

This homework is due at the **beginning** of class on **Thursday, Oct. 20, 2005**

Graded homework will be returned Tues., Oct. 25; the second **exam will be Tues., Nov. 1**

A review sheet will be provided separately

Homework questions (please provide your answers on a separate sheet).

1. (1 pt. each, answer each letter separately) Which RNA polymerase II general transcription factor(s)

A - phosphorylates the CTD of RNA polymerase II

B - is part of the elongating transcription complex

C - remains bound at the promoter after transcription initiation

D - contains TBP and TAFs

E - contains a protein subunit that also functions in transcription by RNA polymerases I and III

F - binds RNA polymerase independently and joins the preinitiation complex with polymerase

2. (4 pts. - 1 each; check all that apply).

AP endonuclease would be expected to act in which of the following repair events:

a) Deamination of cytosine

b) G:T mismatch

c) Thymine dimer

d) Depurination

3. (2 pts.) There are several examples of genetic events which result from double-strand breaks that are initiated by regulated endonuclease cleavage (as opposed to resulting from random DNA damage). Name two.

4. (2 pts.) Which technique for detecting protein DNA interaction (electrophoretic mobility shift assay or footprinting) requires that all (or nearly all) of the DNA present be bound by protein? Which technique generally involves an excess of DNA rather than protein?

5. (4 pts.) A species of bacteria has two chromosomes, A and B. A is 4 Mb. and B is 800 kb.. The copy number of chromosome A is 2, meaning that on average, each cell has two of this chromosome. The copy number of chromosome B is 8, meaning that on average, each cell has ten of this chromosome. You isolate DNA from the bacterium, shear the DNA to an average size of 10 kb. and denature the DNA by heating. DNA on which chromosome will renature first, and by what factor (give me the ratio of the time it takes for each DNA to reach 50% double-stranded).

6. (2 points) Examine Figs. 9.20, 21.9 and 21.16. All of the genes shown are homologs. For each of the following pairs, state whether the term ortholog or paralog is most appropriate:

a) human beta globin and human delta globin

b) human beta globin and human myoglobin

c) human beta globin and mouse alpha globin

d) human beta globin and mouse beta globin