Homework Assignment #5  
Due: 11/22/2004 in class

1. (10 points) Textbook, question 6.4.

2. (7 points) Textbook, question 6.8.

3. (8 points) Textbook, question 6.9.


5. (7 points) Discuss major differences in transcription between eukaryotes and prokaryotes.

6. (7 points) Discuss three types of regulatory elements that enable transcription initiation in prokaryotic and eukaryotic organisms. What are the major differences between them? Make distinction between prokaryotes and eukaryotes.

7. (7 points) What are the major post-transcriptional modifications of hnRNA? Explain each.

8. (9 points) Open reading frames.
   (2 points) What are ORFs?
   (3 points) Discuss importance of ORFs in prokaryotes and eukaryotes.
   (4 points) What is the major difference between the two groups?

9. (7 points) Compare gene density in prokaryotes and eukaryotes. Support your argument by known statistics on the gene density (state the source of information).

10. (6 points) Splicing.
    (2 points) What is splicing?
    (4 points) What is alternative splicing?

11. (7 points) GC content.
    (3 points) Discuss the importance of GC content in eukaryotic DNA.
    (1 point) Are GC regions overrepresented in eukaryotes or underrepresented?
    (3 points) What are CpG islands?

12. (6 points) Transposition.
    (3 points) What are transposons?
    (3 points) What are retrotransposons?

13. (3 points) Who is responsible for the names “intron” and “exon” and when were the names officially suggested? Has this person received any Nobel prizes?

14. (8 points) Repetitive DNA elements.
    (5 points) What is the classification of repetitive DNA fragments that do not propagate through the action of transposase.
    (3 points) Into which of the three classes would the following sequence fall: 5’ GAGAGAGAGAGA 3’?