

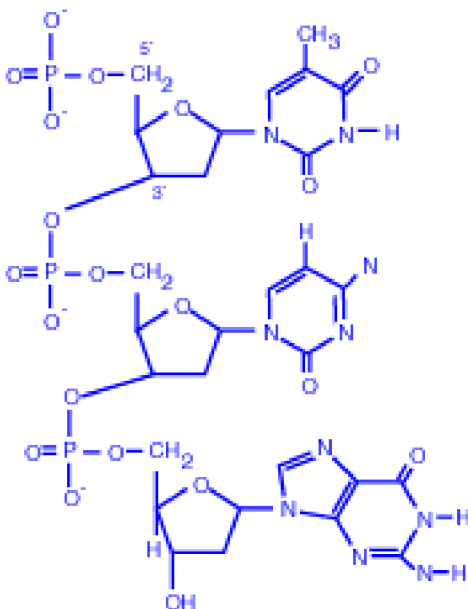
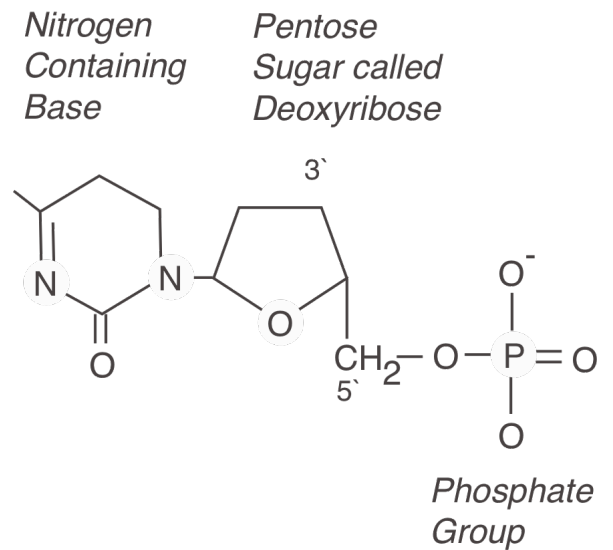
DNA and Gene Regulation

Pages 176 - 191; 195 - 201



1. Overview (Pages 177 - 178)

A. DNA

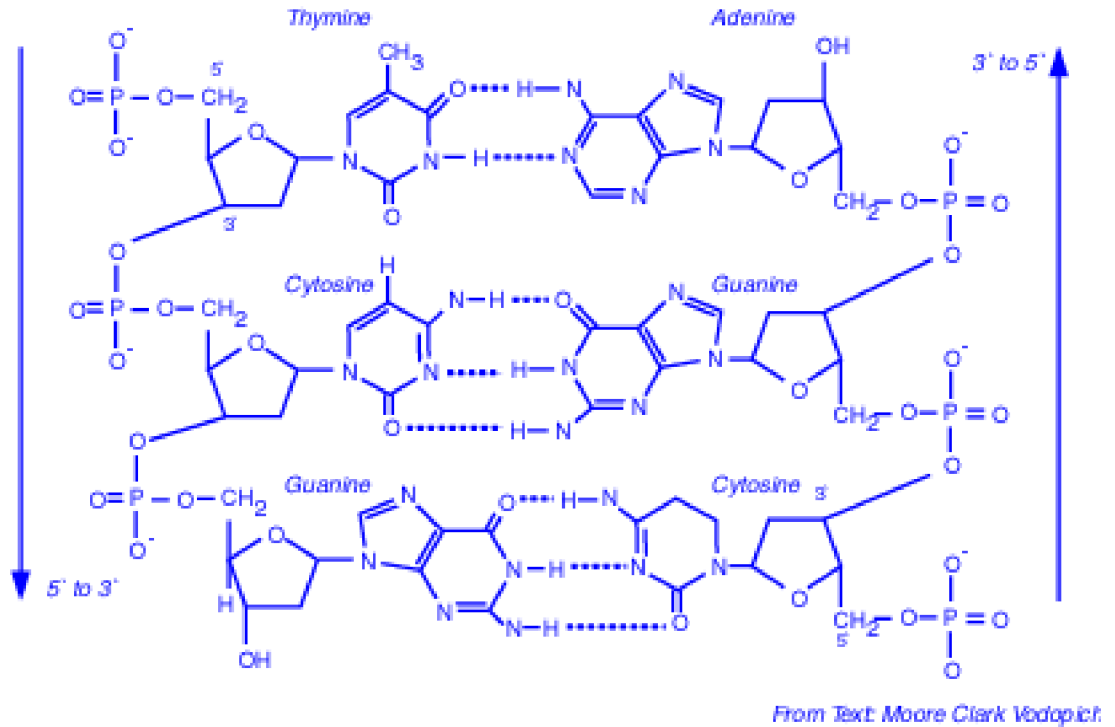
- i. Genome
 - ii. Genes
 - a. Genotype
 - b. Phenotype
- ii. Monomer: Nucleotide
 - a. Phosphate Group
 - b. Sugar
 - c. Nitrogenous Base
- iv. Construct



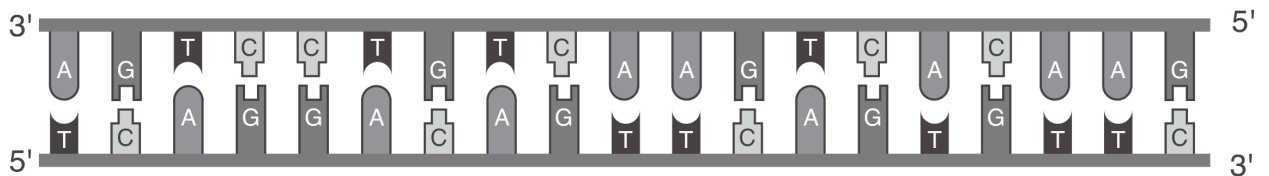
iii. Base Pairs

- Thymine – Adenine 
- Guanine – Cytosine 

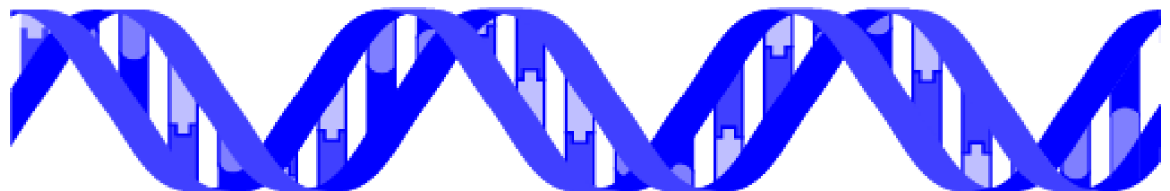
iv. Complimentary Antiparallel Base Pairing in DNA (Page 178)



v. Double Helix



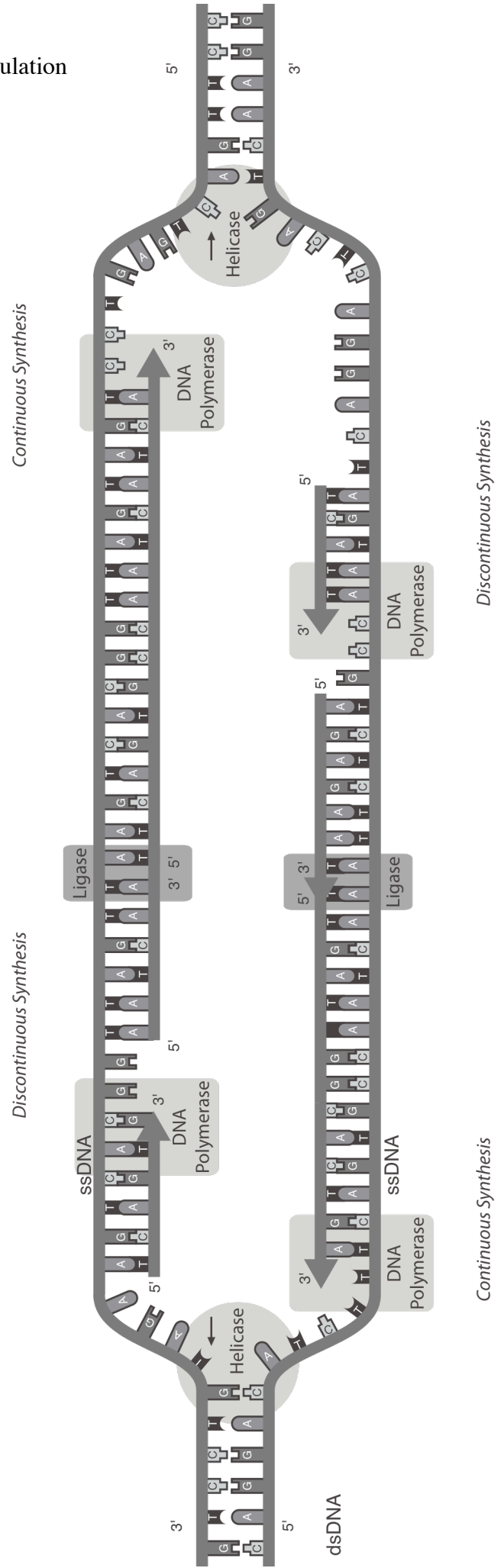
v. Double Helix



2. Binary Fission and DNA Replication
(Pages 180 - 182)

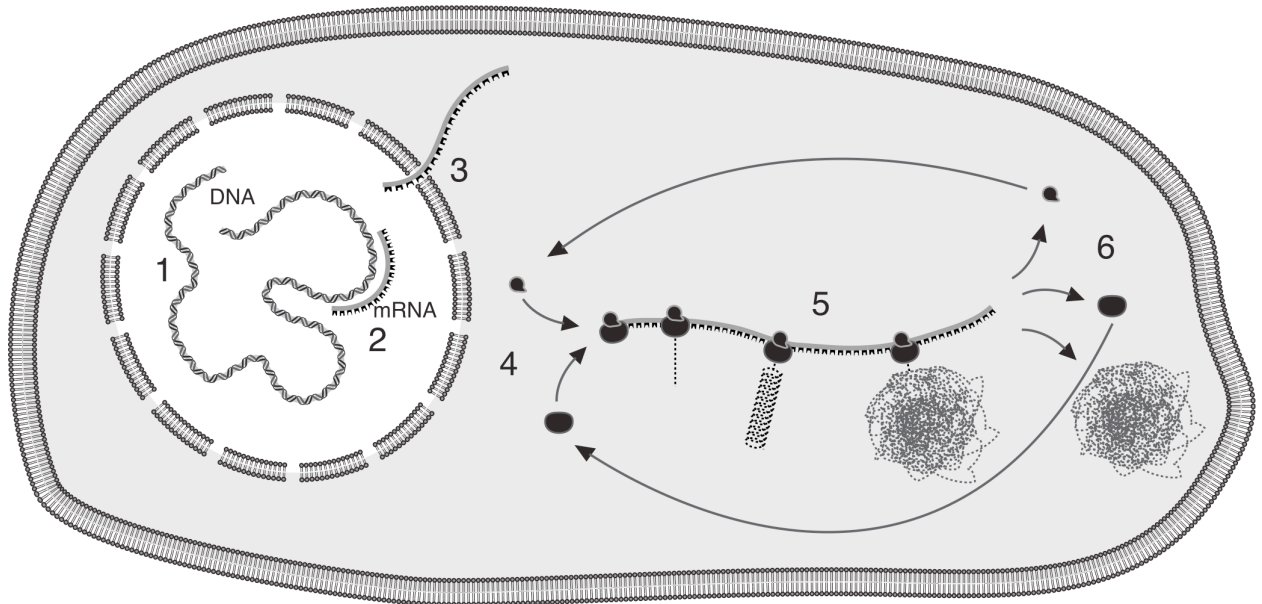
B. DNA Synthesis (always 5' to 3')

- A. Select Enzymes Involved
 - i. DNA Helicase
 - ii. DNA Gyrase
 - iii. Topoisomerase
 - iv. Single-Strand-Binding Protein
 - v. Primase
 - vi. DNA Polymerase
 - vii. DNA Ligase
- i. Continuous
- ii. Discontinuous

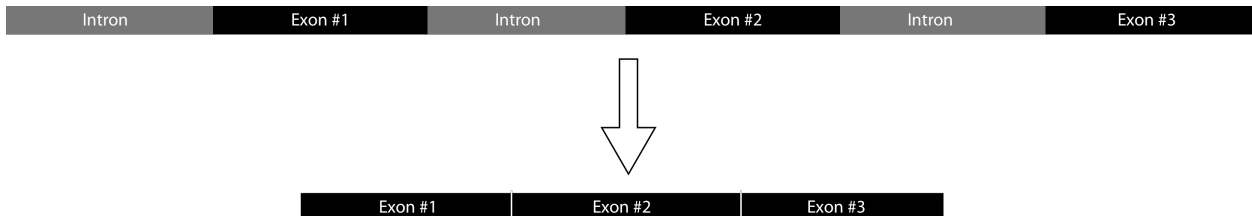


A. Overview of Processes in Eukaryotic Cells

DNA $\xrightarrow{\text{Transcription}}$ RNA Transcript (mRNA) $\xrightarrow{\text{Translation}}$ Protein



- i. DNA
- ii. Transcription
 - a. DNA RNA Polymerase
 - b. RNA Transcript (mRNA)
- iv. RNA Processing (Page 179)



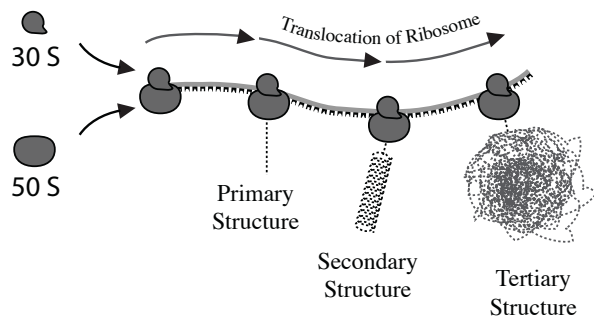
iii. Translation

a. Small Ribosomal Subunit and Large Ribosomal Subunit

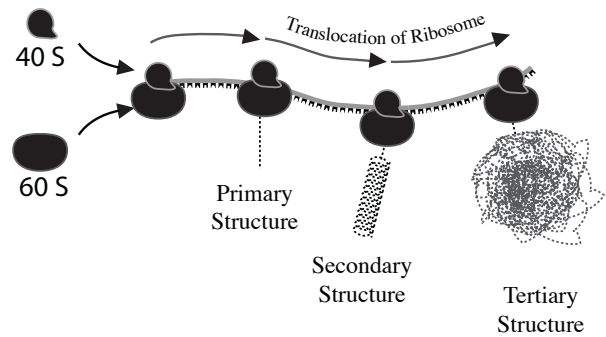


B. Ribosomes (rRNA) (see p. 94)

Prokaryotic
Ribosomal Subunits



Eukaryotic
Ribosomal Subunits



i. Structure (30s & 50s ribosomal subunits)

ii. Function

C. Transcription Expanded

i. RNA Polymerase

ii. Nucleotides

a. DNA Nucleotides

- Thymine – Adenine



- Guanine – Cytosine



b. RNA Nucleotides

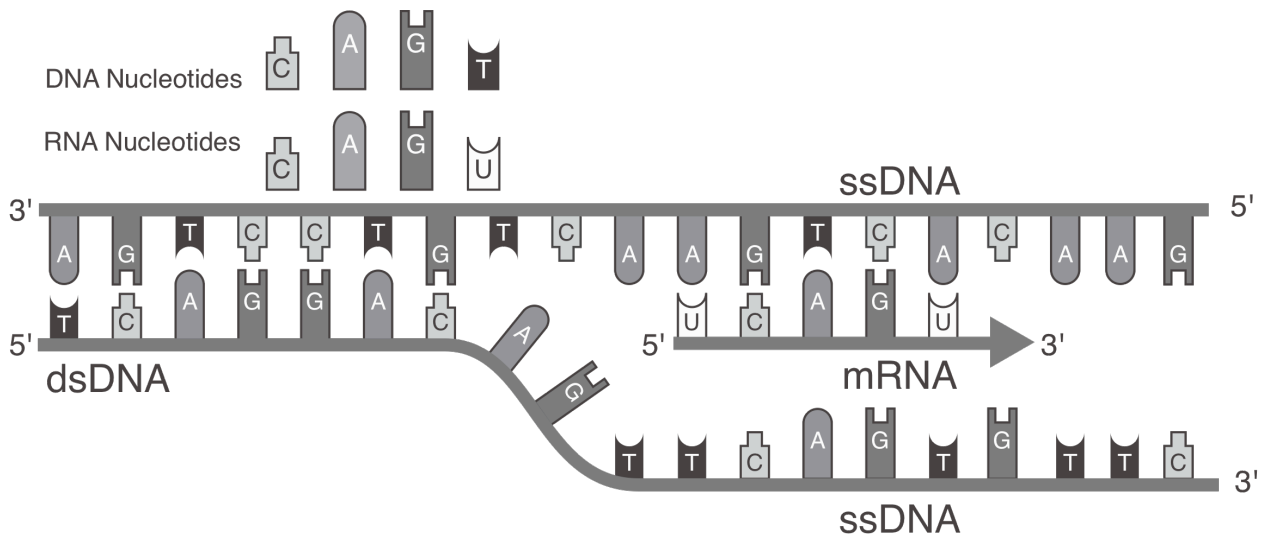
- Uracil – Adenine



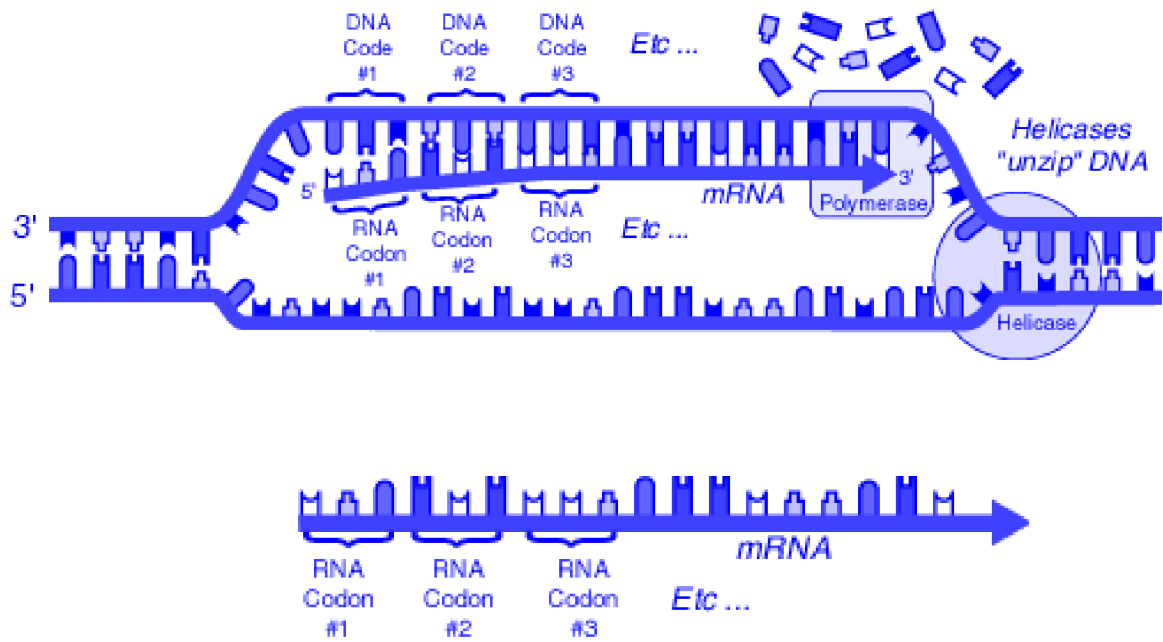
- Guanine – Cytosine



iii. Process of Transcription



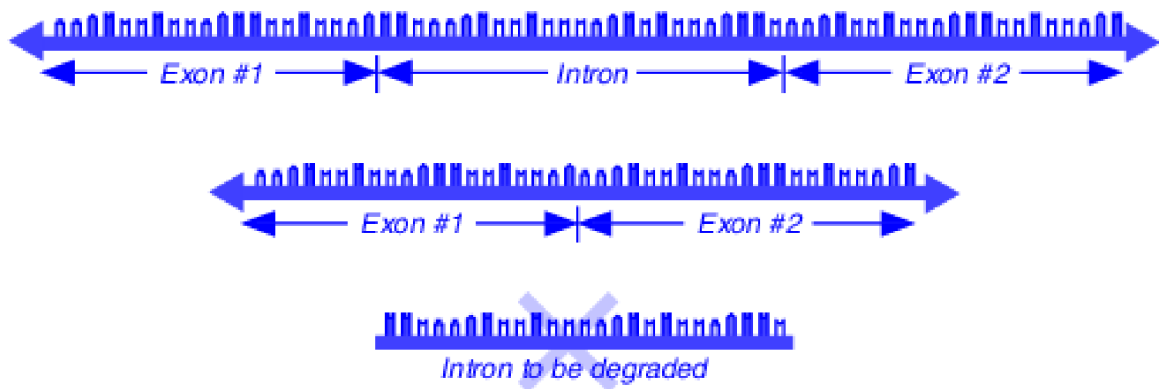
iv. Codes and Codons



v. mRNA Processing

a. Exons

b. Introns

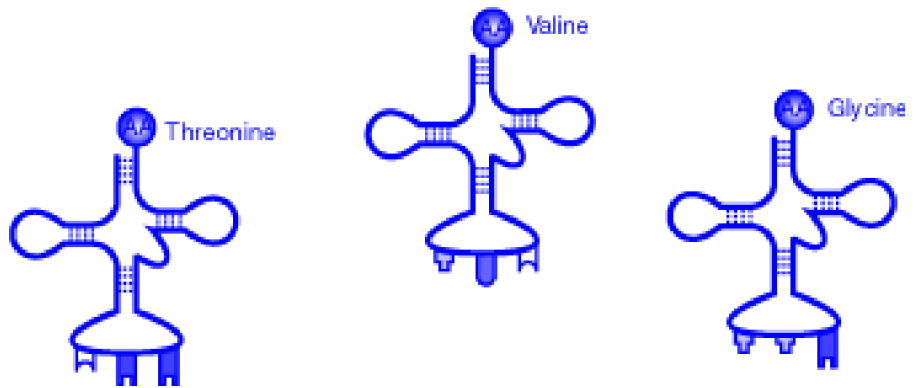


D. Translation

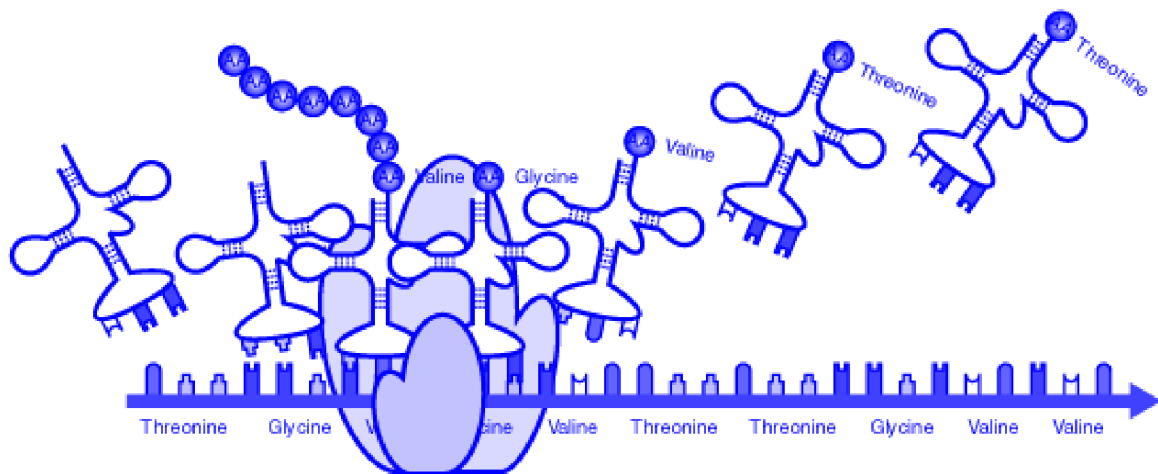
i. Transfer RNA (tRNA)

a. Anticodon

b. Amino Acid Binding Site



DNA Code	mRNA Codon	tRNA Anticodon	Amino Acid
TTT	AAA	UUU	Lysine
TGG	ACC	UGG	Threonine
CCG	GGC	CCG	Glycine
CAT	GUA	CAU	Valine
CTC	GAG	CUC	Glutamate
GAG	CUC	GAG	Leucine
AGA	UCU	AGA	Serine
ACT	UGA	ACU	“Stop”



ii. Steps of Translation (Page 187 - 190) (See figure 7.15)

- a. Initiation
- b. Elongation
- c. Termination

4. Regulation of Gene expression

A. Transcription Control

- i. Chromatin Activation
- ii. Transcription Factors

B. Posttranscriptional Control

C. Translational Control

D. Posttranslational Control

5. Gene Regulation (Pages 195 - 200) (see handout on *BACTERIAL GENETICS*)

A. Inducible Expression of a Gene - (*Lactose Operon*)

i. Operon

B. Repression of a Gene