

PROTEIN SYNTHESIS

1. Transcription is the process of copying a gene's DNA sequence into a messenger RNA (mRNA) sequence. This step occurs in the nucleus of the cell.

2. During transcription, the DNA double helix unwinds, and one strand (the template strand) is used to synthesize a complementary mRNA strand. The mRNA strand is then processed and moves out of the nucleus.

3. Translation is the process of synthesizing a protein from an mRNA sequence. This step occurs in the cytoplasm of the cell, where ribosomes are located. The ribosome reads the mRNA sequence and uses it to assemble a chain of amino acids, which form the protein.



TRANSLATION



THE GENETIC CODE

"One codon at a time"

1. Biological systems use sequences of three nucleotides, called codons, to specify the amino acids that are used to build proteins. Each codon codes for a specific amino acid.

2. The genetic code is the set of rules that defines how sequences of nucleotide base pairs (A, T, C, G) are translated to the amino acid sequences of proteins.

3. The genetic code is universal, meaning that the same codon codes for the same amino acid in all organisms. This is why we can use the same genetic code to understand the relationship between DNA and proteins in all life forms.

4. The genetic code is also redundant, meaning that more than one codon can code for the same amino acid. This helps to ensure that the protein is synthesized correctly even if there is a mistake in the DNA sequence.

"One gene - one protein"

1. Each gene contains the instructions for making a specific protein. The sequence of nucleotides in the gene determines the sequence of amino acids in the protein.

2. The sequence of amino acids in a protein determines its shape and function. This is why a change in the DNA sequence (a mutation) can lead to a change in the protein and, therefore, a change in the organism's traits.

3. A copy of the genetic code can be found on page 119.

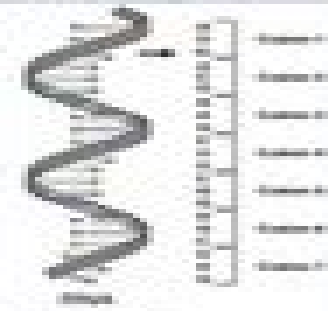


Diagram of a DNA double helix and a protein chain.

Diagram of a DNA double helix and a protein chain.

THE GENETIC CODE

		Second Base				
		U	C	A	G	
First Base	U	UUU Phe	UUC Phe	UAU Tyr	UAG Stop	U
	C	UCU Leu	UCC Leu	UCA Ser	UCG Ser	C
	A	AUU Ile	AUC Ile	AUA Ile	AUG Met	A
	G	GUU Val	GUC Val	GUA Val	GUG Val	G
First Base	C	CUU Leu	CUC Leu	CAU Tyr	CAG Stop	C
	U	CCU Pro	CCC Pro	CCA Pro	CCG Pro	C
	A	CAU Tyr	CAC Tyr	CAA Tyr	CAG Stop	A
	G	GUU Val	GUC Val	GUA Val	GUG Val	G
First Base	A	AUU Ile	AUC Ile	AUA Ile	AUG Met	A
	C	ACU Thr	ACC Thr	ACA Thr	ACG Thr	C
	U	UAU Tyr	UAC Tyr	UAA Stop	UAG Stop	U
	G	GUU Val	GUC Val	GUA Val	GUG Val	G
First Base	G	GUU Val	GUC Val	GUA Val	GUG Val	G
	C	CCU Pro	CCC Pro	CCA Pro	CCG Pro	C
	A	CAU Tyr	CAC Tyr	CAA Tyr	CAG Stop	A
	G	GUU Val	GUC Val	GUA Val	GUG Val	G

THE GENETIC CODE IS A REFERENCE TOOL

THE GENETIC CODE

1. The genetic code is the set of rules that defines how sequences of nucleotide base pairs (A, T, C, G) are translated to the amino acid sequences of proteins.

First Base	Second Base	Third Base	Amino Acid
U	U	U	Phe
U	U	C	Phe
U	U	A	Tyr
U	U	G	Stop
U	C	U	Leu
U	C	C	Leu
U	C	A	Ser
U	C	G	Ser
U	A	U	Ile
U	A	C	Ile
U	A	A	Ile
U	A	G	Met
U	G	U	Val
U	G	C	Val
U	G	A	Val
U	G	G	Val
C	U	U	Leu
C	U	C	Leu
C	U	A	Tyr
C	U	G	Stop
C	C	U	Pro
C	C	C	Pro
C	C	A	Pro
C	C	G	Pro
C	A	U	Tyr
C	A	C	Tyr
C	A	A	Stop
C	A	G	Stop
C	G	U	Val
C	G	C	Val
C	G	A	Val
C	G	G	Val
A	U	U	Ile
A	U	C	Ile
A	U	A	Ile
A	U	G	Met
A	C	U	Thr
A	C	C	Thr
A	C	A	Thr
A	C	G	Thr
A	U	U	Tyr
A	U	C	Tyr
A	U	A	Stop
A	U	G	Stop
A	G	U	Val
A	G	C	Val
A	G	A	Val
A	G	G	Val

2. Using the genetic code, determine the amino acid sequence of the protein encoded by the following mRNA sequence. Remember to use the start and stop codons.

ATG	CGT	ATT	GGC	CGA	TTT	ATA
Start	Arg	Ile	Gly	Arg	Phe	Met

3. Using the genetic code, determine the amino acid sequence of the protein encoded by the following mRNA sequence. Remember to use the start and stop codons.

ATG	CGT	ATT	GGC	CGA	TTT	ATA
Start	Arg	Ile	Gly	Arg	Phe	Met

4. Using the genetic code, determine the amino acid sequence of the protein encoded by the following mRNA sequence. Remember to use the start and stop codons.

ATG	CGT	ATT	GGC	CGA	TTT	ATA
Start	Arg	Ile	Gly	Arg	Phe	Met

Genetic Mutations Packet

Lingjun Ying



Genetic Mutations Packet:

This book delves into Genetic Mutations Packet. Genetic Mutations Packet is an essential topic that must be grasped by everyone, from students and scholars to the general public. The book will furnish comprehensive and in-depth insights into Genetic Mutations Packet, encompassing both the fundamentals and more intricate discussions.

1. This book is structured into several chapters, namely:

- Chapter 1: Introduction to Genetic Mutations Packet
- Chapter 2: Essential Elements of Genetic Mutations Packet
- Chapter 3: Genetic Mutations Packet in Everyday Life
- Chapter 4: Genetic Mutations Packet in Specific Contexts
- Chapter 5: Conclusion

2. In chapter 1, the author will provide an overview of Genetic Mutations Packet. The first chapter will explore what Genetic Mutations Packet is, why Genetic Mutations Packet is vital, and how to effectively learn about Genetic Mutations Packet.
3. In chapter 2, the author will delve into the foundational concepts of Genetic Mutations Packet. The second chapter will elucidate the essential principles that need to be understood to grasp Genetic Mutations Packet in its entirety.
4. In chapter 3, this book will examine the practical applications of Genetic Mutations Packet in daily life. The third chapter will showcase real-world examples of how Genetic Mutations Packet can be effectively utilized in everyday scenarios.
5. In chapter 4, this book will scrutinize the relevance of Genetic Mutations Packet in specific contexts. This chapter will explore how Genetic Mutations Packet is applied in specialized fields, such as education, business, and technology.
6. In chapter 5, this book will draw a conclusion about Genetic Mutations Packet. The final chapter will summarize the key points that have been discussed throughout the book.

This book is crafted in an easy-to-understand language and is complemented by engaging illustrations. It is highly recommended for anyone seeking to gain a comprehensive understanding of Genetic Mutations Packet.

<https://staging.conocer.cide.edu/About/virtual-library/HomePages/Lamp%20Diagram%20Peugeot%20505.pdf>

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Genetic Mutations Packet Introduction

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