Welcome to module number 37, from cell organelles and the module name is Structure and Function of Ribosomes.

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The outline of this module.

The two models explaining the structure of ribosomes in 70 S ribosomes will be done.Structure of 80S ribosomes and the function of ribosomes.

And the learning outcome expected. The student should be able to describe and draw the structure of ribosome, understand and elucidate the functions of ribosomes.

The structure of ribosome is differing in prokaryotes and eukaryotes as far as its size is concerned as far as its composition is concern, but the overall structure as far as its morphology is concern is almost similar in a prokaryote as well as in eukaryote. Prokaryotic 70 S Ribosome structure has been explained in two different models.

One by Stoffler and Wittmann's model, which is also known as a quasi symmetrical model. Quasi, which is a sort of false because it is not actually symmetrical, but a type of symmetry, is being tried explaining in this model.

Lake's model is known as an asymmetrical model of ribosome, which definitely talks about the subunits which are not equally formed, and the eukaryotic 80S ribosome, which is almost similar in morphology as well as function only.

The difference lies in the size and the number of RNA and proteins present in it. Coming to the Stoffler and Wittmann's model of ribosome, which is a quasi symmetrical model proposed in 1977. And this is a

structure of the 30 S ribosome. Under 50 S ribosomal and when they are fit together with the help of a magnesium ion, it forms a 70s ribosome and S stands for the Swedberg unit, which is the sedimentation coefficient given for the sizeof the subunits during the time of ultracentrifugation, and this structure forms are different way of arrangement shown as arrow by rotation through an angle of 90 degree along its axis, including a, b, c, d. If you see the structure of a smaller subunit, it is composed of the head, a dent,and a body which gets fit over the 50 S ribosomal so that there is a small tunnel which is formed, and this is because the 50 S subunit has got a protruberance. That is the lateral protruberance and a central protuberance with Vaulted seat. Over which the smaller subunit fit so well that there is a small tunnel that has been formed, and through this that the mRNA with a tRNA, an amino acid moves, forming a polypeptide chain at the time of protein synthesis. The next stoffler and Whitmann model also gives a three dimensional structure of a ribosome, somewhat like this, which comprises the different parts. The central protuberance, the lateral protuberance, and the Vaulted seat. These are the part of a larger subunit that is the 50 S subunit whereas the 30 S subunit is made up of the head and the body, which fit over this so well that there is a tunnel formation, and this is the area where a protein synthesis takes place. The next model that was explained and proposed by the next model, which is a symmetrical model and established in 1981 and these structures gave off three dimensional in two different orientation. These are composed of 30 S subunit and 50 S subunit which fits well so that we get 70 S subunit.

The 30 S Subunit is made up of the upper 1/3 and the lower 1/3 it has got a cleft and the platform area also the largest subunit has got the lateral protuberance and the central protuberance is the 3 dimensional structure of 80Sribosome which is almost similar in morphology as far as the structure of ribosome is concerned. Whether it is a 70 S or 80 S, which is made up of two subunit, the smaller subunit and the larger subunit. The smaller subunit,which is of 40 S, has got a base and a head, whereas the largest subunit has got a body. And then when the smaller subunit gets fixed up with the larger one, which is a 60 S subunit, there is a small tunnel through which the mRNA passes through and a growing polypeptide chain is being formed, and this structure is found present over the endoplasmic reticulum.

Coming to the functions of the ribosomes. These are the key player in protein synthesis and the

Protein synthesis is one important pathway. One of the important process that takes place within a cell.

If you leave the amount of enzymes that are required for a biochemical reactions, these are nothing by proteinaceous in nature and this needs to be formed every time. Besides, there are some protein molecules like hormones been synthesized by the particular cells. But whatever it is, a protein synthesis becomes a very important process in a cell,wherein a protein synthesis cannot take place if there is no ribosome. The gene may have a codon which will help in the transcription process and the mRNA is formed. The mRNA that come out from the nucleus has to be further processed in the ribosome. So that a polypeptide chain can be formed and therefore ribosomes are also known as the protein factory of a cell.

This is a structure for ribosome, which shows a minor acyl chain of polypeptide chain which is formed on the tRNA. And then mRNA, which passes through the tunnel between these smaller subunit and the largest subunit. The codon and anticodon has been read, the tRNA carrying the amino acids, and there are formation of polypeptide chains through this tunnel. When it passes out. The ribosomes have two important site on its structure. One is the P site and the site,and these are the two important site which are important for the protein synthesis. For the mRNA which carries a codon and anticodon by the tRNA and finally a polypeptide chain which has been formed. And therefore the ribosome is a very important aspect as far as protein synthesis is concern.

So to conclude with this module, the ribosomes are made up of two subunits. They are different in prokaryotes that 70 S and eukaryotes 80 S. There are two important models proposed to explain the structure of 70years ribosome and the function of ribosome is its involvement. In the protein synthesis, which is a very important aspect in almost every cell, including a unicellular to the multicellular organisms.

These are the references which were used to prepare this module.

Thank you.