to life in symbiosis with algae or with cyanophytes, these are lichens (Fig.2c). a B a c Figure 2. Example of some species of Thallophytes (a: Algae, b.fungi, c: Lichens) 2 2.2.2. Cormophytes Cormophytes form a group composed of higher plants that correspond to multicellular organisms and whose eukaryotic cells are united into tissues, forming in turn organs much more complex than a Thallus called the cormus, i.e., a stem with leaves and roots. (Fig.3). Cormophytes are divided into several phyla: bryophytes (non-vascular) and vascular plants (Pteridophyta, gymnosperms and angiosperms (flowering plants) (Fig.3). Figure 3. Example of Cormophytes a. Bryophytes Bryophytes is the division of green plants, which refers to embryophytes. They are land plants, particularly non-vascular ones. There are around 20,000 different plant species in the bryophytes. Following are the characteristics of Bryophyta: ? Plants do not have a vascular system ? Autotrophic organism ? Have a real leafy stem ? They do not have a real root system (Fig.4). 4 Figure 4 : Example of Bryophyta b. Pteridophytes The Pteridophytes are primitive vascular plants with the absence of seeds. The plant body is differentiated into true roots, stems, and leaves. Vascular tissues are present in so-called vascular cryptogams. Most of them have leaves (known as fronds), roots, and sometimes true stems or trunks, as in the tree of ferns. (Fig.5). Figure 5. Example of Pteridophytes (ferns) 5 c. Spermaphytes The spermatophytes are plants that produce seeds; hence the alternative name, seed plants. They are a subset of the embryophytes, or land plants. Seed plants (Division Spermatophyta) are the most common plants on earth today. They are divided into two major categories, which are the gymnosperms (non-flowering plants) and the angiosperms (flowering plants). c.1. Gymnosperms Gymnosperms are vascular, seed-bearing, flowerless plants, whose meaning is "naked seed" (Fig.The cell wall: A cell wall is a structural layer that lies next to the cell membrane and serves primarily to give the cell strength and protection against mechanical stress.Plastids Plastids are a double membrane diverse group of physiologically, phylogenetically, and genetically related eukaryotic organelles that play important roles in plant metabolism through 8 different processes like; Proplastids (undifferentiated plastids) may undergo differentiation into many forms, depending upon their specialized functions in the cell.If the seed has one cotyledon, they are called monocots (wheat, banana, onions), and if the seed has two cotyledons, they are called dicots (apples, mango, oranges).They are eukaryotic and autotrophic cells, which have a true nucleus along with specialized structures called organelles that carry out different functions.The classification of plants The plant kingdom, although less diverse than the animal

kingdom, has more than 400.000 species if we include fungi, although they are now considered to constitute a kingdom distinct from plants and animals.The classic classification of plants is based on several cytological and morphological criteria; thus, in the plant kingdom, we distinguish: 2.1.Eukaryotic, multicellular, chlorophyll–containing, and having a cell wall, are grouped under the kingdom Plantae.Chloroplasts ?Chromoplasts ?2.2.2.2.2.1. 6).?3.3.3. 9).3.1.4. 11).