## **Contents**

Preface .	
Chapter 1	Pathway for the Transfer of Genetic Information: The Central Dogma of Molecular Biology
Chapter 2	Bases, nucleosides and nucleotides. Polymerisation of nucleotides to form nucleic acid chain. DNA is the basic genetic material. Double helical structure of DNA. Various forms of DNA. Structure of RNA. Unusual bases in RNA. Properties of DNA in solution. Breathing in DNA structure. Denaturation and renaturation of DNA.
Chapter 3	DNA Replication
Chapter 4	Organization of the Genome
Chapter 5	The Structure of Gene
Chapter 6	Transcription

	modifacations. Splicing of pre-mRNA. Nuclear splicing: lariat formation. Role of SnRNPs: the splisomes. Autosplicing. Splicing of tRNAs. Production of multiple mRNA from one gene: the alternate splicing. Self-cleavage of viroids and virusoids. RNA processing. Cap formation and polyadenylation. Replication of genome of RNA viruses (By reverse transcriptase; By RNA dependent RNA polymerase).	
Chapter 7	Translation	. 89
	Messenger RNA. Essential features of mRNA structure. Abundance of mRNAs. Genetic code. Genetic code is universal. Degeneraticity of genetic code. Exception to universal code. Anticodons. Machinery for translation. Ribosomes. Transfer RNA. Wobble theory. Aminoacyl tRNA synthetase. Prokaryotic and eukaryotic translation factors. Events in protein synthesis. Role of SD sequences. Kozak's scanning model for initiation of eukaryotic translation. Activation of aminoacids and aminoacyl tRNA formation. Initiation. Elongation. Termination of translation. Fidility of protein synthesis. Role of tRNA synthetase. Proof reading function of ribosomes. GTPase timer. Post-translational modifications. Modification of N-terminal ends. Formation of disulphide bond. Oligomerization. Proteolytic cleavage. Cleavage of signal peptide. Addition of prosthetic group. Protein phosphorylation. Glycosylation. O-liked glycosylation. N-linked glycosylation. Dolichol. High mannose carbohydrate addition. Processing of carbohydrate moity. The events in Golgi and ER. Other modifications.	
Chapter 8	Regulation of Gene Expression	149
	Gene expression is related to metabolic state of the cell. Constitutive expression. Regulated expression. Role of transcription factors. DNA binding. Motifs. Helix-turn-helix motif. Zinc finger motif. Leucine zippers. Helix-loop-helix motif. Catabolic repression. Operon theory. Lac operon. Trp operon. Gal operon. Ara operon. Attenuation: role of alternate RNA structure. Gene regulation in lambda phage: lytic and lysogenic cascade. Regulation of gene expression by genetic recombination. Regulation of gene expression in yeast cell specificity. Regulation of yeast mating types. Regulation of gene expression in drosophila. Alternate splicing plays regulatory role. Factors affecting gene expression. Role of Sigma factors. Heat shock genes. Regulation by heavy metals. Other stress genes. Hormone dependent genes. Cell surface receptor-ligand interaction. Regulation of proto-oncogenes. Other mechanisms. Cytoplasmic control of gene expression. Poly (A) tail. Sequences at the 3'-untranslated region of mRNA. Autoregulation. Hormonal regulation. Concentration of micronutrients. Other factors affecting rate of translation.	
Chapter 9	Protein Targetting	220
	Free and membrane bound polysomes. Membrane bound proteins. Signal peptide and signal recognition particles. The signal hypothesis. Transport	

vesicles. Clathrin containing and non-clathrin vesicles. Direction of protein

transport. Translocation of proteins to organelles.

Rho independent termination). Eukaryotic transcription. Post-transcriptinal

1

Chapter 10 Structure and Genesis of Mitochondrial and Chloroplast Genome  DNA replication, transcription and translation of organelle genome. Mitochondral geneome. Human mitochondria. Yeast mitochondria. Import of ptoreins to mitochondria. Chloroplast geneome. Differentiation of chloroplast. Genesis of organelles.	24:
Chapter 11 Mutation and the DNA Damage and Repair System	265
Chapter 12 Transposable Elements	288
Chapter 13 Principles of Genetic Engineering	303
Selected Readings	335 336 337 375