

An Experimental Method for Ribosome Quantification in a Cell using Fluorescence

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All living organisms are made up of fundamental units of life called cells. These compartmentalized structures comprise of different proteins and organelles. To survive, these cells need to produce proteins, with different functions. Within these compartments, among other important organelles, lays an important organelle called ribosome, which acts as a factory reservoir of proteins. The number of these protein-building machines in a cell of an organism depends on different cellular factors such as growth conditions, and requirement by a cell. It is also evident from studies in eukaryotic cells that the normal number of ribosome changes during different syndromes and lymphomas. Since it is a difficult task to count the number of ribosome in a cell using microscopes, we need to find a simple and direct method of ribosome number estimation. Estimation of accurate number of ribosomes in a cell would ultimately help in studying the biological activity and effects precisely, with the change in number of ribosomes.

So how do we estimate the number of ribosomes in a cell? There have been extensive studies in different organisms to quantify ribosomes previously. These estimations depend on different parameters, such as calculating by relying on other cellular factors such as ribosomal Ribonucleic Acid (RNA) or ribosomal protein, constituents of ribosomes. However, these calculations are just an approximation. One way to estimate the numbers with direct approach would be the use of fluorescence from labeled ribosomes. I used a bacterial cell that contains fluorescent ribosomes. This helped in estimating the number of ribosomes by measuring the amount of fluorescence from ribosomes. In general, more fluorescence means more ribosomes and less the fluorescence means less number of ribosomes.

The preliminary result of this project is very promising, by which one can see an accurate number of ribosomes, although more trials are required. The challenge still remains to estimate the number with varying conditions of growth and other related factors. There is hope to find the answers to an unsolved fundamental question in the future!

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