AP Chapter 17 Study Guide: Protein Synthesis

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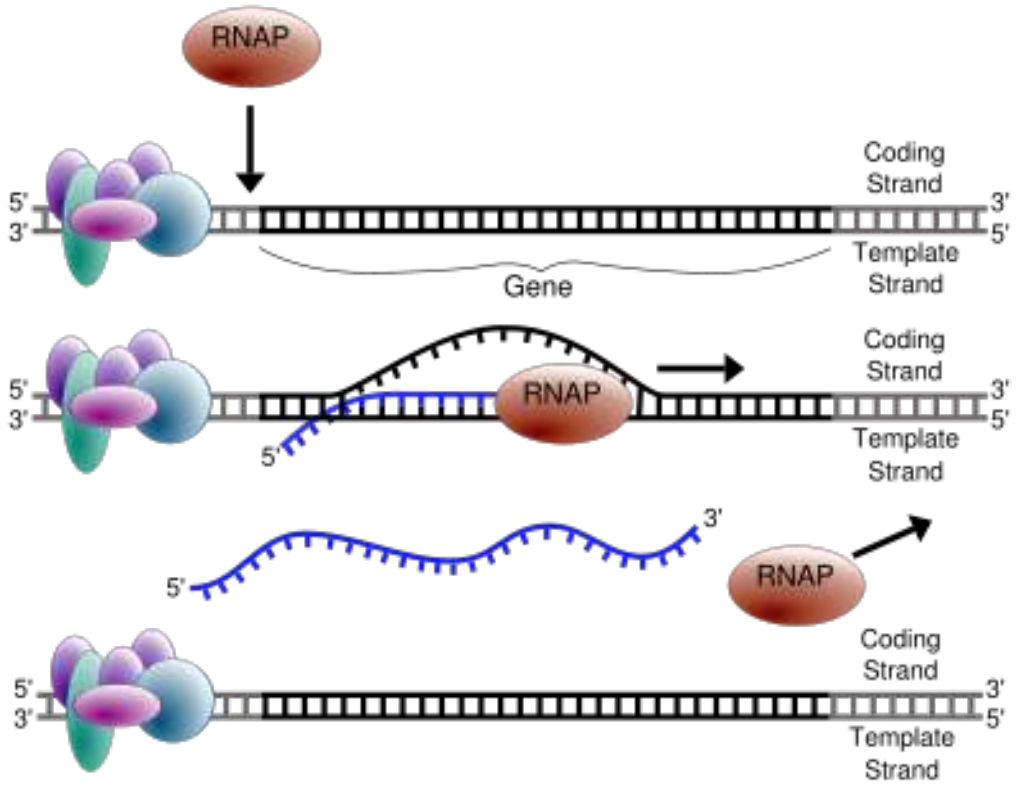
Teacher's Note: The construction of proteins is of vital importance to all cell. Essentially, all life is the expression of protein. Our author presents a voluminous presentation of information in chapter 17. I want to strip it to bare bones……..just the information you must know……BUT YOU MUST KNOW IT COLD!!! Start by reading about transcription of pages 315-317.

1. Define Transcription: _____

_____



2. What is the name of the enzyme that carries out transcription? _____.

   In what direction does it add nucleotides? (Circle one) 5'→ 3' or 3'→ 5'

3. What is the name of the region where this enzyme binds with DNA? _____

4. When does transcription begin? _____. What is the start codon? _____

5. What molecule is produced by prokaryotic transcription? _____

6. What molecule is produced by eukaryotic transcription? _____

7. How do the molecules produced by prokaryotic transcription differ from the ones produced by eukaryotic transcription? _____

8. Name three ways DNA and RNA differ structurally:

   a) _____

   b) _____

   c) _____

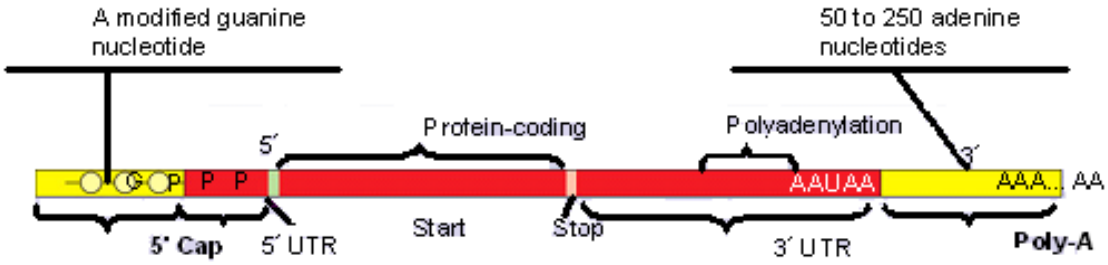
9. What are 3 types of RNA and what are their functions?

   a) _____

   b) _____

   c) _____

Read pgs 317-319 on RNA processing



10. Following eukaryotic transcription, how are the ends of the RNA molecule altered? _____

    _____

    Where does this alteration occur _____ State 3 reasons it is done?

    a) _____

    b) _____

    c) _____

11. How is the middle of the RNA molecules altered following eukaryotic transcription? _____

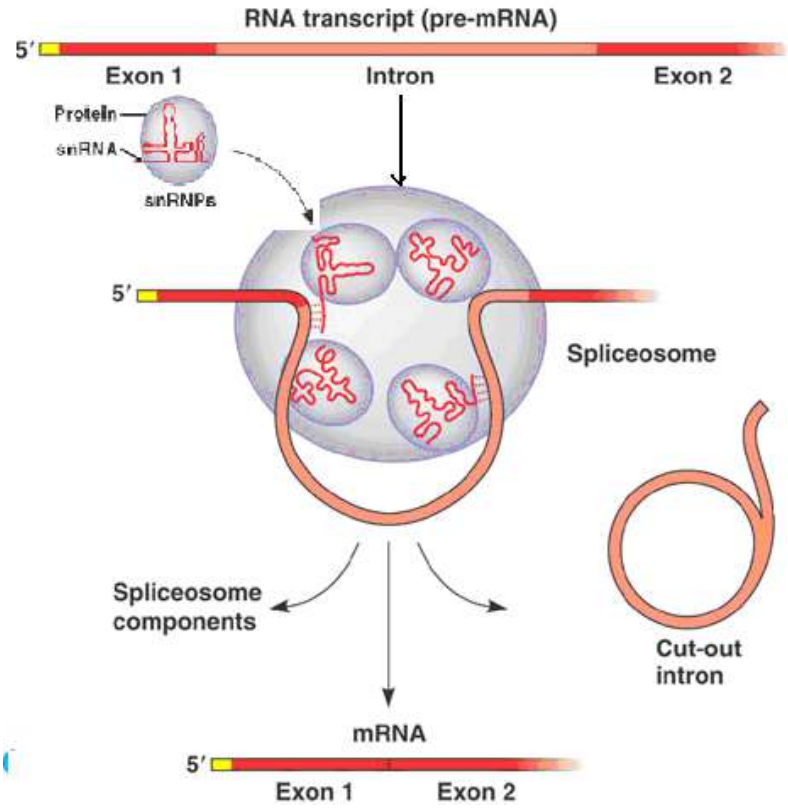
    _____

12. What is the name given to the non-coding segments of RNA? _____

13. What is the name given to the coding segments of RNA? _____

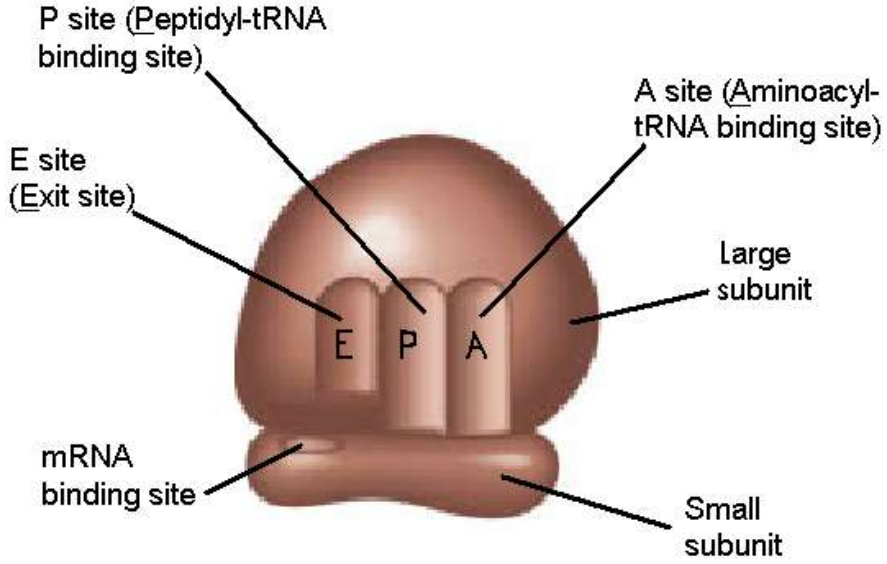
14. What is the name of a small assembly of "snurps?" _____ Where are they found and how do they function? _____

_____



15. What is the name of the RNA molecule that leaves the nucleus and goes to a ribosome? _____

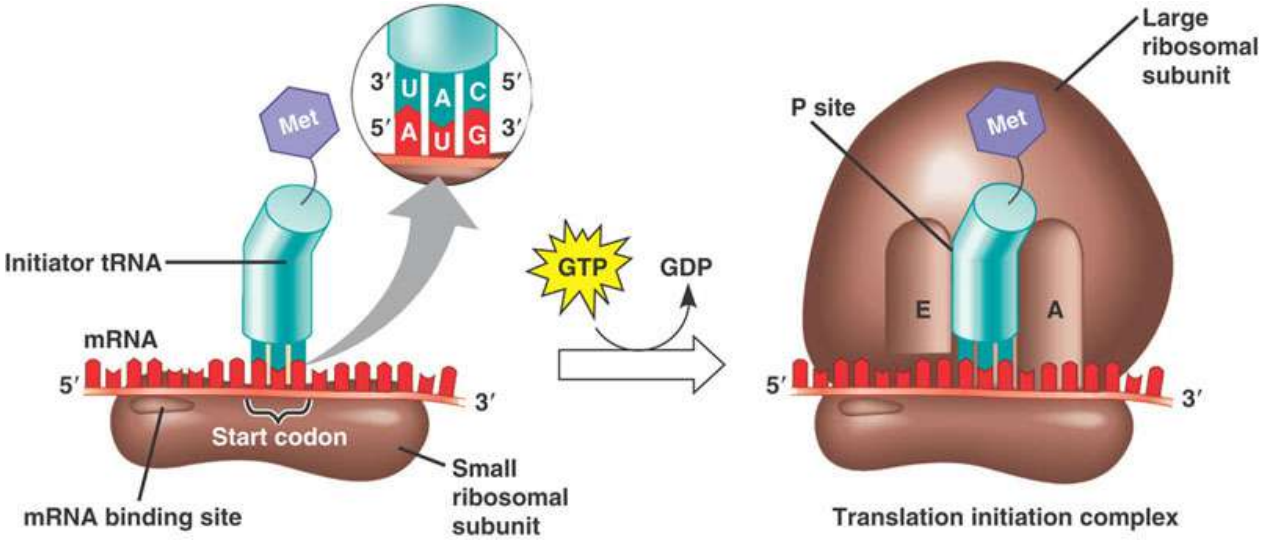
Read about the structure and function of the ribosome on pgs 322-323.



16. Are prokaryotic and eukaryotic ribosomes the same in structure?_____ Why is this useful to humans? _____

17. How many subunits are there in a ribosome? _____

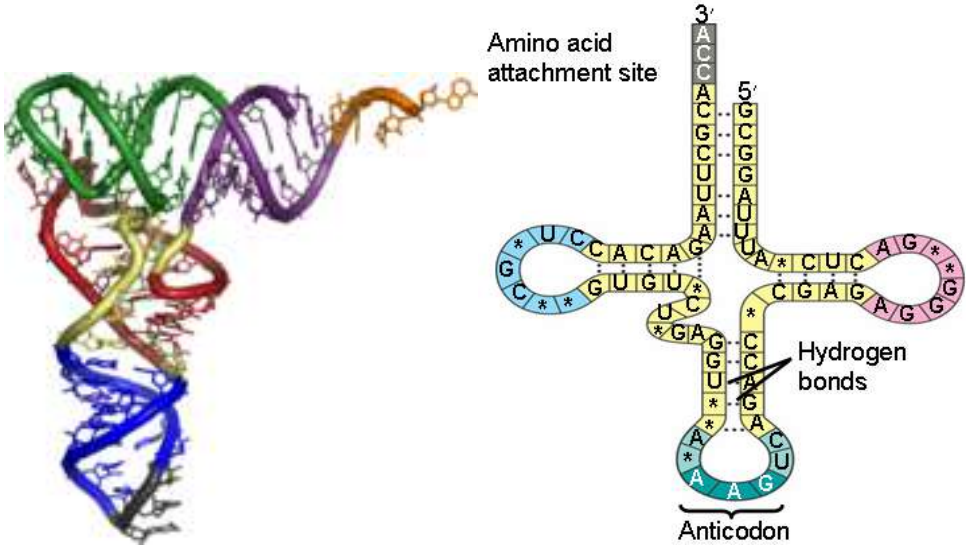
18. What two molecules make up a ribosome? _____ and _____



19. What subunit does m-RNA bind to? _____What amino acid does the initiator t-RNA bring? _____What is the name of the complex that is formed? _____ _____

20. When the large ribosomal subunit joins the complex, the initiator t-RNA is in which site? _____

21. What is a codon? _____ _____



22. What are the two important places on a t-RNA molecule? _____

and the _____

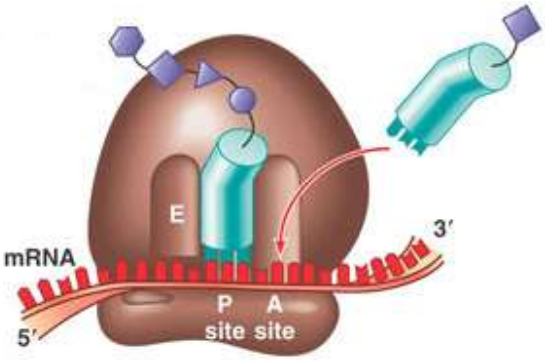
23. What is the name of the enzyme that adds amino acids to the t-RNA? _____

24. How can there be 61 codons for 20 amino acids, but only 45 different t-RNAs? (*Hint: Discuss wobble and inosine)* _____

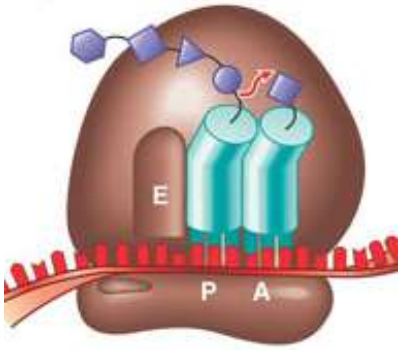
_____

_____

Read about translation on pages 323-325. Examine the pictures and answer the questions:



25. When a new codon is read, in what site does the t-RNA place the new amino acid? _____

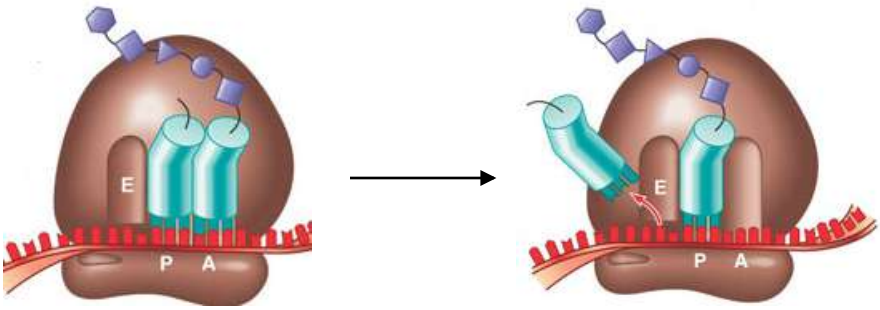


26. What occurs when the amino acids are side by side in the "P" site? _____

_____

27. What is the name of the enzymatic portion of the large ribosomal subunit that catalyzes the union of amino acids? _____What the name of the reaction that occurs and what molecule is a byproduct of this reaction? _____

28. What kind of bond forms between the amino acids? _____

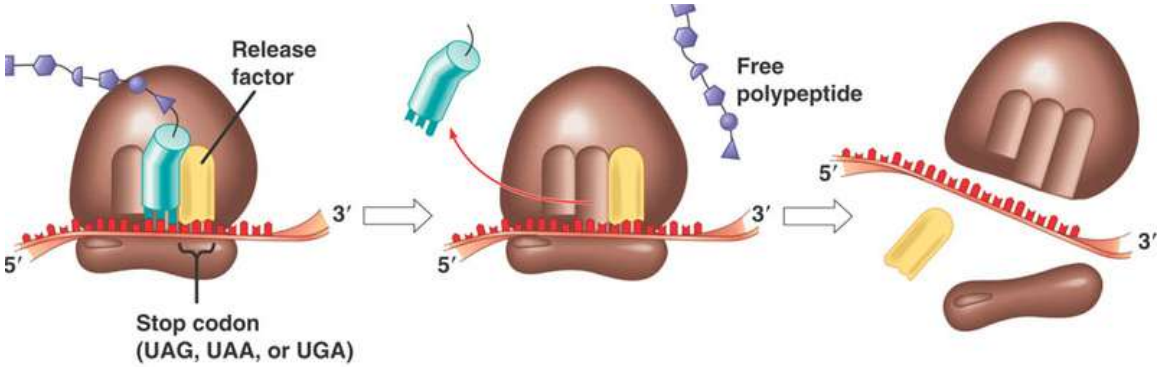


29. What is translocation? _____

30. Where does the t-RNA molecule in the "P" site move to during translocation? _____

31. Where does the t-RNA molecule in the "A" site move to during translocation? _____

32. What happens to t-RNAs in the "E" site? _____



33. When the ribosome encounters a stop codon, what molecule binds in the "A" site? _____

34. What is the result of this union? _____

35. What is the name of a cluster of ribosomes? _____Why would ribosomes be grouped this way? _____

36. When a polypeptide is release from a ribosome, it is not a functional protein. What occurs to make it functional? _____

Read about mutations on pgs 328-330

37. What is a mutation? _____

38. What is the difference between a substitution, or point mutation, and a deletion mutation? _____

_____

39. Which one will result in a frame shift? _____