

Name _____

AP Biology**Chapter 17 - Gene Expression: From Gene to Protein****Guided Reading Assignment Campbell's 10th Edition****Essential Knowledge:**

3.A.1 DNA, and in some cases RNA, is the primary source of heritable information

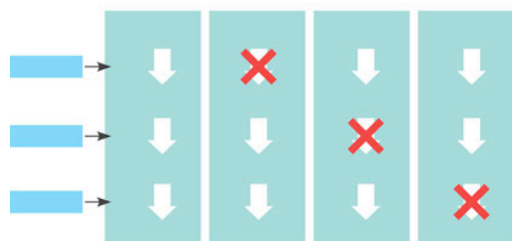
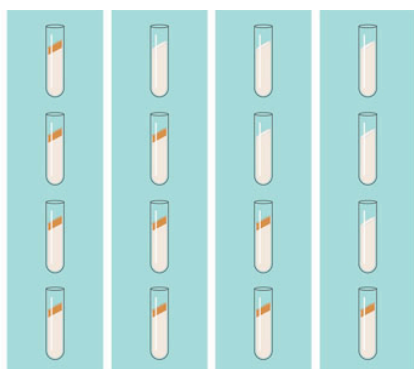
3.C.1 Biological systems have multiple processes that increase genetic variation

2.E.1 Timing and coordination of specific events are necessary for the normal development of an organism, and these events are regulated by a variety of mechanisms

LO 3.4 The student is able to describe representations and models illustrating how genetic information is translated into polypeptides.

LO 3.22 The student is able to explain how signal pathways mediate gene expression, including how this process can affect protein production

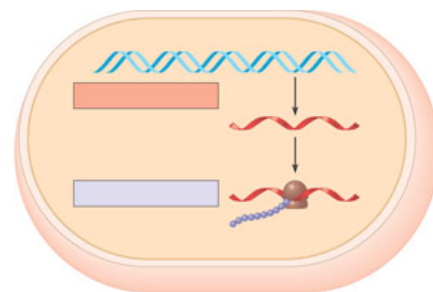
LO 3.25 The student can create a visual representation to illustrate how changes in a DNA nucleotide sequence can result in a change in the polypeptide produced.



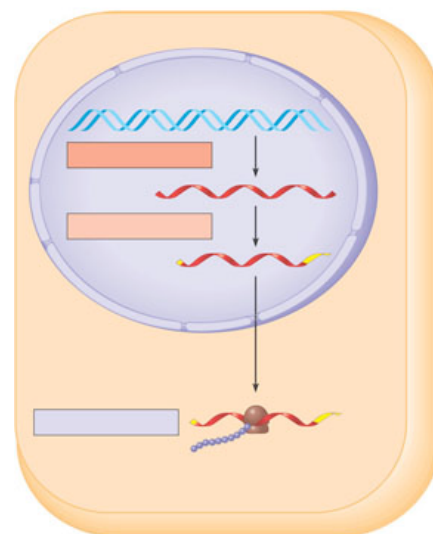
1. What did Garrod mean by “inborn errors of metabolism?”

2. Describe the Beadle and Tatum experiment with mold in detail – use the diagram below to help. The logic behind both the experiment and the results are critical.

3. What was Beadle and Tatum's final hypothesis?



(a)



(b)

4. Use the diagram to note the flow of genetic information in a eukaryotic cell – next to each label in the square – write the definition of the term.

5. Why does the “code” have to be in triplets and not singles or doubles?

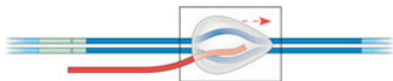
6. What is the template strand?

7. Compare and contrast the codon and anticodon?

8. How did Nirenberg “figure out” which amino acids went with which codes?

9. What is the reading frame?

10. What conclusions can be drawn from the similarities of the genetic code among living organisms?



11. Use the diagram to understand transcription: Define all terms.

12. Describe the prokaryotic promoter and terminator.

13. Use a diagram to demonstrate initiation of transcription at a eukaryotic promoter. Write definition of all terms in diagram.

14. Contrast termination of transcription for prokaryotic and eukaryotic organisms.

15. Why is RNA processing necessary?

16. What does adding a 5' cap and poly A tail mean and why is it important?

17. Define the following terms:

a. RNA splicing

b. Introns

c. Exons

d. Spliceosome

e. snRNP's

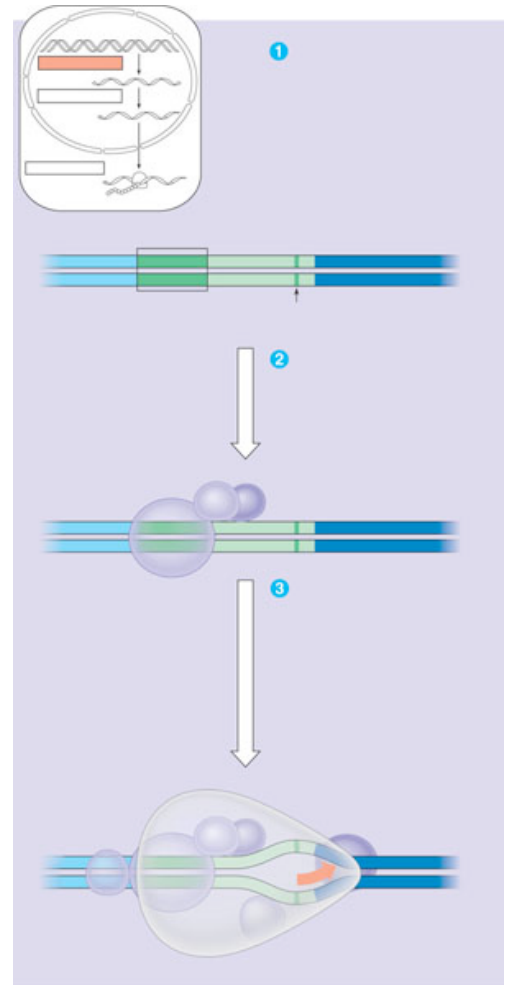
f. ribozymes

g. UTR

h. Alternative RNA splicing

i. domains

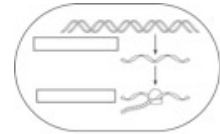
18. Describe the structure and function of transfer RNA.



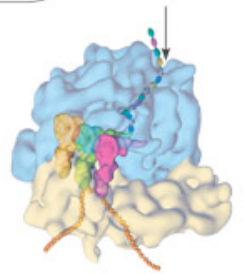
19. Why is the enzyme aminoacyl-tRNA synthetase important to translation and protein synthesis?

20. What is “wobble”?

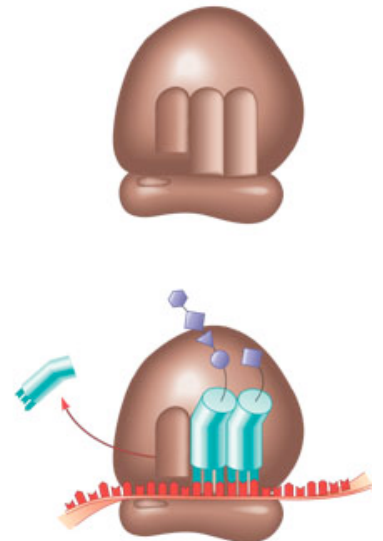
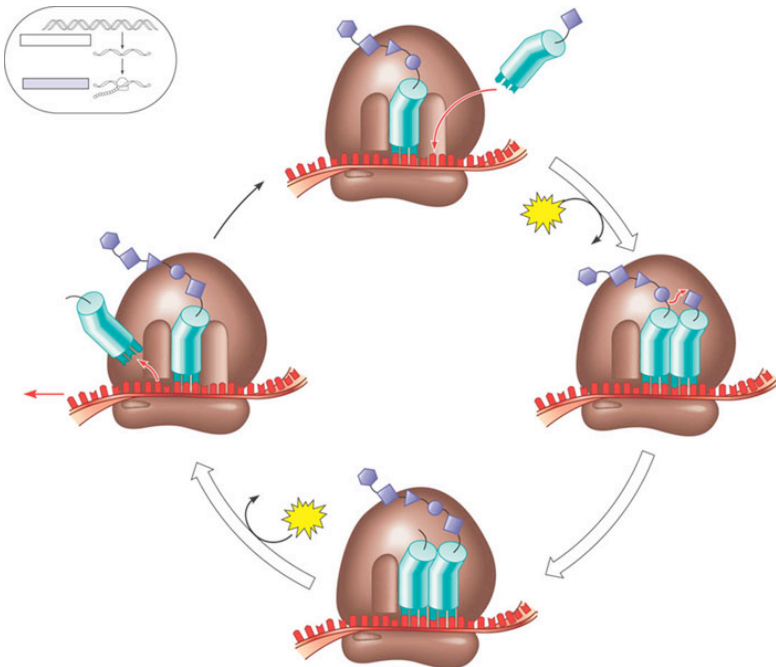
21. Describe the structure and function of ribosomal RNA – use the diagram.



22. Detail the steps of initiation of translation



23. Use the diagram below to detail elongation cycle of translation. Define terms.



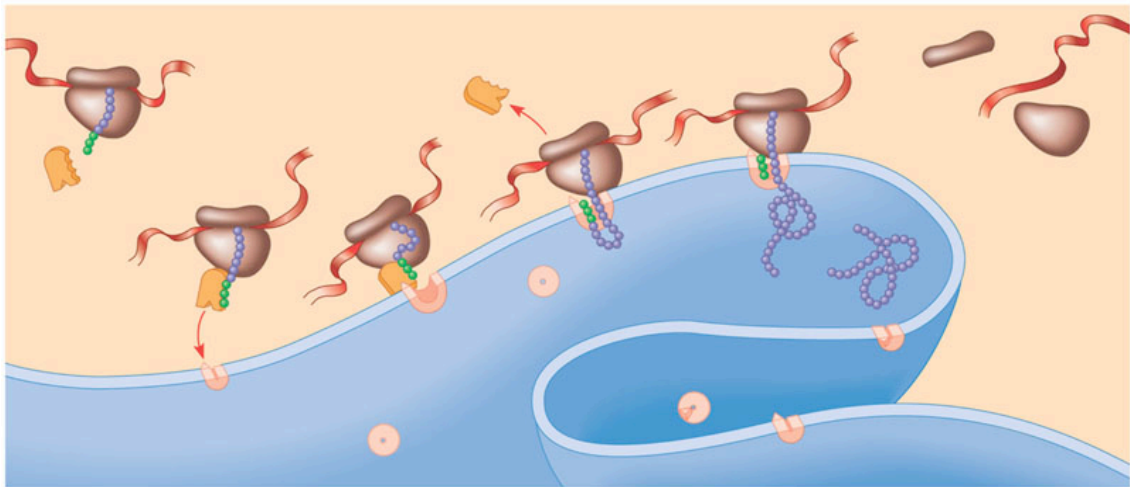
24. What are polyribosomes?

25. What is an example of a post translational modification of a protein?

26. Use the diagram below to highlight the signal mechanism for targeting proteins to the ER.

27. Define the following terms:

- a. Mutations
- b. Point mutations
- c. Base pair substitution
- d. Missense



- e. Nonsense
- f. Insertions
- g. Deletions
- h. Frameshift mutation
- i. Mutagen

28. How has a gene been “redefined” and why?