Eukaryotic cells are the most structurally advanced of the major cell types. Describe the structure of and function of eukaryotic organelles. Distinguish between those that are and are not membranous. Explain the importance of membrane structure and function in the organization of living processes within.

All living organisms have the cell as their basic unit of life. This cells are characterized as either eukaryotic are prokaryotic, eukaryotes are the most advanced types of call they are found in plant, animals ,protest or even fungi. Organisms with eukaryotic cell are referred to as eukaryote organisms, the main distinctive characteristics is that they have their nucleus bound in a membrane. Some of its organelles can also be membrane bounded. Eukaryotic cell are more complex and dominant types of cells. At the cytoplasm not all organelles are enclosed by the membranes some exist freely at the cytoplasm. The once that are unenclosed are at least general in the functioning. The enclosed membrane show the significance of differentiation.

A complete and functional cell has several organelles that carry distinct biological function either individually or independently. The organelle characterized but their physical appearance and distinct functions. The several organelles include; nucleus, mitochondria, Golgi bodies, endoplasmic reticulum, lysosomes, ribosomes and vesicles. Different living organism have different type of organelles for example chloroplasts are only found in plants some photosynthetic bacteria but not in the animal cell, this is because plants make their own food from the sun unlike animals which consumes already manufactured food.

Nuclear is the major organelle found at the cell, all activities of the cell rotates around it. Eukaryotes have true nucleus that is the genetic materials are enclosed in a membrane. The nucleus houses the cell genetic materials (DNA) that directs the synthesis of proteins. The nuclear is enveloped by a double membranous structure composed of a phospholipids bi-layer. Both the inner and the outer membrane can conduct a signal hence harmonizing the environment between the nuclear and the cytoplasm. Chromosomes are also located in the nucleus. The DNA in the nucleus are closely associated with the proteins called histones which help in controlling protein synthesis. The main function of the nucleus is to provide site for r-RNA synthesis.

Mitochondrion is another important organelle found in the eukaryotic cell. Similarly to the nuclear it is a double membrane organelle. It is oval in shape and are distributed all over the cytoplasm, it is the main site where ATP is produced during aerobic metabolism. The outer membrane of the mitochondria is majorly made up of proteins and lipids. The inner membrane has its surface area increased by inner folding called the cristae.

Eukaryotes have slightly larger ribosome. These are cellular machines that make proteins and ribosomal RNA. A ribosome is made of three subunits namely; large subunit, central protuberance and the smaller subunit. Eukaryotic ribosome have more RNA as compare to prokaryotic cells. The different subunits of the ribosome have distinct function during protein synthesis.

Lysosomes are bounded by a single membrane; they vary in shape and size. They can be spherical, larger or irregular in shape. The membrane forms a small compartment that contain a group of enzyme that breakdown polymers into monomeric subunits. They consume the materials to be degraded either by endocytosis or phagocytosis. Most of the lysosomes work effectively in an acidic condition.

The endoplasmic reticulum is classified into two; the rough endoplasmic reticulum and the smooth endoplasmic reticulum. They are compartments made up of interconnected closed membrane bound vesicles. Phospholipids and fatty acids are synthesized in the smooth endoplasmic reticulum. The enzyme in this organelle can detoxify hydrophobic agents in the hepatocytes by converting them into water soluble compounds or conjugate compounds that can be secreted by the body.

Rough endoplasmic reticulum provides site ate which ribosomes are bound. The ribosome bond to this organelles synthesizes other organelles and certain membranes. Rough endoplasmic reticulum are abundant in the cells that produce secretable proteins such as the antibodies and the digestive juices. They are the most abundant organelles in a cell.

Cytoplasm is an unclosed organelle it provide a fluid matrix for all other organelles.it provide nourishment to other organelles. I dissolves the ions and other chemical agents needed by the cell. Some of the biological reactions take place in the cytosol. Before glucose molecules enters the mitochondria for respiration they are fully activated at the cytoplasm.

Each and every organelle has its function, its structure is designed on a way that optimize it function. For example the nucleus have pore in its it membrane that strictly allows required molecules of ions into it. The folding the inner membrane in a chloroplast increases the surface area in which the photosynthetic reaction takes place.

Compartmentalization is the introduction of closed parts within the cytoplasm, they are mostly surrounded by a single or a double membrane. The compartments always defines enclosed regions. This serve as survival mechanisms for a complex cell structure it has several advantages to the cell. Compartmentalization gives the eukaryotic cell it complexity over prokaryotic cell.

Since different processes of in a cell need different environments for example the hydrolytic effects of the lysosomes needs an acidic condition. This lower PH can be obtained by pumping of the H+ by the ATP as that occur in the inner mitochondria. Another good example is the enclosure of photosynthesis in the chloroplast, by so doing the enzyme needed for the photosynthetic processes are maintained at high concentrations.

Most of the biological reaction are catalyzed by enzymes, and since different reaction use different enzymes membrane structure organization solves this problem. Different enzymes have different optimum temperatures and PH values. If all enzymes could be in one compartment then some of the enzyme co be renderd useless or could not have their optimal functioning. by dividing cellular spaces, the organism give different enzyms ample environment to carry it catalytic role.

Through compatimentalization the cell protects itself from the corrosive effects of the lytic enzyme produced by the lysosome. A good example is the sealing of the lytic acid by the lysosome prevents auto digestion of the other organnneles within the cell. Leaking of the lytic enzyme I the cytoplasm can lead to degradation of the organelles and eventually leading to the premature death of the cell.

Reglation of the metabolic pathways is achieved hrough compartmentalization. This makes the paths to be more accurate and minimize the inteferance among pathways that have similar ends product. The regulation of a pathway is done at a poin of entry or at the substrate level.

Covering the DNA in the nucleus protects it and give room for post transcriptional modification to produce accurate mRNA to occur prior to translation into a protein that take place in the cytcol. The translation of the proteins the regulates wht gets into and out of the cell are

Even though compartmentalization shows a significant advantages to the cell, it forces the cell to generate more energy since the consumption is slightly increased. This increase in energy imtake arises from continuous need of the ATP dependet transport molecules that transports substances acoss the organelles membrane. Organisms prefeerfer to have this compartment despite the disaavantage bacauuse the effect that are caused by conflict in the biological processes are fatal.