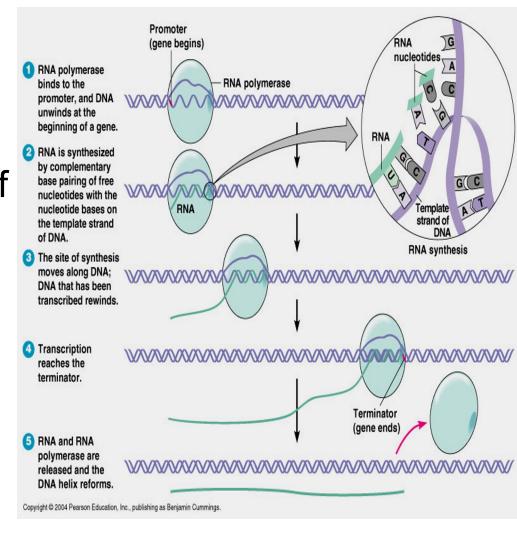
Lecture 27
BT 206
3 April 2023

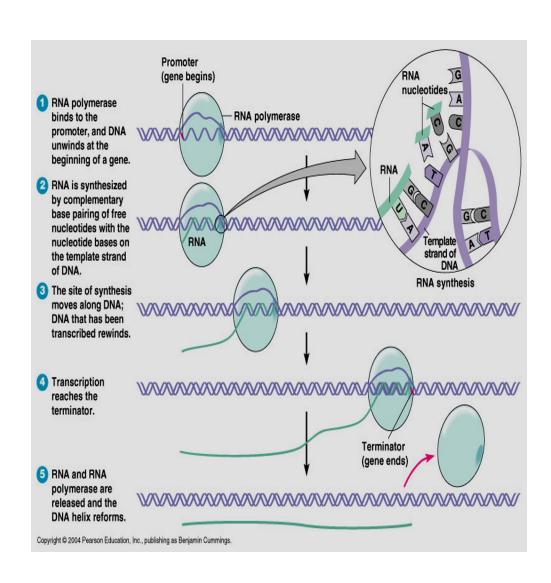


- RNA polymerase binds to DNA at promoter
- Only coding strand of DNA is template
- $5`\rightarrow 3`$ direction
- RNA polymerase assembles RNA nucleotides

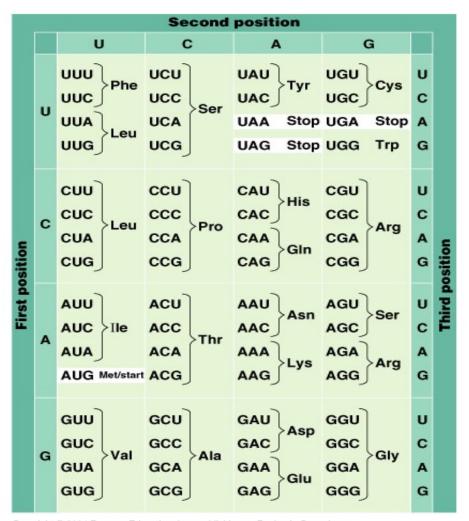




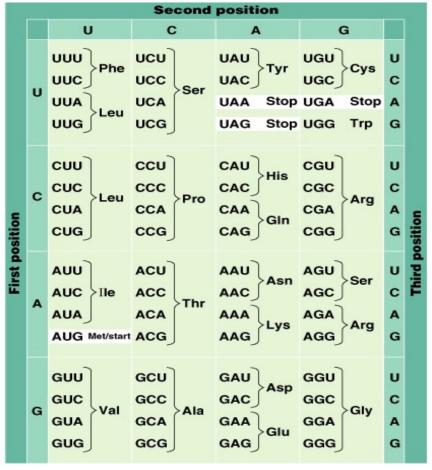
- RNA chain grows
- RNA stops growing at terminator site
- mRNA strand released from DNA
- DNA zips up
- mRNA intermediate between DNA and translation



- Bacterial translation
 - □ Protein synthesis
 - Decoding mRNA to amino acids and proteins
 - Codons
 - Groups of 3 nucleotides
 - Sequence of codons determines amino acid sequence
 - Several codons for a single amino acid
 - Degeneracy
 - Allows for mutations



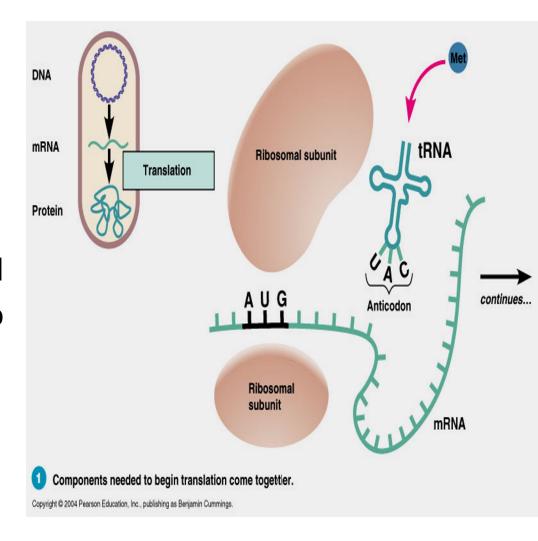
- 64 codons
 - \Box (4³)
 - Sense codons
 - Code for amino acids
 - 61 codons
 - Nonsense codons
 - Stop codons
 - UAG, UAA, UGA
 - Signal end of protein synthesis
 - AUG
 - Start codon
 - Formylmethionine
 - Usually removed from protein



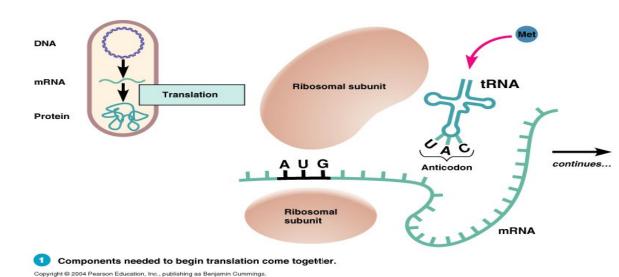


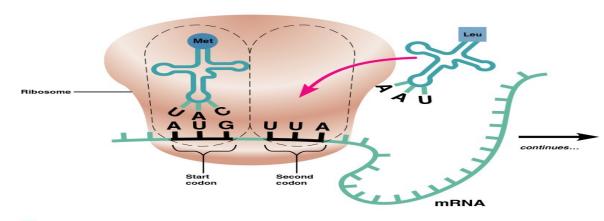
tRNA

- □ Transfer RNA
- □ Anticodon
 - Complementary to codon
- □ Amino acid attached
- □ Brings amino acid to ribosome

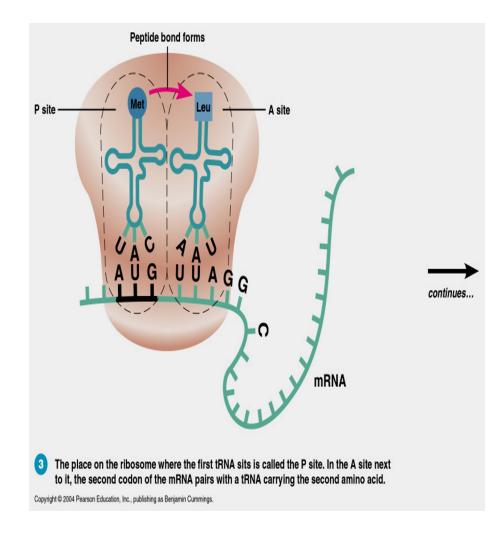


- 1 components needed come together
 - □ Ribosome
 - □ tRNA
 - □ mRNA
- 2 tRNA carries first amino acid (?) to ribosome and mRNA

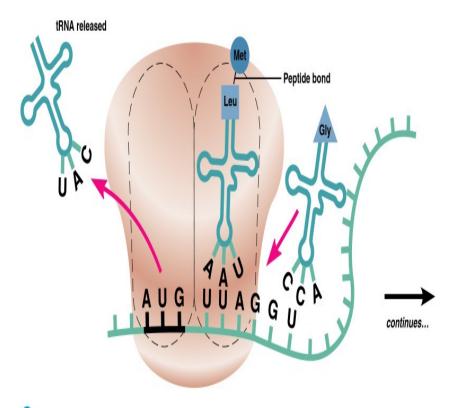




- 3 second amino acid brought to ribosome
 - □ P site
 - Site of first amino acid
 - □ A site
 - Site of second amino acid
 - □ Peptide bond forms



 4 – after peptide bond first tRNA is released to find amino acid

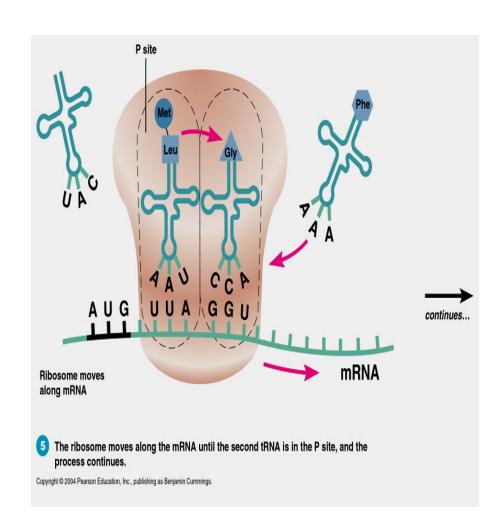


4 The first amino acid joins to the second by a peptide bond, and the first tRNA is released.

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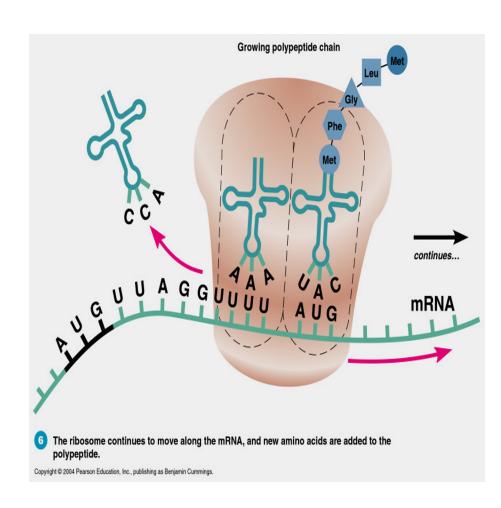


- 5 ribosome moves along mRNA until tRNA is in P site
 - Process continues down mRNA



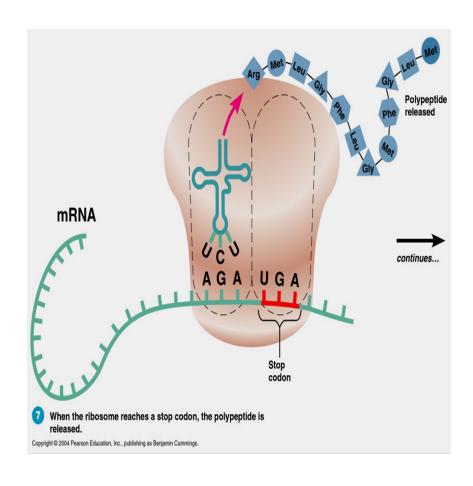


- 6 ribosome continues down mRNA
 - Peptide chain elongates



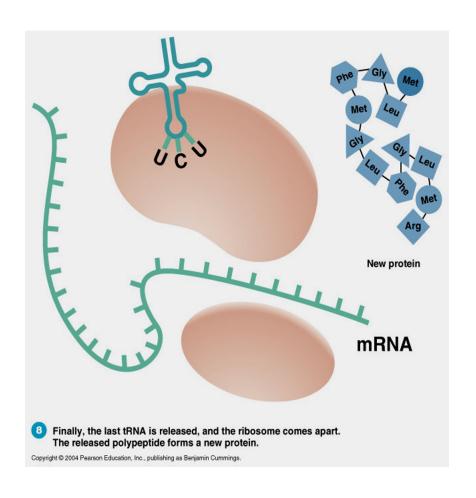


- 7- polypeptide (protein) released
 - Ribosome moves down mRNA until stop codon
 - UAG, UAA, UGA
 - □ Polypeptide released

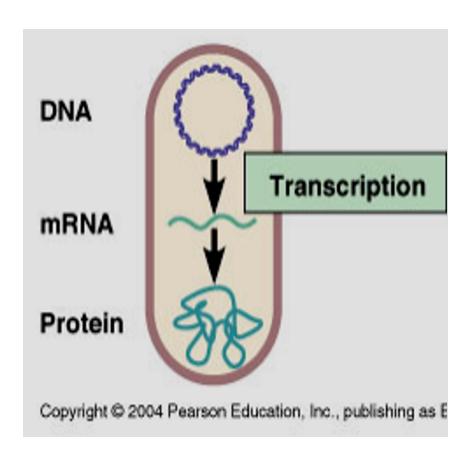


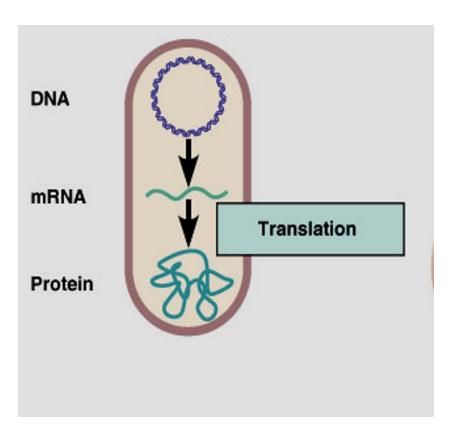


- 8 tRNA is released and ribosome disassembles
 - tRNA, mRNA, and ribosome can be used again



Review







- Ribosome moves5`→3` direction
- Additional ribosome may attach and begin synthesizing protein
- Prokaryotes can start translation before transcription is complete

