

# CHAPTER 13 LAB FROM DNA TO PROTEIN SYNTHESIS ANSWERS

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**What is the process of protein synthesis from DNA to protein?** During transcription, DNA is used as a template to make a molecule of messenger RNA (mRNA). The molecule of mRNA then leaves the nucleus and goes to a ribosome in the cytoplasm, where translation occurs. During translation, the genetic code in mRNA is read and used to make a polypeptide.

**What role do stop codons play in protein synthesis?** Stop Codons Mark the End of Translation The end of the protein-coding message is signaled by the presence of one of three codons (UAA, UAG, or UGA) called stop codons (see Figure 6-50).

**What is the site of protein synthesis?** Ribosomes function as the site for protein synthesis. The mRNA molecules travel out of the nucleus into the cytoplasm and are translated into proteins in the cytoplasm. Ribosomes are RNA-protein complexes and are not specific cell organelles.

**What is a codon in protein synthesis?** (KOH-don) A sequence of three consecutive nucleotides in a DNA or RNA molecule that codes for a specific amino acid. Certain codons signal the start or end of translation.

**What are the 5 steps of protein synthesis in order?**

**What is the process of using DNA to make a protein called?** The journey from gene to protein is complex and tightly controlled within each cell. It consists of two major steps: transcription and translation. Together, transcription and translation are known as gene expression.

**How does DNA code for proteins?** Like words in a sentence, the DNA sequence of a gene determines the amino acid sequence for the protein it encodes. In the protein-coding region of a gene, the DNA sequence is interpreted in groups of three nucleotide bases, called codons. Each codon specifies a single amino acid in a protein.

**What are the three stop codons?** Called stop codons, the three sequences are UAG, UAA, and UGA. Historically, the stop codons have the nicknames: amber, UAG; ochre, UAA; and opal, UGA.

**How many codons make up your protein?** There are 64 different codons: 61 specify amino acids and 3 are used as stop signals.

**What is the process of DNA translation?** Translation is the process that takes the information passed from DNA as messenger RNA and turns it into a series of amino acids bound together with peptide bonds.

**What is the copying of mRNA from DNA called?** Transcription, as related to genomics, is the process of making an RNA copy of a gene's DNA sequence. This copy, called messenger RNA (mRNA), carries the gene's protein information encoded in DNA.

**How is protein made using information from DNA?** To manufacture protein molecules, a cell must first transfer information from DNA to mRNA through the process of transcription. Then, a process called translation uses this mRNA as a template for protein assembly.

**Where does protein synthesis take place?** Ribosomes are the sites in a cell in which protein synthesis takes place. Cells have many ribosomes, and the exact number depends on how active a particular cell is in synthesizing proteins.

**What do ribosomes do in protein synthesis?** Definition. A ribosome is an intercellular structure made of both RNA and protein, and it is the site of protein synthesis in the cell. The ribosome reads the messenger RNA (mRNA) sequence and translates that genetic code into a specified string of amino acids, which grow into long chains that fold to form proteins.

**What are proteins made of?** Proteins are made of amino acids. Proteins are made up of amino acids containing mostly hydrogen, carbon, nitrogen and oxygen, as linked together in chains. The linear number and order of amino acids are coded in genes, a segment of DNA. Proteins contain 20 different amino acids classified by properties.

**What is the function of a codon?** A protein is made from a long chain of amino acids. A codon can instruct the cell to start creating a protein chain, to add a specific amino acid to the growing protein chain, or to end the protein chain. The full set of codons is called the genetic code.

**Which RNA carries the message?** Messenger RNA (mRNA) carries the instructions from DNA that specify the correct order of amino acids during protein synthesis during translation.

**What enzyme does transcription use?** The enzymes that perform transcription are called RNA polymerases. Like the DNA polymerase that catalyzes DNA replication (discussed in Chapter 5), RNA polymerases catalyze the formation of the phosphodiester bonds that link the nucleotides together to form a linear chain.

**What amino acid always starts a protein?** Protein synthesis is initiated universally with the amino acid methionine. In *Escherichia coli*, studies with anticodon sequence mutants of the initiator methionine tRNA have shown that protein synthesis can be initiated with several other amino acids.

**Why are there only 20 amino acids?** Additional amino acids required the evolution of metabolic pathways, increasing the set to 20. As additional amino acids are added to the code, the advantage of adding a further amino acid decreases compared to the risk of adding too many deleterious mutations simultaneously [21].

**Are genes part of an allele?** The short answer is that an allele is a variant form of a gene. Explained in greater detail, each gene resides at a specific locus (location on a chromosome) in two copies, one copy of the gene inherited from each parent. The copies, however, are not necessarily the same.

**What are the steps of the DNA sequence to protein?** Starting in the nucleus, we see how the DNA code is converted to messenger RNA by the process of

transcription. We then follow the messenger RNA into the cytoplasm where it is bound by protein factories, called ribosomes. The ribosomes read the messenger RNA to produce a chain of amino acids.

**What process converts the message of DNA into a protein?** How does the cell convert DNA into working proteins? The process of translation can be seen as the decoding of instructions for making proteins, involving mRNA in transcription as well as tRNA.

**What is the process of synthesizing a protein called?** Protein biosynthesis (or protein synthesis) is a core biological process, occurring inside cells, balancing the loss of cellular proteins (via degradation or export) through the production of new proteins. Proteins perform a number of critical functions as enzymes, structural proteins or hormones.

**What is the process of replication in protein synthesis?** Replication is the process in which a cell makes an exact copy of its own DNA (copy DNA → DNA). Replication occurs in the S-phase in preparation to cell division during which the genetic information for the synthesis of proteins is transferred from the mothercell to the daughtercell.

## **The Fionavar Tapestry: An Epic Fantasy by Guy Gavriel Kay**

### **1. What is The Fionavar Tapestry?**

The Fionavar Tapestry is a three-part fantasy novel series written by Canadian author Guy Gavriel Kay. It tells the epic story of five university students who are transported from Toronto to the magical realm of Fionavar, where they become embroiled in a life-and-death struggle against the forces of evil.

### **2. Who are the main characters?**

The five university students are Kim, Kevin, Laura, Dave, and Jennifer. In Fionavar, they each take on the roles of ancient heroes and figures from Celtic mythology: Kim as King Arthur, Kevin as Merlin, Laura as Vivienne, Dave as Lancelot, and Jennifer as Bevier.

### **3. What is the conflict in the story?**

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The forces of evil in Fionavar are led by the evil god Rakoth Maugrim. Maugrim seeks to conquer the realm and enslave its people. The five students must use their newfound powers and knowledge to defeat Maugrim and restore balance to Fionavar.

#### **4. What are the themes of the trilogy?**

The Fionavar Tapestry explores themes of destiny, responsibility, and the power of friendship. The characters must grapple with the choices they make and the consequences of their actions. They also learn the importance of working together and trusting one another.

#### **5. What are the literary influences on the trilogy?**

Kay's novel draws heavily on Celtic mythology and Arthurian legend. He also incorporates elements from medieval romances and epic poems. The Fionavar Tapestry is a complex and rewarding work of fantasy that appeals to readers of all ages.

### **Static Equipment Interview Questions: A Comprehensive Guide**

Static equipment plays a crucial role in various industries, including manufacturing, power plants, and refineries. Hiring professionals who are well-versed in static equipment maintenance and operation is essential for the safe and efficient functioning of these facilities. To assess candidates' knowledge and skills, interviewers often pose specific questions related to static equipment. Understanding these questions and their potential answers can help candidates prepare effectively for interviews.

#### **1. Describe the types of static equipment commonly used in industry. Answer:**

Static equipment includes vessels, tanks, heat exchangers, pipelines, and pumps. Vessels and tanks store liquids or gases under pressure or vacuum, while heat exchangers facilitate heat transfer between different fluids. Pipelines transport fluids, and pumps help circulate or discharge fluids.

#### **2. Explain the safety precautions to be observed when working with static equipment. Answer:** Safety precautions include:

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- Wearing appropriate personal protective equipment (PPE) such as hard hats, safety glasses, and protective gloves.
- Identifying potential hazards such as pressure leaks, spills, and electrical hazards.
- Following established safety protocols for equipment operation and maintenance.
- Having proper ventilation to prevent the accumulation of hazardous vapors.

### **3. Discuss the inspection and maintenance procedures for static equipment.**

**Answer:** Inspections involve visual examinations, pressure testing, and non-destructive testing (NDT) methods such as ultrasonic or eddy current testing. Maintenance procedures include cleaning, lubrication, repairs, and periodic overhauls to ensure equipment integrity and reliability.

### **4. Explain the principles of fluid flow and pressure drop in pipelines. Answer:**

Fluid flow is governed by the principles of fluid dynamics. Factors influencing pressure drop include pipe diameter, fluid viscosity, and flow velocity. Pressure drop can be calculated using equations such as the Darcy-Weisbach equation.

### **5. Describe the different types of pump seals and their applications. Answer:**

Pump seals prevent fluid leakage from the pump shaft. Common seal types include mechanical seals, lip seals, and packing seals. Mechanical seals are used for high-pressure and abrasive applications, lip seals for low-pressure applications, and packing seals for general-purpose applications.

## **Soluzioni al Libro "Don Chisciotte" di Cervantes**

### **1. Chi era Don Chisciotte?**

- Alonso Quijano, un nobile di mezza età che perde la ragione leggendo troppi romanzi cavallereschi

### **2. Perché Don Chisciotte decise di diventare un cavaliere errante?**

- Per diventare famoso, aiutare i deboli ed essere amato dalla sua amata, Dulcinea del Toboso

### 3. Quali erano i nomi di Sancho Panza e Ronzinante?

- Sancho Panza era il fedele scudiero di Don Chisciotte, mentre Ronzinante era il suo magro cavallo.

### 4. Quali erano le principali avventure di Don Chisciotte?

- Sconfisse i mulini a vento (che credeva fossero giganti), combatté contro un gregge di pecore (che credeva fossero eserciti), liberò alcuni galeotti (che poi lo derubarono), fu sconfitto da un cavaliere della Mancia (con il vero nome di Alonso Quijano)

### 5. Qual è il tema principale del libro "Don Chisciotte"?

- Il contrasto tra realtà e illusione, la follia della ricerca di gloria e l'importanza dell'amicizia e della lealtà.

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