

Exam III review Sheet

- Exams in this class ask you to demonstrate your knowledge of the subject matter that we have been discussing in class and you have been working on by going over the material and doing practice problems.
- The exam will consist of short answer questions and problems similar to the suggested problems/homework. None of the problems will be a surprise. They are all similar to things you have already worked on. *If you have prepared for the exam, the 55 minutes provided will be ample time to finish the exam. If you are not prepared, you may not finish the exam.*
- The practice exam questions have come from previous exams. They are good practice questions.
- This is not an exhaustive review sheet. It only outlines ideas that you should be familiar with.
- The best way to prepare is:
 - Do and understand all of the suggested problems in the book (this is especially important)
 - Do and understand the homework assignment
 - Do and understand questions from the old exam
 - Understand the concepts listed below

You should be able to work the following types of problems

- Bacterial Interrupted Conjugation Mapping
- Phage Recombination Mapping (Inter- and Intragenic)
- Phage Complementation

Bacterial Genetics

- What are the differences between F-, F+, and Hfr bacterial cells
- Be able to do problems associated with conjugation and transformation of bacteria (assigned problems are good for this)

Phage genetics

- Be able to determine recombination distance from phage crosses
- Know the difference between recombination and complementation and what each tells you.
- Understand the experiments that Benzer did with the rII phage mutants.

Avian Influenza

- + strand and – strand RNA viruses
- What is a Zoonosis?
- What is a reservoir?
- The function of Hemagglutinin in Flu virus infection
- The importance of the antigenic sites and the receptor sites on Hemagglutinin
- The role of sialic acid modification of surface proteins in defining what organisms a virus can infect.
- The difference between antigenic drift and antigenic shift.

Transposons

- What is the difference between a transposon and a retrotransposon? How do they move?
- What is the difference between an autonomous and a nonautonomous transposable element?
- Understand the Ac-Ds instability example from Maize

Chromosome Variation

- The difference between the major kinds of chromosome structural abnormalities (deletions, duplications, inversions, translocations)
- How repeated DNA sequences can give rise to changes in chromosome structure.
- Why changes in gene dosage (loss of genes, too many copies of genes) is detrimental to cells.
- The different kinds of aneuploidy (monosomy, trisomy, etc)
- How aneuploidy occurs during meiosis

Cancer Genetics

- Knudson's "two hit hypothesis" to explain sporadic and inherited retinoblastoma
- Proto-oncogenes and why mutations producing oncogenes act dominantly
- Tumor suppressors and why cancer causing tumor suppressor mutations act recessive
- Idea of cancer as a multi-step process
- Difference between an inherited vs. a sporadic common cancer