HE AMERICAN COLLEG

PG & Research Department of Zoology

RIBOSOMES

Dr. P.Dailiah Roopha
Assistant Professor

"Ribosomes are most important cell organelles composed of RNA and protein that converts genetic code into chains of amino acids."

- The ribosome word is derived – 'ribo' from ribonucleic acid and 'somes' from the Greek word 'soma' which means 'body'.
- Ribosomes are tiny spheroidal dense particles (of 150 to 200 A^0 diameters) that are primarily found in most prokaryotic and eukaryotic.
- They are sites of protein synthesis.
- The ribosomes occur in cells, both prokaryotic and eukaryotic cells.

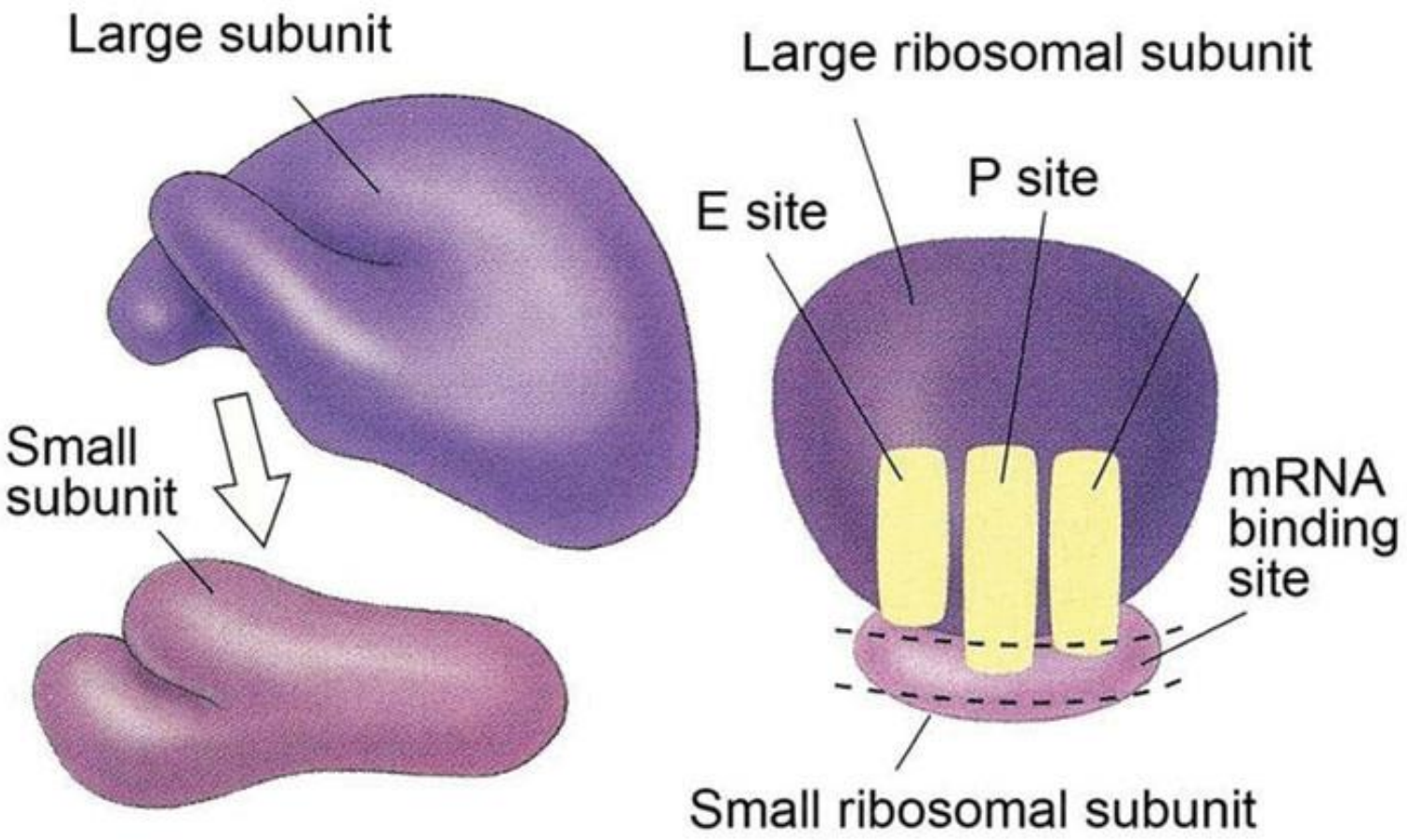
Structure of Ribosomes

- A ribosome is made from complexes of RNAs and proteins, called as ribonucleoprotein.
- Each ribosome is divided into two subunits:

A smaller subunit which binds to a larger subunit and the mRNA pattern

A larger subunit which binds to the tRNA, the amino acids

- Prokaryotes have 70S ribosomes respectively subunits comprising the little subunit of 30S and the bigger subunit of 50S.


Large subunit
Small subunit
Large ribosomal subunit
E site
P site
mRNA binding site
Small ribosomal subunit

- Eukaryotes have 80S ribosomes respectively comprising of little (40S) and substantial (60S) subunits.
- The smaller 40S ribosomal subunit is prolate ellipsoid in shape and consists of one molecule of 18S ribosomal RNA (or rRNA) and 30 proteins.
- The larger 60S ribosomal subunit is round in shape and contains a channel through which growing polypeptide chain makes its exit.
- It consists of three types of rRNA molecules, i.e., 28S rRNA, 5.8 rRNA and 5S rRNA, and 40 proteins.
- During protein synthesis, when multiple ribosomes are attached to the same mRNA strand, this structure is known as polysome.

Functions of Ribosomes

- They assemble amino acids to form specific proteins, proteins are essential to carry out cellular activities.
- The process of production of proteins, the deoxyribonucleic acid produces mRNA by the process of **DNA transcription.**
- The genetic message from the mRNA is translated into proteins during **DNA translation.**
- The sequences of protein assembly during protein synthesis are specified in the mRNA.
- The mRNA is synthesized in the nucleus and is transported to the cytoplasm for further process of protein synthesis.

- In the cytoplasm, the two subunits of ribosomes are bound around the polymers of mRNA; proteins are then synthesized with the help of transfer RNA.
- The proteins that are synthesized by the ribosomes present in the cytoplasm are used in the cytoplasm itself. The proteins produced by the bound ribosomes are transported outside the cell.

THANK YOU