

BIO 5099
Homework Assignment #8

Name _____

Due start of class, **Tuesday October 15th**.

Late assignments are not accepted, show your work for partial credit.

Assignments may be e-mailed to: christiaan@xiaan.com or rbaror@dmibio.com anytime, or faxed to (303) 556-2889 between 3:00 and 4:00 p.m. on Tuesday.

Please check the web site homework page for specific hints on this assignment.

Define in your own words and give an example:

1. (2pts) Okazaki Fragment

2. (2pts) (Gene) Homologue

3. (2pts) Tubulin

4. (2pts) Transcription Factor

5. (2pts) Operon.

6. (2pts) Why is bacterial DNA replication initiated only at a single point?

7. (12pts) Each of the following DNA fragments has exactly one thing wrong with it. For full credit, indicate a) what is wrong with the fragment, b) a possible source of the problem, c) which DNA repair mechanism(s) are necessary to **completely repair** the problem, and d) what the correct DNA sequence should be. For all examples, assume the top strand to be the parent. In the last example, assume **T=T** is a thymine dimer, and **A-A** is a normal continuation of the DNA sequence.

5' -ACGTCGATACTGCGATCTGACGTA CTGACTGACGACTG-3'
3' -TGCAGCTATGACGCTA ACTGCATGACTGCTGAC-5'

5' -GCATGACTGACTGCGCTGAGTCATGACGTCAGTC-3'
3' -CGTACTGACTGACGCGACTCAGTAUTGCAGTCAG-5'

5' -AAGACTGACTGACTGACTGACGTA CTGACTGACGACTG-3'
3' -TTCTGACTGACTGACTGACTGACGTA CTGACTGACGACTG-5'

5' -ATCATACTGCATGCAT=TACTGACGAGTCATCTAC-3'
3' -TAGTATGACGTACGTA-ATGACTGCTCAGTAGATG-5'

8. (6pts) Indicate whether each of the following statements is true or false (circle correct answer). If your answer is false, indicate what would make the statement true.

T F Prokaryotic genomes often have genes that code for proteins involved in the same metabolic process on adjacent stretches of DNA.

T F One gene codes for exactly one protein.

T F Prokaryotic DNA that is not used for genes is called random DNA.

T F The promoter is a downstream regulator of gene transcription.

T F Intercalating agents such as aflatoxin cause DNA mutation, resulting in frame shifts during translation.

T F A mutation in a photolase gene is thought to cause Werner's Syndrome.

9. (2pts) What three classifications does DNA take on in a chromosome?

10. (4pts) Explain why DNA replication is the rate-limiting step in prokaryote reproduction.

11. (4pts) Describe two differences between the trp and lac operons.