



**Codons:**

- found only on:
- 1 start codon - AUG - methonine
- 3 stop codons - UAA/UAG/UGA
- 60 codons - for the 20 amino acids

**TRANSCRIPTION:** (p. 195; Fig. 10.9A & B)

Occurs:

**RNA polymerase:**

Three functions: a)

b)

What bonds are being broken?

c)

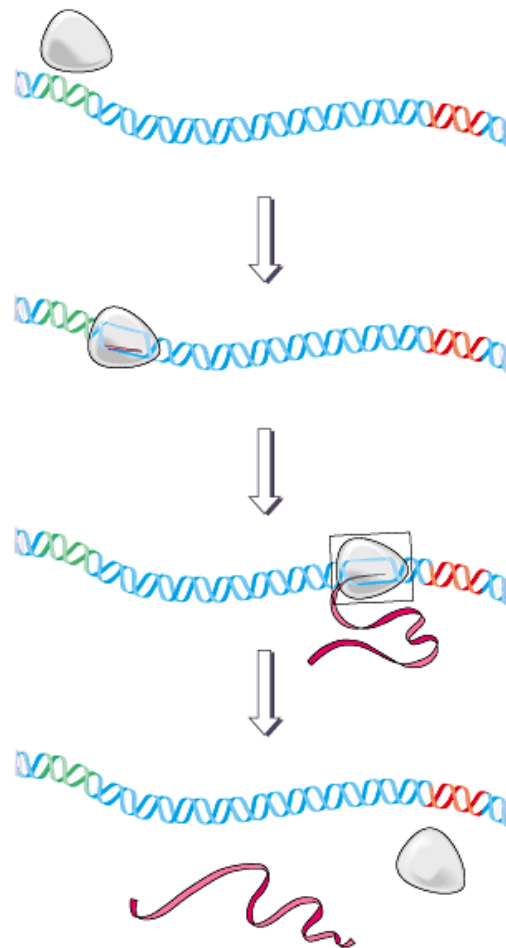
(5' → 3' direction)

**Promotor region of DNA:**

**Initiator site:**

**Elongation:**

**Termination:**



Copyright © 2003 Pearson Education, Inc., publishing as Benjamin Cummings.

**Types of RNA from transcription:**

- a) messenger RNA (mRNA):
- b) transfer RNA (tRNA):
- c) ribosomal RNA (rRNA):

What is the complementary **RNA** strand that would be transcribed from the following DNA sequence?

DNA 5' - TACTTCAAATC - 3'  
3' - ATGAAGTTTTAG - 5'

DNA 5' - TACTTCAAATC - 3'

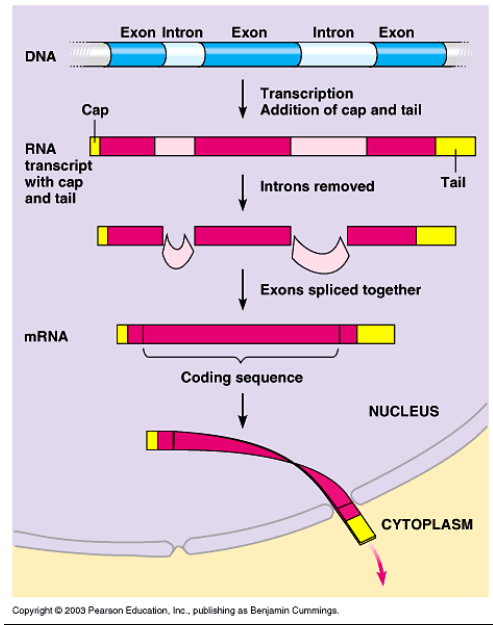
RNA \_\_\_\_\_

**RNA PROCESSING:** (p. 217; Fig. 11.7)

- 1) Guanine cap
- 2) Poly-A tail
- 3) Introns:
- 4) Exons:

**Spliceosome:**

**Ribozymes:**

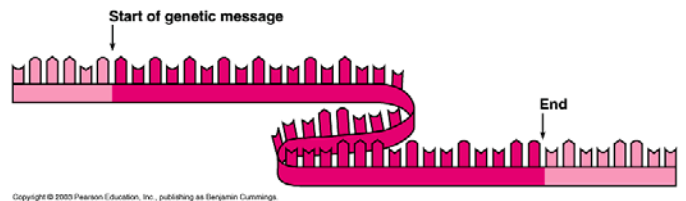


**TRANSLATION:** (p. 198 - 200; Fig. 10.13 - 10.15)

Occurs:

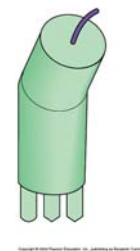
**Players involved in translation:**

1) mRNA:



2) tRNA:

- functions as:
- carries:
- recognizes:
- Anticodon:**



3) aminoacyl tRNA synthetase:

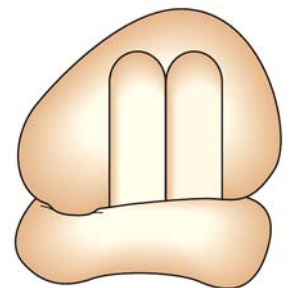
4) ribosomes:

coordinates the coupling of:

small subunit

large subunit: has the 2 (3) binding sites

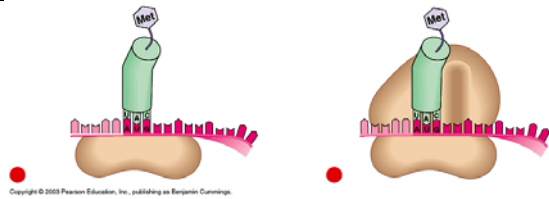
- a) A site:
- b) P site:
- c) E site: exit site (new site in which the tRNA in the P site enters)



**3 Stages of Protein Synthesis - "The process":** (p. 199; Fig. 10.13B and 10.14)

**a) Initiation:**

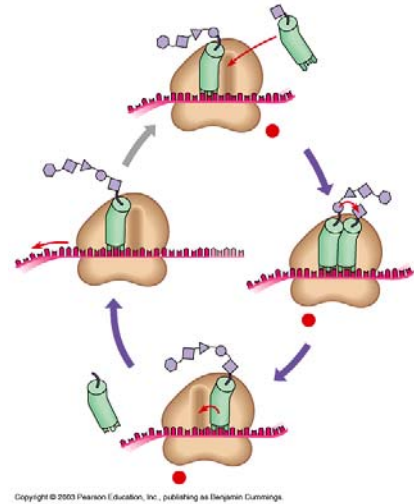
- 1) Binding of:
  - a)
  - b)
  - c)



- 2) Large subunit attaches:

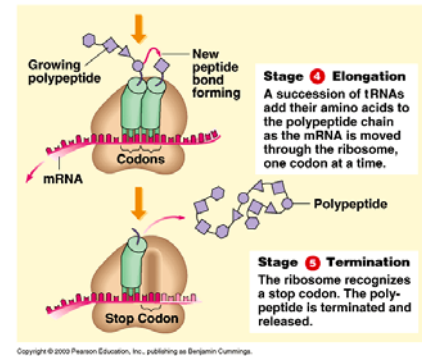
**b) Elongation:**

- 1) Codon recognition:
- 2) Peptide bond formation:
- 3) Translocation:

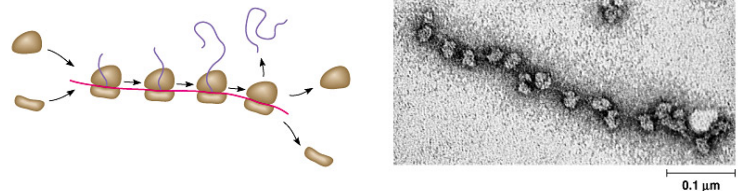


**c) Termination:**

- stop codons (UAA/UAG/UGA):
- releasing factors attaches:



**Polyribosome:**



The proteins produced are in the 1° level of protein structure, which the genes determine  
Some proteins are modified further before they do their specific jobs

**What are some of the possible roles for these proteins?**

The following tRNA has the anticodon UAC. What is the DNA base code for this tRNA?  
What amino acid would this tRNA carry?

|            |       |           |
|------------|-------|-----------|
| Amino acid | _____ |           |
| tRNA       | UAC   | anticodon |
| mRNA       | _____ | codon     |
| DNA        | _____ |           |

Dictionary of the genetic code  
for amino acid: codons

## Changes in the Genome:

### **Mutations:**

Could be: a) disastrous:

b) advantageous:

If mutations occur in the gametes (sperm or ovum), then they can be transferred to offspring

Gene mutation:

Point mutations:

### **2 types of mutations:**

#### 1) **Base substitution:**

a) could make no difference at all, **why?**

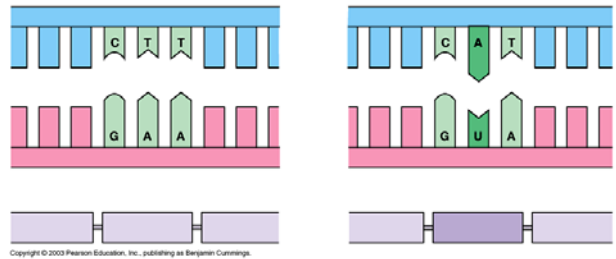
GGC → GGU in mRNA; still codes for glycine

b) could be:

c) could be detrimental (useless protein)

Ex. sickle cell anemia: GAA → GUA

mRNA (valine instead of glutamic acid)



Missense or nonsense

#### 2) **Insertion or Deletions:**

Frameshift mutation:

This is more disastrous effect on the resulting protein than substitutions. Why?

### **Viruses:**

Are these living or non-living?

What is the genetic material of viruses?

Viruses are a problem to all organisms.

What is HIV? AIDS?

What type of virus is HIV? (p. 205; Fig. 10.21)

What types of cells do they tend to attack in the human body and why?