

I'm Dr.Kulkarni Rajender Rao from Government College of Art, Science and Commerce ,Quepem.. I'm going to explain the structure of the Golgi complex from cell organelles. Outlines of this module general structure.Important enzymes and the origin of the Golgi complex.

At the end of this module you can describe the general structure, list.Important enzymes, explain the origin of Golgi complex.

Camillo Golgi in 1898 discovered the Golgi complex in the Purkinje cells.the nerve cells of cerebral cortex of the barn owl. and cat.. He used silver chromate impregnation technique and coined the term Internal reticular apparatus. Later it was named Golgi. Apparatus Or Golgi complex. In 1954 Dalton and Felix studied the Golgi complex under the electron microscope. Golgi Complex is an important cell Organelle. which is in pleomorphic. that is,it exists in multiple structural forms in the cytoplasm.

It is single in many vertebrate cells and is described as localized. Whereas it is a connected complex in many invertebrates liver, nerve cells of vertebrates and is described as a diffused structure. Inside the cell. Nucleus generally takes the central position and different cell organelles present between the nucleus and cytoplasm. However in particular zone of a cell , only Golgi complex is present that is other Cell organelles, like mitochondria,centrioles, and other structures, do not present and only Golgi complex is present in this zone, so this zone is known as the zone of exclusion. or Golgi ground substance Position of the Golgi complex. is polar in secretory cells in the secretory poll and circum nuclear , that is around the nucleus in nerve cells Golgi complex is absent in prokaryotic cells. For example, in Mycoplasma or pleuropneumonia like organisms, in cyanobacteria or blue green algae. It is absent. Golgi complex is present in all the eukaryotic cells, except in the Mature sperms. In the mature sperms Golgi complex gets modified into Acrosomal cap. and in RBC where in the initial stages of

the RBC Golgi complex is present. However, after the multiplication during maturation of RBC when nucleus disappears along with the nucleolus, all the cell organelles, including Golgi Complex disappear and provide the place for hemoglobin. Shape and size of the Golgi complex depends on the physiological state of the cell. It is highly developed if the cell is active in function. Golgi complex is made up of four important structural components, Cisternae, or Saccules, tubules, vacuoles, and vesicles. Cisternae or saccules are arranged in a single stack of three to seven cisternae. The membrane of the cisternae is smooth without any Ribosomes. The lumen of cisternae is about 60 to 90 angstroms. The matrix, intracisternal space is about 100, to 300 angstroms. This space is filled with thin layer of cytoplasm having parallel fibrils connecting the cisternae or saccules. The Golgi complex exhibits polarity. The cisternae or saccules will have the curved margins. One side convex the convex side is the forming face or cis face where the new vesicles from endoplasmic reticulum come and fuse. The concave side is the maturing face or the trans face. cis and trans axis. cis or proximal or forming face is always lie towards the nucleus or endoplasmic reticulum. It has a thickness of 3 to 4 nanometers whereas the trans or distal. or maturing face always lie towards the plasma membrane. The thickness of cisternae in this face is between 6 to 9 nanometers. The next structural component of Golgi complex tubules. Tubules form the complex network due to the high fenestration that is opening between the tubules, and these tubules are interconnected to the cisternae. They are always present towards the maturing phase. The diameter of tubules is between 30 to 50 nanometers. Golden vacuoles They form from expanded cisternae from the concave maturing phase. They contain amorphous or granular substance containing hydrolases, because of this, the Golgi complex produces lysosomes. Vesicles These are the small size of about 20 to 80 nanometers in diameter. They are attached with tips of the tubules. They are of three

types.

Transitional Vesicles which are responsible for the formation of new cisternae. Smooth Vesicles which are secretory in function and they are released from the maturing phase, move towards the plasma membrane can undergo exocytosis at the secretory material. The third type is the coated vesicles which are having a rough surface as they are coated with protein clathrin, hence they are called clathrin coated vesicles. They are responsible for the transport of the material between the membranes they carry. material from plasma membrane to endosomes,,endoplasmic reticulum to Golgi complex Golgi complex to lysosome cisternal maturation model. This model explains how Golgi complex originates and measures endoplasmic reticulum are nuclear membrane, produces several transitional vesicles. Now these vesicles will fuse to make the forming phase or proximal phase or cis face and the contents of this initial that the forming phase undergoes. various stages are various reactions that is they undergo processing. After the processing, they reach the maturing face or distal phase or trans face. As they move toward the trans face, the products become fully mature. Once the products mature. the Golgi complex from the trans phase or distal phase produces several types of vesicles and vacuoles. They may be smooth vesicles or coated vesicles. Now these bags like, which are having secretory products, will fuse with the plasma membrane and pinch off. Chemistry of Golgi complex. Golgi complex is made up of about 60% proteins and 40% lipids. Small fraction of the carbohydrates and other chemicals. The Main phospholipids. animal Golgi complex is phosphatidylcholine whereas in the plants it is phosphatidylglycerol. The other chemical components of the Golgi complex include glycoproteins, glycolipids, sialic acid and galactose. Coming to the important enzymes of the Golgi complex.

Glycosyltransferases and the function is biosynthesis of Glycoproteins. Sialyl transferase transfer sialic acid from cytidine monophosphate Galactosyl transferase, this transfer galactose to protein or lipids, Sulpho or glycotransferases is responsible for glycolipid biosynthesis. Oxidoreductases perform oxidation and reduction reactions in the substances cytochrome C reductase. CoenzymeQ is responsible for removal or addition of hydrogen. Glucose 6 phosphatase and ATPase. They are responsible for removal of phosphate group from the substances. Coming to the origin of Golgi complex Golgicomplex originates from pre-existing stacks of the Golgicomplex by division or fragmentation. Golgi complex also originates from a smooth endoplasmic reticulum as it produces the vesicles and these physical fuses to form the Golgi complex. The Golgi complex also forms denovo, that is, from the cytoplasm. Thank you.