Biology 10

Chapter 12: DNA
p 338-353

Objectives

- Summarize the relationship between genes and DNA
- Describe the overall structure of the DNA molecule.

What Carries Genes?

- _____ determined that chromosomes carried the genetic material
- Chromosomes are made of _____ and _____, so the debate was on as to which carried the genetic information.
- Early guesses were that it was the _____, and not the _____

Early DNA Experiments

- Frederick Griffith
  - _____ experiment
  - determined that dead bacteria could still pass on some factor to living bacteria
    - **transformation**: _____

      _____

Griffith's Experiment (see fig 12-1, p339)

Avery and DNA

- Oswald Avery in 1944 duplicated Griffith's work and determined that it was DNA that was causing the bacteria to transform

Hershey-Chase Experiment

- Basically found that it was the viral DNA that was entering the cell and causing the cell to produce more viruses

•Role of DNA

- •DNA has three important jobs
  - •**1) _____ information:** it has the information needed to make every single protein in your body, which in turn influence all of your traits
  - •**2) _____ information:** DNA needs to be able to copy itself so that future cells will have all the required information

●**3) _____ information:** DNA needs to be passed on completely from parent cell to daughter cell

Structure of DNA (Ch 12-2)

- monomer of DNA is _____
- each nucleotide consists of:
  - _____ (deoxyribose)
  - _____ group
  - _____

- 4 types of nitrogenous bases
  - **purines**- have a _____ structure
    - adenine and guanine
  - **pyrimadines-** have a _____ structure
    - cytosine and thymine
  - You can use the fact that pyrimadine, cytosine, and thymine all have the _____ in them to remember)
- Nucleotides join together to form long strands
- Two strands then bind together and twist, forming a _____
  - double-helix model discovered by _____ and _____ in 1953
  - one of most important discoveries in science

- The two strands are joined together by _____ between the nitrogenous bases
- each bond consists of one purine and one pyrimadine
  - This allows the two strands to always remain the same distance apart (three ring width)
  - _____ binds with _____
  - _____ binds with _____
  - The two strands match up, but face in opposite directions
    - termed _____, strands are _____

Replication of DNA (Chapter 12-2)

- **replication**- the process by which _____
- each strand serves as a template for new strands
  - Replication is **semiconservative**, as each new strand of DNA contains _____

- 1st step- _____ through an enzyme called **DNA helicase**
- 2nd step- unpaired bases react with nucleotides floating freely in the nucleoplasm

- 3rd step- enzyme called _____ "zips up" the new DNA strands

- Replication in eukaryotes takes place _____ (about 6000)
- Replication in prokaryotes only takes place _____, and works its way towards the ends (only 1 chromosome!)
- The nature of the binding between nucleotides helps ensure accuracy
- usually only about one error per _____ nucleotides
- Several enzymes also help detect and repair errors in replication
- Errors in DNA replication do occur, and are called _____