

Week 8 – Recombinant DNA and DNA Replication & The Cell Cycle

Part I – Recombinant DNA

Learning Goal: Appreciate how restriction enzymes allow scientists to create recombinant DNA molecules in the lab

After the pre-class assignments you should be able to:

- Explain how restriction enzymes recognize and cut DNA
- Outline the steps involved in creating a recombinant DNA plasmid

By the time you take the second midterm you should also be able to:

- Identify potential restriction enzyme sites based on the sequence of nucleotides
- Determine whether two different restriction enzymes would generate compatible “sticky ends” given the recognition sequence and cut site for the enzymes
- Determine the size(s) of restriction fragments produced when a linear or circular piece of DNA is cut by one or more restriction enzymes
- Compare and contrast the genetic information stored in complementary DNA (cDNA) vs. genomic DNA

Part II – DNA Replication & The Cell Cycle

Learning Goal: Appreciate how cells replicate their chromosomes to pass genetic information on to daughter cells during cell division

After the pre-class assignments you should be able to:

- Outline the stages of the cell cycle
- Explain function of the components of the replication machinery
- Describe how the process of DNA replication is initiated in prokaryotes and eukaryotes
- Discuss the “end replication problem” and how it is dealt with by cells with linear chromosomes

By the time you take the final exam you should also be able to:

- Relate events in the process of DNA replication to stages in the cell cycle
- Relate the quantity of DNA found in a cell to the cell’s progression through the cell cycle
- Differentiate between the leading and lagging strand during DNA replication
- Evaluate how changing components of the replication machinery would alter the process of replication
- Predict how changes in telomerase activity affect cell division