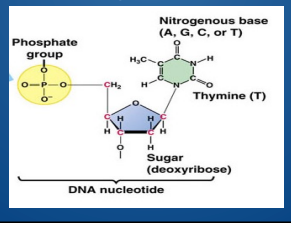
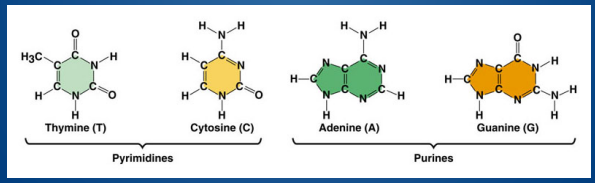
Chapter 8 From DNA to Proteins

8.2 Structure of DNA

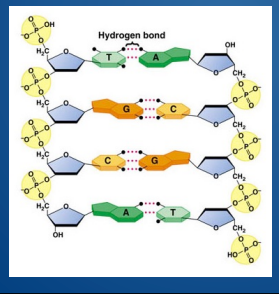
I. DNA is composed of four types of nucleotides
   A. Nucleotides are the units that make up DNA made up of three parts:
      1. 5-carbon sugar called deoxyribose
      2. Phosphate group
      3. One of four nitrogenous bases

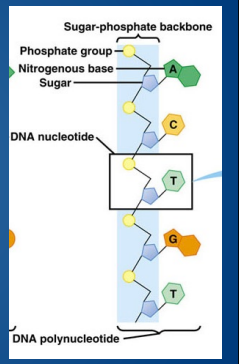


   a. Purines that have a two ring structure-
      i. Adenine (A)
      ii. Guanine (G)
   b. Pyrimidines that have a single-ring structure-
      i. Thymine (T)
      ii. Cytosine (C)

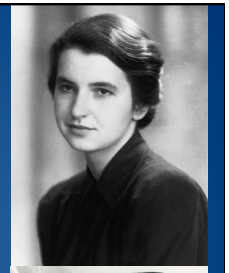


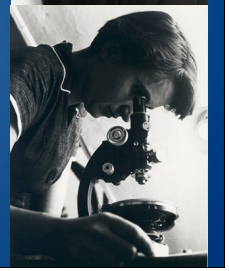
   B. The backbone of DNA is made from alternating deoxyribose and phosphate groups.
   C. The nucleotides join together in the center of DNA strand

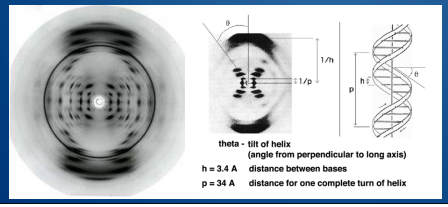




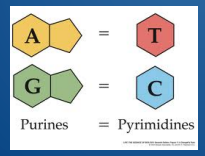
II. Watson and Crick developed an accurate model of DNA's three-dimensional structure
   A. X-Ray Evidence:
      Rosalind Franklin used X-ray diffraction to show the structure of DNA as a two strands in a helix shape.

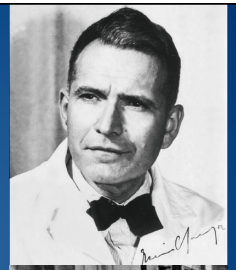


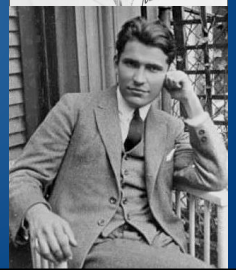




B. Erwin Chargaff found that the amount of G and C were always equal in DNA. The same was true for A and T. Therefore he concluded, G must bond with C, and A to T.

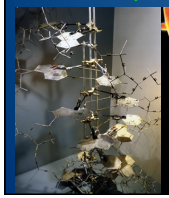


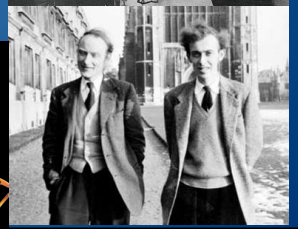




C. The Double Helix:

1. Francis Crick and James Watson used Franklin's photograph of DNA's structure to build a structural model of DNA that was a double helix, like a twisted ladder or spiral staircase.





2. From Watson and Crick's model, base pairing was determined. The reason that there were equal amounts of G and C, and A and T were because hydrogen bonds held the two strands of DNA together; three bonds for G and C, and two bonds for A and T.