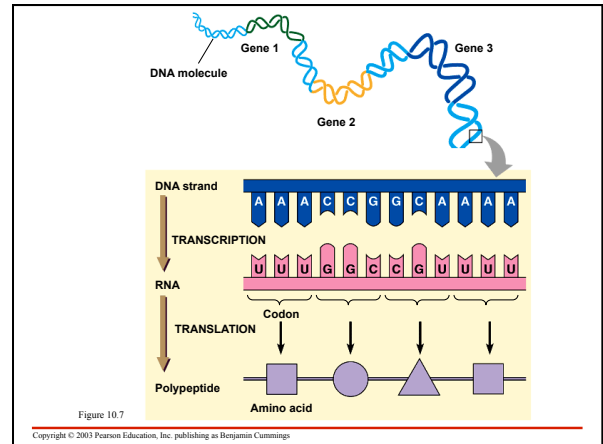


Translation and Anticodons

Translation of nucleic acids into amino acids

- The “words” of the DNA “language” are triplets of bases called codons
 - The codons in a gene specify the amino acid sequence of a polypeptide

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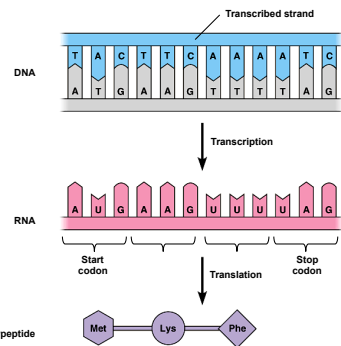


Virtually all organisms share the same genetic code “unity of life”

		Second Base				
		U	C	A	G	
First Base	U	UUU } phe UUC } UUA } leu UUG }	UCU } ser UCC } UCA } UCG }	UAU } tyr UAC } UAA } stop UAG } stop	UGU } cys UGC } UGA } stop UGG }	U C A G
	C	CUU } leu CUC } CUA } CUG }	CCU } pro CCC } CCA } CCG }	CAU } his CAC } CAA } CAG }	CGU } arg CGC } CGA } CGG }	U C A G
	A	AUU } ile AUC } AUA } AUG met (start)	ACU } thr ACC } ACA } ACG }	AAU } asn AAC } AAA } AAG }	AGU } ser AGC } AGA } AGG }	U C A G
Third Base	G	GUU } val GUC } GUA } GUG }	GCU } ala GCC } GCA } GCG }	GAU } asp GAC } GAA } GAG }	GGU } gly GGC } GGA } GGG }	U C A G

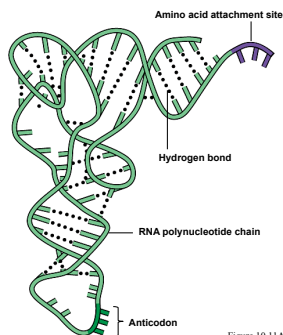
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- An exercise in translating the genetic code

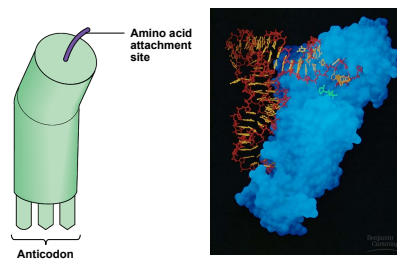


Transfer RNA molecules serve as interpreters during translation

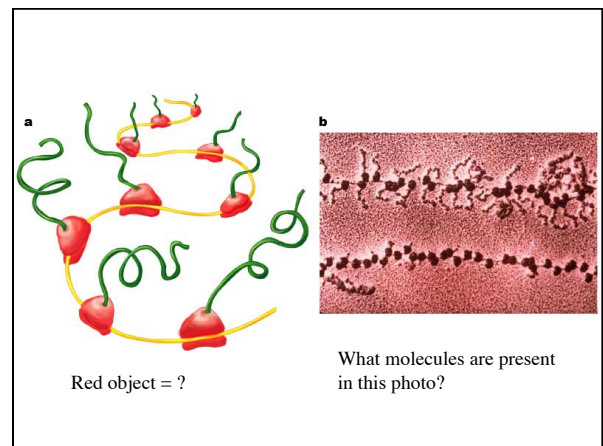
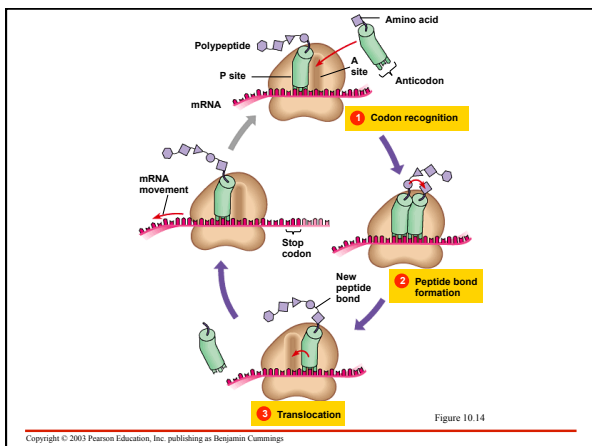
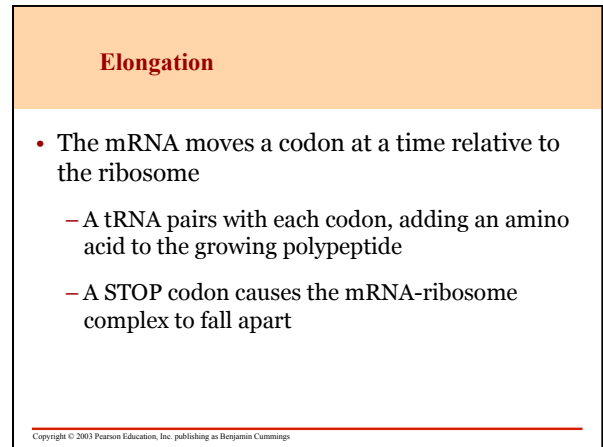
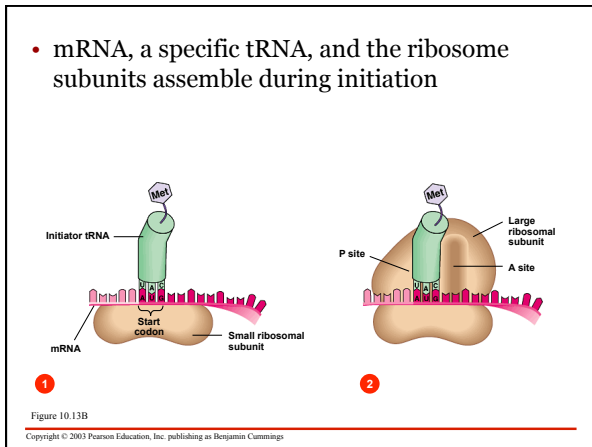
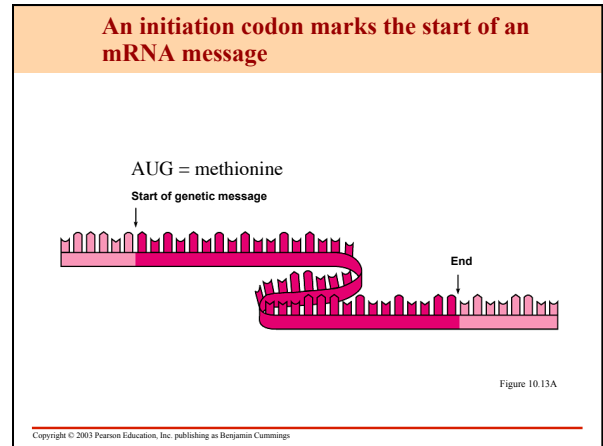
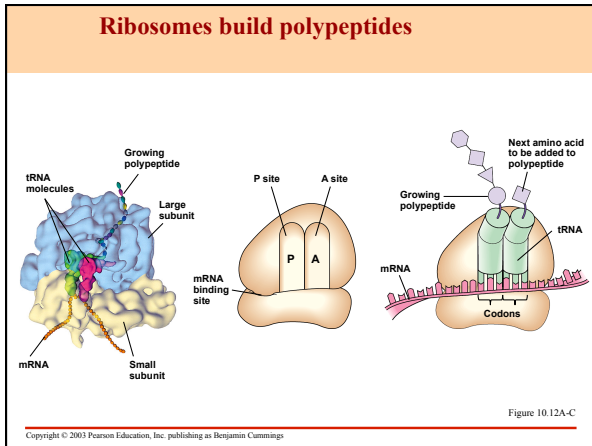
- In the cytoplasm, a ribosome attaches to the mRNA and translates its message into a polypeptide
- The process is aided by transfer RNAs






- Each tRNA molecule has a triplet anticodon on one end and an amino acid attachment site on the other



Translation and Anticodons



Translation and Anticodons

Type of RNA	Functions in	Function
Messenger RNA (mRNA) 	Nucleus, migrates to ribosomes in cytoplasm	Carries DNA sequence information to ribosomes
Transfer RNA (tRNA) 	Cytoplasm	Provides linkage between mRNA and amino acids; transfers amino acids to ribosomes
Ribosomal RNA (rRNA) 	Cytoplasm	Structural component of ribosomes

Review: The flow of genetic information in the cell is DNA → RNA → protein

- The sequence of codons in DNA spells out the primary structure of a polypeptide
 - Polypeptides form proteins that cells and organisms use

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Mutations can change the meaning of genes

- Mutations are changes in the DNA base sequence
 - caused by errors in DNA replication or by mutagens
 - change of a single DNA nucleotide causes sickle-cell disease

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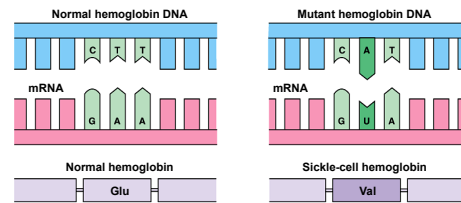


Figure 10.16A

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Types of mutations

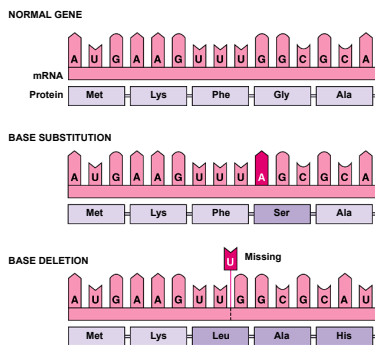


Figure 10.16B

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Chromosomal changes can be large or small

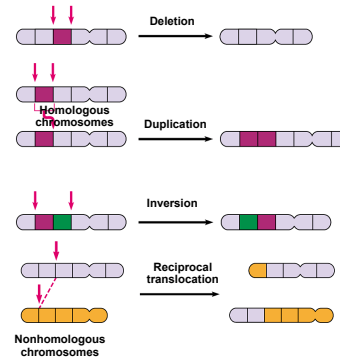


Figure 8.23A, B

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Translation and Anticodons

- Summary of transcription and translation

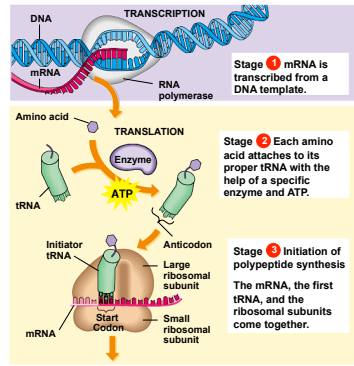


Figure 10.15

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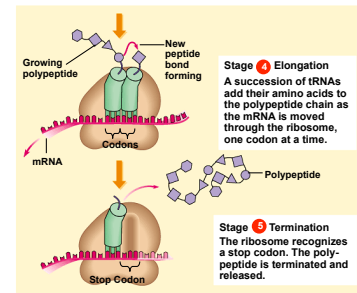


Figure 10.15 (continued)

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