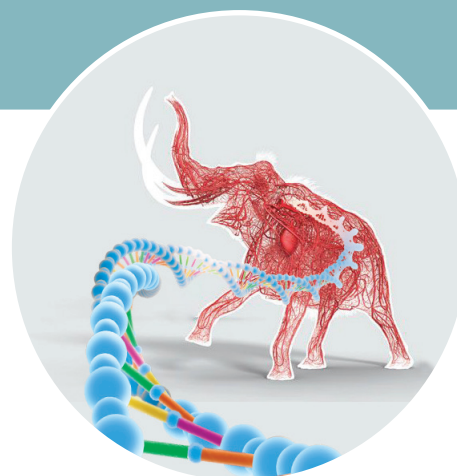


5

CHAPTER

UNIT - II

Molecular Genetics



New life for Woolly Mammoth DNA-researchers can now re-create the genes of mammoth and study the proteins they encoded.

Chapter Outline

- 5.1 Gene as the functional unit of inheritance
- 5.2 In search of the genetic material
- 5.3 DNA is the genetic material
- 5.4 Chemistry of nucleic acids
- 5.5 RNA world
- 5.6 Properties of genetic material
- 5.7 Packaging of DNA helix
- 5.8 DNA Replication
- 5.9 Transcription
- 5.10 Genetic code
- 5.11 tRNA – the adapter molecule
- 5.12 Translation
- 5.13 Regulation of Gene expression
- 5.14 Human Genome Project (HGP)
- 5.15 DNA finger printing technique



Learning Objectives

- Identifies DNA as the genetic material.
- Understands the organization of prokaryotic and eukaryotic genome.
- Learns to differentiate the nucleotides of DNA and RNA.
- Understands gene expression - Replication, Transcription and Translation.
- Learns about codons and the salient features of genetic code.
- Understands the gene regulation through Lac operon model.
- Realizes the importance of Human Genome Project.
- Illustrates the applications of DNA finger printing technique.



Mendel's theory dispelled the mystery of why traits seemed to appear and disappear magically from one generation to the next. Mendel's work reveals the patterns of heredity and reflect the transmission of evolved information from parents to offspring. This information is located on the chromosomes. One of the most advanced realizations of human knowledge was that our unique characteristics are encoded within molecules of DNA. The discovery that DNA is the genetic material left several questions unanswered. How is the information in DNA used? Scientists now know that DNA directs the construction of proteins. Proteins determine the shapes of cells and the rate of chemical reactions, such as those that occur during metabolism and photosynthesis. The hereditary nature of every living organism is defined by its genome, which consists of a long sequence of nucleic acids that provide the information needed to construct the organism. The genome contains the complete set of hereditary information for any organism. The genome may be divided into a number of different nucleic acid molecules. Each of the nucleic acid molecule may contain large number of genes. Each gene is a sequence within the nucleic acid that represents a single protein. In this chapter we will discuss the