

Ch. 7: 25 (but pretend it's asking about *S. cerevisiae*, so spore order is irrelevant), 26, 27, 29, 30, 32, 33

### **I. What does a gene look like?**

- A. T4 rII genes and the nature of the gene
  - 1. rII mutants grow on B, not on K
  - 2. rIIA and rIIB distinguished by complementation
  - 3. mutations located within genes by mapping
  
- B. Benzer's saturation mutagenesis
  - 1. virtually every base can be mutated
  - 2. gene is linear array of mutable sites, just as chromosome is linear array of genes
  
- C. Recomb. between two mutants in same gene  $\sim 10^{-3}$ , reversion  $\sim 10^{-6}$ 
  - 1. non-reverting and non-recombining mutants
  - 2. mapping indicates they cover several contiguous sites
  - 3. they are deletions - used for rapid deletion mapping of mutations within a gene (by failure to generate + recomb.)

### **II. What does a gene do?**

- A. Beadle and Tatum - one gene one enzyme
  - 1. several complementing auxotrophic mutations with same phenotype indicates more than one gene needed for biosynthesis
  - 2. complex biomolecules likely require several steps to build
  - 3. pathway confirmed by feeding intermediate compounds
  
- B. Epistasis can also be used to order pathways if different mutants have distinct phenotypes (in addition to auxotrophy)
  - 1. mutant for gene encoding enzyme near end of pathway grows on fewest intermediates
  - 2. compounds near beginning of pathway allow growth of fewer mutants than compounds near end
  
- C. Feeding and epistasis experiments may sometimes give different answers for path order, complete answer comes from both