



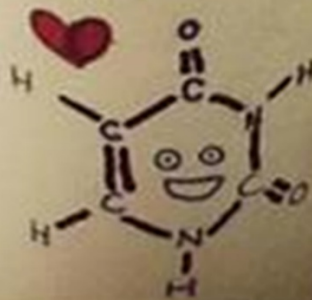
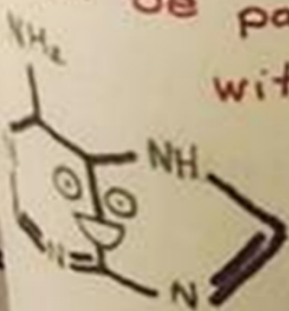
Protein Synthesis (making **PROTEIN** !)

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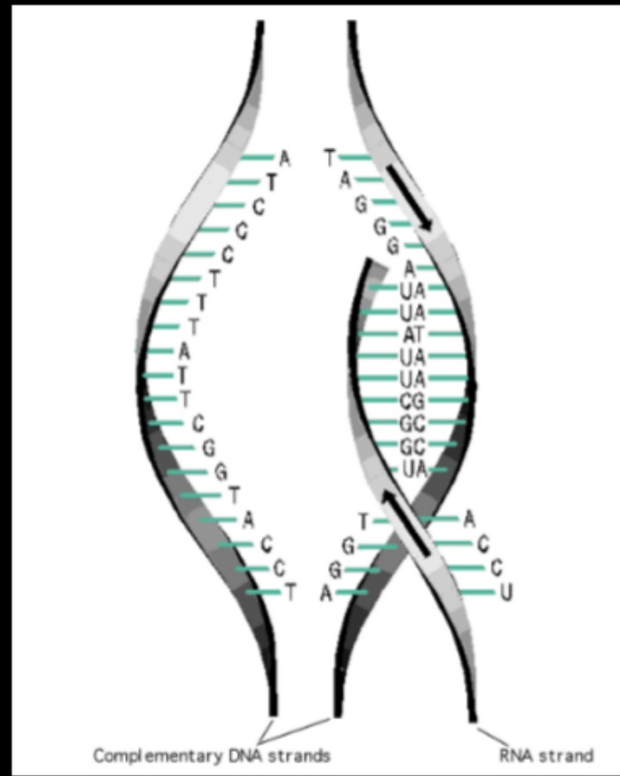
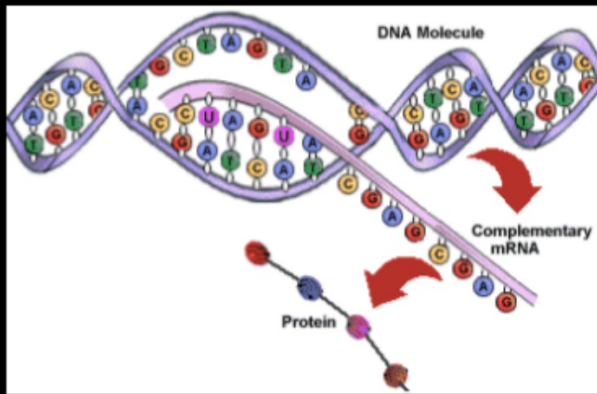
Step 1: Transcription

What is it?	makes an mRNA strand with a message from DNA
Where does it happen?	Nucleus
Why is this step necessary?	DNA holds the genetic code for a living organism inside the nucleus . But proteins are made at ribosomes . mRNA acts like the messenger and takes the code from the nucleus to the ribosome in the cytoplasm where the protein can be made.
How does it occur?	STEPS: 1. UNZIP: An enzyme unzips the DNA 2. MAKE mRNA: Use the DNA template to make mRNA (messenger RNA) REMEMBER! RNA uses U instead of T 3. LEAVE: mRNA leaves the nucleus and goes into the cytoplasm to find a ribosome.

I want to
be Adenine so
I can be paired
with U.



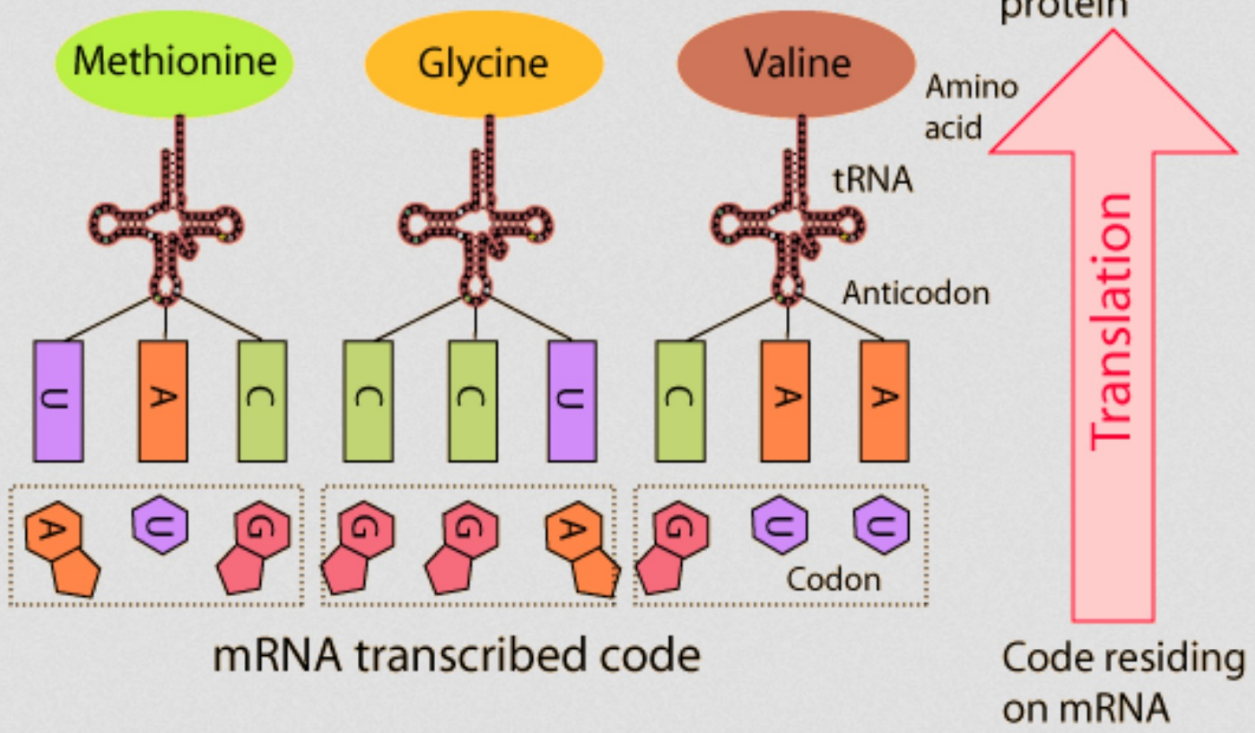
Soo.. where are we?



Step 2: Translation


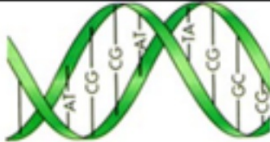
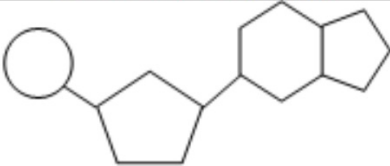
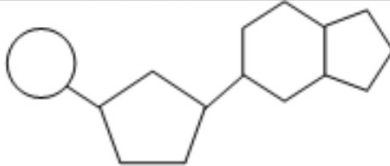
What is it?	ribosome converts mRNA to amino acids that make protein
Where does it happen?	CYTOPLASM at the RIBOSOME
Why is this step necessary?	Messenger RNA (<u>mRNA</u>) carries the genetic code from the DNA in the <u>nucleus</u> to the ribosome in the <u>cytoplasm</u> . Translation converts the <u>mRNA</u> message into the <u>protein</u> !
How does it occur?	<p>STEPS:</p> <ol style="list-style-type: none"> FIND RIBOSOME: mRNA attaches to a <u>ribosome</u> READ: Ribosome "<u>reads</u>" the mRNA in groups of <u>3</u> bases (a CODON) tRNA MATCHES: A <u>tRNA</u> molecule comes along with the right <u>anticodon</u> to match the <u>codon</u> <p style="text-align: center;"> CODON = UAG ANTICODON = <u>AUC</u> </p> <p>LINK AMINO ACIDS: the <u>ribosome</u> links the amino acids together with <u>peptide</u> bonds to make a <u>polypeptide</u> (protein)!</p>

Amino acids corresponding to the codons are added to the growing protein chain.



Time Out! What is RNA?!

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<u>RNA</u> : Ribonucleic Acid	<u>DNA</u> : Deoxyribonucleic Acid
	
<p>single stranded</p>	<p>double stranded</p>
<p>ribose sugar</p>	<p><u>Deoxyribose</u> sugar</p>
 <p>Bases: A, U, G, C</p>	 <p>Bases: A, T, C, G</p>

		SECOND LETTER				
		U	C	A	G	
FIRST LETTER	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 } Ileu	ACU } Thr	AAU } Asn	AGU } Ser	U
		AUC } Ileu	ACC } Thr	AAC } Asn	AGC } Ser	C
		AUA } Met (initiator)	ACA } Thr	AAA } Lys	AGA } Arg	A
		AUG } Met (initiator)	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 } (initiator)	GCG } Ala	GAG } Glu	GGG } Gly	G

THIRD LETTER

Using a Codon Chart

You try it!

- Name the amino acids that are coded by the following codons:
 - AAA=
 - UAC=
 - GGG=
 - GGA=
 - CAC=
 - UGA=
 - AGC=
 - CCC=
- Write the amino acid sequence to make up the protein:
GCA – GGU – CCA – AUG – UGC
- Write the amino acid sequence to make up the protein:
GCA – GGU – CCG – AUA – UGC

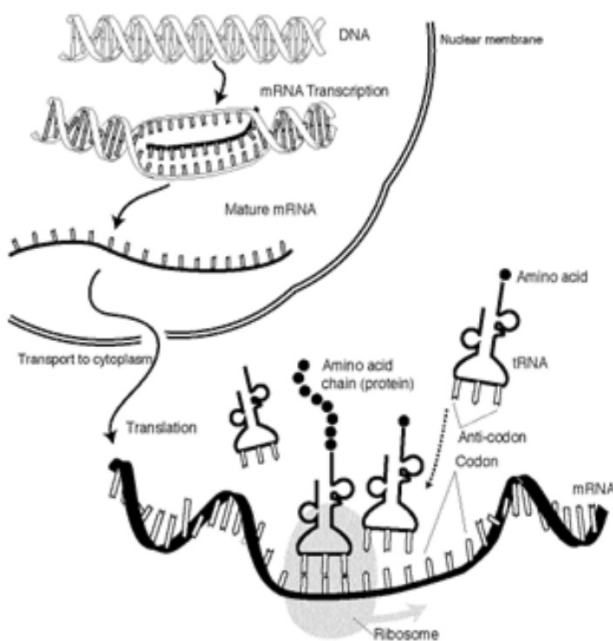
		SECOND LETTER				
		U	C	A	G	
FIRST LETTER	U	UUU } Phe UUC } UUA } Leu UUG }	UCU } UCC } Ser UCA } UCG }	UAU } Tyr UAC } UAA Stop UAG Stop	UGU } Cys UGC } UGA Stop UGG Trp	U C A G
	C	CUU } CUC } Leu CUA } CUG }	CCU } CCC } Pro CCA } CCG }	CAU } His CAC } CAA } Gln CAG }	CGU } CGC } Arg CGA } CGG }	U C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

First Letter	Second Letter				Third Letter
	U	C	A	G	
U	phenylalanine	serine	tyrosine	cysteine	U
	phenylalanine	serine	tyrosine	cysteine	C
	leucine	serine	stop	stop	A
	leucine	serine	stop	tryptophan	G
C	leucine	proline	histidine	arginine	U
	leucine	proline	histidine	arginine	C
	leucine	proline	glutamine	arginine	A
	leucine	proline	glutamine	arginine	G
A	isoleucine	threonine	asparagine	serine	U
	isoleucine	threonine	asparagine	serine	C
	isoleucine	threonine	lysine	arginine	A
	(start) methionine	threonine	lysine	arginine	G
G	valine	alanine	aspartate	glycine	U
	valine	alanine	aspartate	glycine	C
	valine	alanine	glutamate	glycine	A
	valine	alanine	glutamate	glycine	G

AMINO ACID CHART

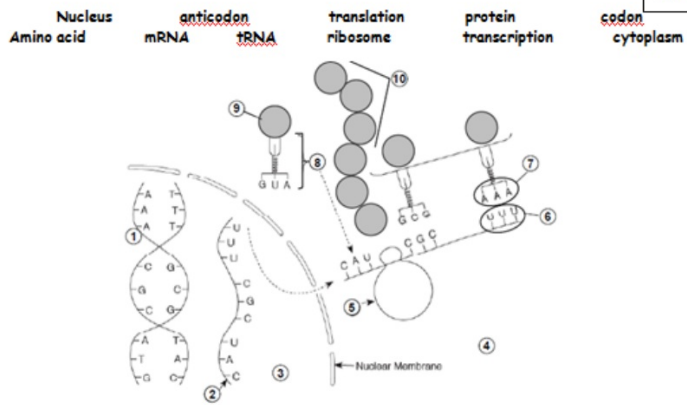
DNA	CAT	TAG
RNA	GUA	AUC
Amino Acid	Valine	isoleucine

DNA	AAA	GGG
RNA		
Amino Acid		

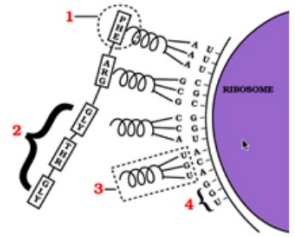


Practice EOC Questions

- The process in which part of the DNA nucleotide sequence is copied into a complementary sequence of RNA is
 A. translation B. Replication
 C. Transcription D. Reproduction
- What structure is this and where was it originally transcribed?
 A. mRNA, transcribed in nucleus
 B. tRNA, transcribed in nucleus
 C. mRNA, transcribed in ribosome
 D. tRNA, transcribed in ribosome
- Where does protein synthesis take place:
 A. nucleus B. cytoplasm
 C. ribosome D. chloroplast
- Which relationship is most similar to tRNA:
 A. book; publisher B. truck; factory
 C. key; lock D. baker; pie
- What amino acids pair with the DNA sequence CAG-TAG-CGA?
 A. valine - isoleucine - glycine
 B. valine - aspartic acid - alanine
 C. valine - isoleucine - alanine
 D. valine - phenylalanine - alanine



1.	This process is called
2.	
3.	
4.	This process is called
5.	
6.	
7.	
8.	
9.	
10.	



1. _____
2. _____
3. _____
4. _____

<http://www.youtube.com/watch?v=H5udFjWDM3E>

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<http://www.youtube.com/watch?v=PEDQoQuIhkg>