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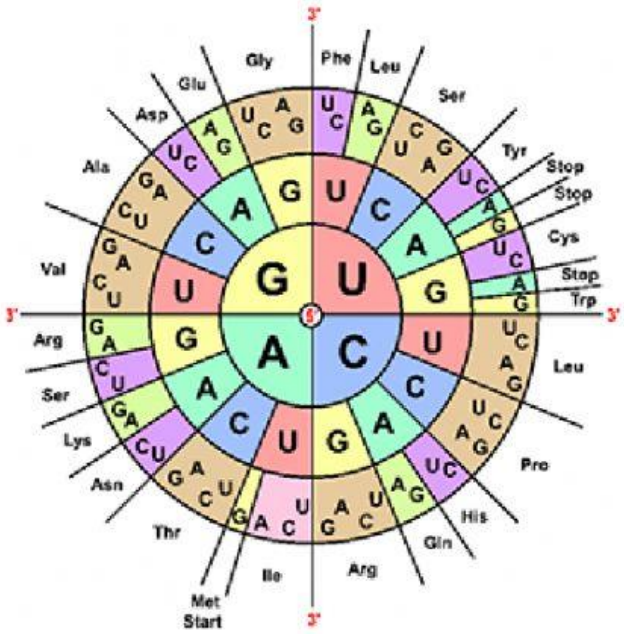
More Protein Synthesis Practice

Protein synthesis is the process where a sequence of DNA is used to build a protein from individual amino acids. The first step in this process is called **TRANSCRIPTION**, where a coding region of DNA is converted to messenger RNA (mRNA). During transcription, mRNA is made from the DNA sequence following the base pair rule, except RNA does not contain the base **T**hymine, but instead has **U**racil. The mRNA then leaves the nucleus and goes to a ribosome in the cell's cytoplasm. The ribosome reads the message three bases at a time, called a **CODON**. Each codon will specify a single amino acid. The amino acids are joined together and folded into a protein, a process called **TRANSLATION**

Key Points

- DNA is used to make a copy of mRNA (transcription)
- mRNA leaves the nucleus and goes to ribosomes
- 3 bases = codon
- 1 codon = a single amino acid
- A chain of amino acids = a protein
- Protein synthesis is a combination of the processes of transcription AND translation

First base in codon	Second base in codon: U	Second base in codon: C	Second base in codon: A	Second base in codon: G	Third base in codon
U	UUU Phe	UCU Ser	UAU Tyr	UGU Cys	U
	UUC Phe	UCC Ser	UAC Tyr	UGC Cys	C
	UUA Leu	UCA Ser	UAA Stop	UGA Stop	A
	UUG Leu	UCG Ser	UAG Stop	UGG Trp	G
C	CUU Leu	CCU Pro	CAU His	CGU Arg	U
	CUC Leu	CCC Pro	CAC His	CGC Arg	C
	CUA Leu	CCA Pro	CAA Gln	CGA Arg	A
	CUG Leu	CCG Pro	CAG Gln	CGG Arg	G
A	AUU Ile	ACU Thr	AAU Asn	AGU Ser	U
	AUC Ile	ACC Thr	AAC Asn	AGC Ser	C
	AUA Ile	ACA Thr	AAA Lys	AGA Arg	A
	AUG Met or start	ACG Thr	AAG Lys	AGG Arg	G
G	GUU Val	GCU Ala	GAU Asp	GGU Gly	U
	GUC Val	GCC Ala	GAC Asp	GGC Gly	C
	GUA Val	GCA Ala	GAA Glu	GGA Gly	A
	GUG Val	GCG Ala	GAG Glu	GGG Gly	G



1. Use the codon chart to write the amino acid that corresponds to each codon found in mRNA:

CCC _____ AGU _____

CAG _____ UAC _____

GAA _____ CGU _____

UUU _____ CCA _____

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2. Write a CODON that corresponds with each amino acid. ***There may be more than one.*** The full names are written, but the codon chart only shows the first three letters.

proline _____ **gly**cine _____

valine _____ **phe**nylalanine _____

histidine _____ **arg**inine _____

3. A single codon is used to signal the beginning of protein synthesis. It is commonly called the START CODON.

Locate the start codon on the chart. What are the three bases of this codon? _____

4. There are three codons that signal the end of synthesis, these are called STOP codons.

What are the three stop codons? _____

5. For each sequence of DNA is shown. Write the complementary RNA sequence underneath the letters, then use the codon chart to determine the amino acid sequence:

DNA → T A C C A T G G A A T T A C T

RNA →

Amino Acids →

DNA → T T C A A T G G T C T A G G G

RNA →

Amino Acids →

DNA → A C A T T T C A G A C C G T C

RNA →

Amino Acids →

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