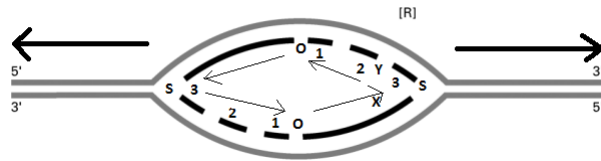


Molecules and Cells HW 5

September 29th, 2016

1. The light arrows represent the direction of DNA synthesization, and the black arrows represent the



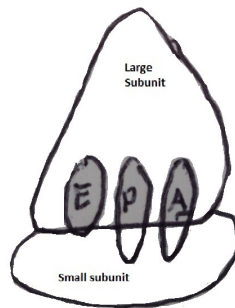
direction of movement for the bubble.

2a. The presence of small molecules would affect the T_m . DNA is a negative molecule due to the phosphate group. The salt molecules would help stabilize DNA, increasing T_m .

2b. T_m would increase with more C+G because these two nucleic acids bind with 3 hydrogen bonds rather than A+T's two, so more energy would be needed to break the bonds. T_m also increases with length because there would be more bonds to break to make a longer chain separate.

$$2c. T_m = 59.9 + 0.41(50) - 675/100 = 73.65^\circ C$$

3. (E) A=Arrival, P=Protein Elongation, E=Exit

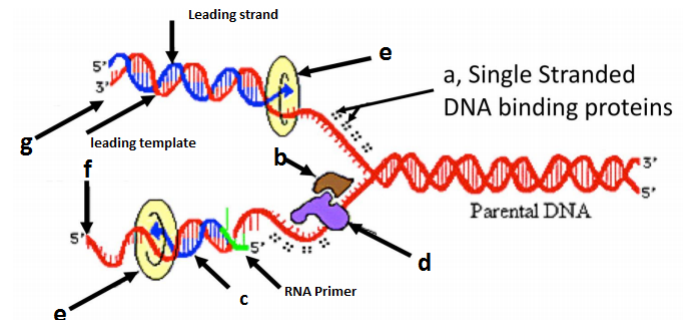


- 4a. quaternary structure
- 4b. α -helix
- 4c. primary structure
- 4d. binding site
- 4e. polypeptide backbone
- 4f. β -sheet
- 4g. antibody
- 4h. allosteric protein
- 4i. gene
- 4j. antiparallel
- 4k. RNA primer
- 4l. ligase

- 4m. DNA helicase
- 4n. leading strand
- 4o. sliding clamp
- 4p. replication fork
- 4q. lagging strand

5. 3'-TACCACGTG-5' or 5'-GTGCACCAT-3'

6.



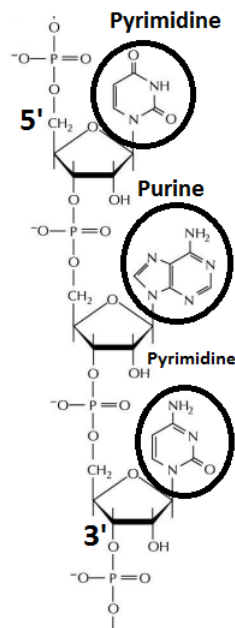
Synthesizes DNA in 5' to 3' direction
Error checking in 3' to 5' direction

7a. 3'-CCTAAAAACAGGTGTTAGT-5' or 5'-TGATTGTGGAGACAAAAATCC-3'

7b. Since complementary strands run in opposite directions, the phosphate group is on the 5' end.

7c. No, DNA replication copies over the complementary nucleotides. Because DNA does not have to be symmetrical, the new strand is not the same as the parental strand.

8.



The sugar is a ribose.

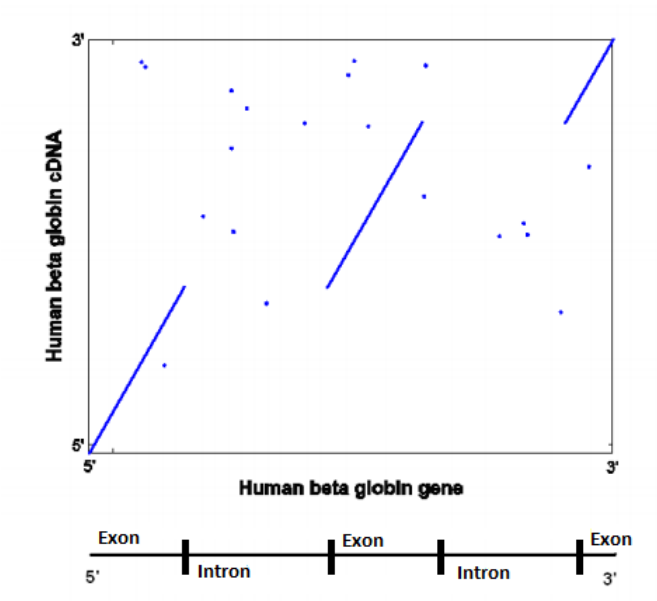
9. The molar percent of G has to be the same as C, so it must be 30%. Then, the remaining percentages must be split equally between A and T, so both of them must 20%.

10. True, True

11. (E) There are 6 codons for Arg, 6 codons for Leu, and 6 codons for Ser, for a total of $6 * 6 * 6 = 216$ possibilities.

12. (D)

13a.



13b. The gene has 2 introns and 3 exons.

14. Since RNA polymerase transcribes from 3' to 5', the bottom strand is the template. The resulting RNA strand is 5'-GUAACGGAUG-3'