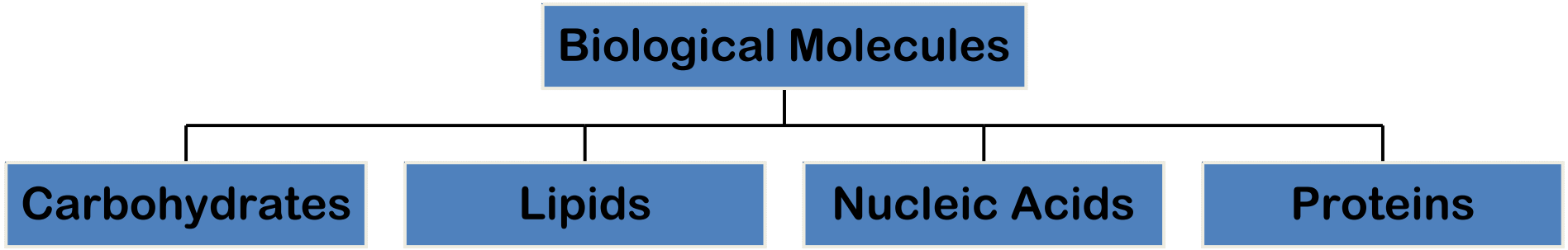
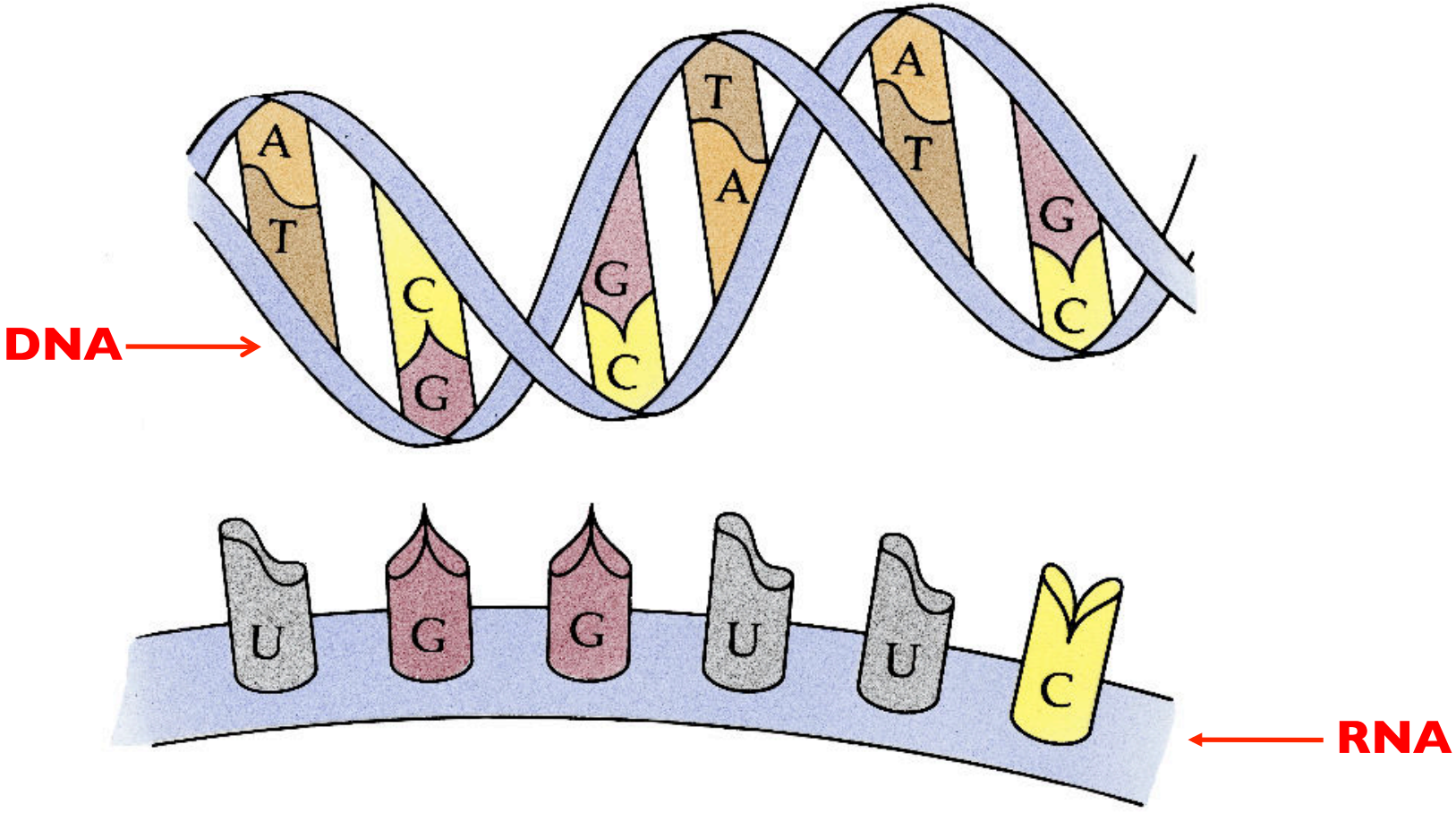
# NUCLEIC ACIDS

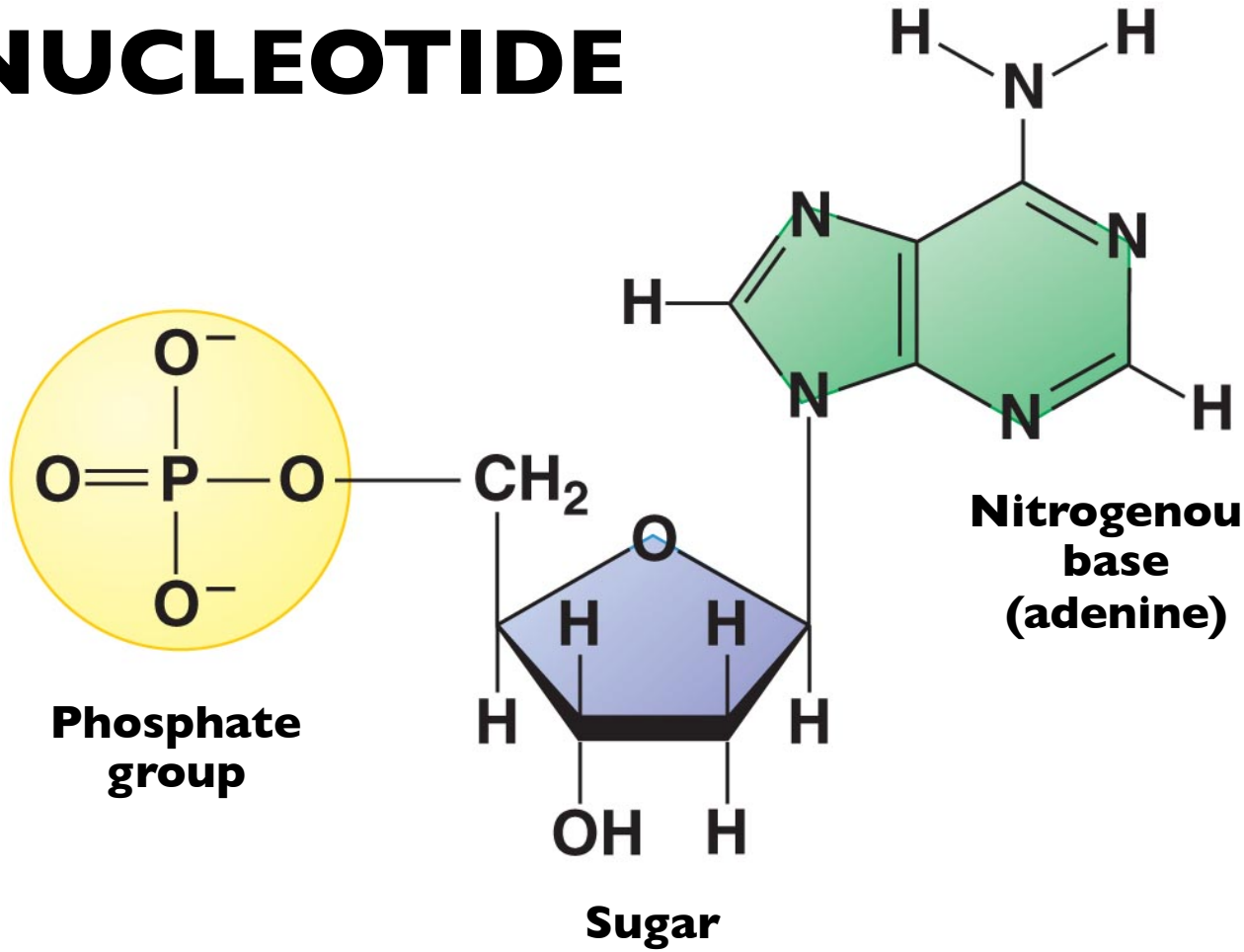

Biological Molecules
Carbohydrates
Lipids
Nucleic Acids
Proteins

| Biological Molecule | Monomer | Polymer(s) |
| --- | --- | --- |
| **Carbohydrates** | Monosaccharide | Disaccharide, Polysaccharide |
| **Lipids** | None, but bigger lipid molecules are generally made of glycerol and fatty acid chains | Big molecules include: triglycerides, steroids, and phospholipids |
| **Nucleic Acids** | Nucleotide | DNA, RNA |
| **Proteins** | Amino Acid | Dipeptide, Polypeptide |

# TWO VARIETIES OF NUCLEIC ACIDS

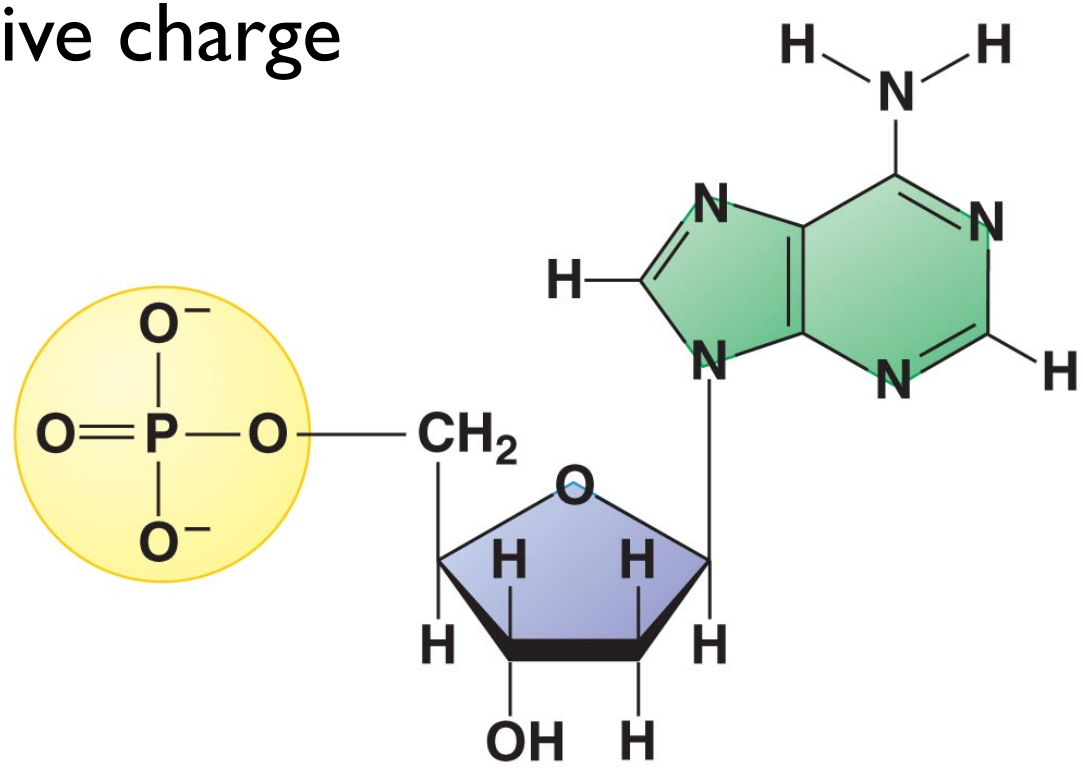


# Monomer: NUCLEOTIDE



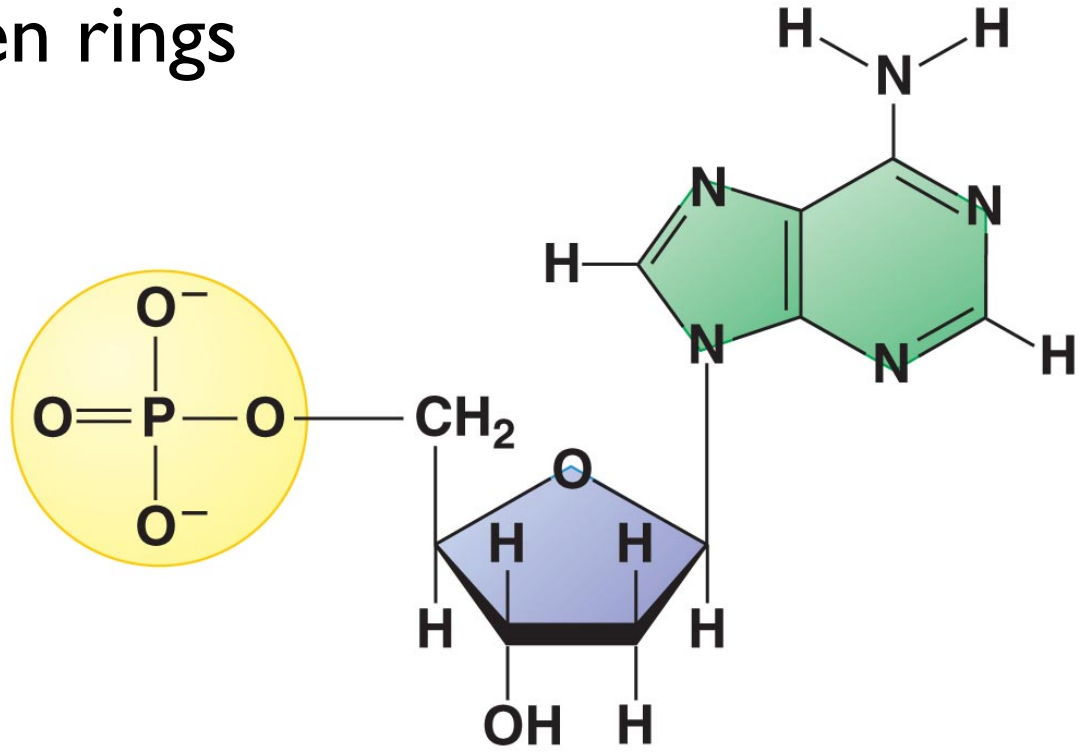
# Nucleotide components:
# PHOSPHATE GROUP

- Carries a negative charge

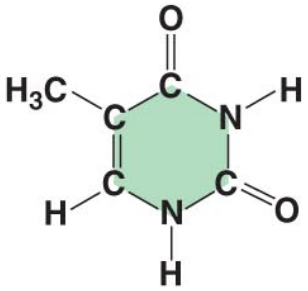


# Nucleotide components:
# NITROGENOUS BASE

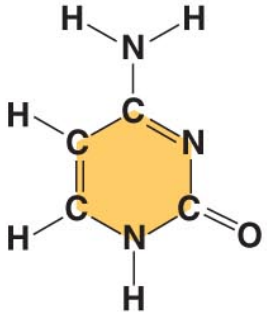
- 1 or 2 nitrogen rings



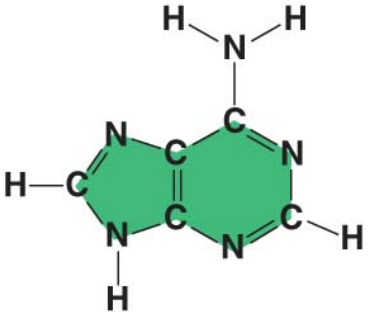
# Nucleotide components: NITROGENOUS BASES



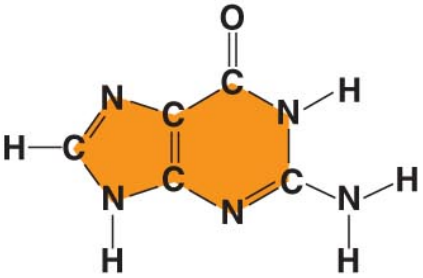
**Thymine (T)**



**Cytosine (C)**

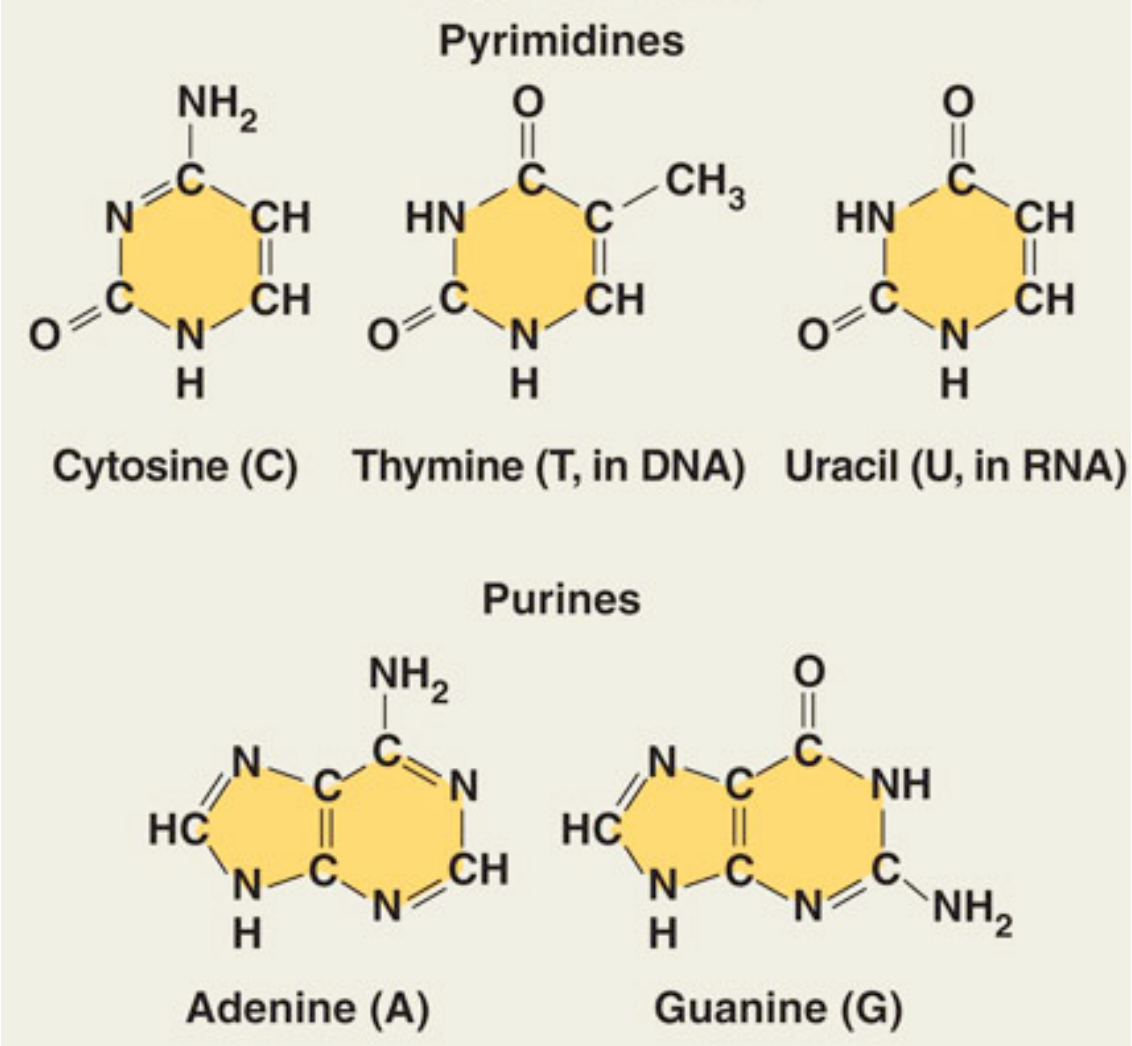


**Adenine (A)**



**Guanine (G)**

# Nucleotide components: NITROGENOUS BASES



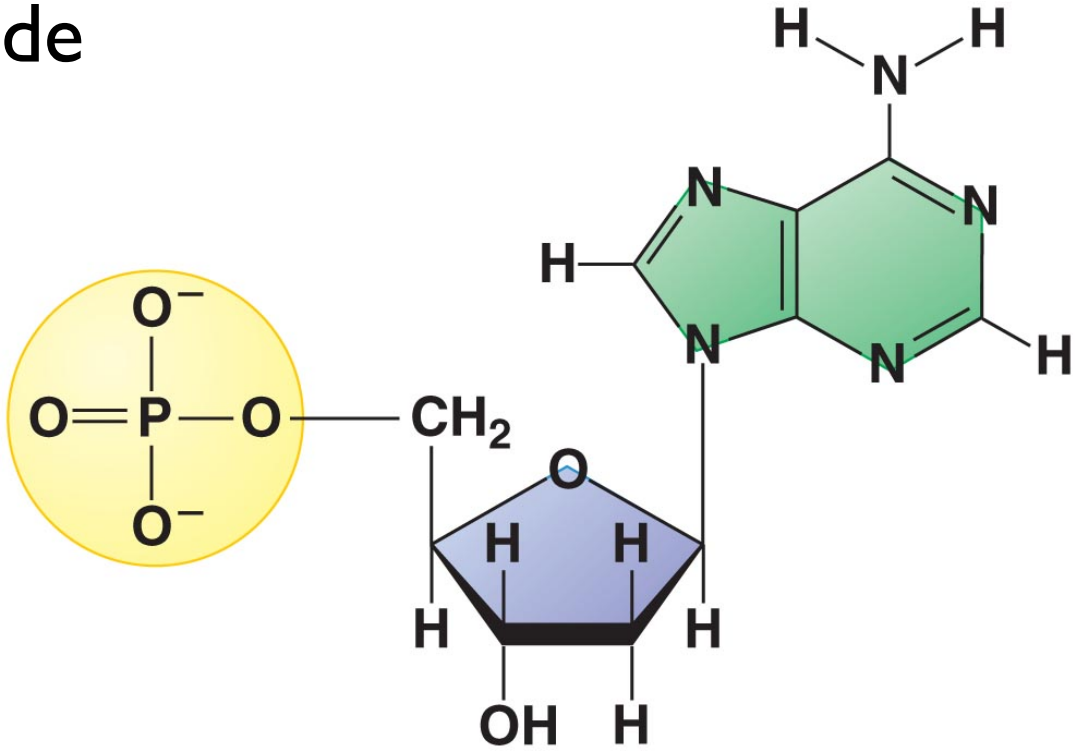
# Complementary Base Pairing

| In DNA | | |
|---|---|---|
| A | pairs with | T |
| C | pairs with | G |

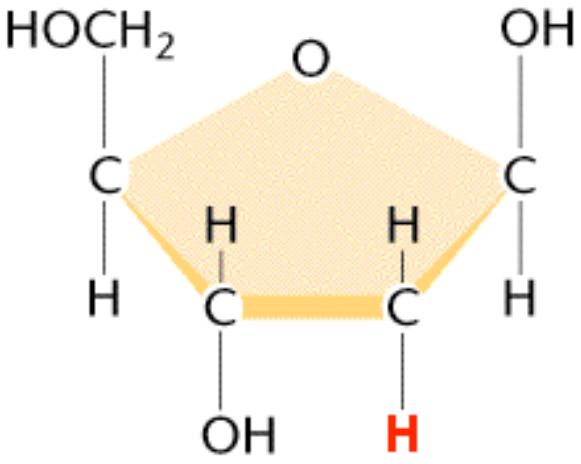
| In RNA | | |
|---|---|---|
| A | pairs with | U |
| C | pairs with | G |

# Nucleotide components:
# PENTOSE SUGAR

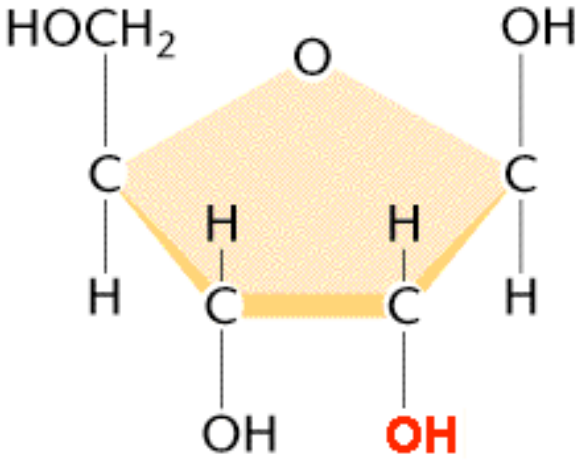
- monosaccharide



# Nucleotide components:
# PENTOSE SUGAR




2-Deoxyribose




Ribose

**In DNA**

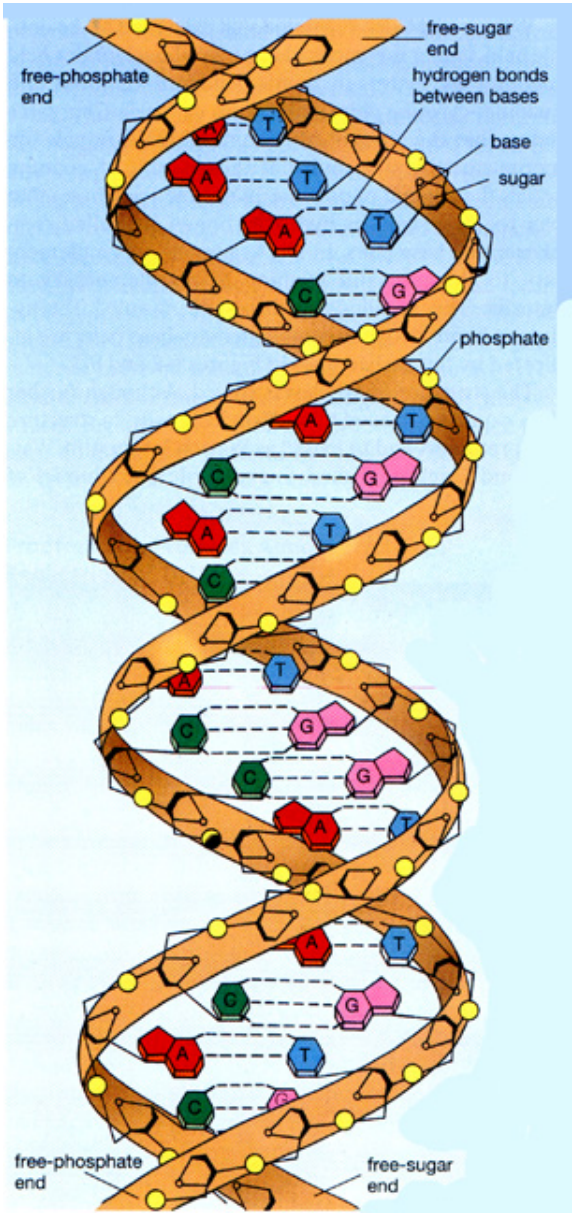
**In RNA**

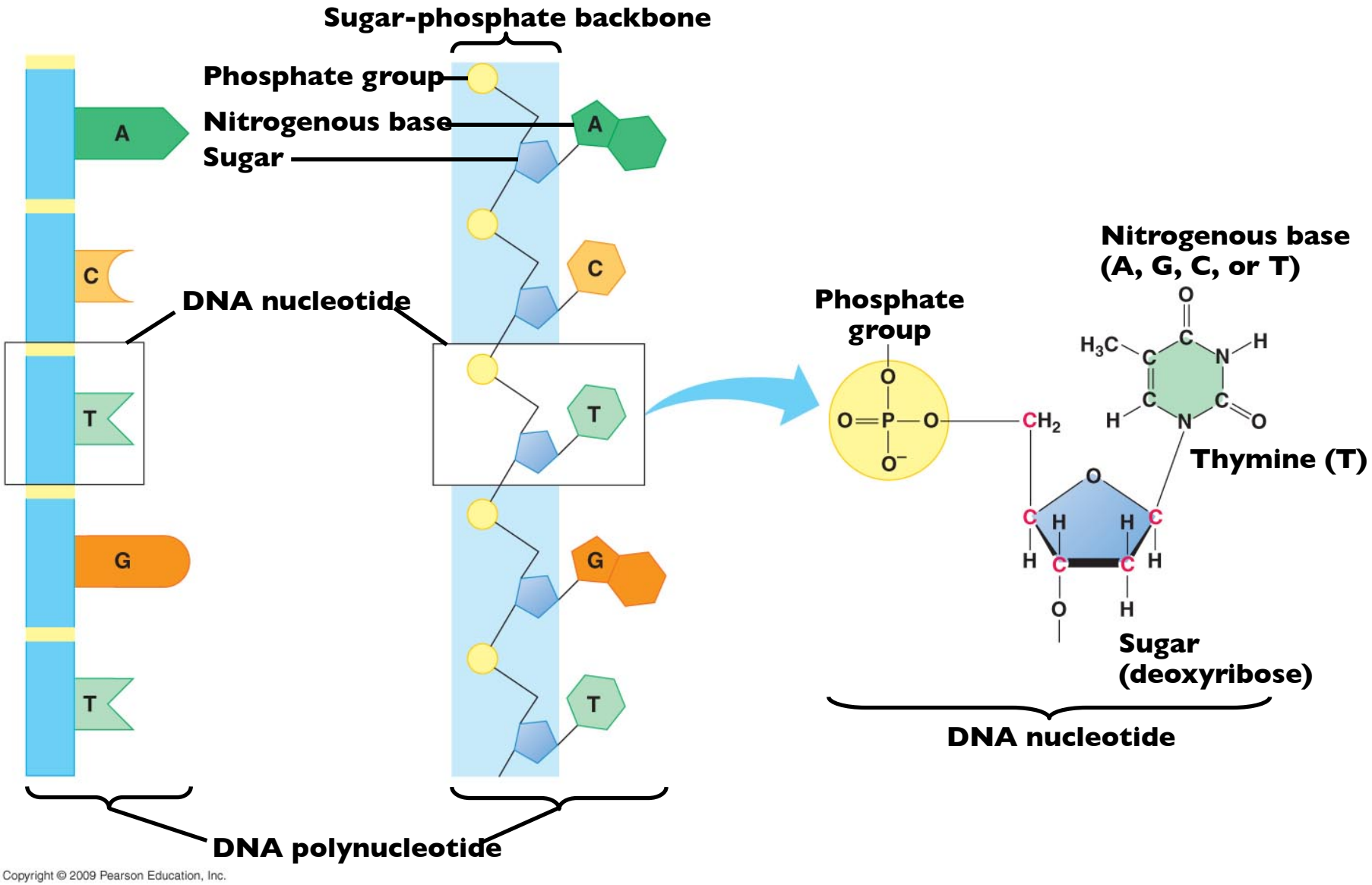

THE MUSIC OF LIFE
IN THE KEY OF DNA
Chris Madden
www.chrismadden.co.uk

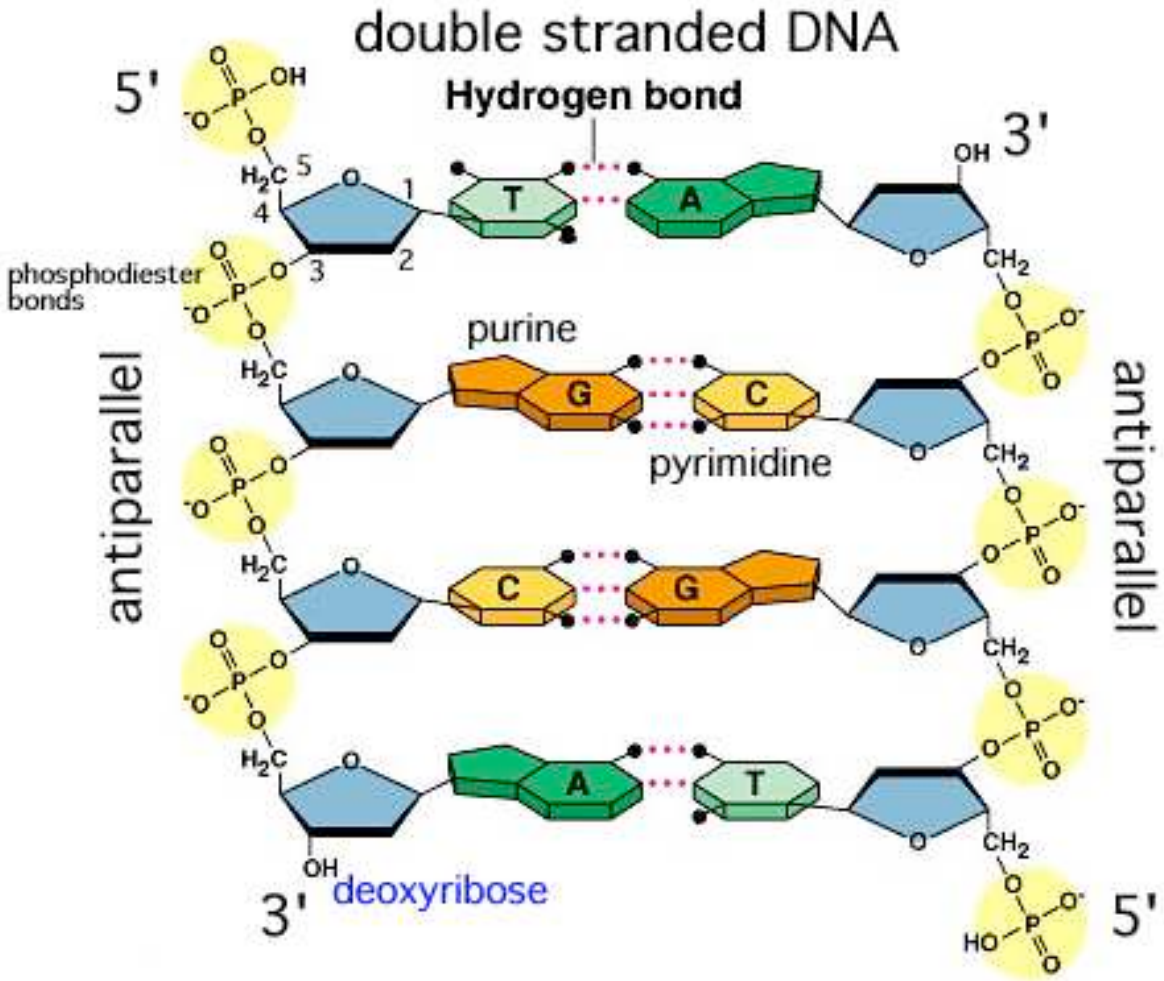
# DNA

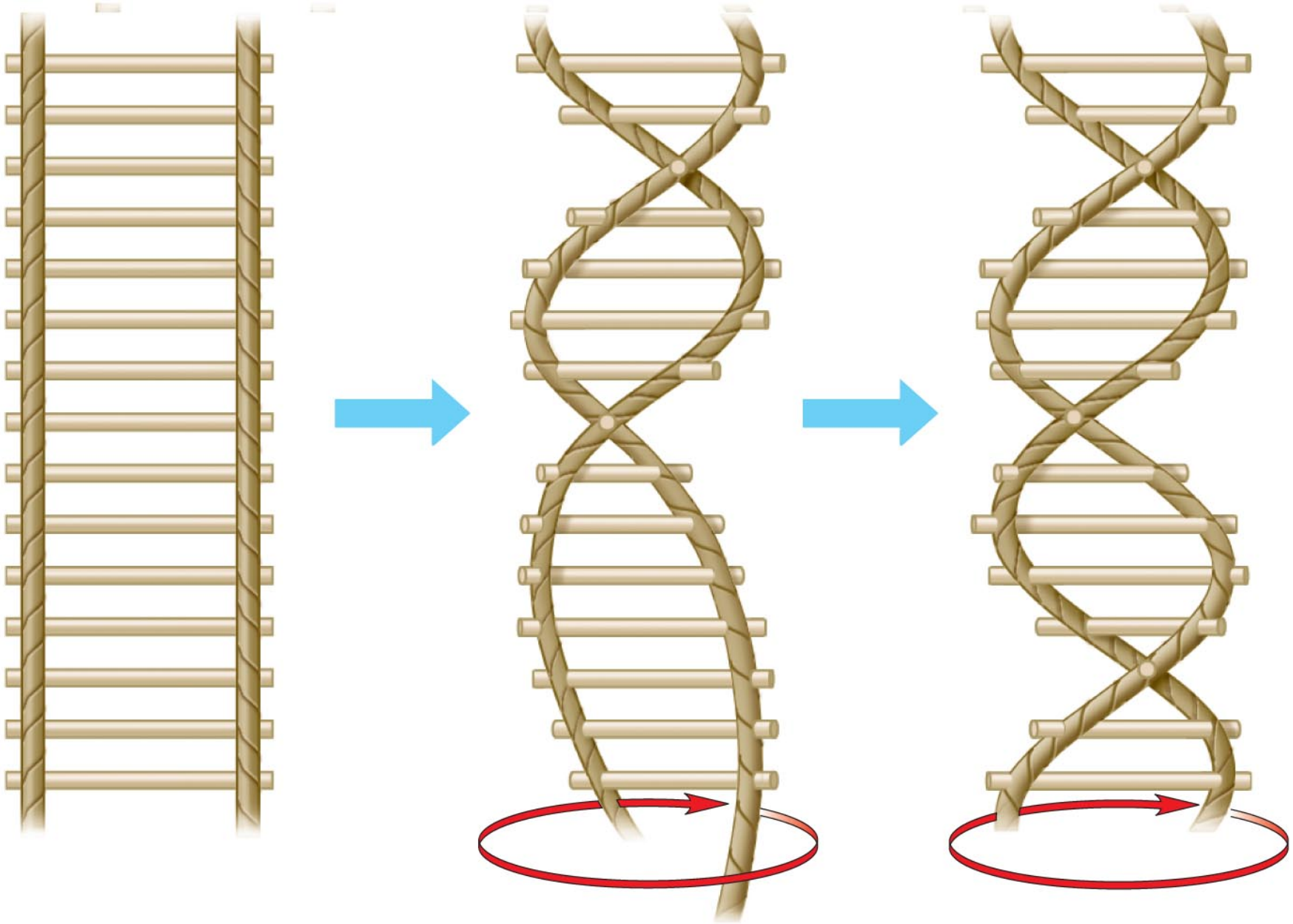
# DNA (deoxyribonucleic acid)

- Contains genetic information
- Pentose sugar = deoxyribose
- Shaped like a twisted ladder (double helix)
- Sides of the ladder are composed of alternating sugar and phosphate groups
- Each "rung" of the ladder is made up of two complementary bases
  - A pairs with T
  - C pairs with G



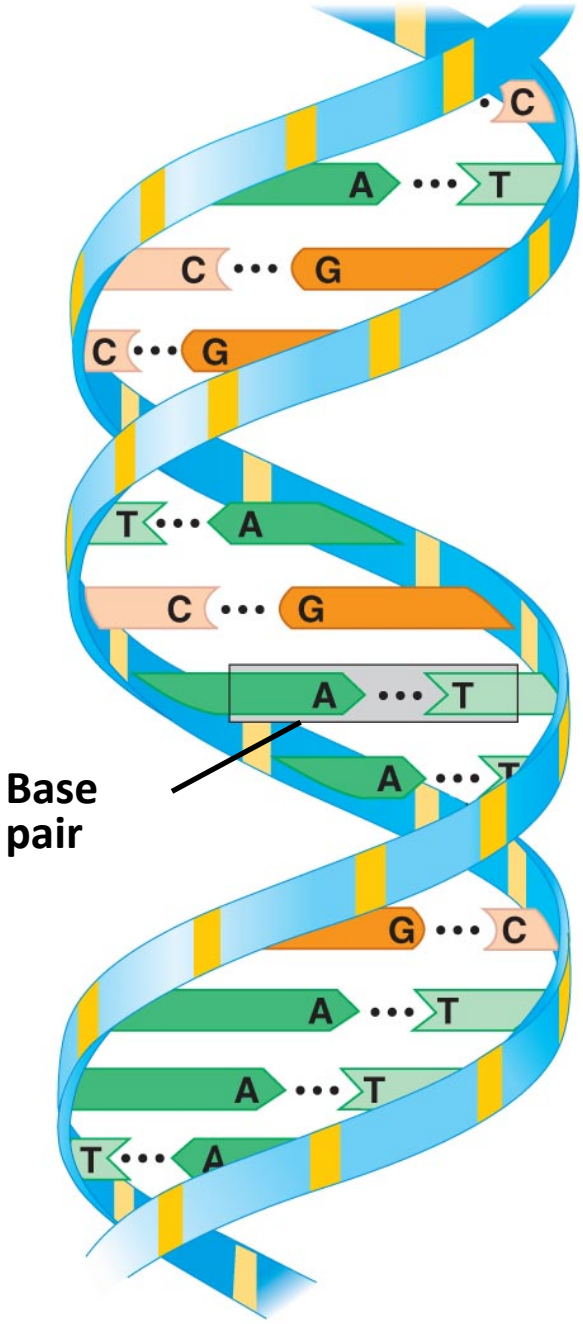


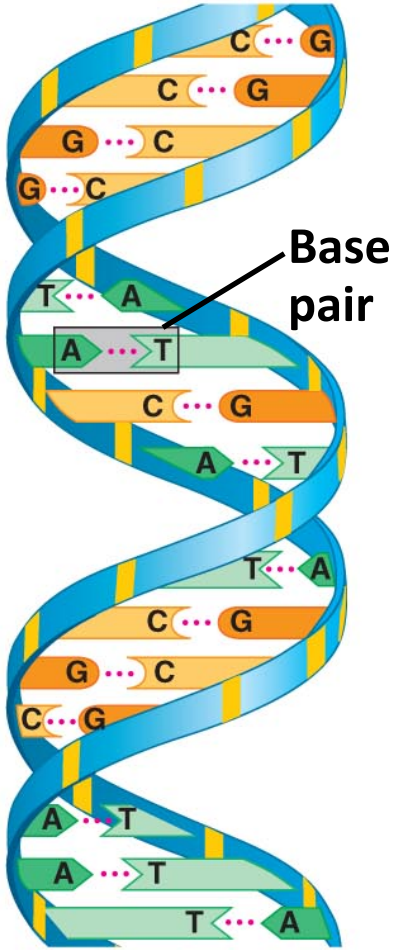

double stranded DNA
Hydrogen bond
5'
3'
phosphodiester bonds
purine
pyrimidine
antiparallel
antiparallel
T
A
G
C
C
G
A
T
3'
deoxyribose
5'



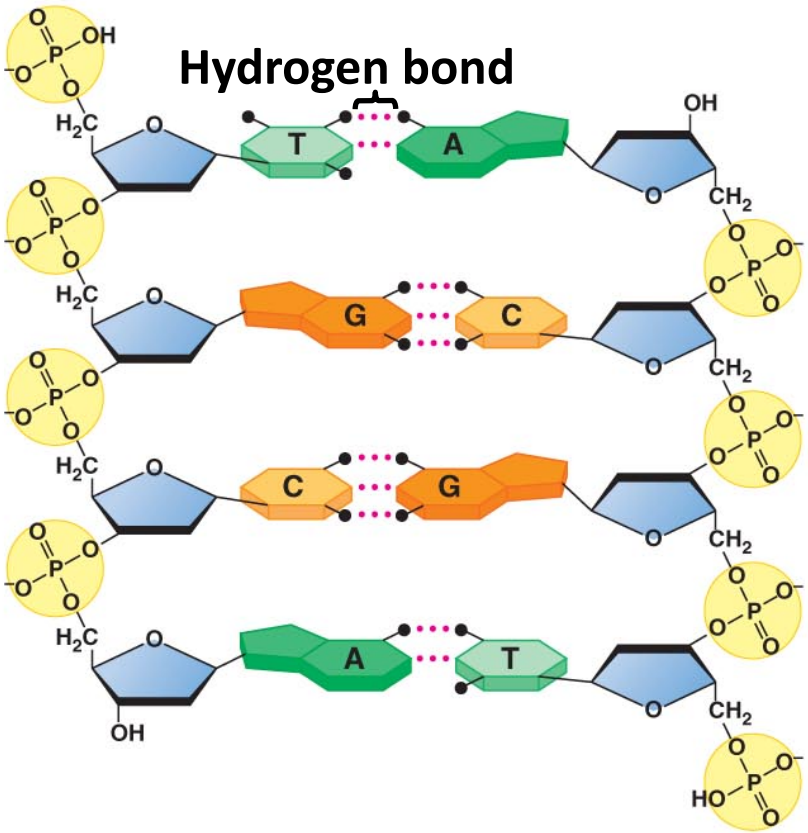
**Twist**

Fig. 3-16c

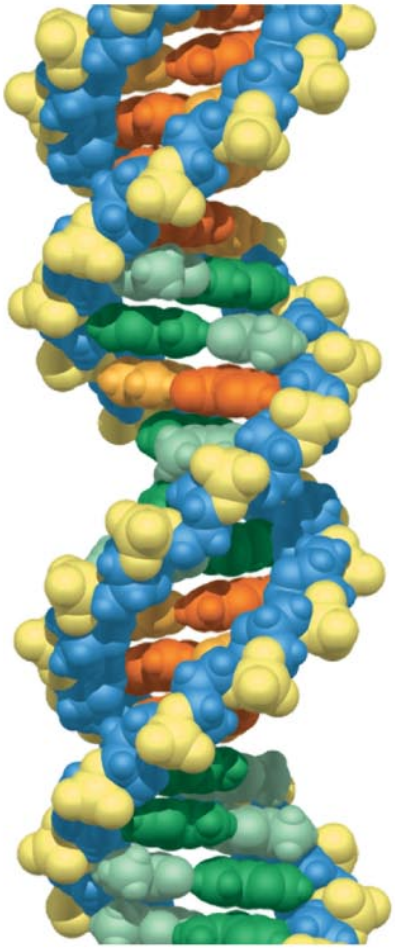




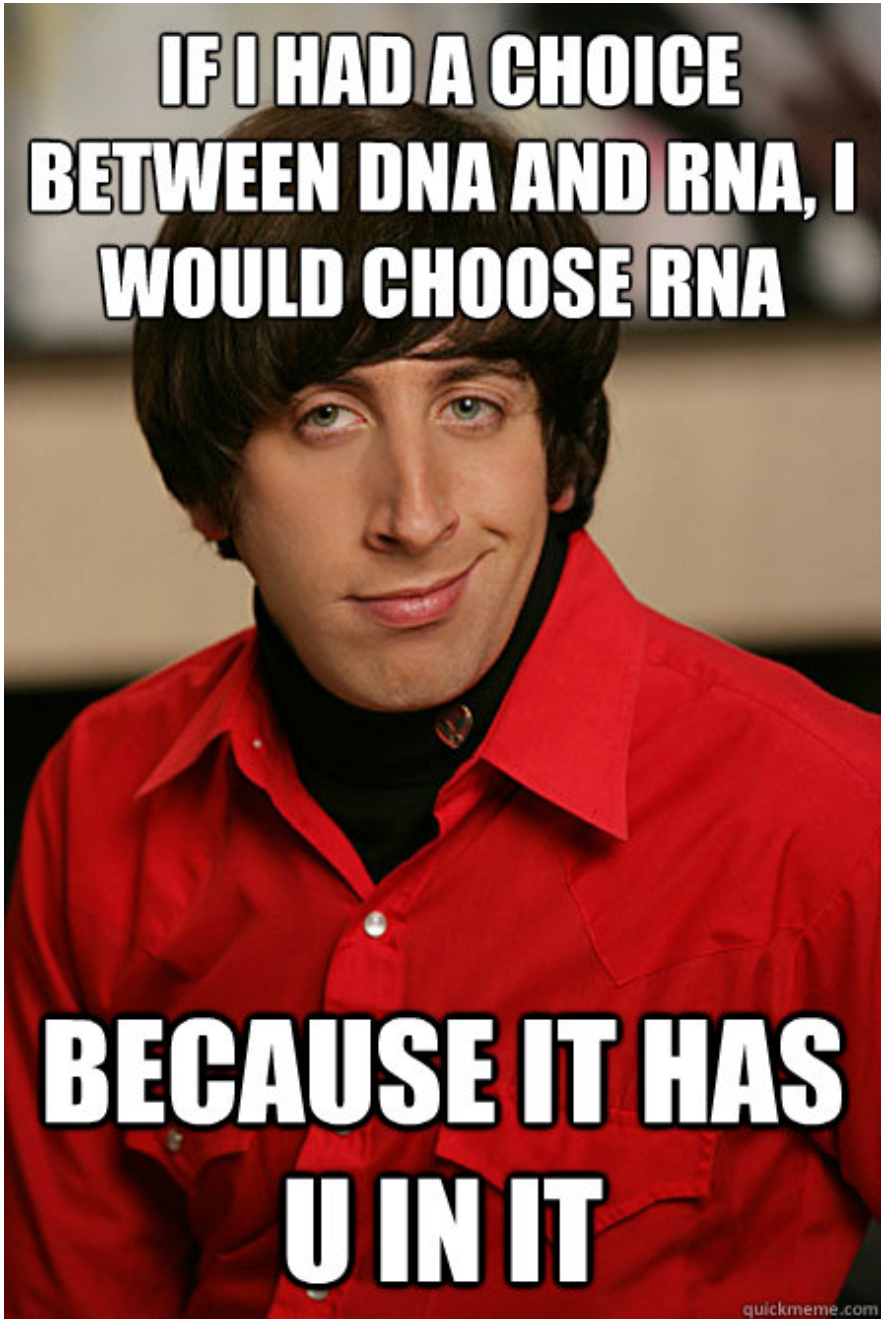

Ribbon model




Partial chemical structure



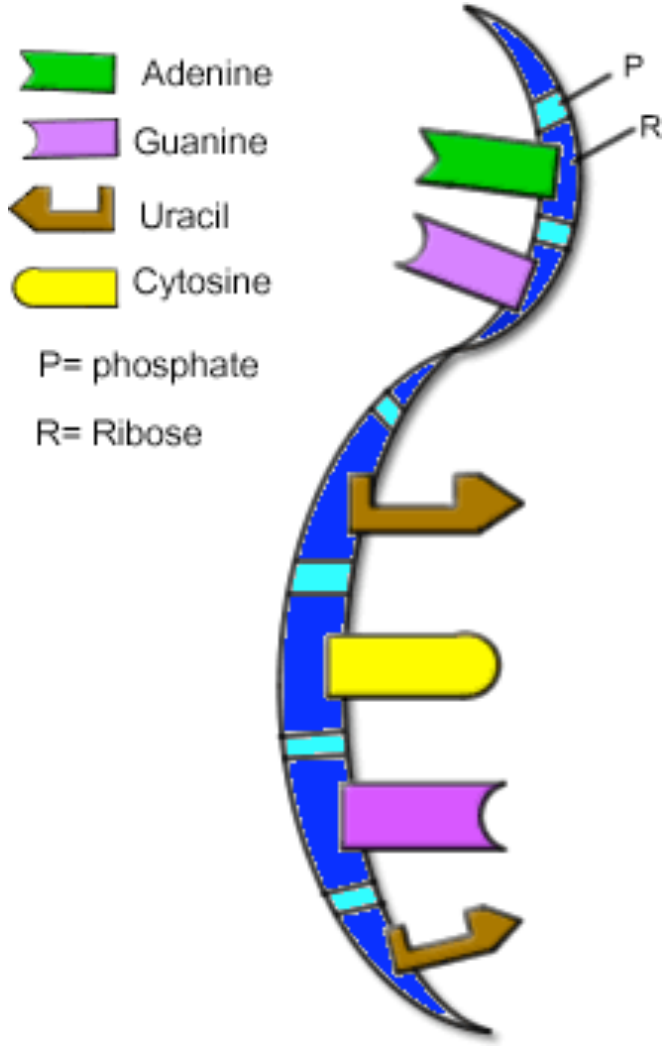
Computer model

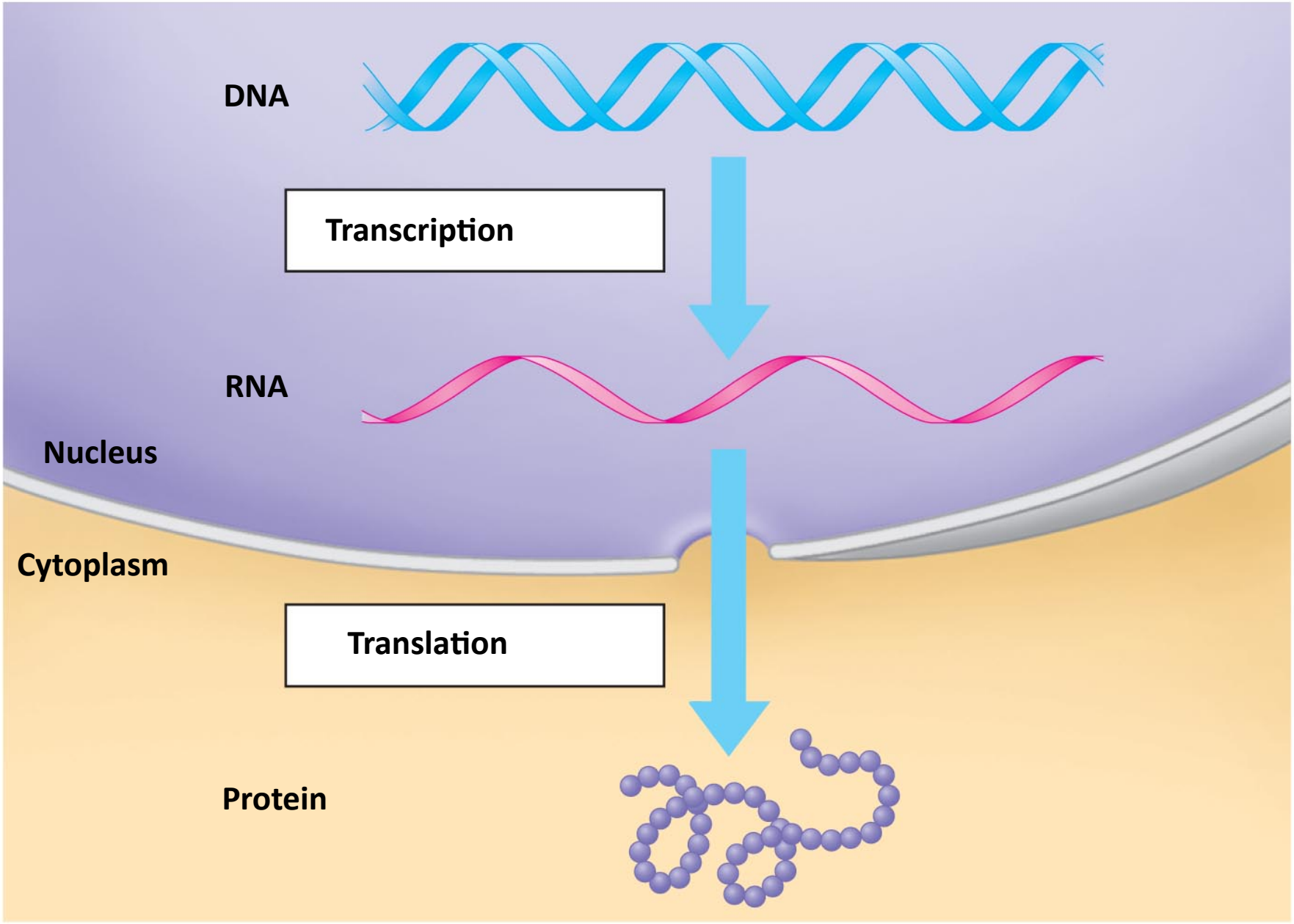

IF I HAD A CHOICE BETWEEN DNA AND RNA, I WOULD CHOOSE RNA
BECAUSE IT HAS U IN IT
quickmeme.com

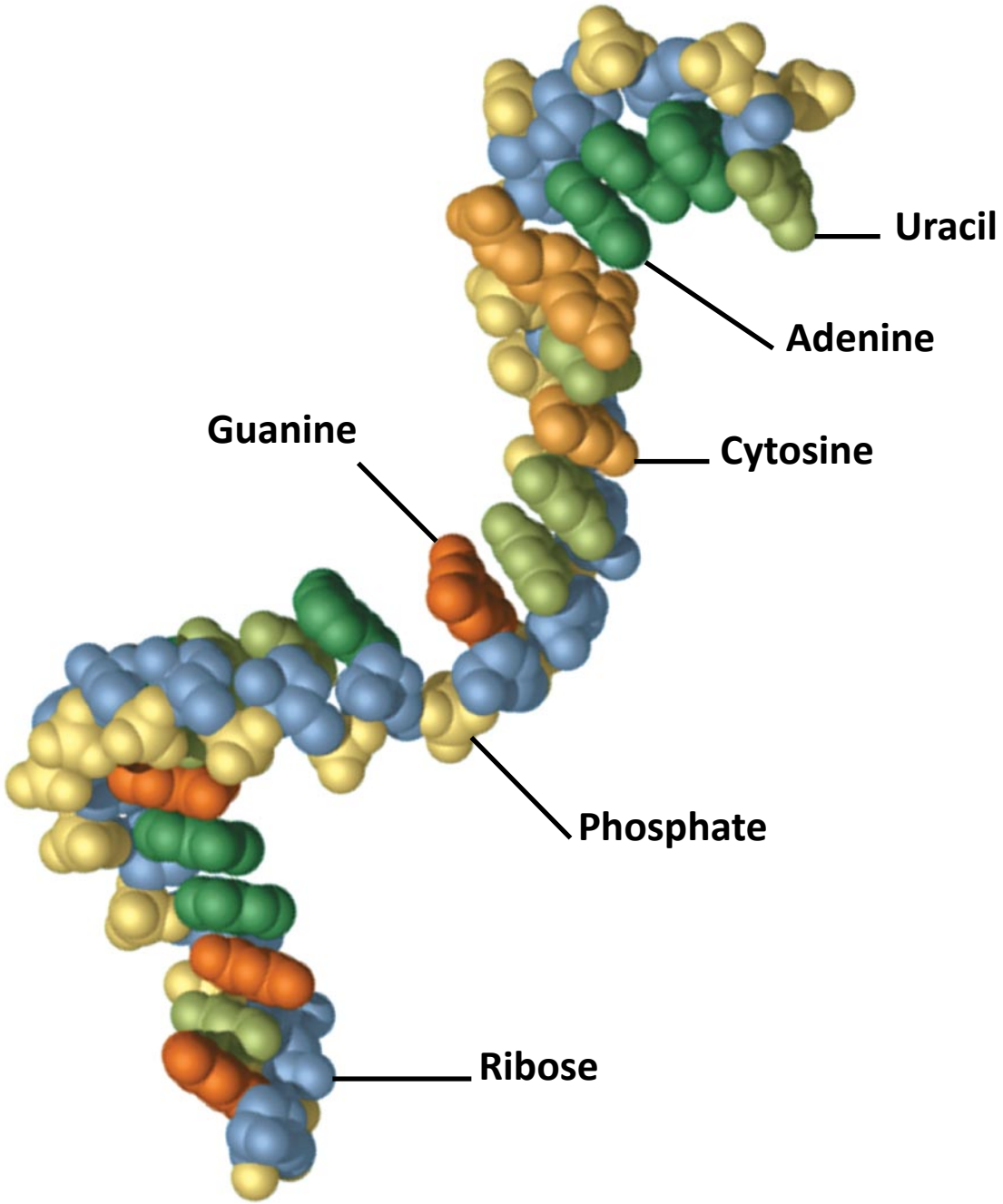
# RNA

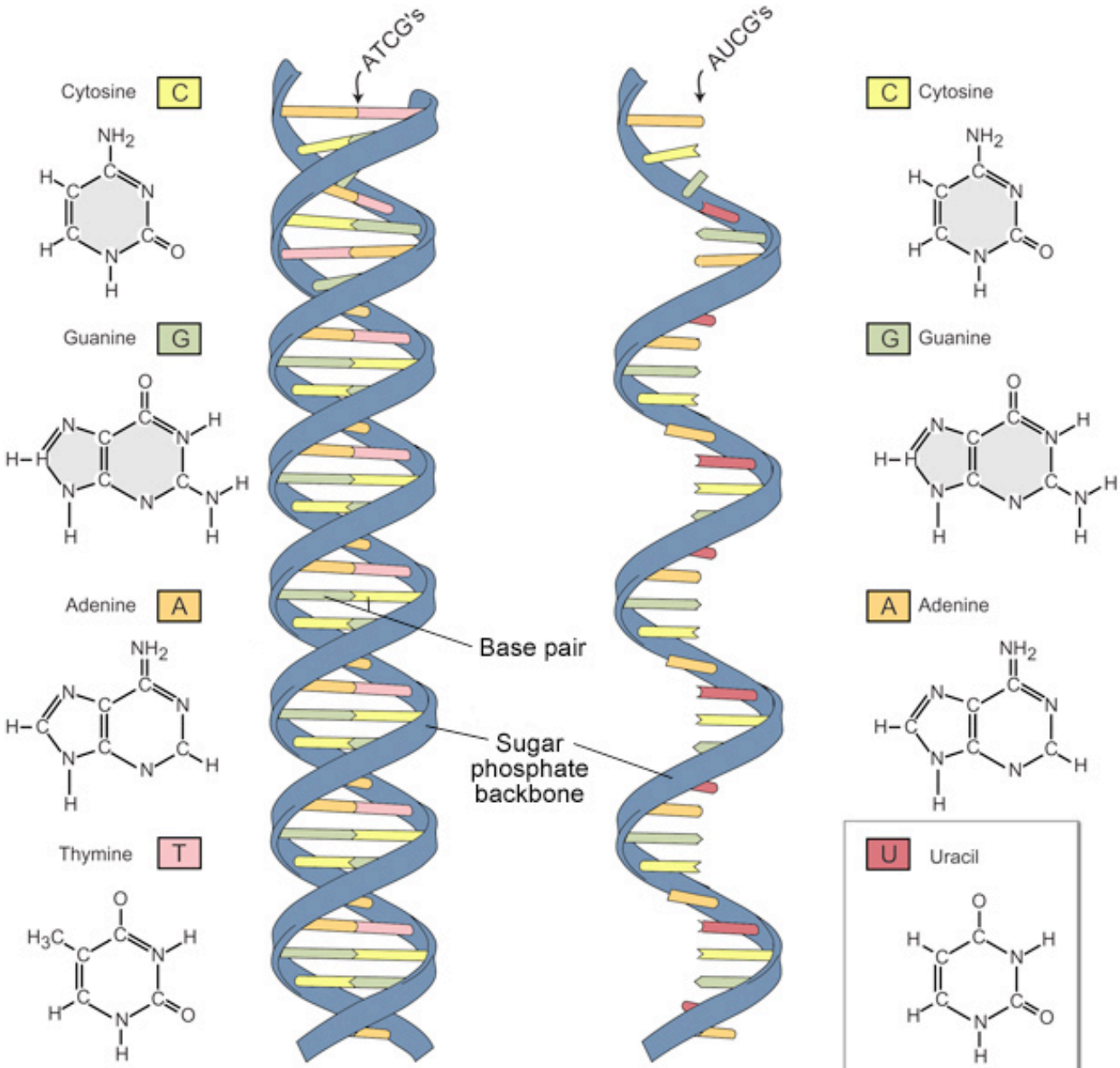
# **RNA** (ribonucleic acid)

- One type (messenger RNA) helps transmit genetic code from DNA to the part of the cell that builds proteins
- Pentose sugar = ribose
- Usually single-stranded
- Uracil (U) instead of thymine (T)








ATCG's
AUCG's
Cytosine C
Guanine G
Adenine A
Thymine T
Base pair
Sugar phosphate backbone
C Cytosine
G Guanine
A Adenine
U Uracil
replaces Thymine in RNA
DNA
Deoxyribonucleic acid
RNA
Ribonucleic acid
Nitrogenous Bases
Nitrogenous Bases