

**Southwest Center for Microsystems Education (SCME)  
University of New Mexico**

# **DNA to Protein Overview**

## **Learning Module**

**This Learning Module consists of the following:**

Knowledge Probe (KP) or pre-quiz  
DNA to Protein Primary Knowledge (Reading Material)  
Protein Structure and Function Activity  
Gene Transcription Activity  
Final Assessment

*This learning module provides information needed to understand how the digitally encoded information in DNA is translated into a functional protein that can be used for biomedical applications. Activities delve deeper into protein structure and function as well as gene transcription.*

Target audiences: High School, Community College, University

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# DNA to Protein Overview

## Knowledge Probe (Pre-Test) Participant Guide

### Introduction

*This learning module provides information needed to understand how the digitally encoded information in DNA is translated into a functional protein that can be used for biomedical applications. Activities delve deeper into protein structure and function as well as gene transcription.*

This knowledge probe is a short quiz to help you to identify your current understanding of proteins, and the biology processes involved in making proteins from DNA. Please answer the following to the best of your knowledge.

There are 14 questions.

1. Which of the following BEST describes “proteins”?
  - a. The linear sequences of information found with a gene
  - b. Polymer biological molecules that are subunits of amino acids
  - c. Polymers composed of subunit known as amino acids
  - d. A region of a DNA sequence to which RNA polymerase binds
2. Which of the following is NOT a function of protein?
  - a. Transport and storage of atoms and molecules within cells
  - b. Catalyst for mRNA replication
  - c. Protect the body from foreign particles
  - d. Provide structure and support for cells
3. What are amino acids composed of?
  - a. Carbon, hydrogen, oxygen and nitrogen
  - b. Carbon, hydrogen, oxygen and phosphate
  - c. Proteins, chromosomes, oxygen, and nitrogen
  - d. Carbon, proteins, oxygen and nitrogen
4. The process where DNA is transcribed to RNA and RNA is translated to a polypeptide is referred to as the ....
  - a. Genetic Code
  - b. Crick’s Process of DNA to Protein
  - c. Hershey-Chase Process
  - d. Central Dogma of Biology

5. The nitrogenous bases of RNA are...
  - a. Adenine, thymine, guanine, and cytosine
  - b. Adenine, thymine, uracil, and cytosine
  - c. Adenine, uracil, guanine, and cytosine
  - d. Uracil, thymine, guanine and cytosine
6. In the DNA to Protein process, the step that is defined as “DNA-directed RNA synthesis” is called...
  - a. Transcription
  - b. Elongation
  - c. Initiation
  - d. Translation
7. In the DNA to Protein process, the step where the mRNA is translated to protein or polypeptide is called...
  - a. Transcription
  - b. Elongation
  - c. Initiation
  - d. Translation
8. During the DNA to Protein process, the \_\_\_\_\_ serves as the template for the creation of a protein and is responsible for transferring genetic information from the nucleus to the cytoplasm.
  - a. DNA
  - b. mRNA
  - c. tRNA
  - d. rRNA
9. During the DNA to Protein process, the \_\_\_\_\_ carries specific amino acids for incorporation into a growing polypeptide chain.
  - a. DNA
  - b. mRNA
  - c. tRNA
  - d. rRNA
10. The triplet code contained within mRNA is a series of three adjacent bases in one polynucleotide chain. This code is called a ....
  - a. tRNAm<sub>et</sub>
  - b. codon
  - c. phe
  - d. met

11. Which of the following BEST explains why the genetic code is “almost” universal by all known organisms (i.e., human, animals, plants, fungi, archaea, bacteria and viruses.)? Small variations in the code do not exist in...
- mitochondria and certain microbes.
  - mitochondria and ribosome.
  - cytoplasm and centrosome.
  - nucleus and cytoskeleton.
12. What components make up a ribosome?
- Amino acids and tRNA
  - mRNA and cytoplasm
  - Ribosomal RNA and amino acids
  - Ribosomal RNA and proteins
13. The process which converts a polypeptide into its characteristic and functional three-dimensional structure is called protein...
- folding
  - elongation
  - termination
  - translation
14. A micro-sized device that uses an enzyme linked to an antibody to detect specific proteins is called...
- GeneChip
  - RNA chip
  - Nucleic acid array
  - ELISA

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