

What is Translation?

Worksheet

Translation is the process of decoding mRNA codons into a specific sequence of amino acids to build a protein, carried out by ribosomes and tRNA.

Questions

1. Where does translation take place in a eukaryotic cell?
 - A) Nucleus
 - B) Ribosome
 - C) Golgi apparatus
 - D) Mitochondrial matrix
2. What is the start codon in translation?
 - A) UAA
 - B) AUG
 - C) UGA
 - D) UAG
3. Which molecule carries amino acids to the ribosome?
 - A) mRNA
 - B) rRNA
 - C) tRNA
 - D) DNA
4. A 600-nucleotide coding mRNA sequence (excluding the stop codon) encodes how many amino acids?
 - A) 100
 - B) 150
 - C) 200
 - D) 300
5. An mRNA coding sequence has 300 nucleotides (excluding the stop codon). How many amino acids does it encode?
6. A finished protein is 150 amino acids long. How many mRNA nucleotides (excluding the stop codon) encoded it?
7. The mRNA codon is 5'-AUG-3'. What is the complementary tRNA anticodon, and which amino acid does it carry?
8. Define: What is translation?
9. Define: Where does translation occur?
10. Define: What are the three stages of translation?

Answer Key

1. B) Ribosome - Ribosomes (free in the cytoplasm or bound to the rough ER) are the site of translation.
2. B) AUG - AUG signals the start of translation and codes for methionine.
3. C) tRNA - Transfer RNA (tRNA) carries specific amino acids and matches its anticodon to the mRNA codon.
4. C) $200 \div 3 = 66$ amino acids.
5. Amino acids = nucleotides $\div 3$ Amino acids = $300 \div 3$ Amino acids = 100 amino acids
6. Nucleotides = amino acids $\times 3$ Nucleotides = 150×3 Nucleotides = 450 nucleotides (plus 3 more for the stop codon = 453 total)
7. tRNA anticodon pairs antiparallel and complementary to the codon 5'-AUG-3' pairs with 3'-UAC-5' AUG codes for methionine, so this tRNA carries methionine (the start amino acid)
8. The process of synthesizing a protein by reading an mRNA sequence on a ribosome and linking amino acids together.
9. On ribosomes, in the cytoplasm or on the rough endoplasmic reticulum.
10. Initiation, elongation, and termination.

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