Study Questions for the assigned journal article:
Dianov and Lindahl  
**Current Biology** 4: 1069-1076  1994.

**Question 1:** Examine figure #2. Explain the significance of panel a. 
(1-2 sentences)

**Question 2:** Examine panel b in Figure #2. *E. coli* strain BD10 is *ung*⁻ and W3110 is *ung*⁺. They are otherwise isogenic (or genetically identical). The examination of these strains is an important step in the work-up of this *in vitro* system. Explain why.

**Question 3:** Examine lane 1 in figures 3 & 4. Briefly explain why there is band in figure 3 but not in figure 4 even though the enzymatic components added are the same in both. (2 sentences)

**Question 4:** Look at Figure 2b (lanes 2 & 3) and Figure 3 (lanes 6 & 9) and recall that the role of the *ung* gene product in BER (base excision repair) had been previously established. *E. coli* strain BD10 is *ung*⁻ and W3110 is *ung*⁺. They are otherwise isogenic (genetically identical).

  - Briefly explain what the data in Figure 3 (lanes 6 & 9 only) tell you. (two sentences)
  - Briefly explain what the data in Figure 2b (lanes 2 & 3 only) tell you. Why was this experiment also done? (one- two sentences)

**Question 5:** Explain lane 4 in figure #4

**Question 6:** How did experimenters adjust the *in vitro* reaction conditions to approximate in vivo reality? one sentence

**Question 7:** The RecJ protein can remove 5’ terminal sugar phosphate residues. In this *in vitro* system, this protein is obviously not absolutely required for repair. What enzyme can replace RecJ function? Briefly explain

**Question 8:** What sort of experiment would you do to ask if the RecJ protein is required for base excision repair in the cell? Briefly outline your strategy.
**Question 9:** What facts about base excision repair support Jacque Monod’s statement about *E. coli* and the elephant? No explanation necessary.

**Question 10.** This paper states that “it has not been possible to construct an *E. coli* mutant totally deficient in the repair of DNA abasic sites, implying that continuous correction of spontaneous DNA lesions is required for viability.” *What old-style strategy would you use to find an *E. coli* mutant totally deficient this type of repair? Just summarize strategy -- don’t worry about the details of how the experiment is actually carried out.*

**Question 11:** In mice, targeted disruption of the AP-1 gene that codes for AP endonuclease results in *recessive* embryonic lethality. How is this mutation propagated?

**Question 12.** The *ung*- *E. coli* strain is viable, but deficient in uracil-DNA glycosylase. *Does this contradict the statement in question 4? Briefly explain.* *(1-2 sentences)*