

Chapter 22 Nucleic Acids and Protein Synthesis

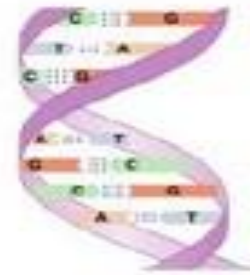
22.1 Components of Nucleic Acids

22.2 Nucleosides and Nucleotides

22.3 Primary Structure of Nucleic Acids

22.4 DNA Double Helix: A Secondary Structure

22.5 DNA Replication

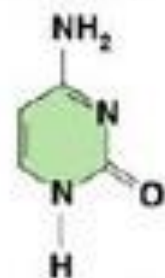


Nitrogen Bases

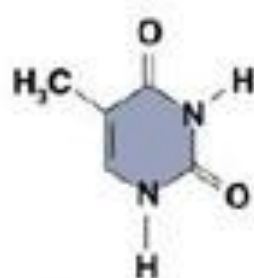
The **nitrogen bases** in nucleic acids consist of the:

- Pyrimidines C, T, and U
- And purines A and G.

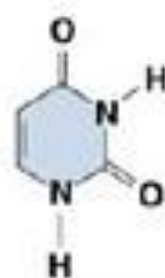
Pyrimidines



Cytosine (C)
(DNA and RNA)

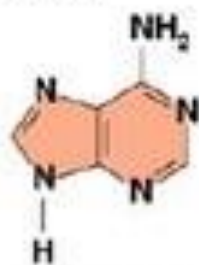


Thymine (T)
(DNA only)

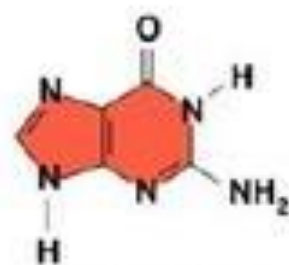


Uracil (U)
(RNA only)

Purines



Adenine (A)
(DNA and RNA)



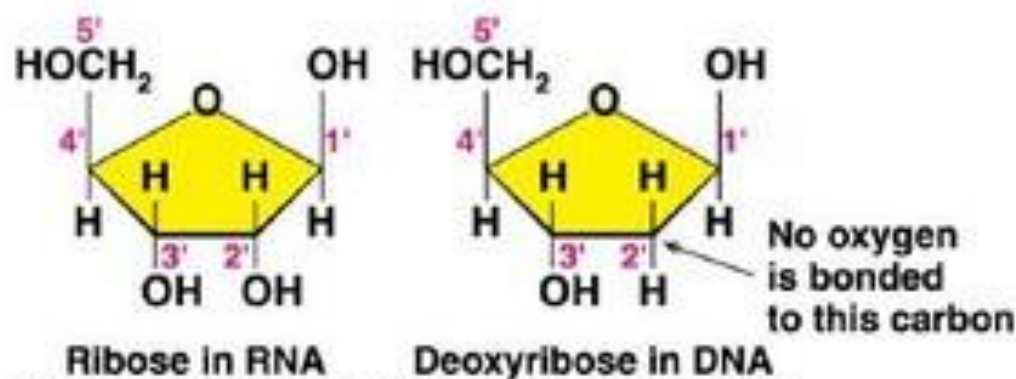
Guanine (G)
(DNA and RNA)

Pentose Sugars

The **pentose (five-carbon) sugar**:

- In RNA is **ribose**.
- In DNA is **deoxyribose**.
- Has carbon atoms numbered with primes to distinguish them from the nitrogen bases.

Pentose sugars in RNA and DNA

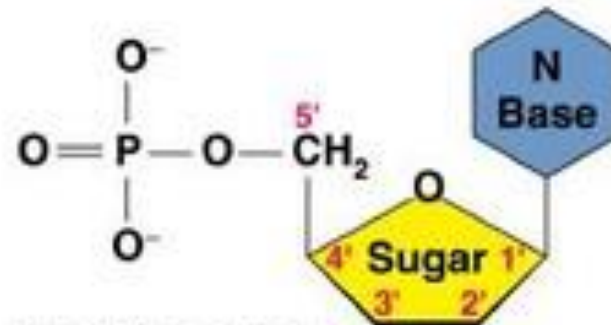


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Nucleotides

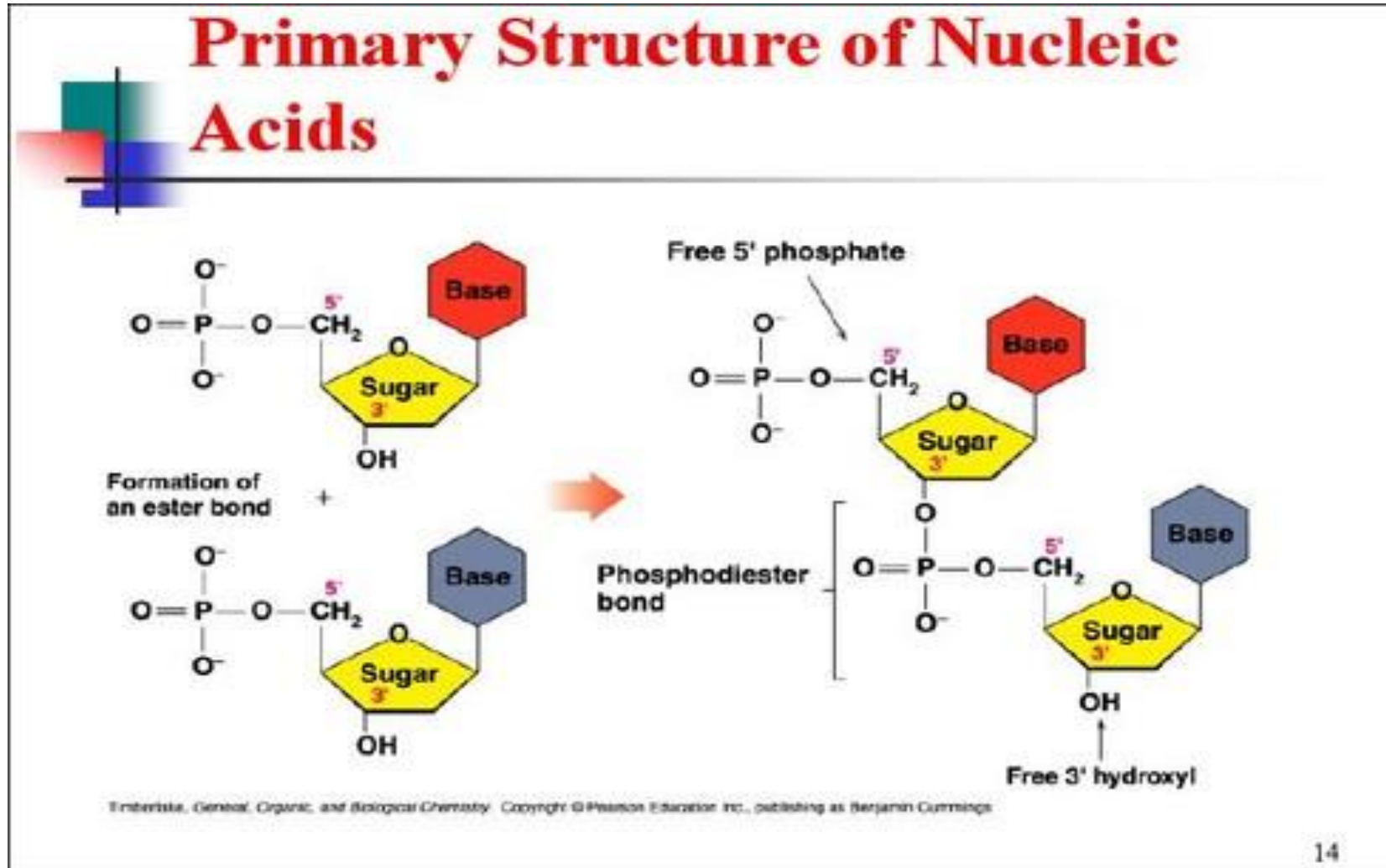
A nucleotide:

- Is a nucleoside that forms a phosphate ester with the C5' OH group of ribose or deoxyribose.
- Is named using the name of the nucleoside followed by *5'-monophosphate*.



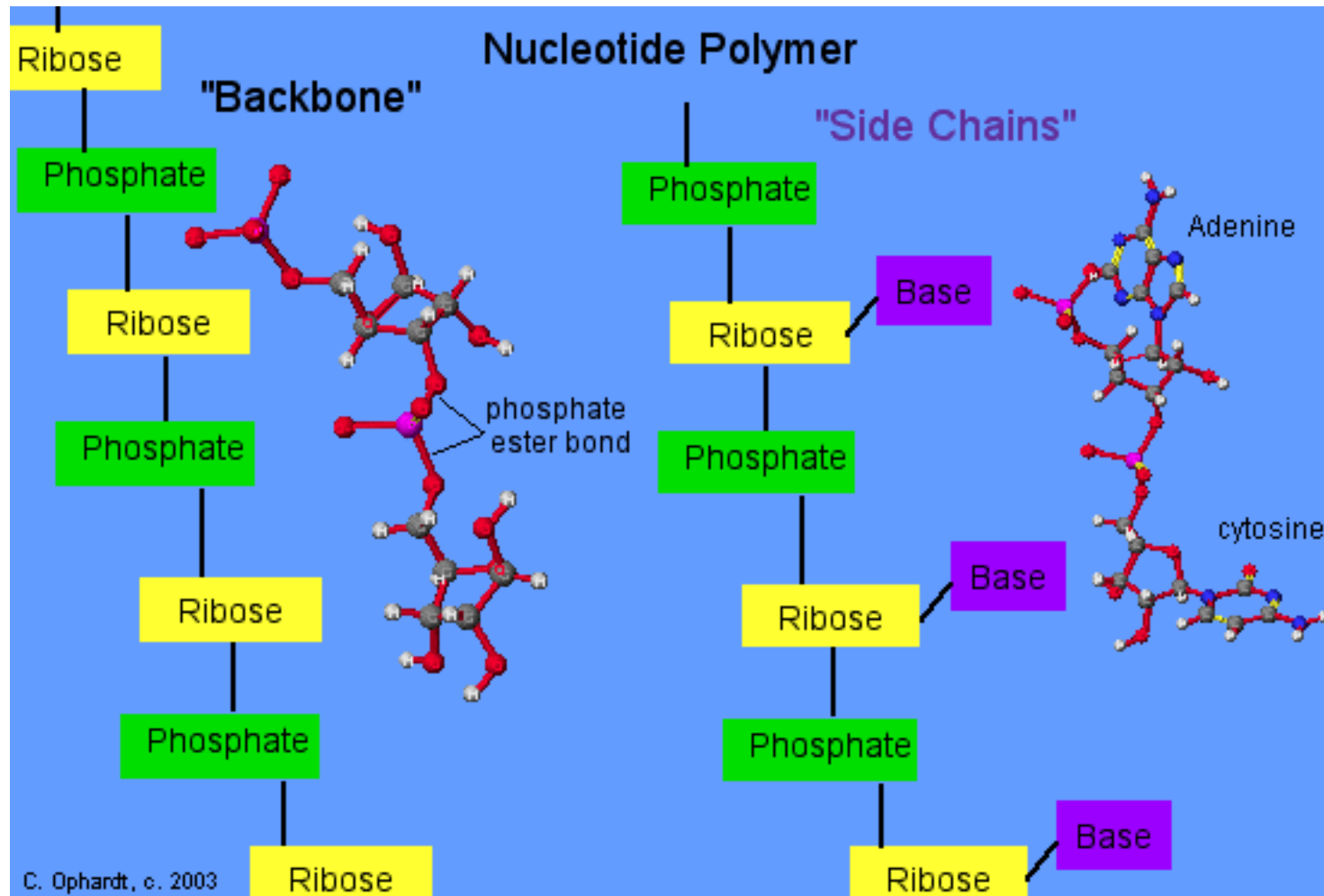
DNA Backbone Structure

- Alternate phosphate and sugar (deoxyribose), phosphate ester bonds



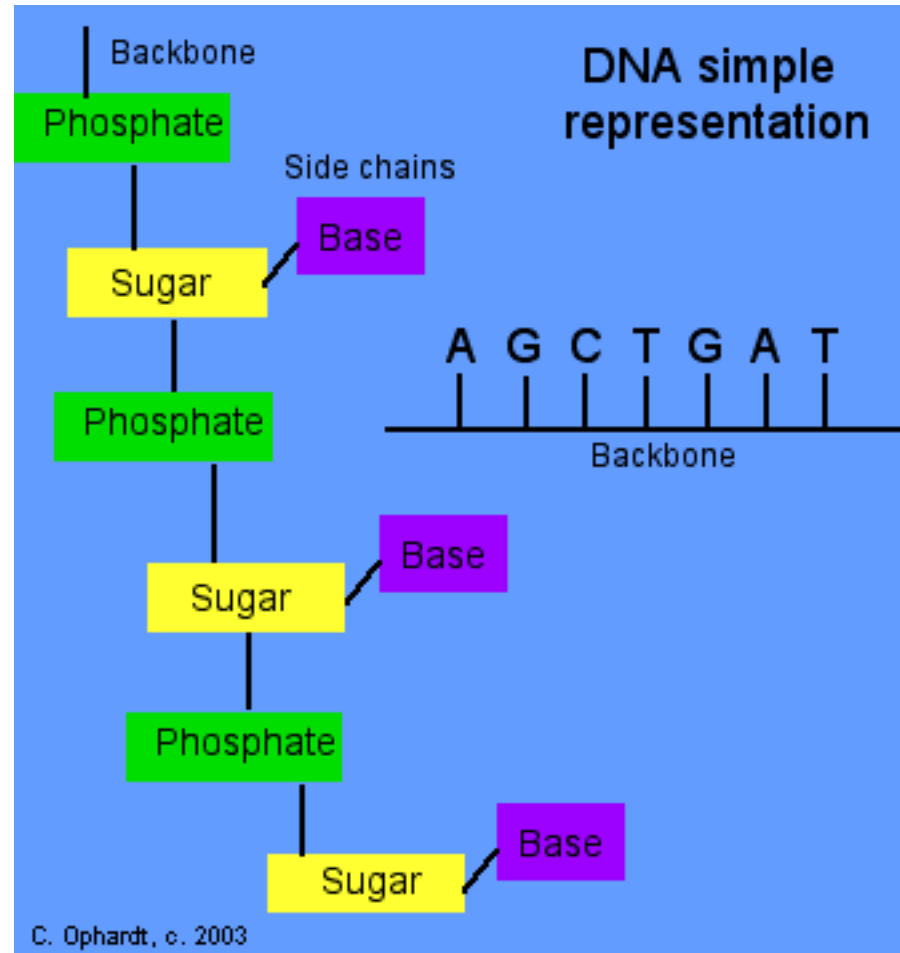
DNA Backbone Structure

- Alternate phosphate and sugar (deoxyribose), phosphate ester bonds



DNA Primary Structure Summary

- Backbone (sugar+phosphate with phosphate ester bonds and base or heterocyclicamine side chains)



DNA Double Helix

- Base pairing by unique hydrogen bonds
 - C - G and A - T pairs

