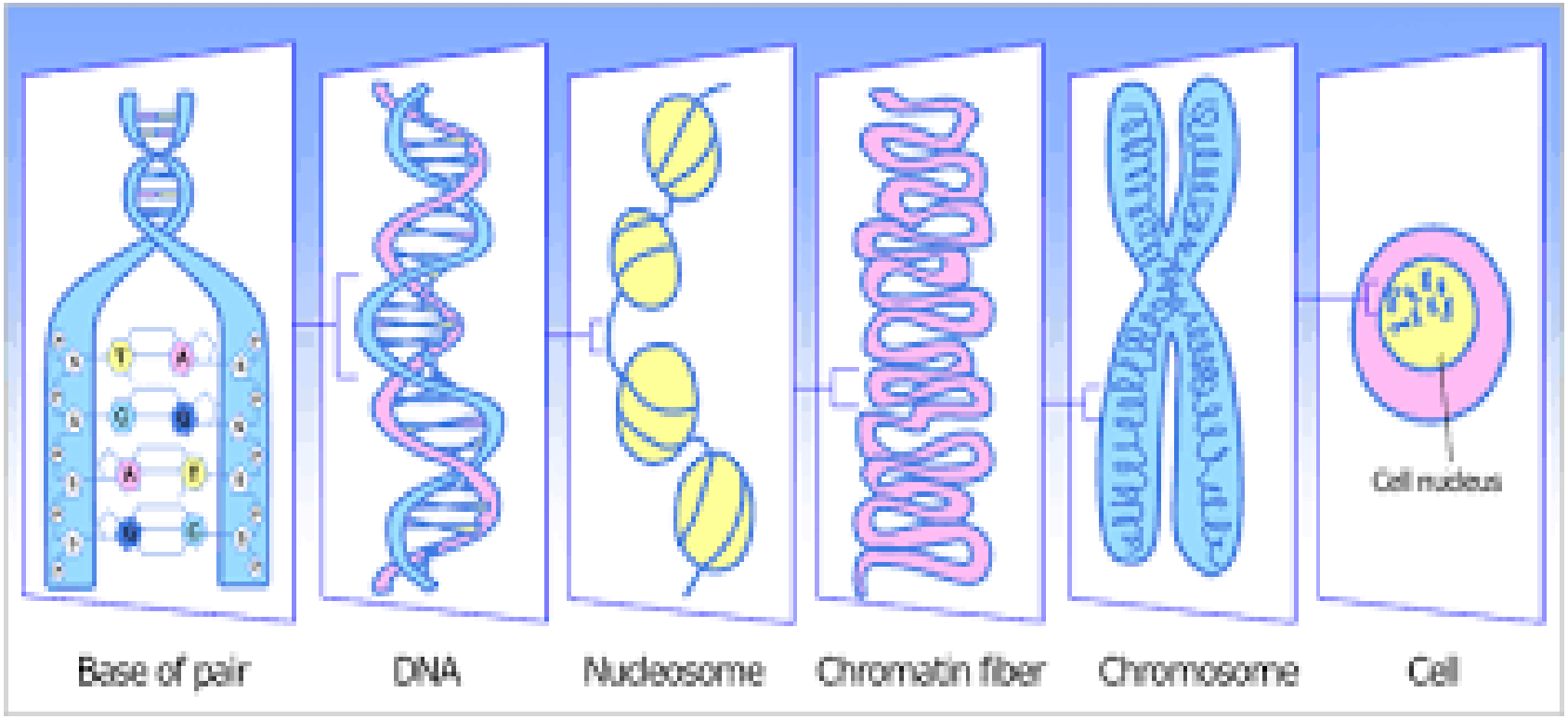
Introduction to Nucleic acids



Family Resemblances

- Why do siblings often look alike?

Family Resemblances

- Why do siblings often look alike?
- Why do children often look like their parents?

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- Why do children often look like their parents?
- Do parents physically give their offspring their characteristics?

Family Resemblances

- Why do siblings often look alike?
- Why do children often look like their parents?
- Do parents physically give their offspring their characteristics?
- How do ‘genes’ actually work?

Biomolecules

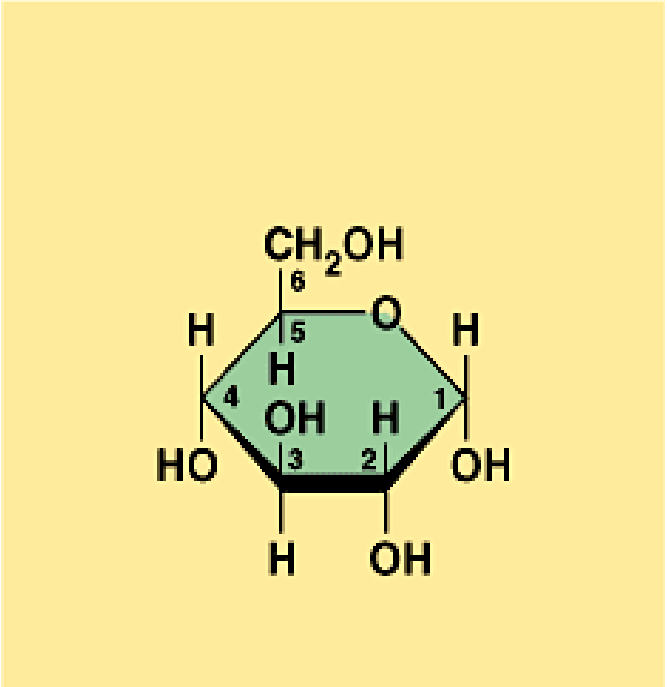
Four classes of biomolecules:

Biomolecules

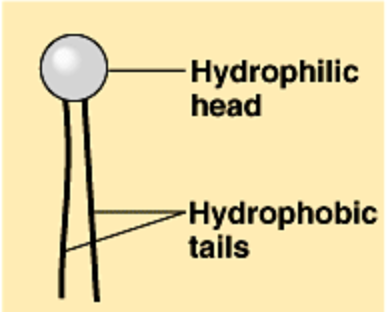
Four classes of biomolecules:

1) Carbohydrates (sugars)

Glucose



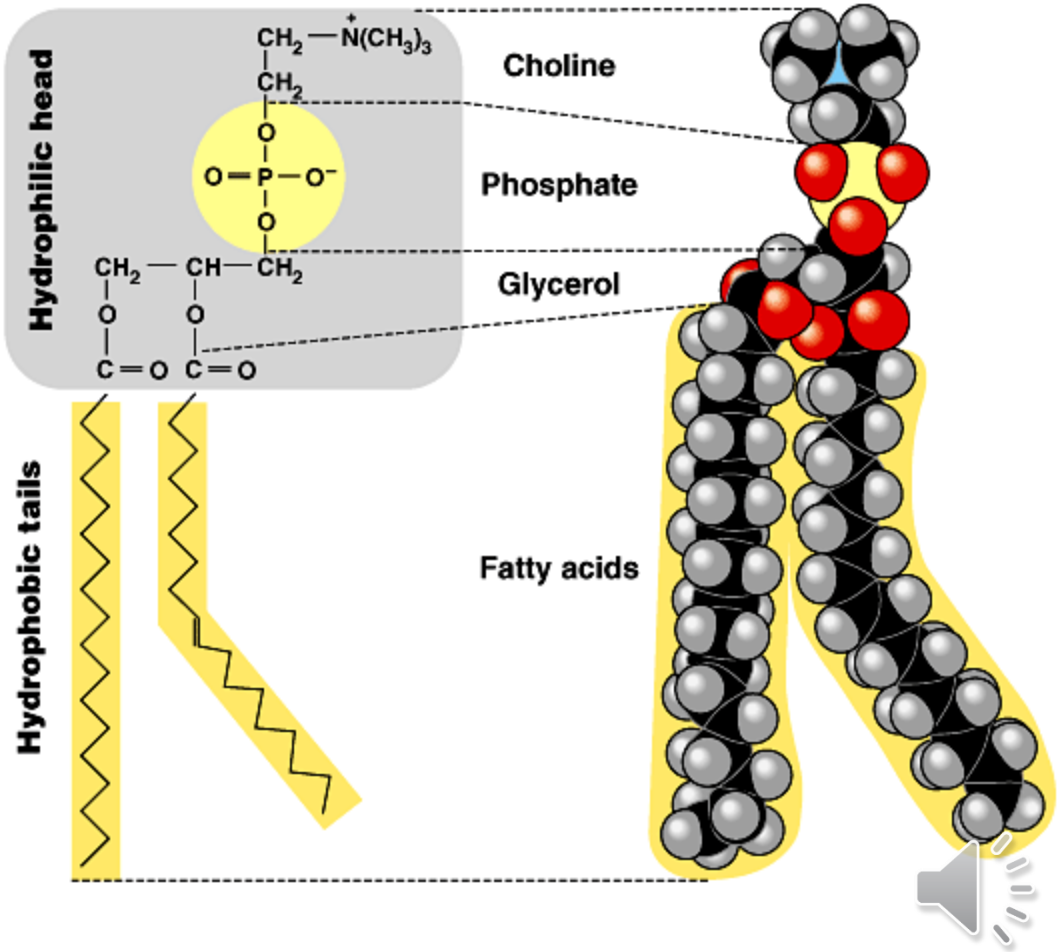
Biomolecules



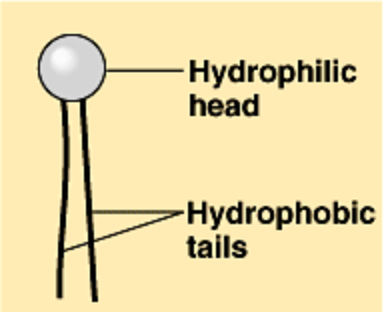
Four classes of biomolecules:

1) Carbohydrates

2) Lipids (fats)



Biomolecules



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1) Carbohydrates

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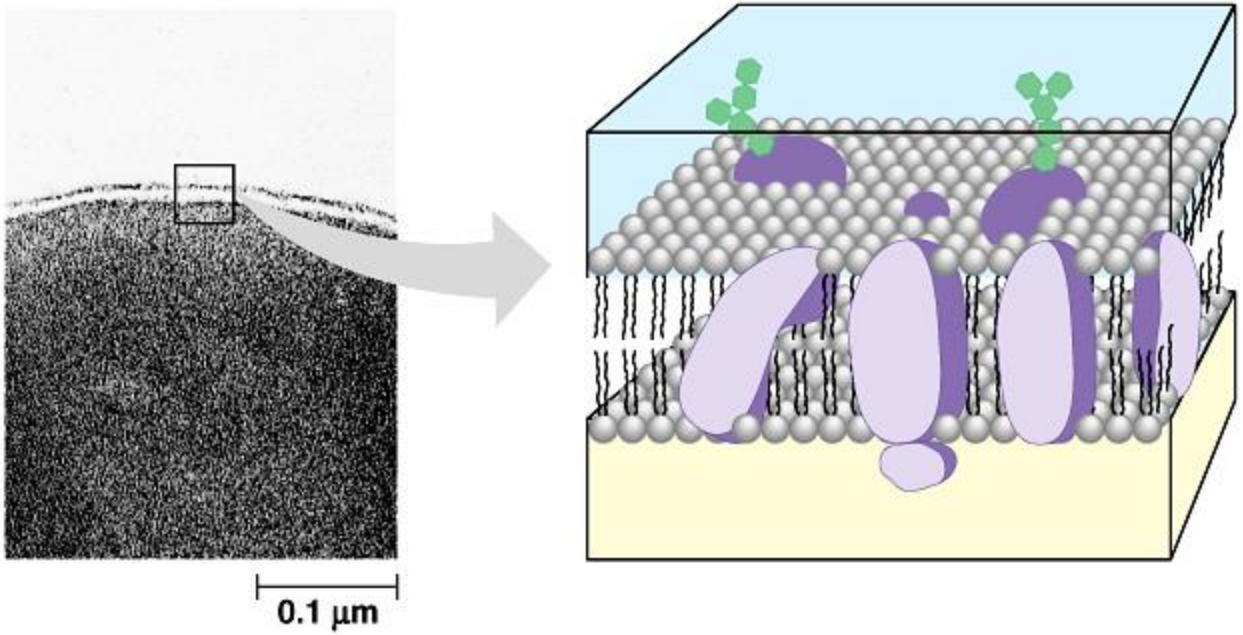


Biomolecules

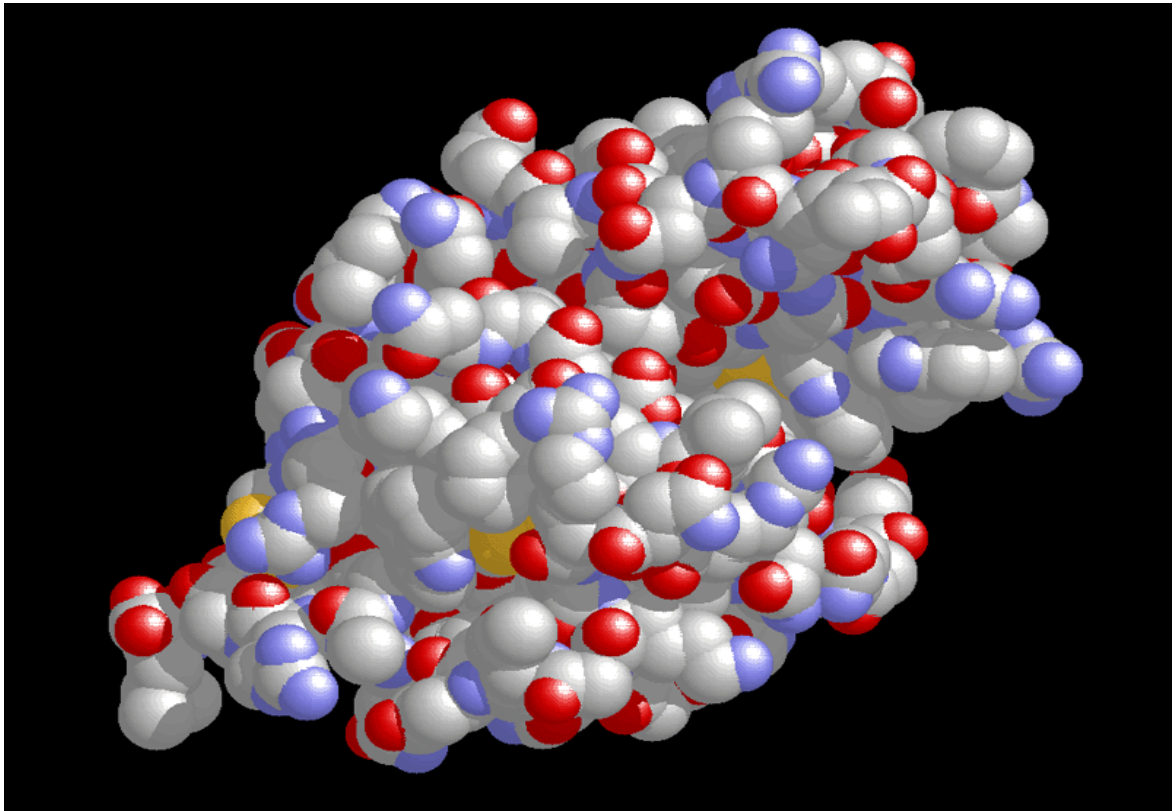
Four classes of biomolecules:

1) Carbohydrates

2) Lipids (fats)

3) Proteins

An Enzyme



Biomolecules

Four classes of biomolecules:

1) Carbohydrates

2) Lipids (fats)

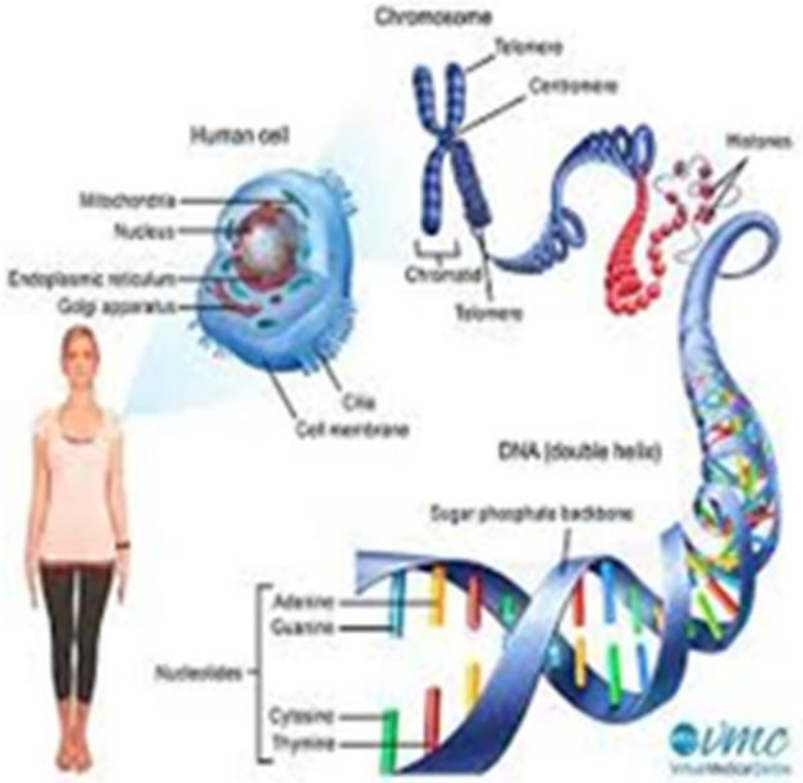
3) Proteins

4) Nucleic Acids:

Includes:-

- DNA
- RNA

- (ATP)



Biomolecules

Four classes of biomolecules:

1) Carbohydrates

2) Lipids (fats)

3) Proteins

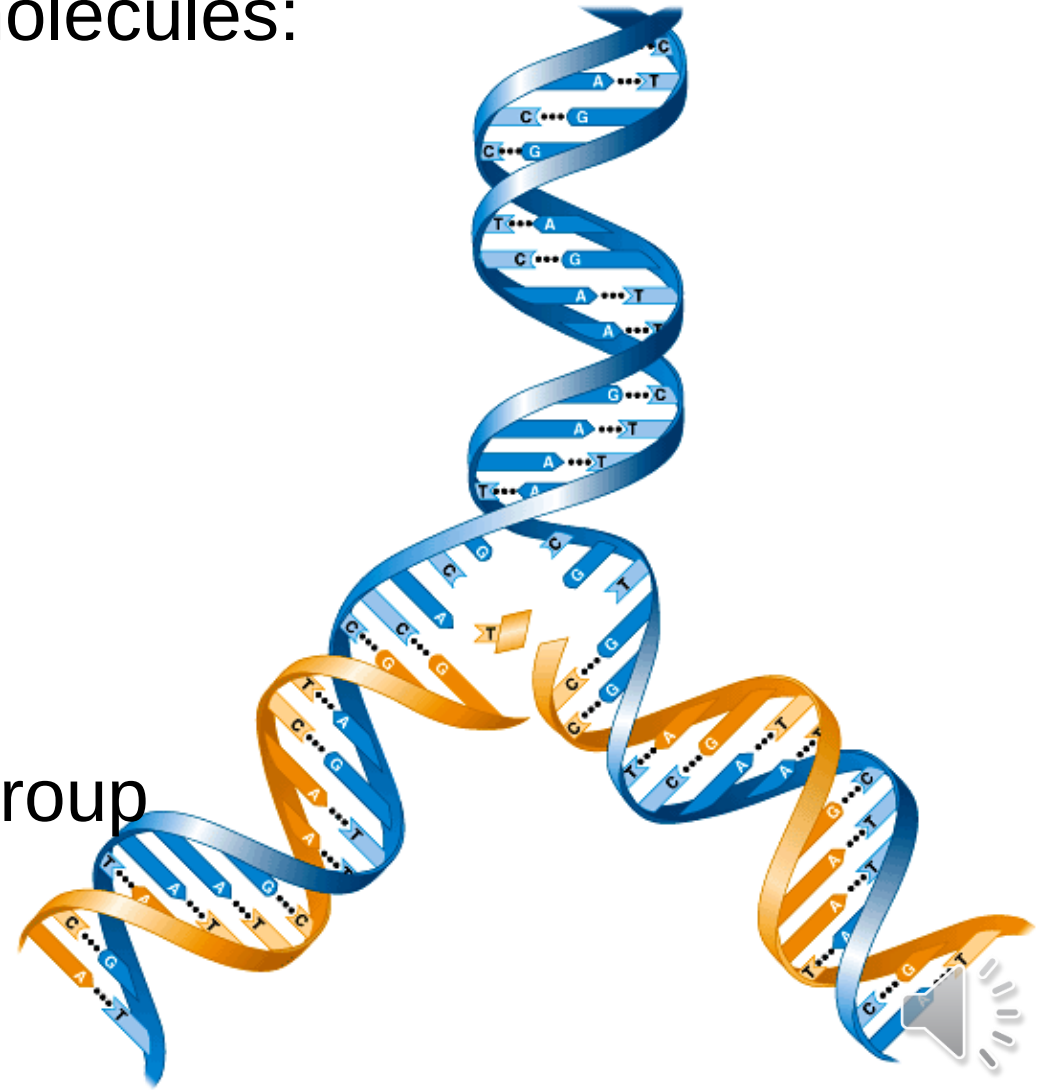
4) Nucleic Acids:

Consist of:-

a) sugar

b) Phosphate Group

c) A ‘Base’



Nucleic Acids- Introduction

- Nucleic Acids store and transmit hereditary information.
  - DNA = Deoxyribo Nucleic Acid
  - RNA = Ribo Nucleic Acid

- DNA- Stores the information in a ‘genetic code’

- RNA carries the information to the protein synthesizing machinery

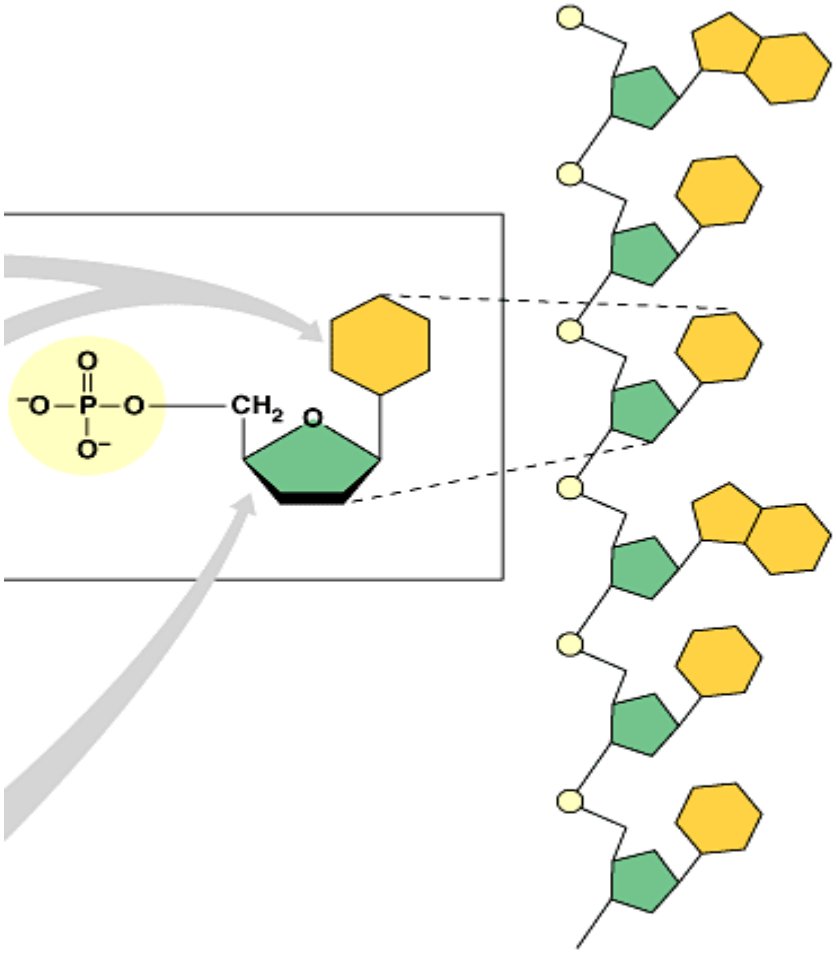
Structure of DNA/RNA (1)

Nucleic Acids consist of:-

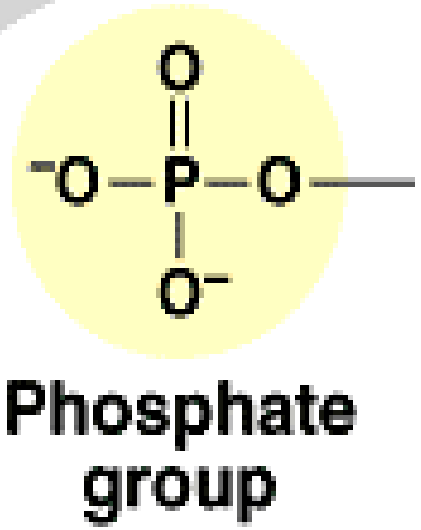
a) sugar

b) Phosphate group

c) A ‘Base’



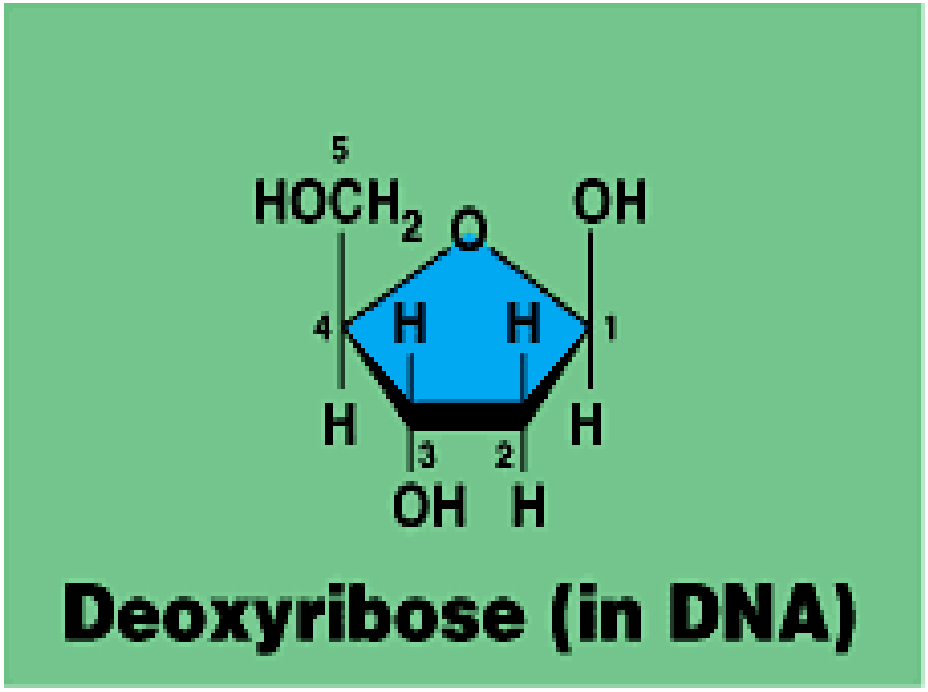
Structure of DNA/RNA (2)

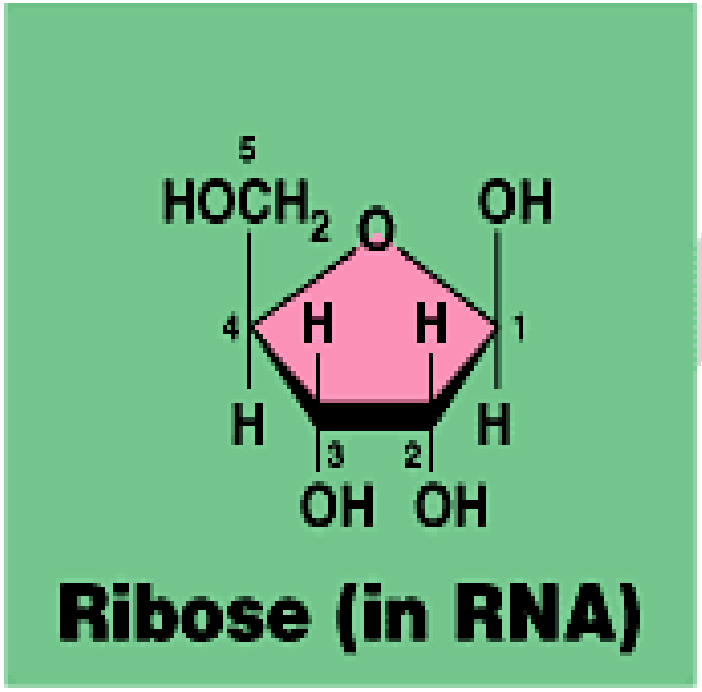


Phosphate Group

Structure is constant

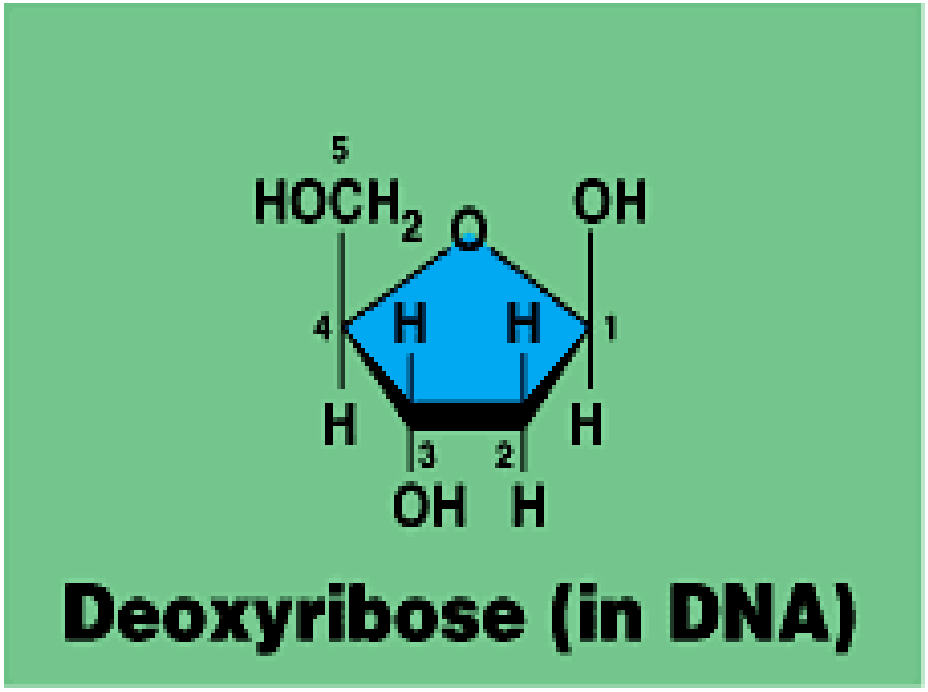
Structure of DNA/RNA (Sugar)

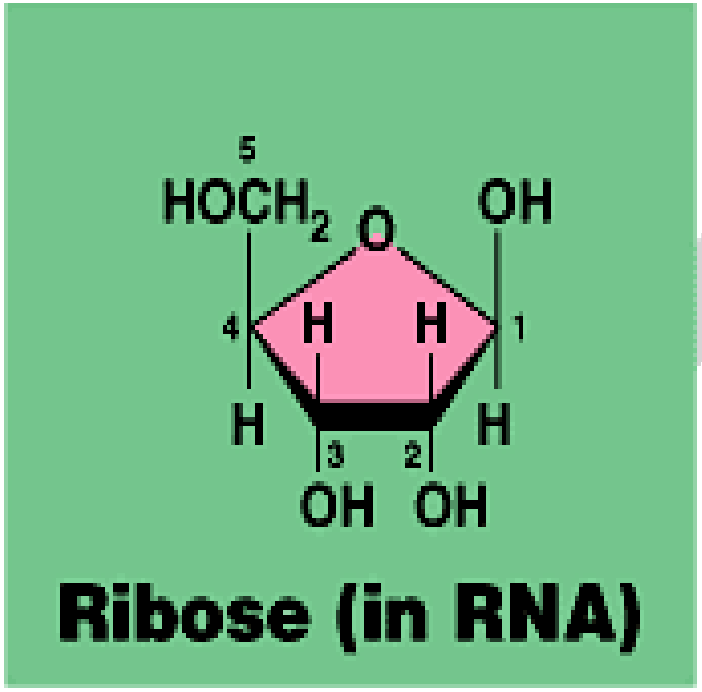




Deoxyribose and Ribose are both 5 carbon sugars

Structure of DNA/RNA (Sugar)

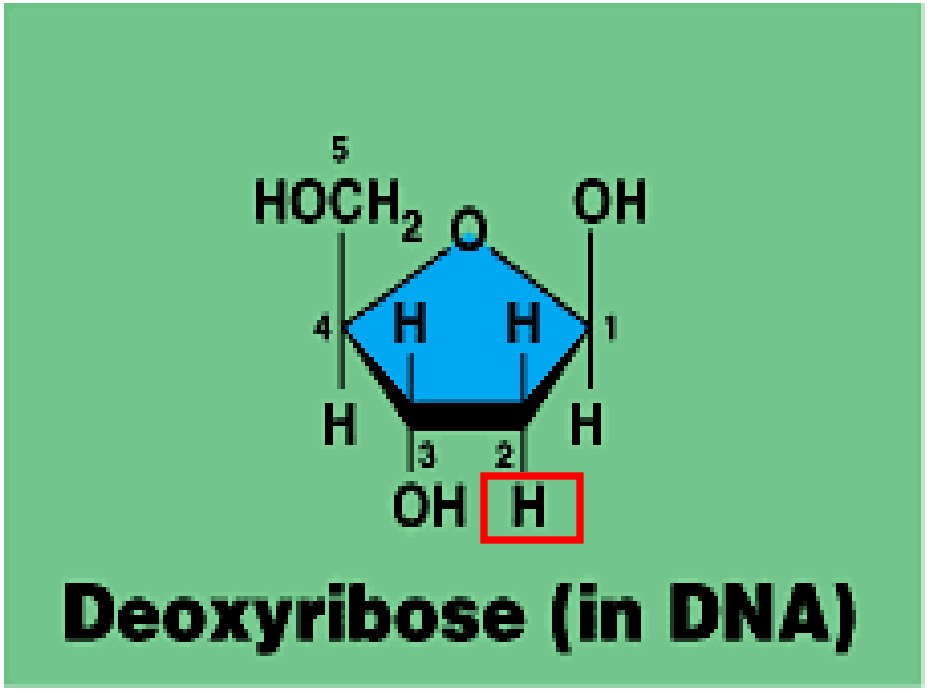


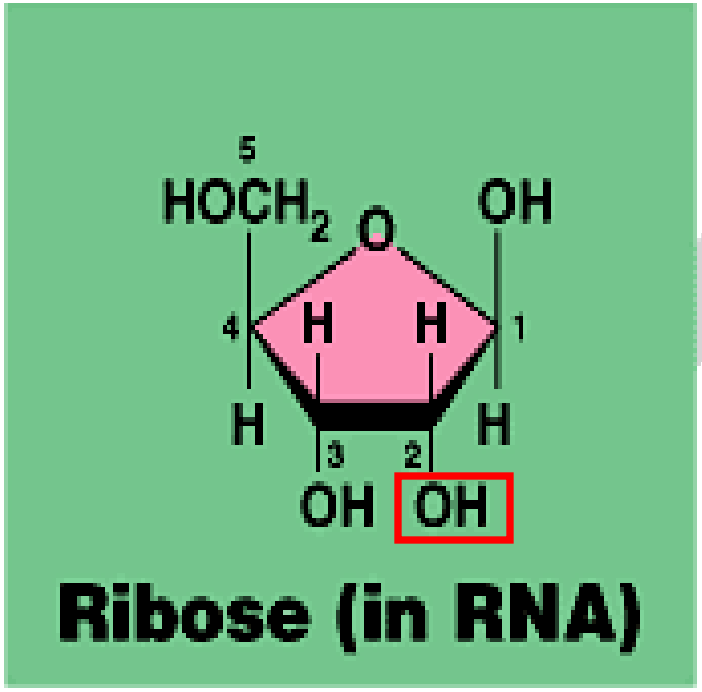


Deoxyribose and Ribose are both 5 carbon sugars

What is the difference between them?

Structure of DNA/RNA (Sugar)

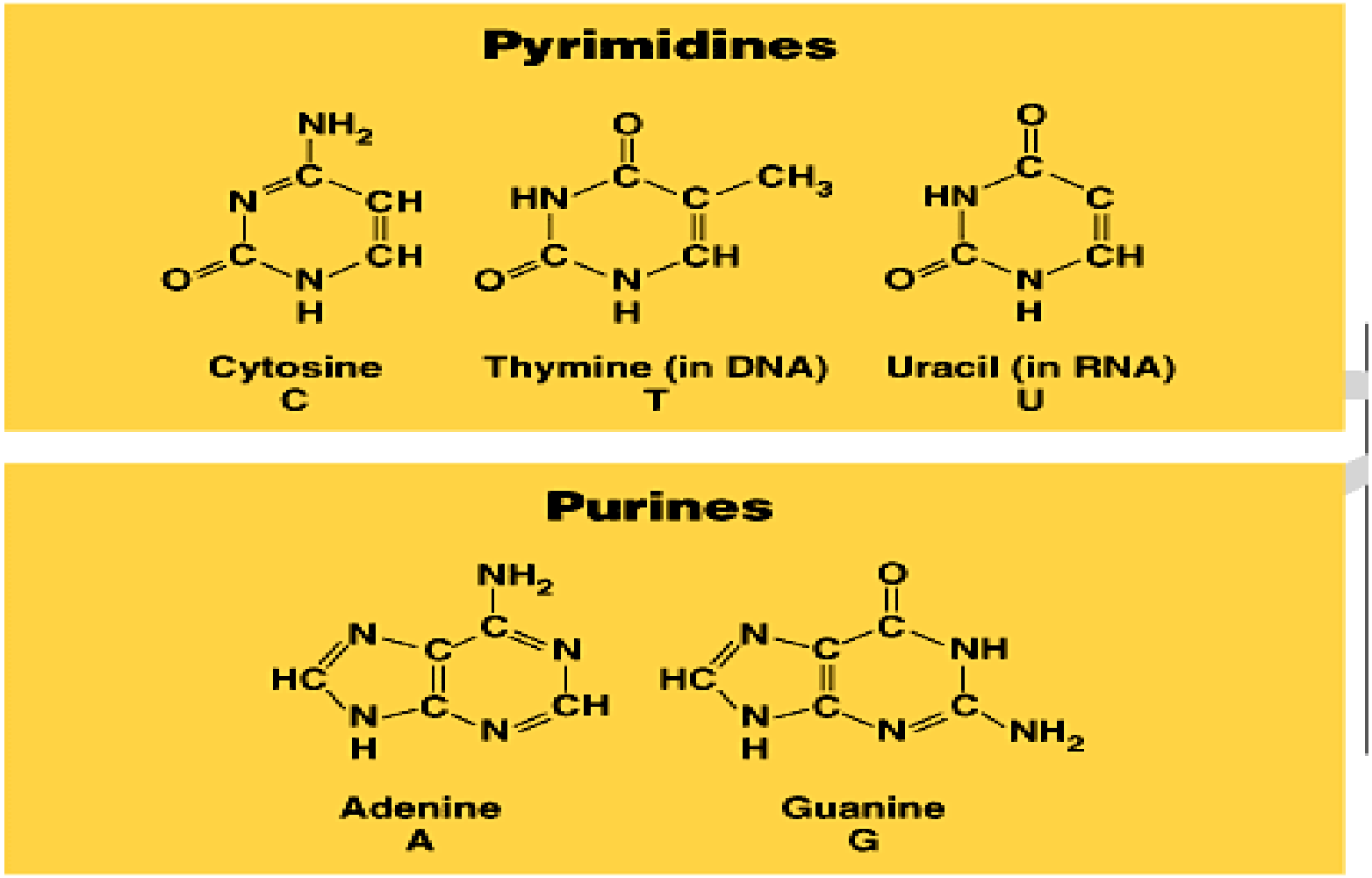




Deoxyribose and Ribose are both 5 carbon sugars

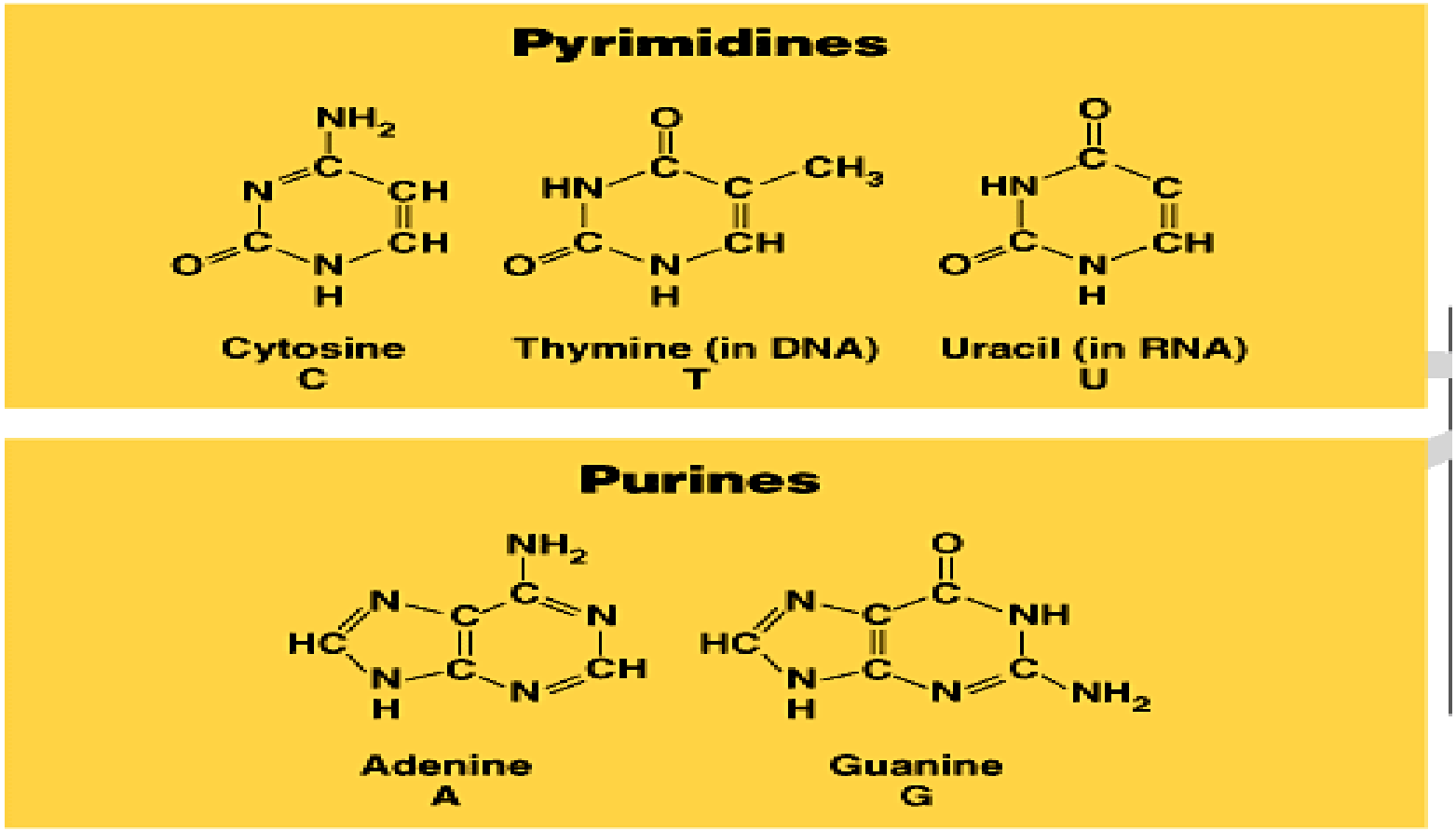
What is the difference between them?

Structure of DNA/RNA (3)



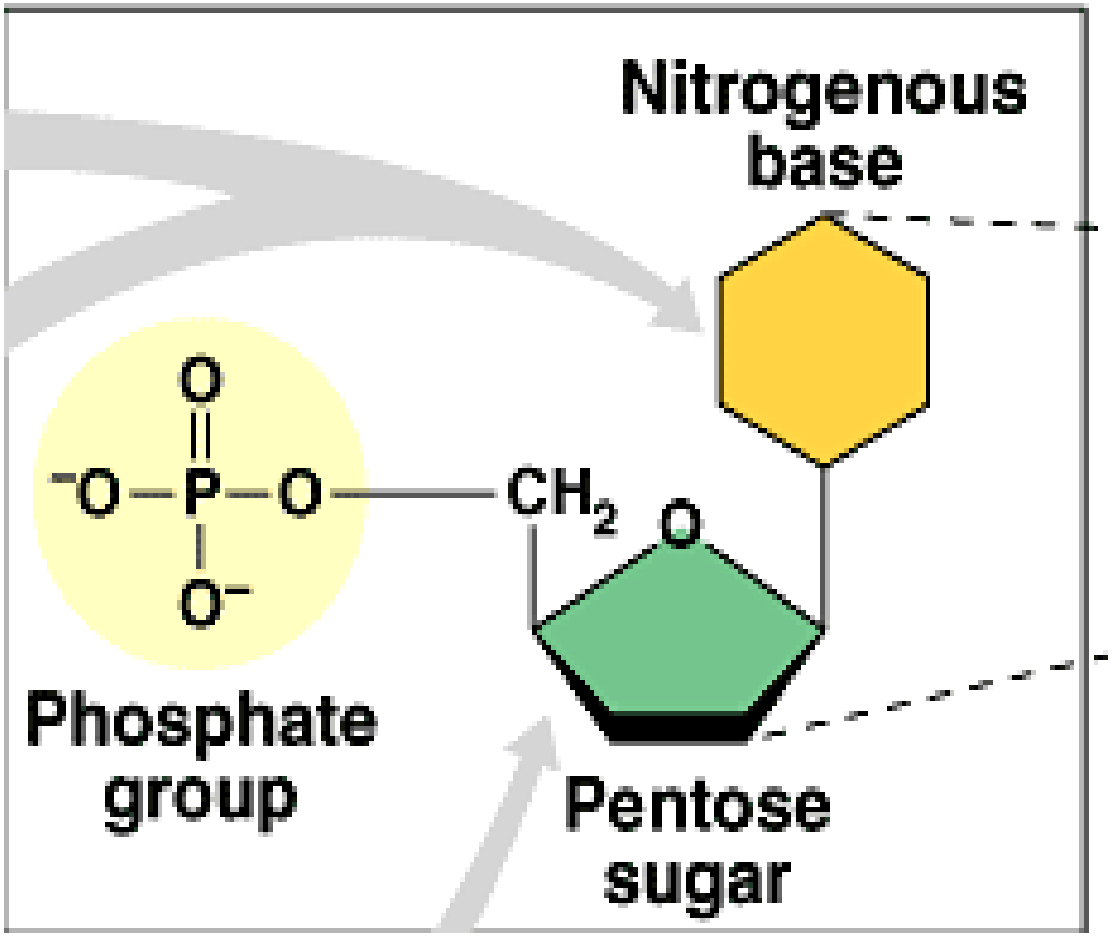
Nitrogenous Bases

Structure of DNA/RNA (4)

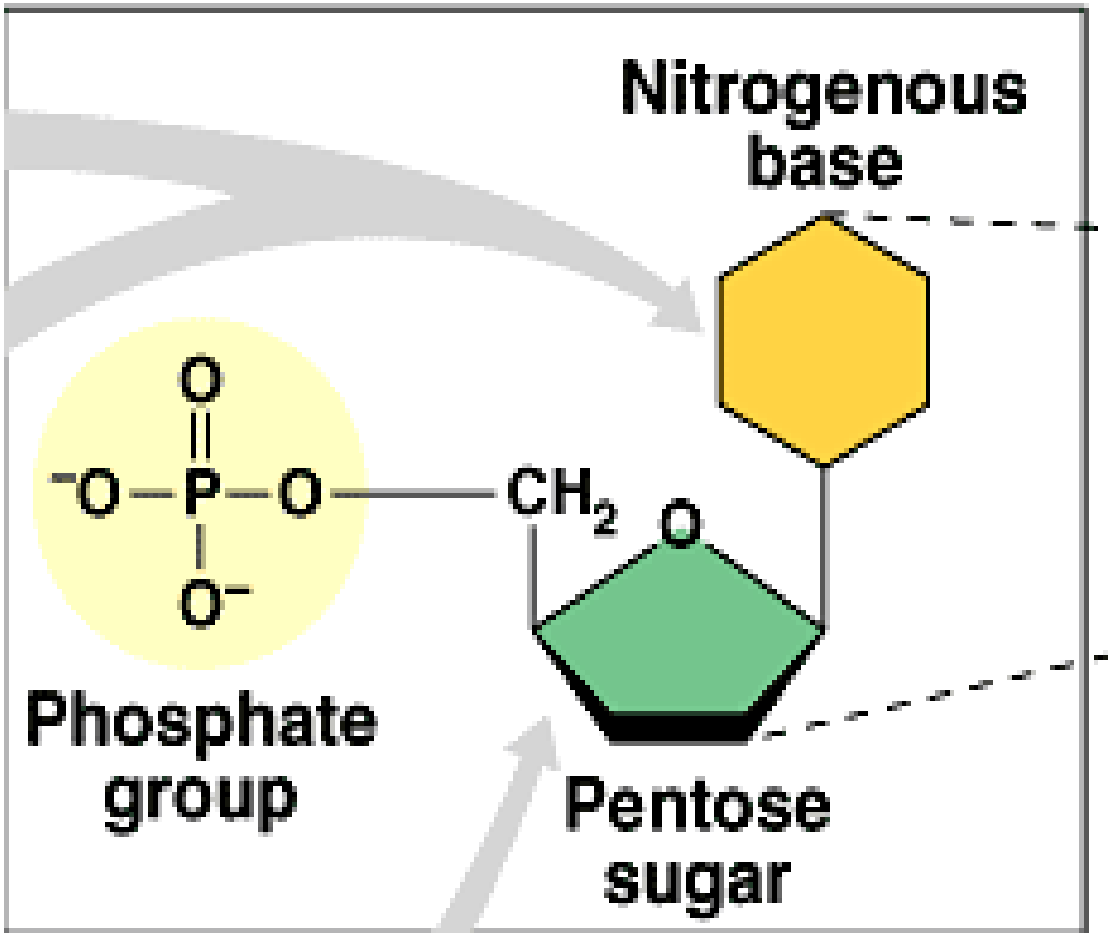


You need to remember these!

Structure of DNA/RNA (5)



Structure of DNA/RNA (6)



As a unit, these three components make up one monomer.

A Quick Aside (but an important one)

What is a monomer?

A Quick Aside (but an important one)

What is a monomer?

A monomer is an individual unit that acts as a building block for large biological molecules

Monomers are *nearly* identical units

A Quick Aside (but an important one)

What is a monomer?

A monomer is an individual unit that acts as a building block for large biological molecules

Monomers are *nearly* identical

What is a polymer?

A Quick Aside (but an important one)

What is a monomer?

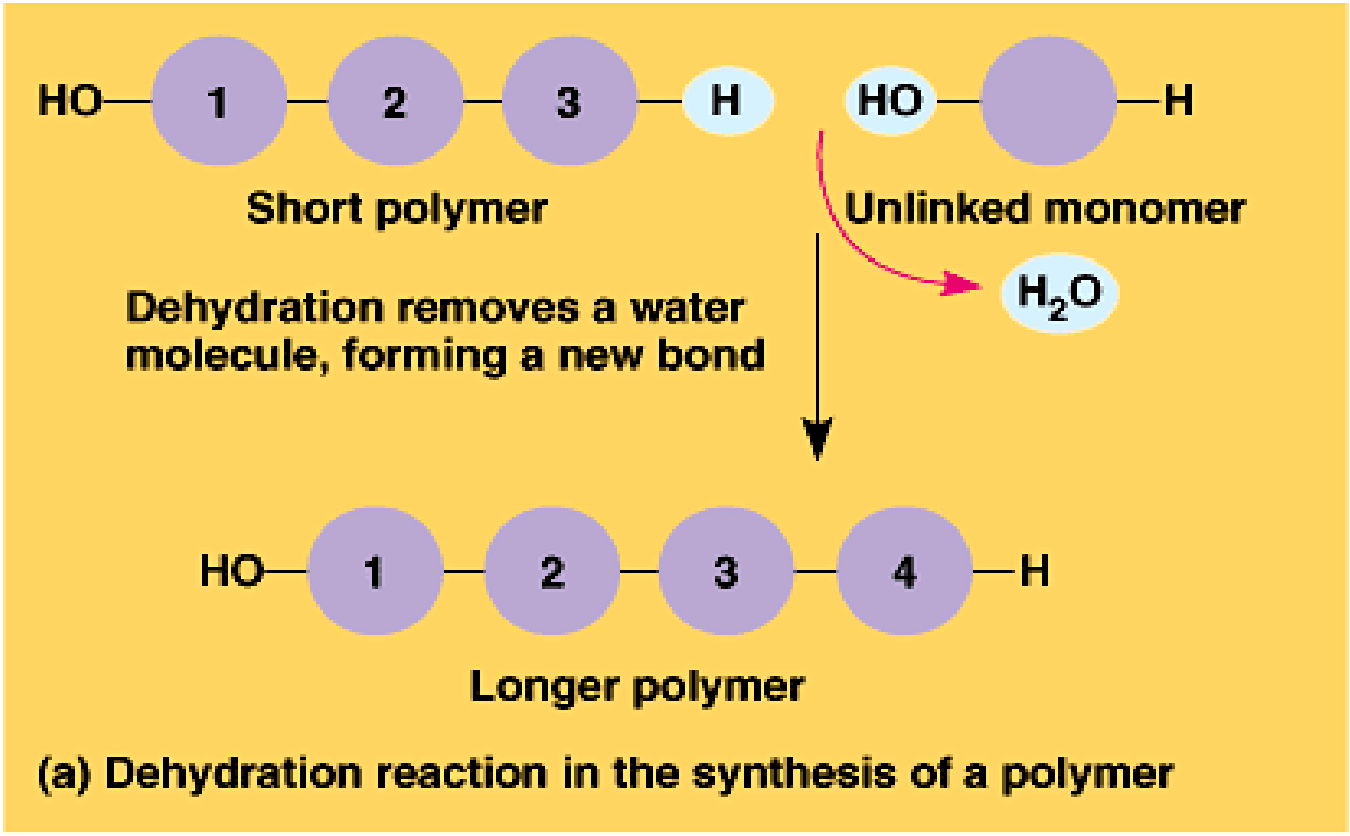
A monomer is an individual unit that acts as a building block for large biological molecules

Monomers are *nearly* identical units

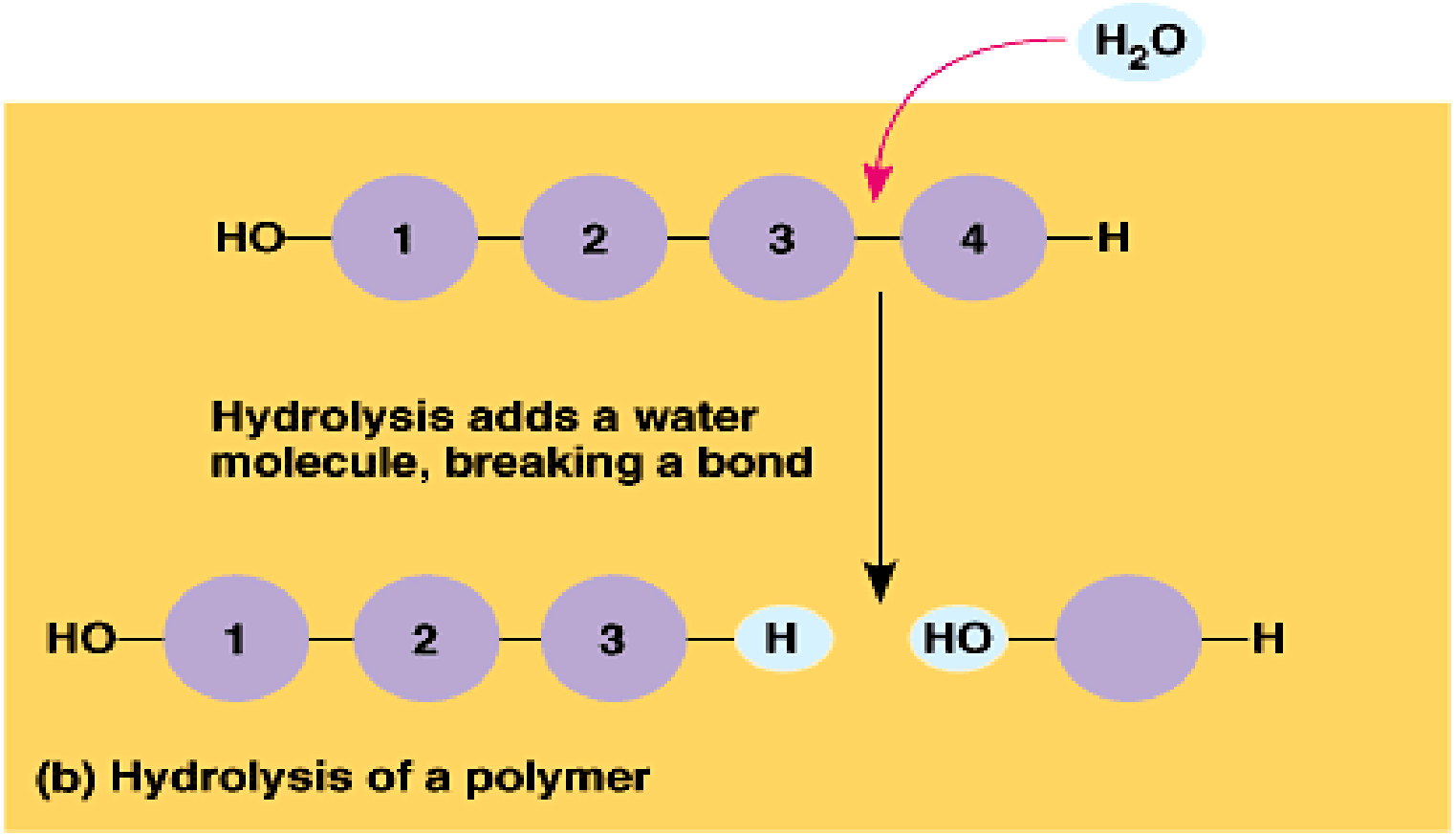
What is a polymer?

A polymer is large molecule made up many small monomers. Think of a chain.

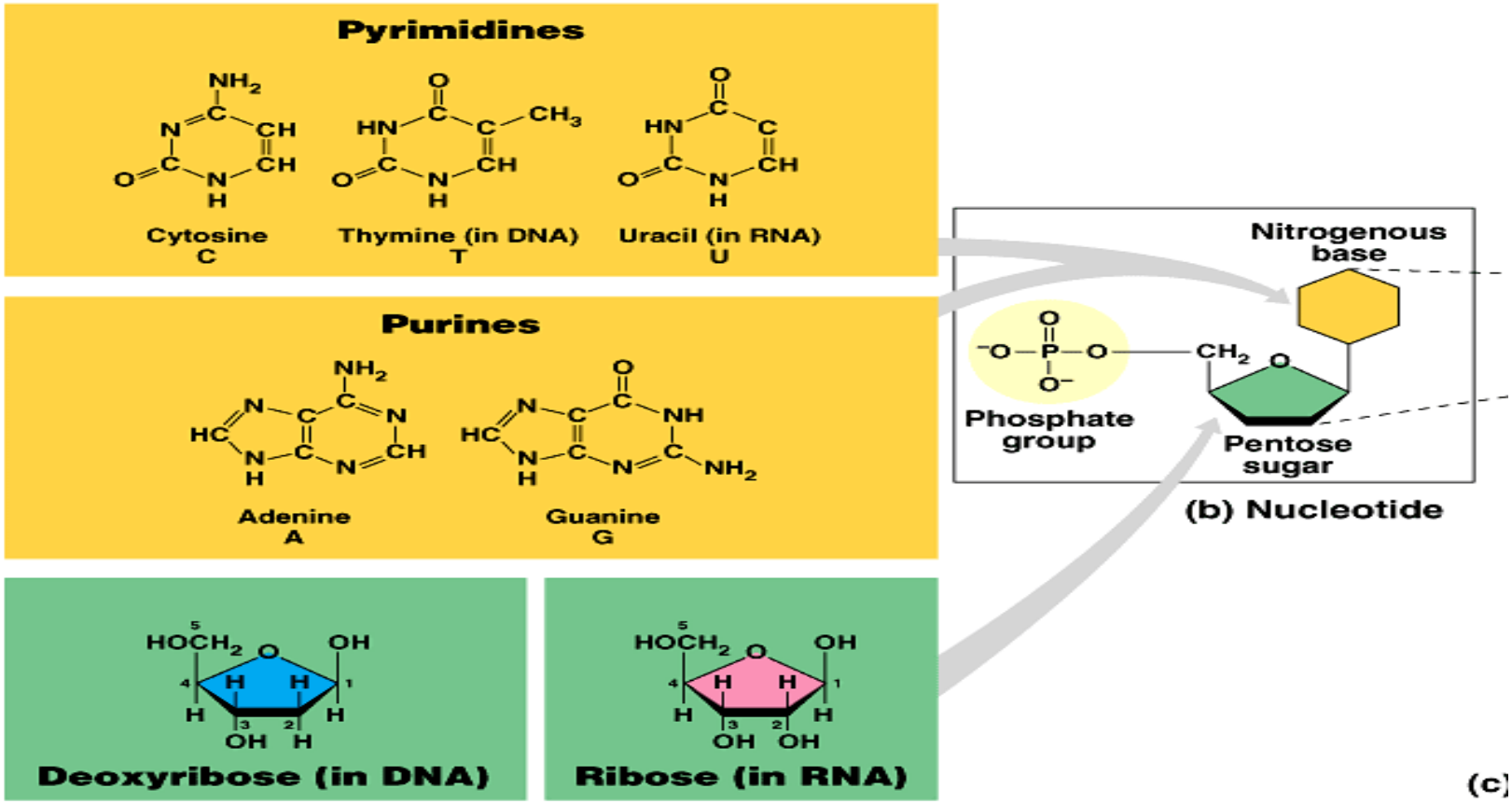
Polymers are linked by Covalent Bonds



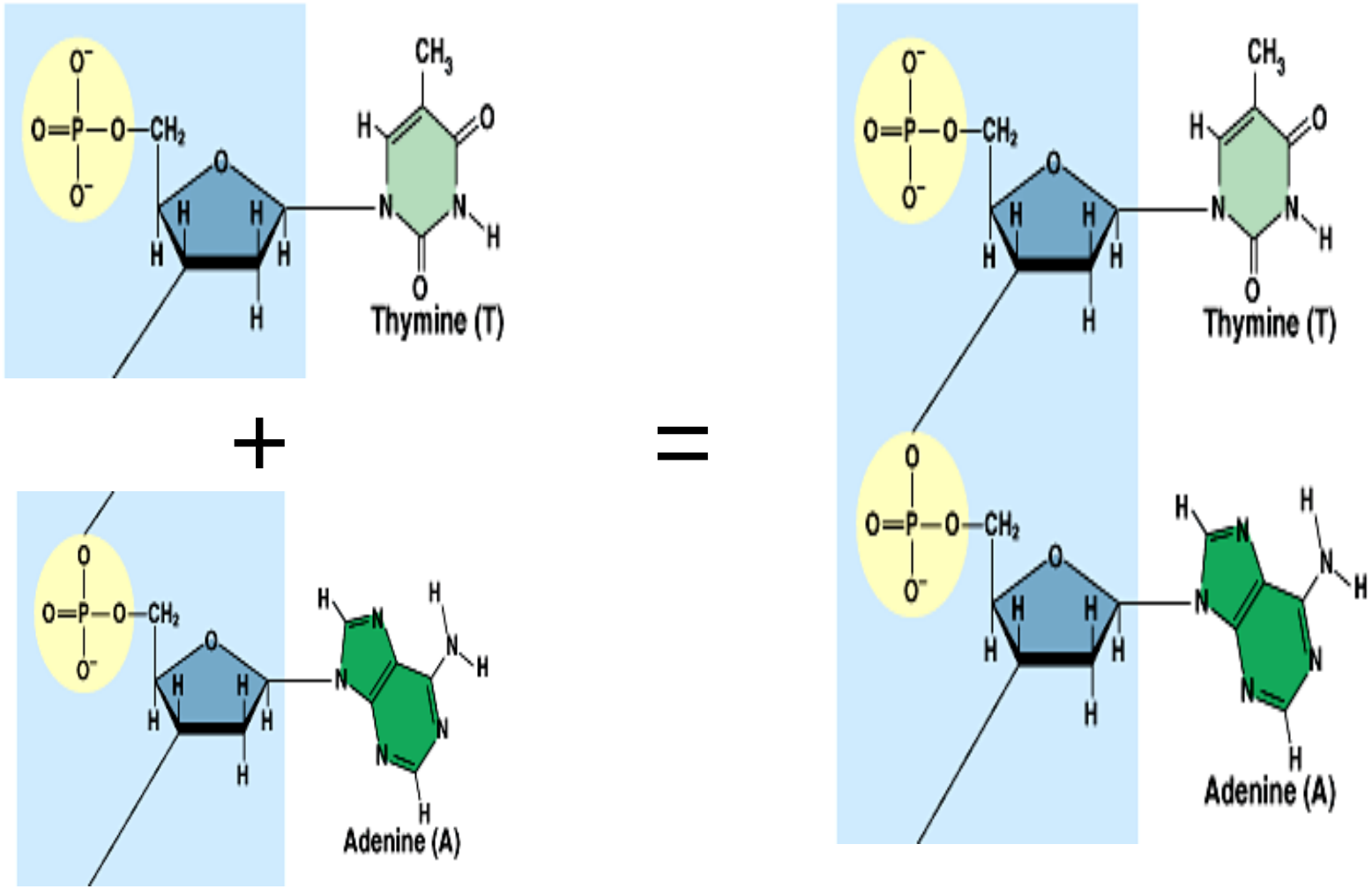
Polymers are linked by Covalent Bonds



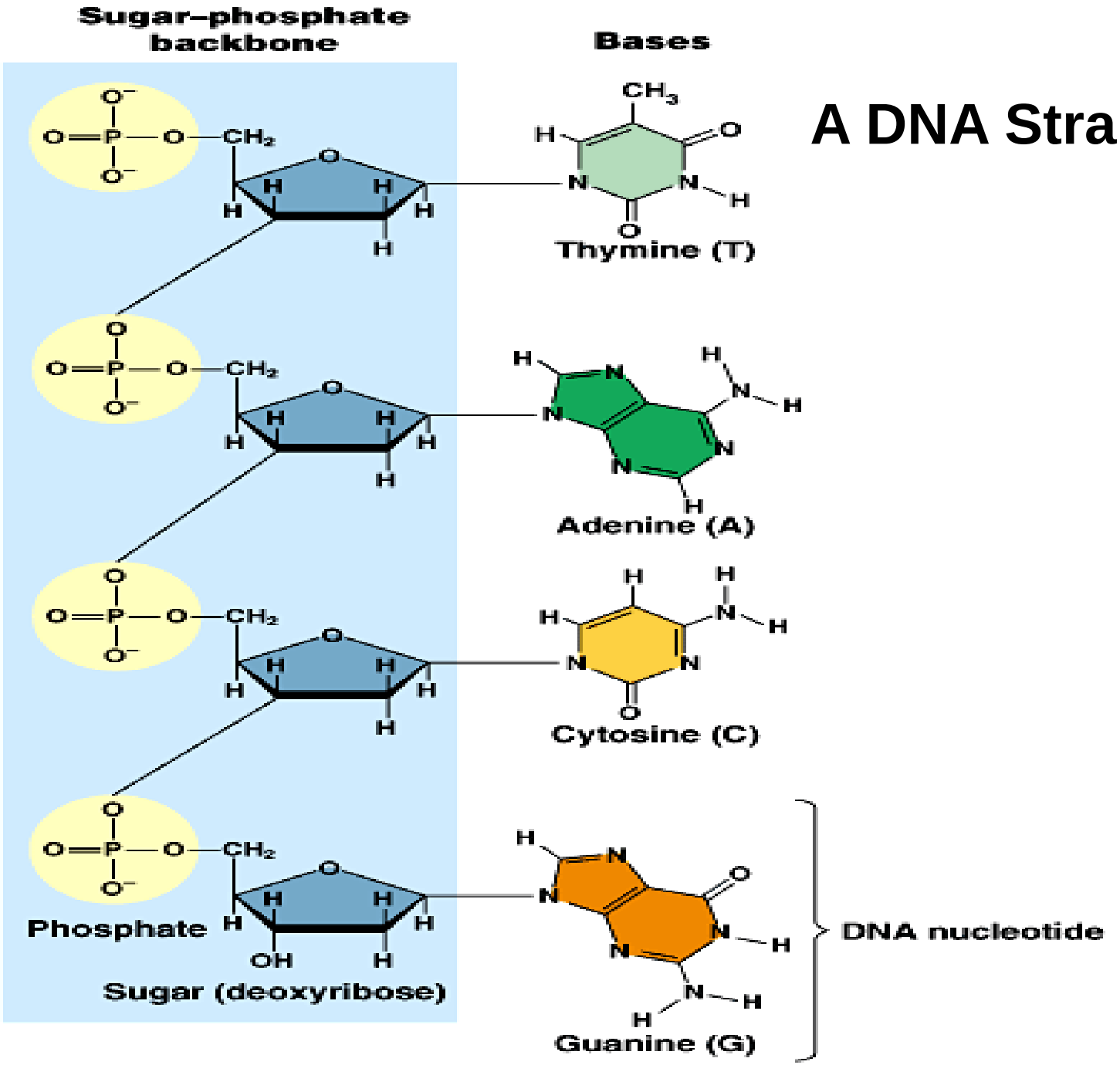
So What?



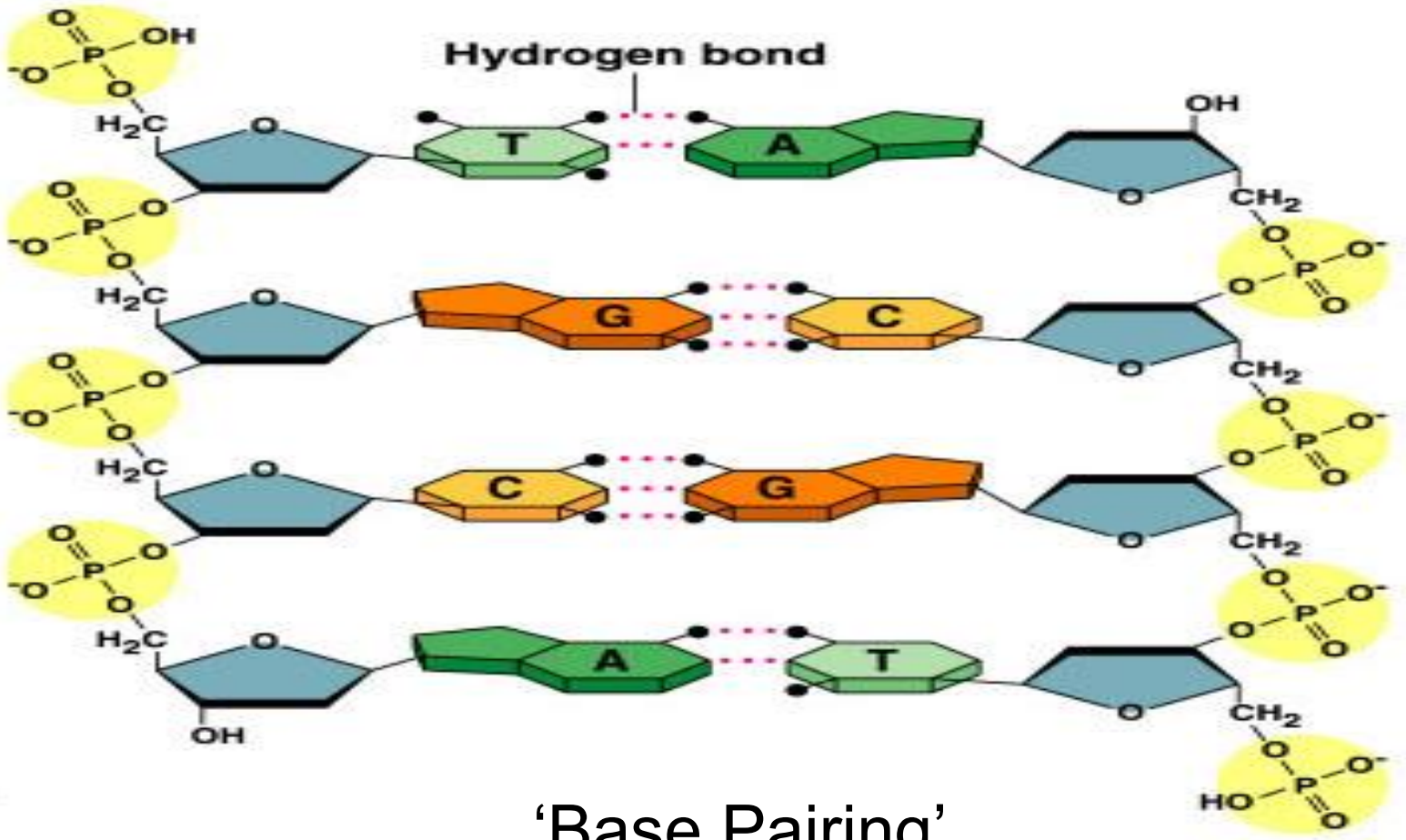
DNA/RNA are Polymers of Nucleotides



A DNA Strand!



Two DNA Strands!
or
Double strand DNA

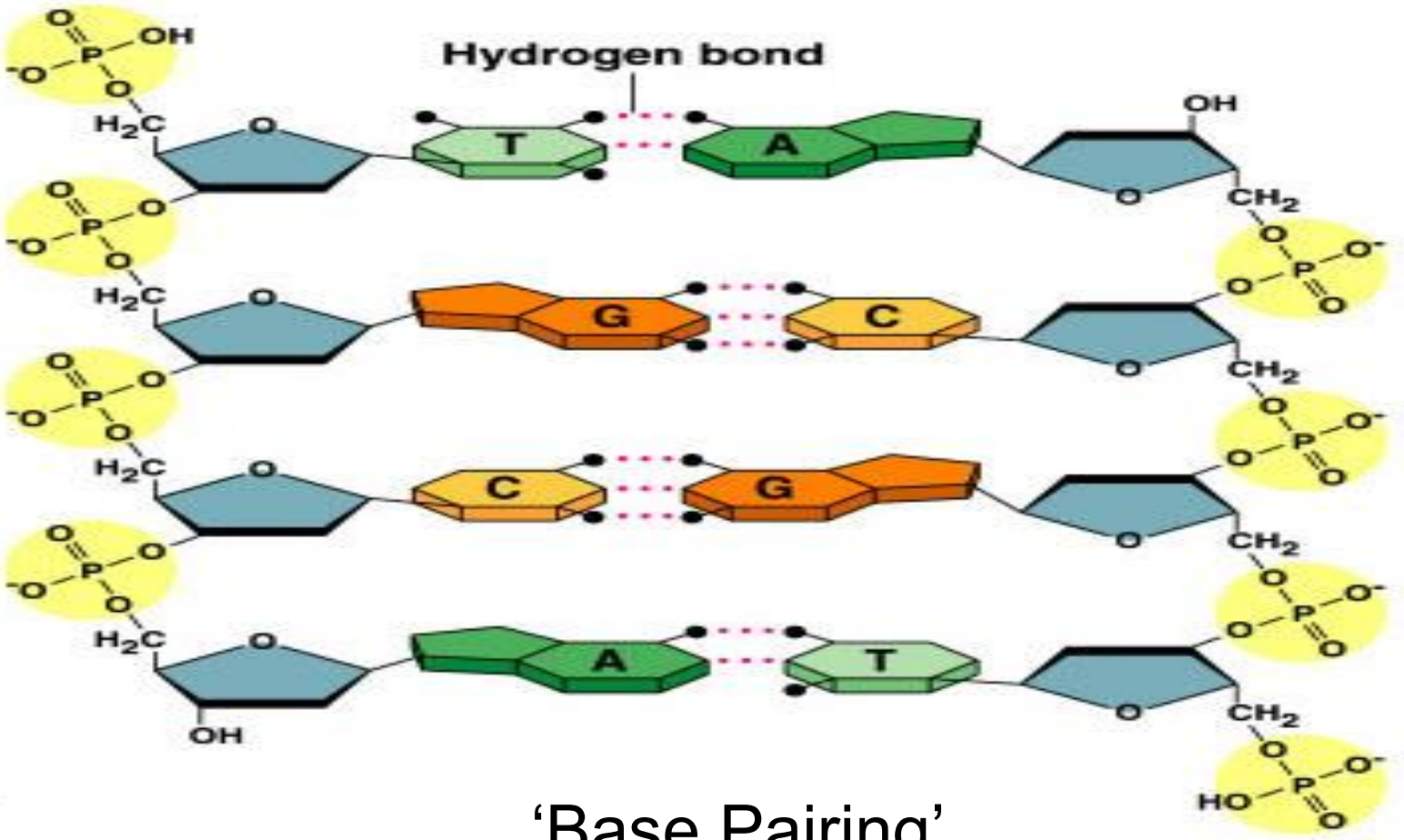


‘Base Pairing’

The sequence of nitrogenous bases is the code of DNA

Cytosine + Guanine

Adenine + Thymine

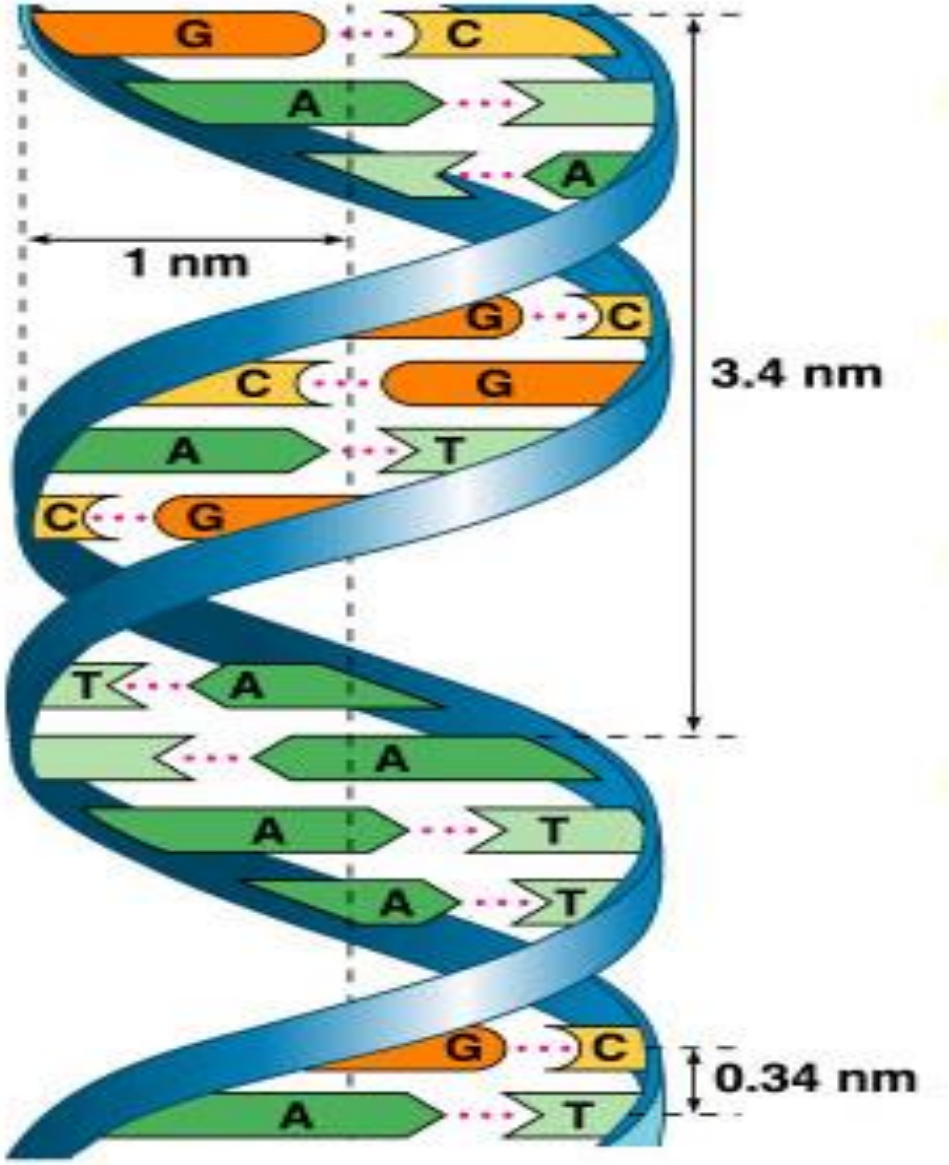


‘Base Pairing’

The sequence of nitrogenous bases is the code of DNA

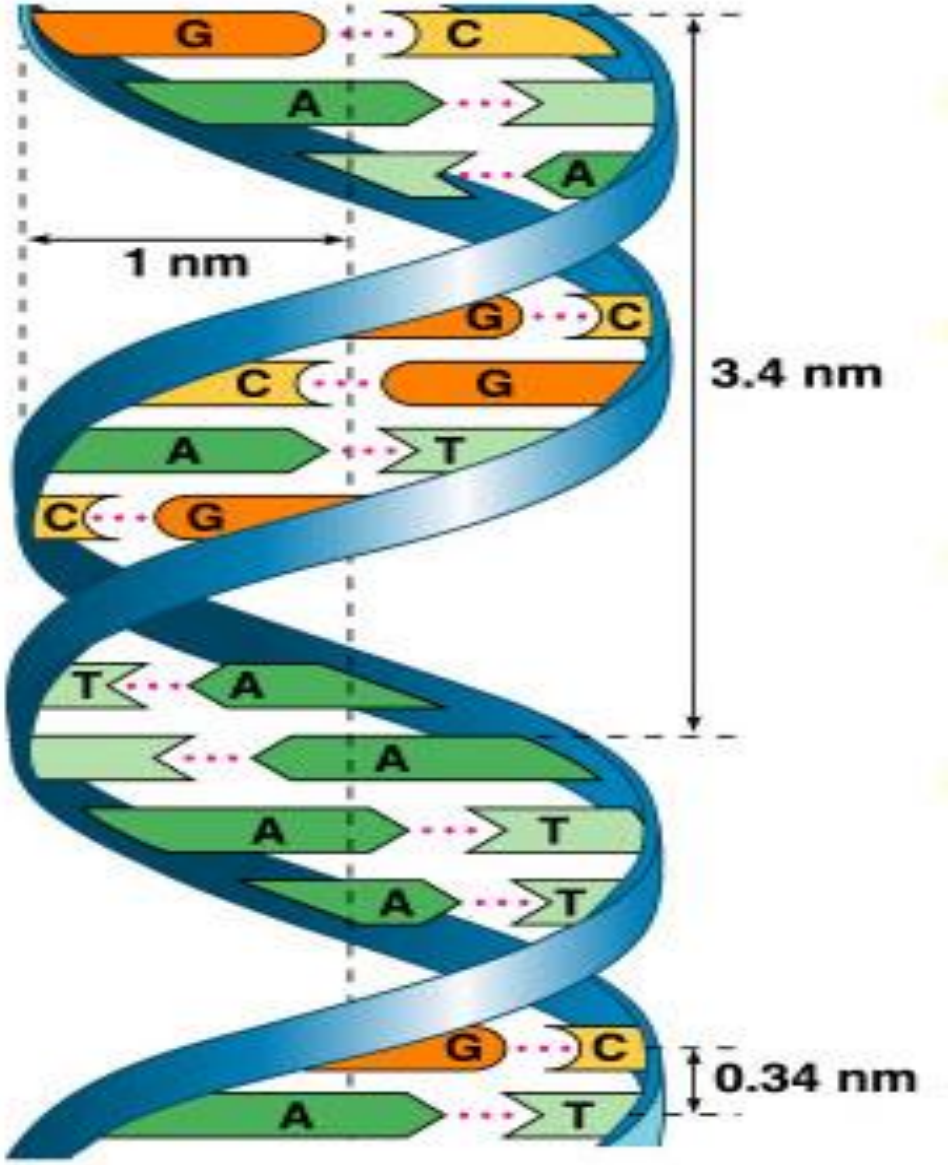
Reminder

- Purines
  - Adenine (A)
  - Guanine (G)
- Pyrimidines
  - Cytosine (C)
  - Thymine (T)
  - Uracil (U)
    - (In RNA only)



The Double Helix

This shows two strands of DNA in the form in which DNA is present within cells.



The Double Helix

This shows two strands of DNA in the form in which DNA id present within cells.

Within all of *your* cells (almost).

Review

1) Name the four classes of biomolecules
   Give an example of each
2) Explain why **offspring** look like parents
3) Define **nucleotide**
4) Define **monomer** and **polymer**
5) What are the 3 components of a nucleotide?
6) What is one difference between DNA and RNA?
7) What type of reaction occurs to allow monomers of nucleotides to form polymers?
   Draw out an example.
8) What shape does DNA take in your cells?

More Review

1) Name the Purines.
2) Name the Pyrimidines.
3) What base pairs with Cytosine?
4) What base pairs with Thymine?