

Nucleoside= sugar + base

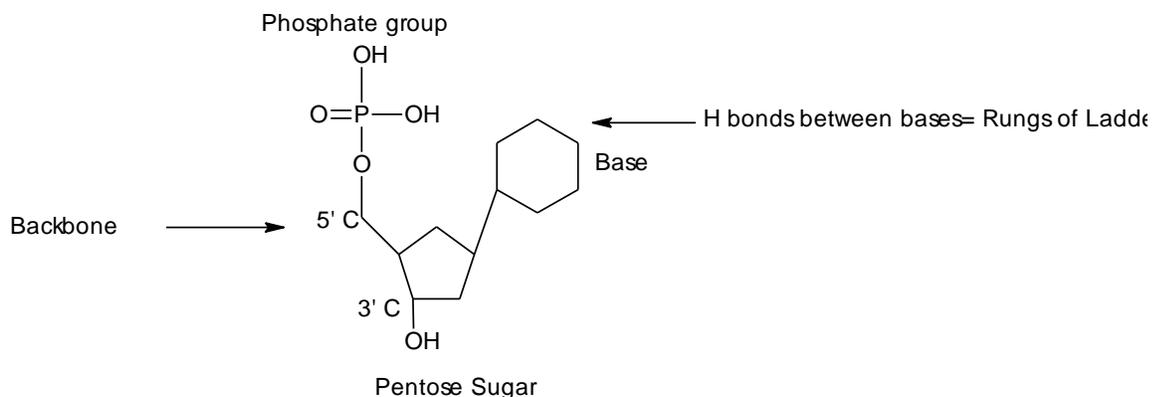
Nucleotide= sugar + base + phosphate

1. Answer the following questions about the experiments discussed in class.
 - a. What was the significance of Griffith's experiment? What was his critical experiment? Based on your knowledge of biology, what do you think "transformation" actually is?
 - A substance in the heat-killed virulent bacteria genetically transformed the type IIR bacteria into live, virulent type IIIS bacteria.
 - Transformation is probably replication of genetic material.
 - b. What was the significance of Avery's experiment? What was his critical experiment?
 - Discovered DNA was genetic material
 - Enzymes (trypsin, chymotrypsin) that break down proteins and RNA had no effect.
 - Enzymes that break down DNA stop biological activity indicating DNA as the genetic material.
 - c. What was the significance of the Hershey-Chase experiment? Which molecules did they label and which (radioactive forms of the) elements did they label them with?
 - Significance= to determine whether phage proteins or phage DNA were transmitted in phage reproduction.
 - Radioactive isotope ^{32}P tagged DNA and Radioactive isotope ^{35}S tagged RNA.
 - DNA was found in replicated phages and not proteins therefore DNA- not protein- is the genetic material in bacteriophages.
2. A nucleotide is made up of three distinct components. Draw a picture of a nucleotide and label these components. Indicate which carbon these components are located on. Which part(s) of the nucleotide make up the "backbone" of the DNA? Which part(s) of the molecule make up the "rungs of the ladder"?

Chargaff's rule indicates A's are paired with T's and G's are paired with C's

Purines= A & G

Pyrimidines= C, U, T



3. Who constructed the idea of the three-dimensional structure of DNA and how did they do it?
Watson and Crick – with X-Ray diffraction

4. *What is the directionality of the phosphodiester bond?*

5' C ----> 3' C

5. If a region of DNA contains 6,000 nucleotides, how many base pairs does the molecule contain?

3,000 bp

6. Which regions of the double-stranded DNA (dsDNA) are hydrophilic? Which regions are hydrophobic?

Phosphate= hydrophilic

Sugar + base= hydrophobic

7. What are the major differences between DNA and RNA? Draw the two sugars associated with each of these molecules.

DNA	RNA
Deoxyribose	Ribose
Double stranded	Single stranded
T	U

8. Does the following DNA sequence form a hairpin loop or a stem (GGCAATATTGCC)?

stem

9. Does the following DNA sequence form a hairpin loop or a stem (TGCGATACTCATCGCA)?

Loop

