GENOME553 Winter 2004

Paper for Tuesday 27 January 2004
Benzer. 1967. Behavioral mutants of Drosophila isolated by counter current distribution. *Proc. Natl. Acad. Sci. USA* **58**: 1112-1119.

Homework: **As you read this paper, write down three questions you may have about the biology of the system, fly nomenclature, behavioral mutants, or fly genetics. Also, please answer the "question" in bold below.**

Questions for Thought

1. What was known at this time? Why screen for UV-insensitive eye mutants? Why is UV-sensitivity an interesting process to study? Is it a "good model" for something? If so, what?

2. Briefly describe the mutagenesis screen developed by Benzer. What assumptions was Benzer making in designing his screen? What predictions was he making about the phenotypes of his desired UV-insensitive mutants? What other types of mutants could Benzer have recovered from his screen? How could he distinguish true "phototactic" mutants from these other types of mutants?

3. Why did Benzer examine so many different wild-type strains? Why examine previously known mutants? Why mix populations of flies?

4. Was this screen saturating? How do you know? What kinds of genes would he miss with his approach? What are the advantages of the approach he used?

5. What do we know about the two mutants that Benzer recovered from his screen? That is, what exactly are the phenotypes? Summarize the data for each mutant.

6. Interpreting the phenotypes depends on knowing something about the alleles. What do we know about the nature of the alleles? Are they loss or gain of function? How would you figure that out?

7. Based on the mutant phenotypes and our assumptions about the nature of the alleles, what can we say about the function of the proteins disrupted in these mutants? Can we define a process in which these proteins might act, something more specific and mechanistic than simply "moving toward light"? How do the assays Benzer used help us distinguish between potential functions? Can we eliminate some potential functions for these proteins? **With these ideas in mind, suggest at least three possible explanations for the defects we see in mutant SB8.** Do the same for mutant SB6.

8. Design some experiments to distinguish between your hypotheses.