What Is Protein Synthesis?

Worksheet

Protein synthesis is the two-step process (transcription then translation) by which a cell reads a gene's DNA sequence and builds the corresponding protein from amino acids.

Questions

1. What molecule carries the genetic code from the nucleus to the ribosome?

A) tRNA
B) rRNA
C) mRNA
D) DNA

2. How many nucleotides make up one codon?

A) 1
B) 2
C) 3
D) 4

3. Which process converts mRNA into a chain of amino acids?

A) Transcription
B) Replication
C) Translation
D) Mutation

4. What stops translation?

A) A start codon
B) A stop codon
C) An intron
D) A promoter

5. An mRNA coding sequence is 300 nucleotides long. How many amino acids does the resulting protein contain?

6. The mRNA codon is 5'-AUG-3'. Which amino acid and tRNA anticodon match it?

7. A gene's mRNA has 603 coding nucleotides (including the stop codon). How many codons are translated into amino acids?

8. Define: What are the two main stages of protein synthesis?

9. Define: Where does transcription occur?

10. Define: Where does translation occur?

Answer Key

1. C) mRNA - mRNA is transcribed from DNA and carries the code to ribosomes.

2. C) 3 - A codon is a triplet - three nucleotides coding for one amino acid.

3. C) Translation - Translation reads mRNA codons and assembles the corresponding protein.

4. B) A stop codon - A stop codon (UAA, UAG, UGA) signals the ribosome to release the protein.

5. Amino acids = (L/3) 1 Amino acids = (300/3) 1 Amino acids = 100 1 = 99 amino acids

6. AUG is the start codon, coding for methionine The matching tRNA anticodon is complementary and antiparallel: 3'-UAC-5'

7. Total codons = 603/3 = 201 codons One codon is the stop codon (not translated) Amino acids incorporated = 201 1 = 200

8. Transcription (DNA mRNA) and translation (mRNA protein).

9. In the nucleus (in eukaryotic cells).

10. At ribosomes in the cytoplasm, often on the rough ER.