

Lesson 5.5 Protein Synthesis Review

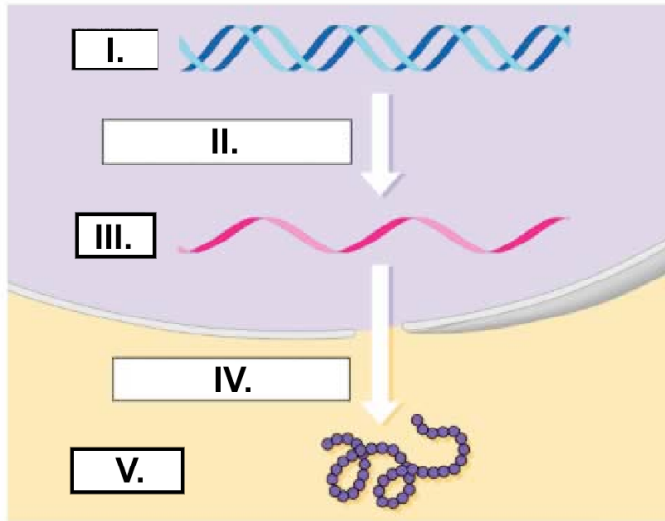
Name

Date

Period



Engage



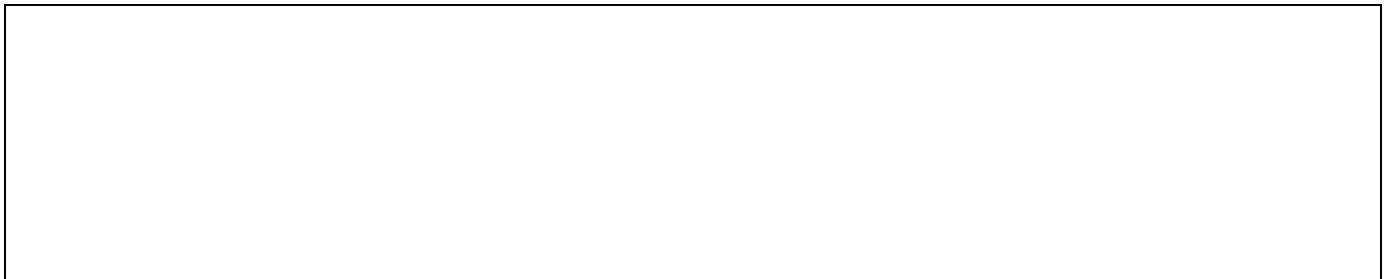
1. What molecule is represented by I?
2. What process is represented by II?
3. Where does II occur?
4. What molecule is represented by III?
5. What are the differences between a molecule of I and III?
6. What process is represented by IV?
7. Where does IV occur?
8. What molecule brings amino acids to the ribosome for assembly into a polypeptide chain?
9. What molecule is represented by V?

Let's put together our DNA sequence.

STEP 1: Place the blue pieces next to each other in any order you wish, but "TAC" must be first and "ATC" must be last. Tape them together with clear tape.

STEP 2: Tape the gold pieces to their matching blue pieces with masking tape. Then tape the gold pieces together with clear tape.

10. Draw your model from step 2 below (use color):



11. What do your blue and gold strips represent? Label it in your drawing above.

12. What kind of bond is represented by the clear tape? The masking tape? Label them in the drawing above.

STEP 3: “Unzip” your strand and place the gold piece to the side for now.

STEP 4: Match up the green pieces to your blue “template” strand. Tape the green pieces together with clear tape; do NOT tape the green strand to the blue strand.

13. Draw your model from step 4 below (use color):



14. What does the green strand represent? Label it in your diagram above.

15. Which step from protein synthesis did you just complete?

16. Where does this step take place?

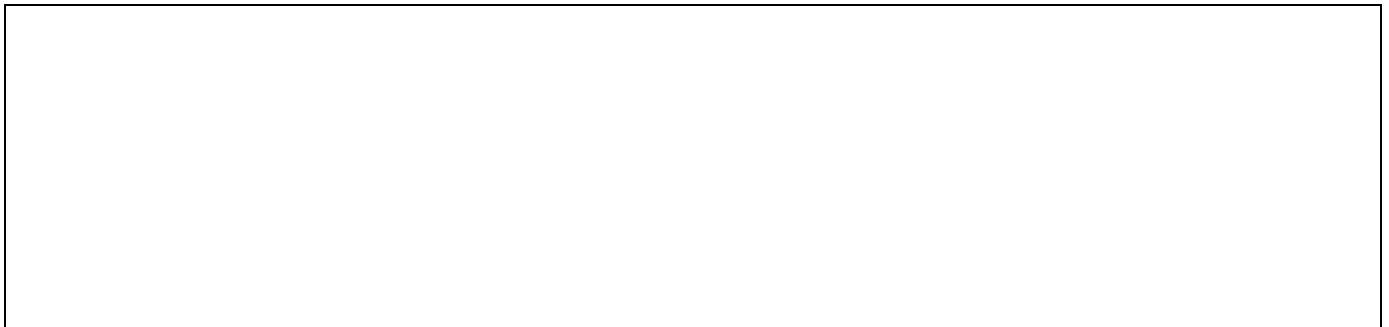
STEP 5: Remove the green strand and “rezip” your DNA. Place aside for now.

STEP 6: Match the light yellow pieces to the words on the pink pieces and tape them with masking tape.

17. What do the pink pieces represent? What is now attached to them?

STEP 7: Place the pink/yellow compound pieces in order depending on how they match up to the green strand.

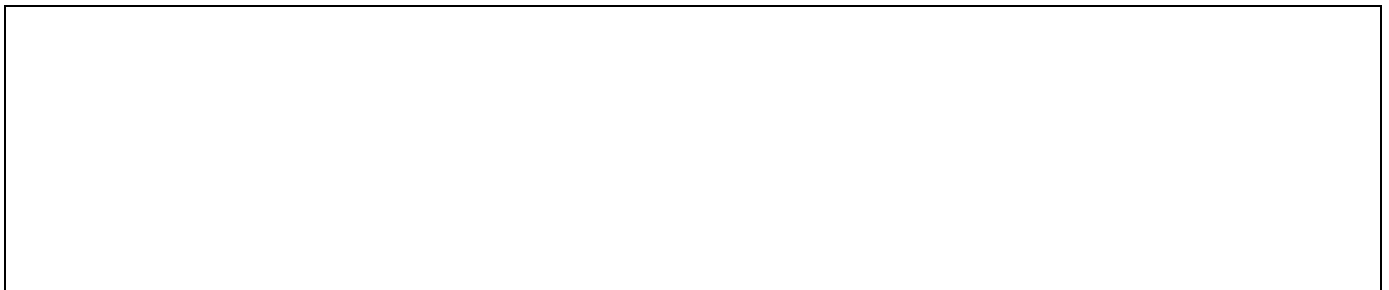
18. Draw your model from step 7 below (use color):



STEP 8: Tape the light yellow pieces together with clear tape.

STEP 9: Remove the light yellow strand from the pink pieces.

19. Draw the light yellow strand below:



20. What does the light yellow strand represent?

21. Is your strand the same as the strand that belongs to other group at your table? Why or why not?

22. What does a gene ultimately code for?

Practice

One of the genes isolated from the students in the class is called the VIP Gene. People with this gene tend to do very well in biology.

VIP Gene DNA Base Sequence

ACA-ACA-TCG-TCG-TTC-CTA-TTC-TCG-ACA-TCG-TTC-TTC-CTA-CTA-CTA-ACA

23) **TRANSCRIBE** this gene into mRNA. Record the mRNA bases in the space below.

VIP Gene mRNA Base Sequence

24) **TRANSLATE** this mRNA sequence into amino acids. Record the amino acids in the space below.

		Second base						
		U	C	A	G			
First base	U	UUU } Phenyl-alanine F UUC } UUA } Leucine L UUG }	UCU } Serine S UCC } UCA } UCG }	UAU } Tyrosine Y UAC } UAA } Stop codon UAG } Stop codon	UGU } Cysteine C UGC } UGA } Stop codon UGG } Tryptophan W	Third base	U	C C A G
	C	CUU } Leucine L CUC } CUA } CUG }	CCU } Proline P CCC } CCA } CCG }	CAU } Histidine H CAC } CAA } Glutamine Q CAG }	CGU } Arginine R CGC } CGA } CGG }		C C A G	
	A	AUU } Isoleucine I AUC } AUA } AUG } Methionine start codon M	ACU } Threonine T ACC } ACA } ACG }	AAU } Asparagine N AAC } AAA } Lysine K AAG }	AGU } Serine S AGC } AGA } Arginine R AGG }		U C A G	
	G	GUU } Valine V GUC } GUA } GUG }	GCU } Alanine A GCC } GCA } GCG }	GAU } Aspartic acid D GAC } GAA } Glutamic acid E GAG }	GGU } Glycine G GGC } GGA } GGG }		U C A G	

25. Suppose a mutation occurred in your DNA that codes for the VIP polypeptide producing the following DNA base sequence.

ACA-ACA-TCG-TCG-TTC-CTA-TTC- ACA-ACA-TCG-TTC-TTC-CTA-CTA-CTA-TCG

What effect would this mutation have on the final VIP polypeptide effectiveness?