**Cell wall composition**

The fungal cell divided in two parts.

1. The cell wall
2. The protoplast
3. **The cell wall**

Cell wall is made up of fungal cell or chitin cell (C22H54O27)n. under electron microscope the cellulose and chitin occurs as elongated micofiblure units. Incase of omycetes distinct from other fungal cell due to occurrence of cellulose in the cell wall. The basic structural constitutent of the cell wall in the zygomycetes in the higher fungi i.e. Ascomycetes and Basidiomycetes is chitin. Chitin is a polysaccharide based on the nitrogen contains sugar glucosamine. In the yeast and a few other hemiascomycetideae, chitin is absent. Their walls are mainly composed of microfibrils of manon and glucon (polymer of hexosugar). Some investigators have reported the occurance of lignin in several fungi.

Property- the cell wall is permeable to both water and substance in true solution.

1. **The protoplast**- the living substance of the cell within the cell wall is the protoplast. It differentiated into other cell parts such as
2. **Cell membrane**
3. Vacuolated cytoplasm
4. Cell organelles
5. One or more nuclei

The chloroplast is totally absent in protoplast of fungal cells.

1. **Cell membrane** – the outermost layers of the protoplasm is the cell membrane, which is delicate extremely thin living membrane enveloping the protoplasm. Therefore it is the surface layer of the protoplast. It performs special functions. It is differentially permeable and shows a typical tripartite structure under the electron microscope. There is an electron dense central region.
2. **Vacuolated cytoplasm** - It is the colourless region of the protoplast enclosing by the plasma membrane. In this cytoplasm sap filled vacuoles may occur. In young hyphae or hyphaltips the cytoplasm appears rather uniform or homogeneous.
3. **Cell organelles** – the structure that are immersed in the cytoplasm are cell organelles and inclusions. The organelles are living structure each with a specific function. Therefore they are not essential to cell survival. The cell organelles are essential structure which are divided onto
4. **Endoplasmic reticulum** - The presence of endoplasmic reticulumin the fungal cytoplasmhas been reveat by the electron microscope. It is composed of a system of membranes and microtubuler structure which are usually besel with granules thart are like to the ribisomes. In many fungi the endoplasmic reticulum is highly vasicular. Usually it is loose and more irregular than inn the cells of green plant.
5. **Mitochondria** - The cytoplasm contains small usually spherical body known as mitochondria. Each mitochondria is enveloped by double membrane. The inner membrane is infolded to form the cristae which are in the form of parallel flate plates or irregular tubules, the cristae contain the same fluid that fills tha space between the two membrane, the function of the mitochondria is as the power house of the cell which is like to the hiher plant.
6. **Golgi apparatus or dictyosomes**- There is less certainity of the occurance of the structure similar to those of the golgi apparatus in fungi except omycetes.
7. **Vacuoles** - The cytoplasm of young hyphae or fungal cells, hyphal tips lakes vacuoles. It appears later old ages. It become enlarge and shows a tendency of coallepsa and ultimately reduced the cytoplasm to thin nliving layer immediately with in the cell wall.

Except the cell organelles the cytoplasm contains various kinds of inclusion for eg. Store food like lipid globules, granules of glycogen and the carbohydrate trihalose proteinaceous material and volutin. The pigment carotenoids are often conspicuous by their presence and may occur throughout the cytoplasm or concentration of lipid granules or distributed in cell walls. Besides this the cytoplasm secrets several kinds of ferments, enzymes and organic acid.

1. Ribosomes- Ribosomes are similar to higher plants.
2. One or more nuclei – The cytoplasm of fungi contains one or more globules or ellipse nuclei which are small and usually range from 1-2 or 3 µ in diameter. Structurally the nucleus consists of a central densed body with a clear area around it and the whole structure surrounded by a definite nuclear membrane. The central body takes heavy iron haematoxylin stain and usually feulgen negative. There is an amorphous granular mass inside which is designated as the nucleolus. The neuclear membrane is consists of inner and outer layers of electron dense materials and the middle one of electron transpiring substances. It has some force. At certain points the nuclear membrane is continuous with the endoplasmic reticulum.