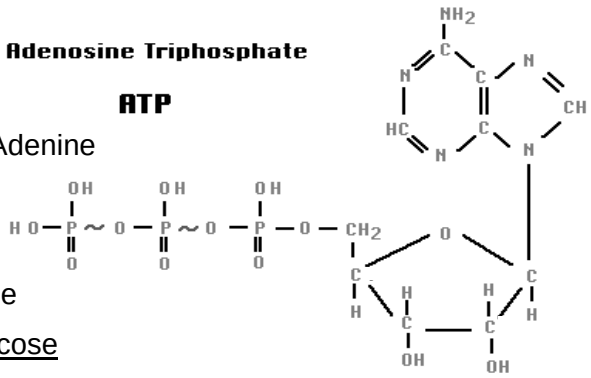
Nucleotides & Nucleic Acids

Readings: Saladin p. 85-87

I. Nucleotide
   A. organic compound composed of :
      1. a nitrogenous base
         a) single or double carbon-nitrogen ring
      2. a monosaccharide
      3. one or more phosphate groups

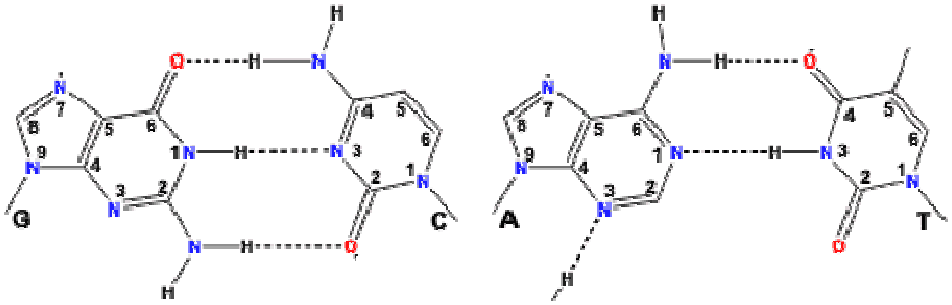
II. ATP (Adenosine Triphosphate)



   A. ATP structure
      1. nitrogenous base = double ring called Adenine
      2. monosaccharide = ribose
      3. 3 phosphate groups
   B. Body's most important energy transfer molecule
      1. Stores energy from the oxidation of glucose
      2. Releases energy for physiological work
         a) muscle contraction
         b) ion pumps in cell membranes
         c) physiological reactions (ie. synthesis reactions)
      3. Most energy transfer involve adding and removing the 3rd phosphate.
         a) ATP $\leftrightarrow$ ADP + P + energy
         b) enzyme = adenosine triphosphatase (ATPase) removes phosphate
      4. ATP molecule only lasts about 60 seconds before it is consumed.
   C. More about ATP in week 9 (metabolism). Read about this & other nucleotides p. 86.

III. DNA (deoxyribonucleic acid)
   A. Functions of DNA
      1. Gives instructions for synthesizing all bodily proteins
      2. transfers hereditary material to next generation when cells divide.
   B. DNA is a polymer of nucleotides - 100 million to 1 billion nucleotides long
   C. Composed of 4 different nucleotides (fig 4.2 p. 131)
      1. Purines (double ring)
         a) Adenine (A)
         b) Guanine (G)
      2. Pyrimidines (single ring)
         a) Cytosine (C)
         b) Thymine (T)

D. A purine bonds to a pyrimidine (A – T and G – C)



IV. RNA (ribonucleic acid)

A. Functions of RNA

1. Carries out the genetic instructions in DNA to synthesize proteins

a) RNA codes for the primary sequence of amino acids in a protein

B. RNA is a polymer of nucleotides - 70 to 10,000 nucleotides long

C. Composed of 4 nucleotides (fig 4.2 p. 131)

1. Purines (double ring)

a) Adenine (A)

b) Guanine (G)

2. Pyrimidines (single ring)

a) Cytosine (C)

b) Uracil (U) (note: NOT thymine)

D. A purine bonds to a pyrimidine (A – U and G – C)