Homework #2 for Computing for Bioinformatics I

Due: Friday, Sept. 14, 2007

Chapter 3 problems:

1. What is the complementary sequence to the following string of nucleotides?

Be sure to label the 5' and 3' ends of the sequence that you write.

5' - G G A T C G T A G C C T A - 3'

2. Diagram the "central dogma" of molecular biology complete with labels that indicate the portions that correspond to transcription and translation and indicate what enzymes are responsible for those important steps.

3. How frequently would you expect to find the sequence of nucleotides provided in Question 1.2 in a DNA molecule simply as a result of random chance? Assume that each of the four nucleotides occurs with the same frequency.

4. How many nucleotides long would a DNA sequence need to be in order for it to not be found by chance more than once in a genome whose size is 3 billion base pairs long?

5. a) What sequence of amino acids would the following RNA sequence code for if it were to be translated by a ribosome?

5' - AUG GGA UGU CGC CGA AAC - 3'

b) What sequence of amino acids would it code for if the first nucleotide were deleted and another "A" were added to the 3' end of the RNA sequence?