

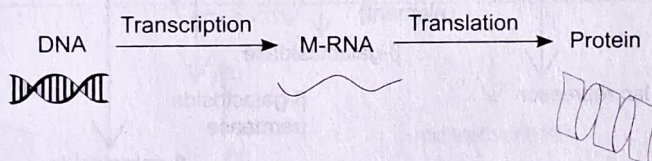
Gene Regulation in Prokaryotes

6.1 INTRODUCTION

Bacteria are exposed to wide variety of environmental condition, and they have remarkable capacity to adapt this harsh condition which is called as adaptability. This adaptability depends on ability to “**turn on**” and “**turn off**” the expression of genes in response to specific demands of the environment.

Gene expression is a process by which information of a gene is used to synthesize a function of gene product. According to ‘**Law of Central Dogma**’ the information present on DNA used to synthesize m-RNA by the process called transcription. This information is further used to synthesize functional protein by the process called translation. So, the flow of information through various processes is called as gene expression.

The organisms have the ability to regulate the gene-expression of particular gene at several level:



- Transcription
- m-RNA processing
- m-RNA turn over
- Translation
- Enzyme function

Out of these levels the most important mode of the control of gene-expression is at **transcriptional level**. It is regulated by induction and repression of the several genes. The model of transcriptional control in bacteria is regulated by Lac operon model or Operon concept given by Jacob and Monad in 1961 and got Nobel prize in 1965 for their discovery of Lac-operon in prokaryotes.

Lac-Operon

Before studying Lac-operon first we should learn what is an operon. So, operon is “**Cluster of genes which co-ordinates with each other to regulate one particular function**”. In case of Lac-operon one particular function is, to handle lactose-metabolism in bacteria.