



6. In 1950 Erwin Chargaff published a result that came to be known as Chargaff's rules. What did he discover? What accounts for Chargaff's rules? (2)
  
7. Who published the "double helix model" for the structure of DNA published in 1953? Describe the model with reference to the dimensions 2 nm, 3.4 nm, and 0.34 nm. The model contained basing pairing and was anti-parallel, how so? (5)
  
  
  
  
  
  
  
  
  
  
8. DNA replication in eukaryotes begins when regulatory proteins bind at several points along each chromosome called \_\_\_\_\_. Binding of these regulatory proteins allows an enzyme that separates the strands called \_\_\_\_\_ to bind. Tension produced by separating the strands is relieved by the enzyme \_\_\_\_\_. Separated strands are stabilized by \_\_\_\_\_. The new daughter strands produced by replication are designated by different names. The strand formed following the separating strands is called the \_\_\_\_\_ strand. The strand formed in a "backstitch" pattern, bit by bit, away from the separating strands is called the \_\_\_\_\_ strand and is formed in 1000-2000 base stretches called \_\_\_\_\_. These sections are initially separated by short 10 base RNA segments called \_\_\_\_\_. The enzyme complex that replaces the RNA segments with DNA is called \_\_\_\_\_ and the short sections are jointed together by the enzyme \_\_\_\_\_. (10)
  
9. Describe the method used to solve the genetic code. Which was the first codon solved? Define codon. (3)

10. What enzyme complex performs transcription? Where does it bind? Which way does it travel?  
(3)

11. What three things happens in RNA processing? Which RNA(s) is(are) subject to processing?  
(3)

12. Assume the following sequence represents one end of a mRNA (shown 5' to 3'):

methyl-GGAAGGAGGUAACACAUGCCUCCUUAACUGCGGAGGAUAAA....

a) list the first 3 amino acids that would appear in the resulting peptide. Hint: where does transcription start? (1)

b) list the anti-codons, in order, of the first 3 tRNAs involved in the synthesis of that peptide (1)

13. Describe the function of the lac operon. Explain how and why gene expression changes in the presence and absence of lactose. (4)

14. Briefly describe mitosis. What are the phases and what happens in each? (5)

Bonus questions:

1. Which important scientist was killed during WWII when a bomb landed on his lab? (1)
2. Fred Griffith, Martha Chase, Melvin Calvin, Erwin Chargaff, Maurice Wilkins, Oswald Avery, James Watson, Fredrich Miescher, Alfred Hershey, Francis Crick, Rosalind Franklin, which one is still alive?
3. What are nucleosomes? (1)

		Second Position					
		U	C	A	G		
First Position	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
	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	AUU } AUC } Ile AUA } AUG } Met	ACU } ACC } Thr ACA } ACG }	AAU } Asn AAC } AAA } Lys AAG }	AGU } Ser AGC } AGA } Arg AGG }	U	C
	G	GUU } GUC } Val GUA } GUG }	GCU } GCC } Ala GCA } GCG }	GAU } Asp GAC } GAA } Glu GAG }	GGU } GGC } Gly GGA } GGG }	U	C
						A	G