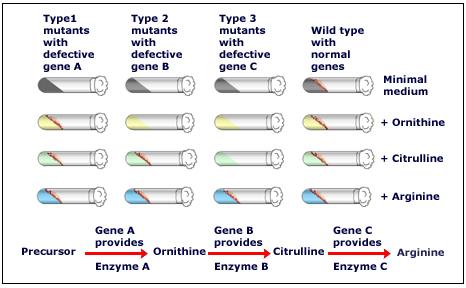
ADVANCED BIOLOGY: GENE EXPRESSION: FROM GENE TO PROTEIN

(USE CHAPTER 17 AS A RESOURCE)

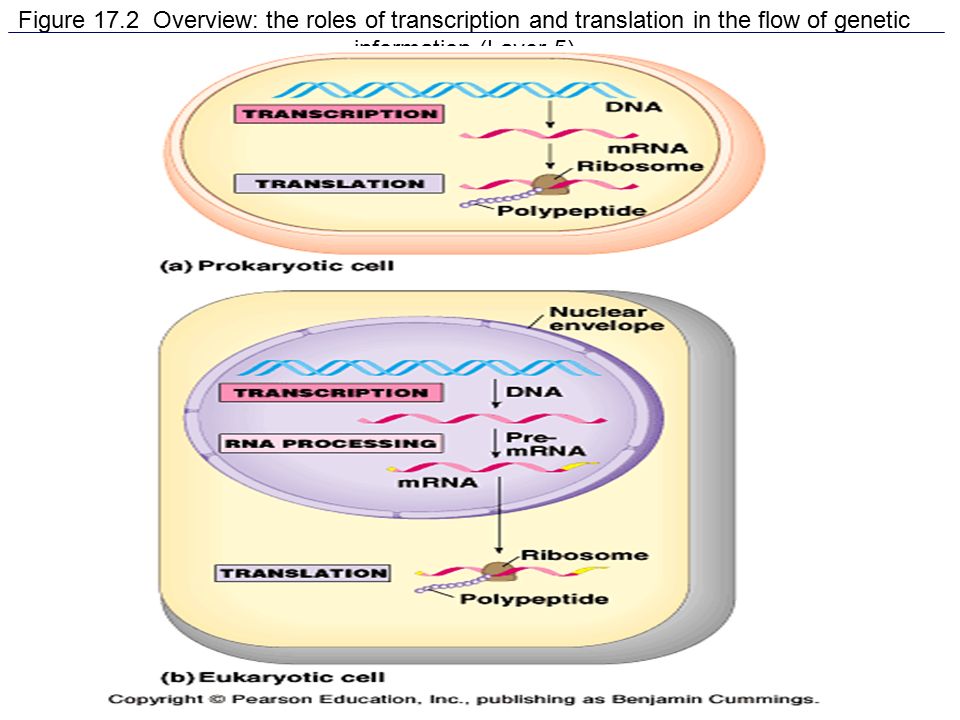
THE FLOW OF GENETIC INFORMATION

GENES SPECIFY PROTEINS VIA TRANSCRIPTION AND TRANSLATION

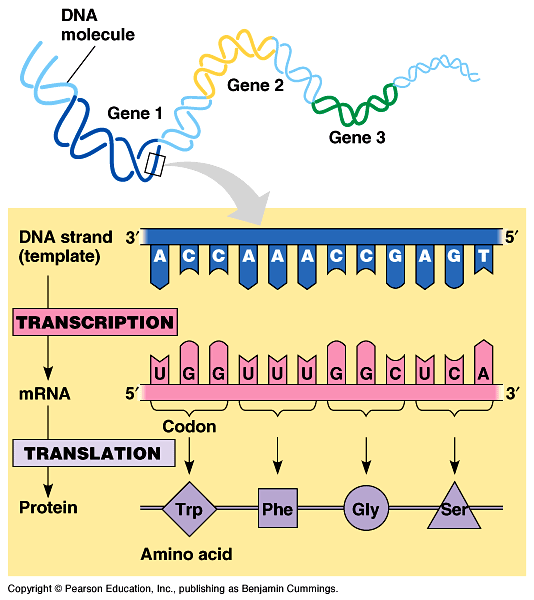
1. Evidence from the Study of Metabolic Defects
2. Garrod’s observations of alkaptonuria
3. Nutritional Mutants in Neurospora: Scientific Inquiry



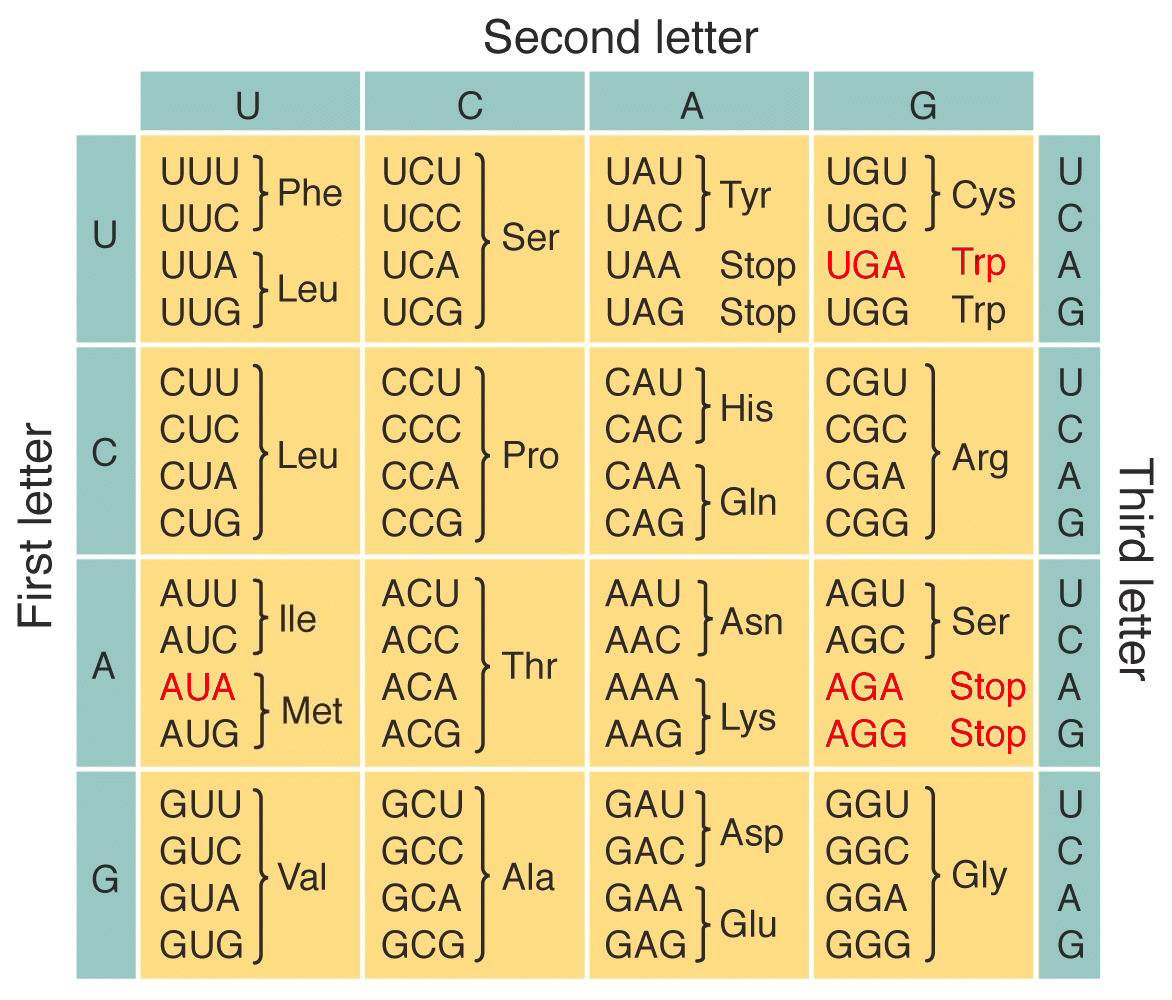
1. The Products of Gene Expression: A Developing Story
2. Basic Principles of Transcription and Translation



1. The Genetic Code
2. Codons: Triplets of Nucleotides



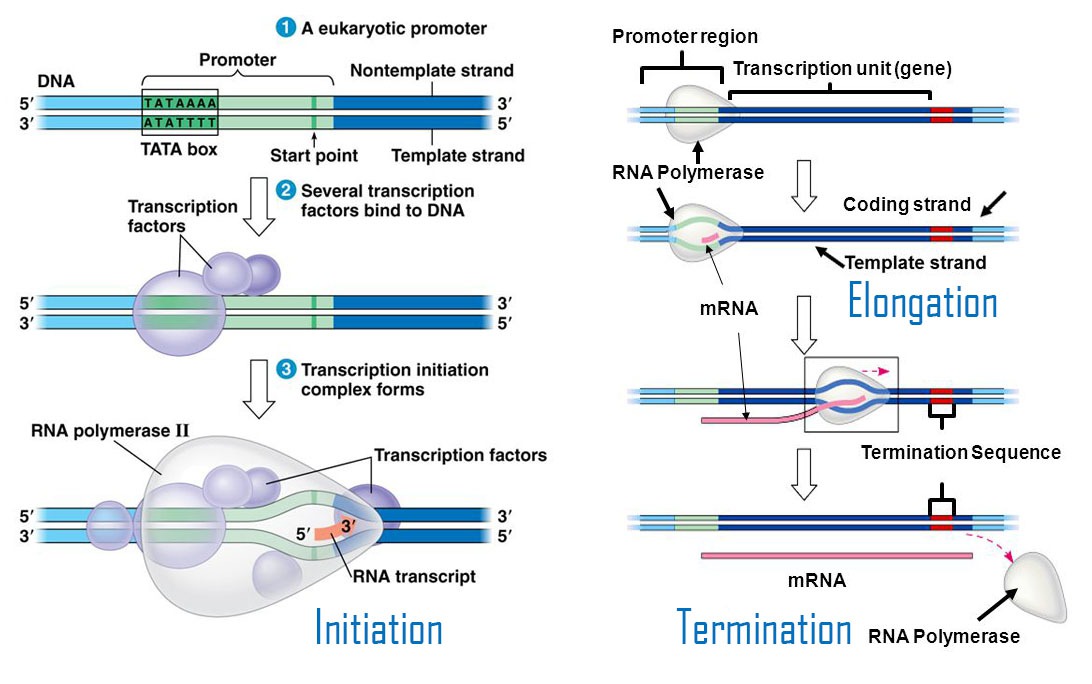
1. Cracking the Code



1. Evolution of the Genetic Code

TRANSCRIPTION IS THE DNA-DIRECTED SYNTHESIS OF RNA: A CLOSER LOOK

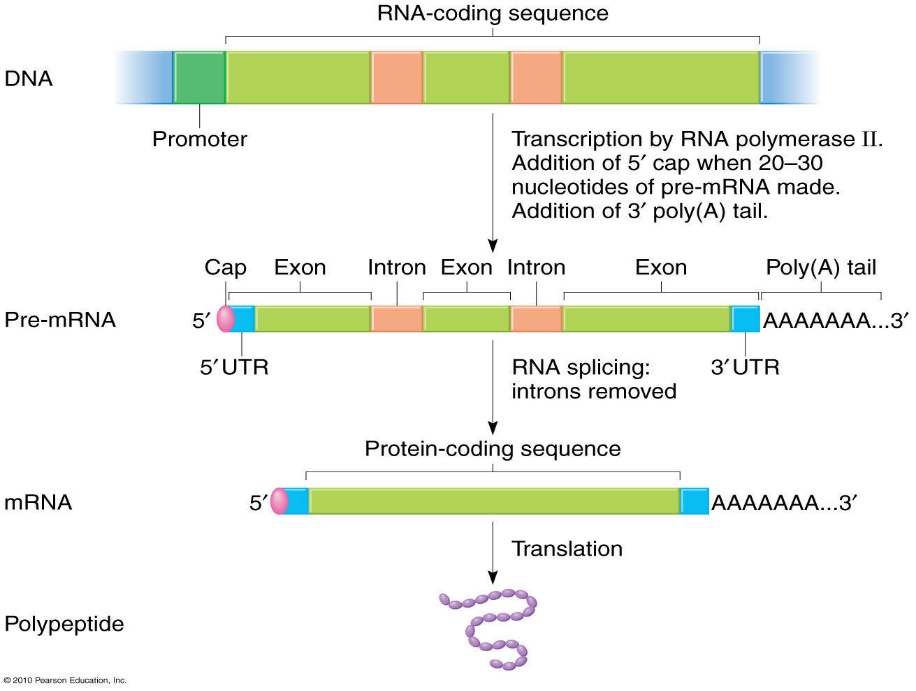
1. Molecular Components of Transcription
2. RNA Polymerase
3. Promoter
4. Transcription Unit
5. Synthesis of a RNA Transcript



1. RNA Polymerase Binding and Initiation of Transcription
2. Promoter
3. Transcription factors
4. Transcription Initiation Complex
5. TATA box
6. Elongation of the RNA Strand
7. Termination of Transcription

EUKARYOTIC CELLS MODIFY RNA AFTER TRANSCRIPTION

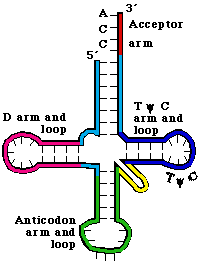
RNA Processing



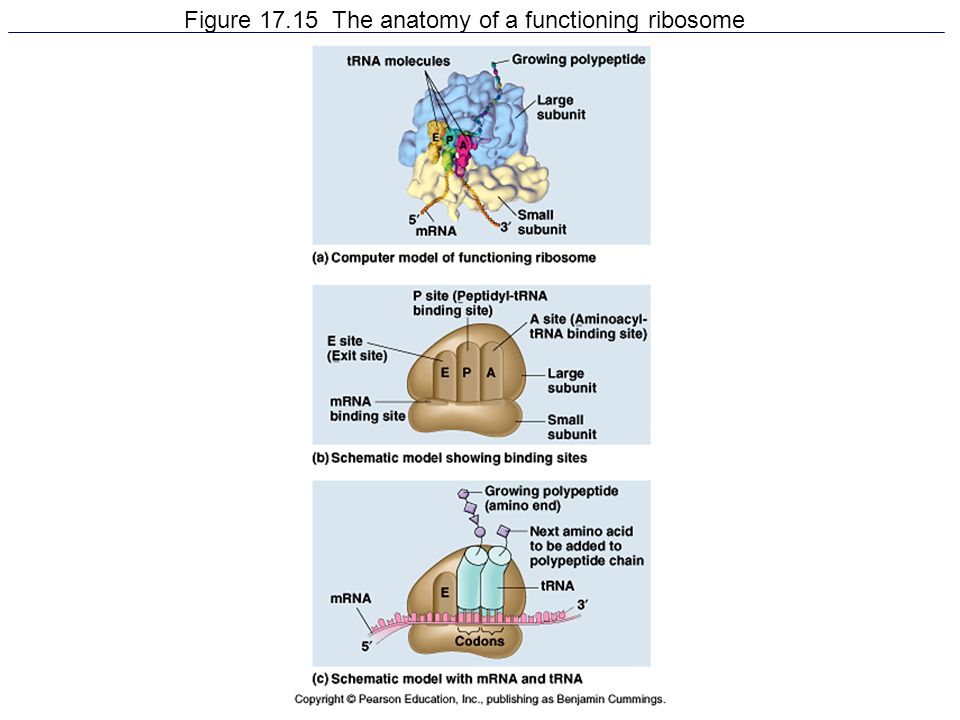
1. Alteration of mRNA Ends
2. Gene Splicing
3. Alternative RNA Splicing
4. Ribozymes

TRANSLATION IS THE RNA-DIRECTED SYNTHESIS OF A POLYPEPTIDE: A CLOSER LOOK

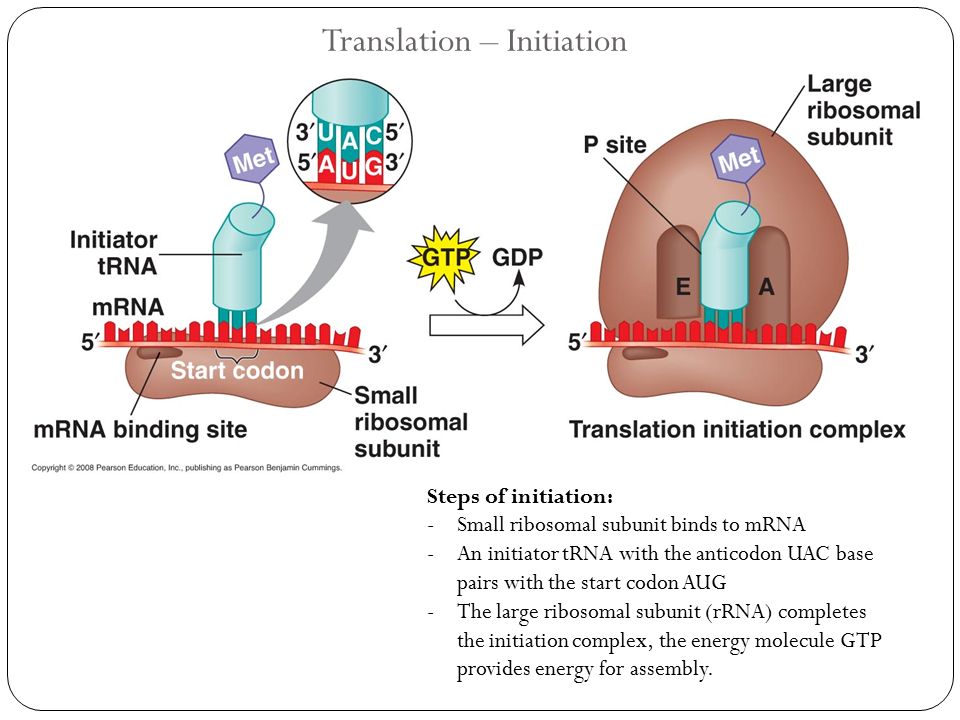
1. Molecular Components of Translation
2. The Structure and Function of Transfer RNA



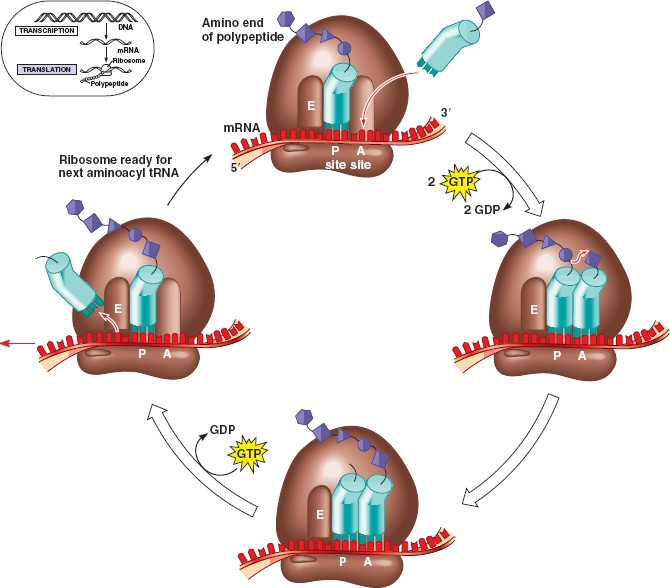
1. Anticodon
2. Where made
3. Aminoacyl-tRNA synthetases
4. Wobble
5. Ribosomes



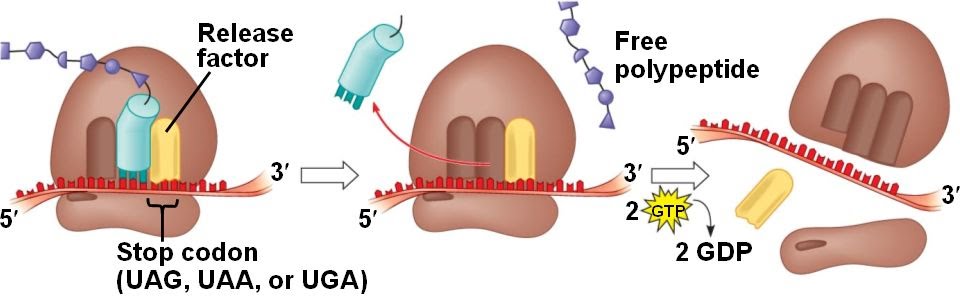
1. Building a Polypeptide
2. Ribosome Association and Initiation of Translation



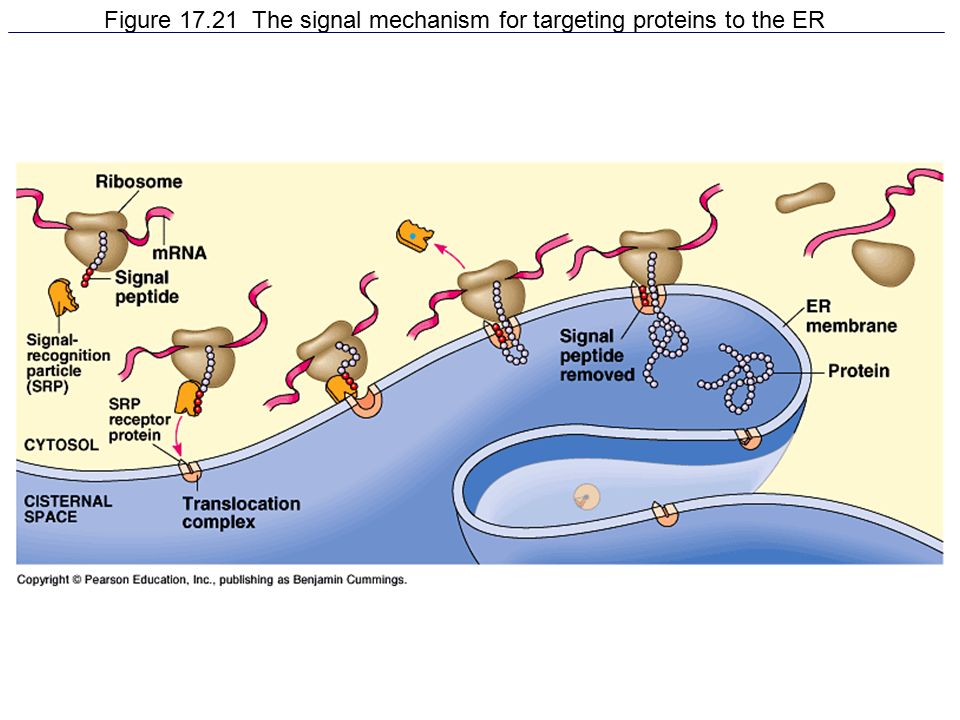
1. Elongation of the Polypeptide Chain



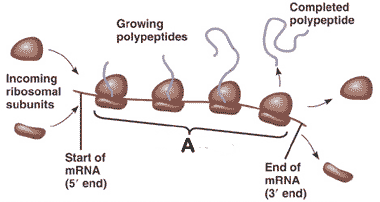
1. Termination of Translation



1. Completing and Targeting the Functional Protein
2. Protein Folding and Post-Translational Modifications
3. Targeting Polypeptides to Specific Locations



1. Signal peptide
2. Signal-Recognition Particle (SRP)
3. Making Multiple Polypeptides in Bacteria and Eukaryotes

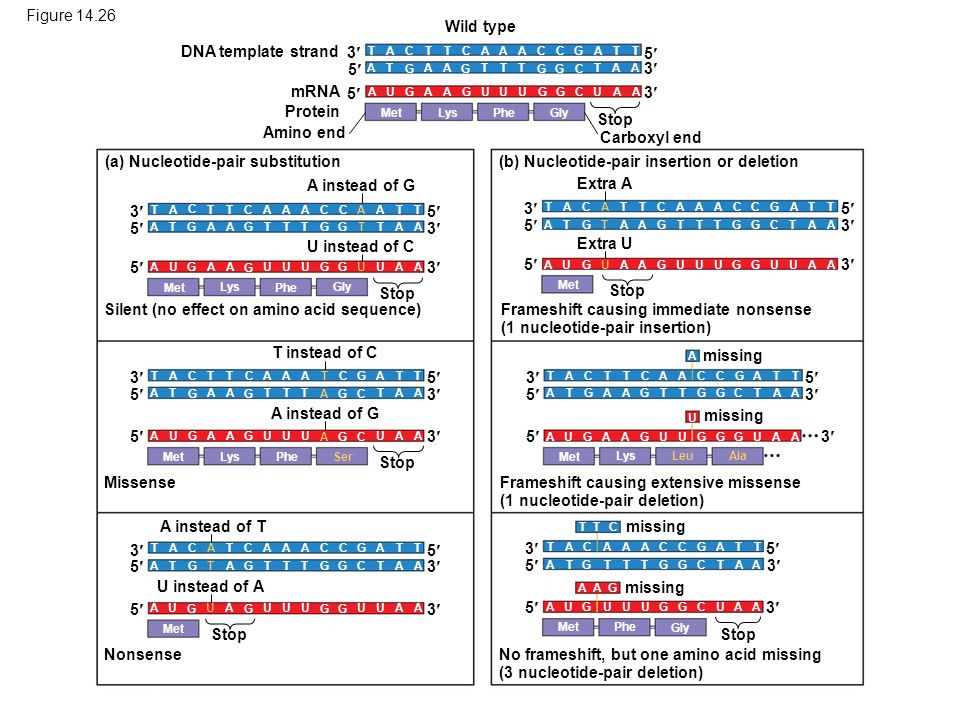


MUTATIONS OF ONE OR A FEW NUCLEOTIDES CAN AFFECT PROTEIN STRUCTURE AND FUNCTION

Mutations

Point Mutations

1. Types of Small-Scale Mutations
2. Substitutions
3. Insertions and Deletions



1. Mutagens
2. What is a Gene? Revisiting the Question