THE CHEMISTRY OF HEREDITY

By
Ram Balak Mahto
Guest faculty
Zoology department
V.S.J College Rajnagar Madhubani

WHERE DO ALL CELLS COME FROM (CELL THEORY) ?

WHAT IS HEREDITY?

Answer these questions:

The passing of traits to offspring from parents

Traits

Physical and chemical characteristics

The result of protein synthesis

Answer this question:

What controls protein synthesis?

DNA controls protein synthesis

Genes make up DNA

Genes control the formation of protein

Genetics
The study of genes

Why characteristics appear

The processes of heredity

- Answer these questions:
- What makes two proteins different? (Hint: think primary
- structure)
- Where are proteins assembled?
- Proteins differ by amino acid arrangement
- The order of amino acids
- Proteins are assembled at the ribosome
- Genes tell the sequence of amino acids
- The sequence is read at the ribosome
- The ribosome joins the amino acids in the proper order

- The Discovery of DNA
- Answer these questions:
- What is the monomer of DNA?
- What are the 4 monomers found in DNA?
- Deoxyribonucleic acid (DNA) – The Double Helix
- DNA is a polymer
- The monomer units of DNA are nucleotides
- Each nucleotide is made of a:
- 5-carbon sugar (deoxyribose)
- Nitrogen containing base
- Phosphate group

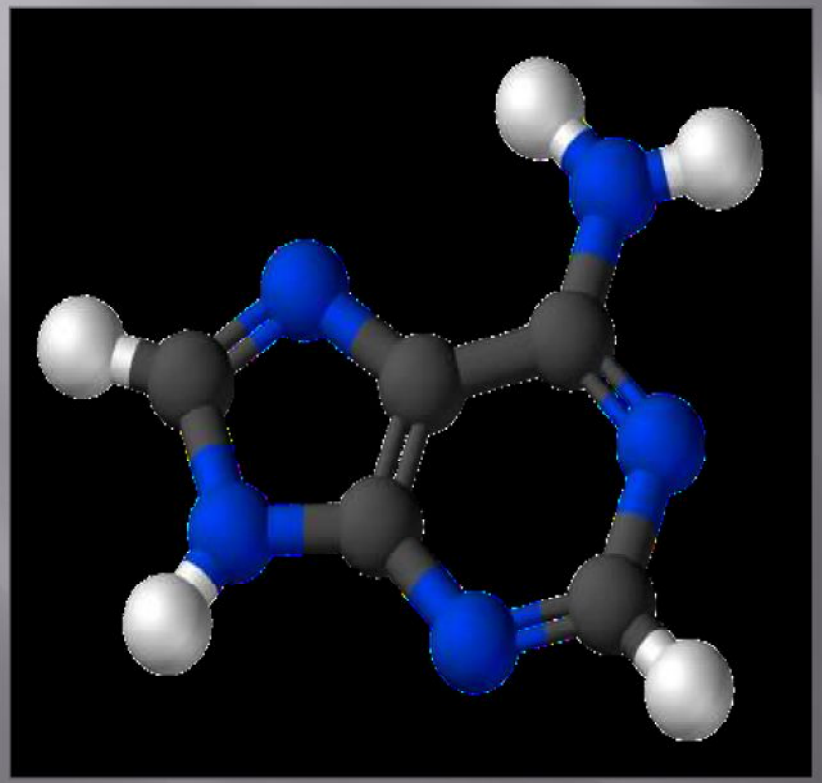
There are 4 types of nucleotides, differing only in the nitrogenous base

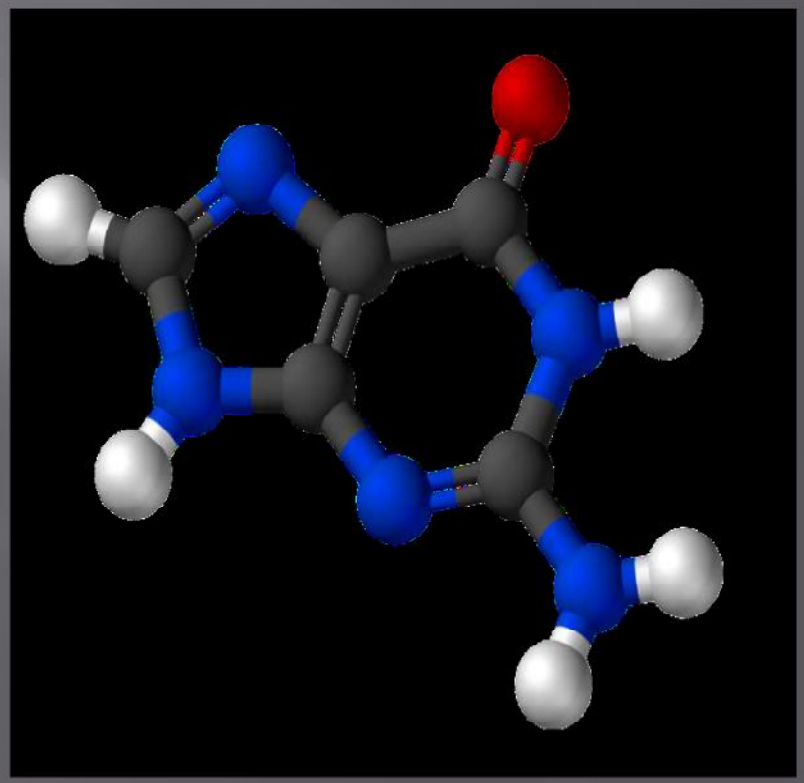
- Adenine (A)
- Guanine (G)
- Cytosine (C)
- Thymine (T)

A and G are called **purines**

C and T are called **pyrimidines**

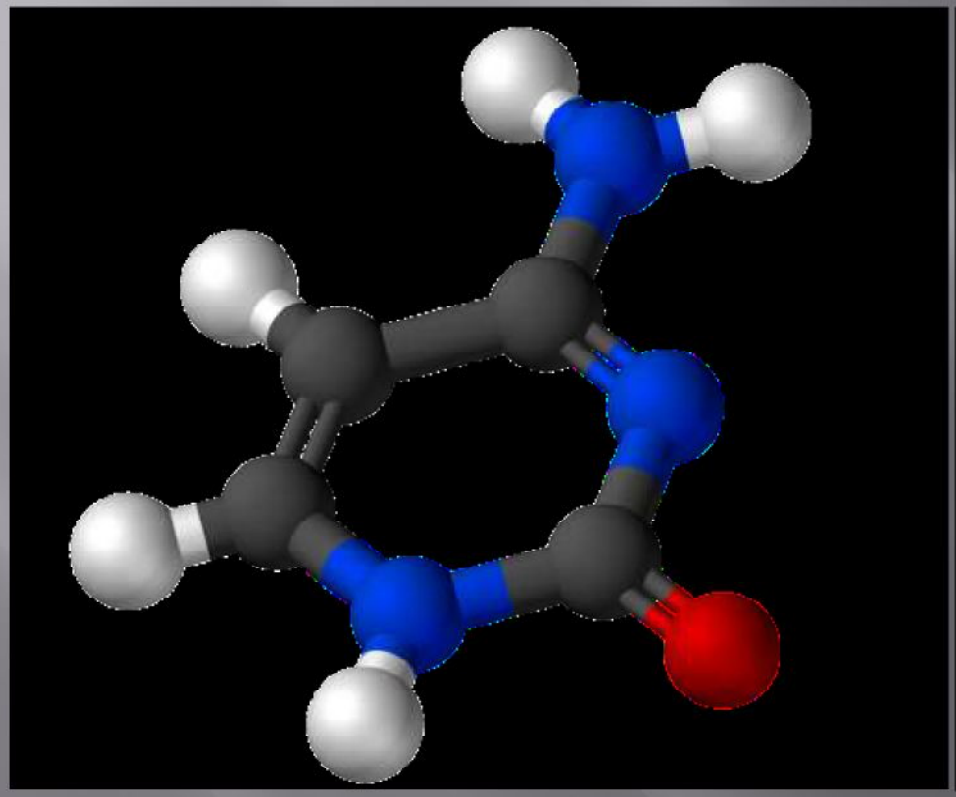
Purines
Adenine (A) and Guanine (G) are composed of two rings

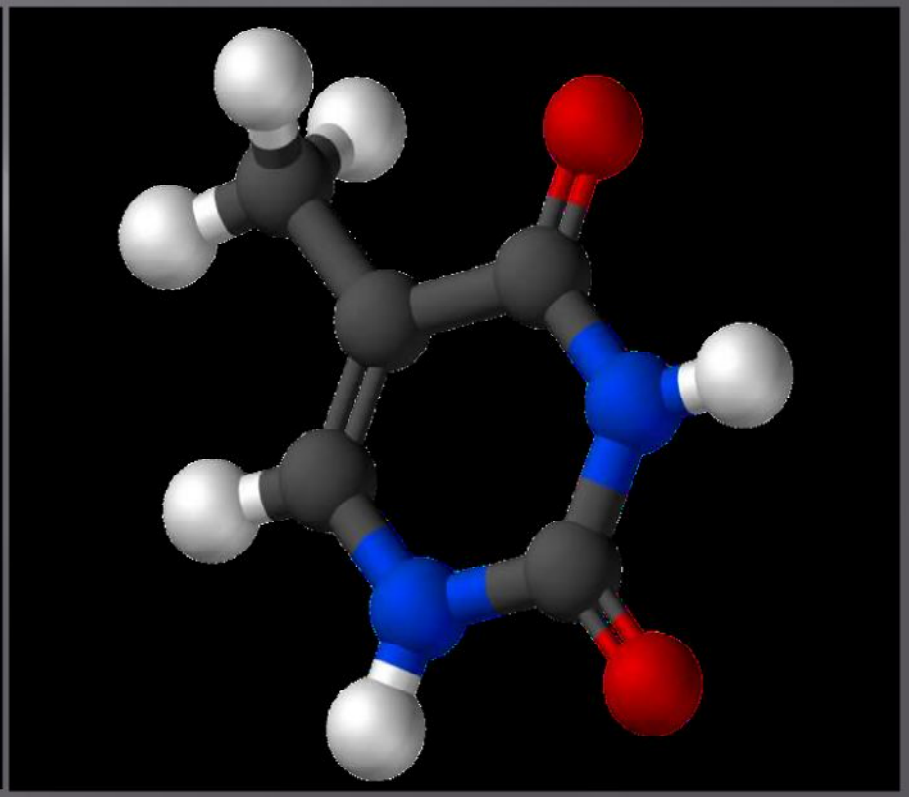




Pyrimidines

Cytosine (C) and Thymine (T) are composed of one ring

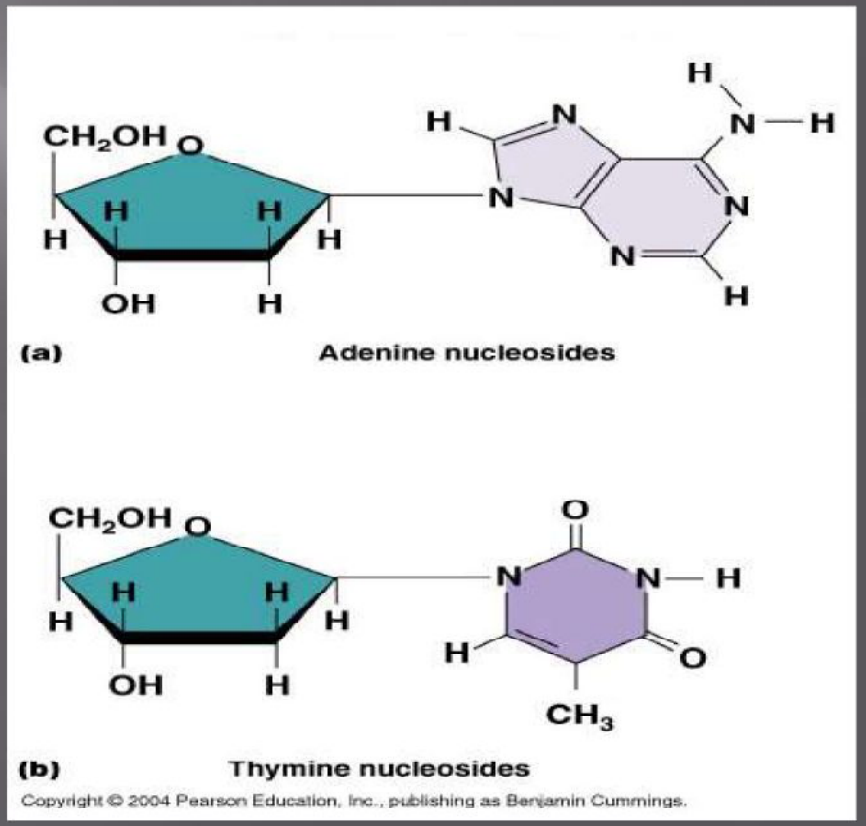




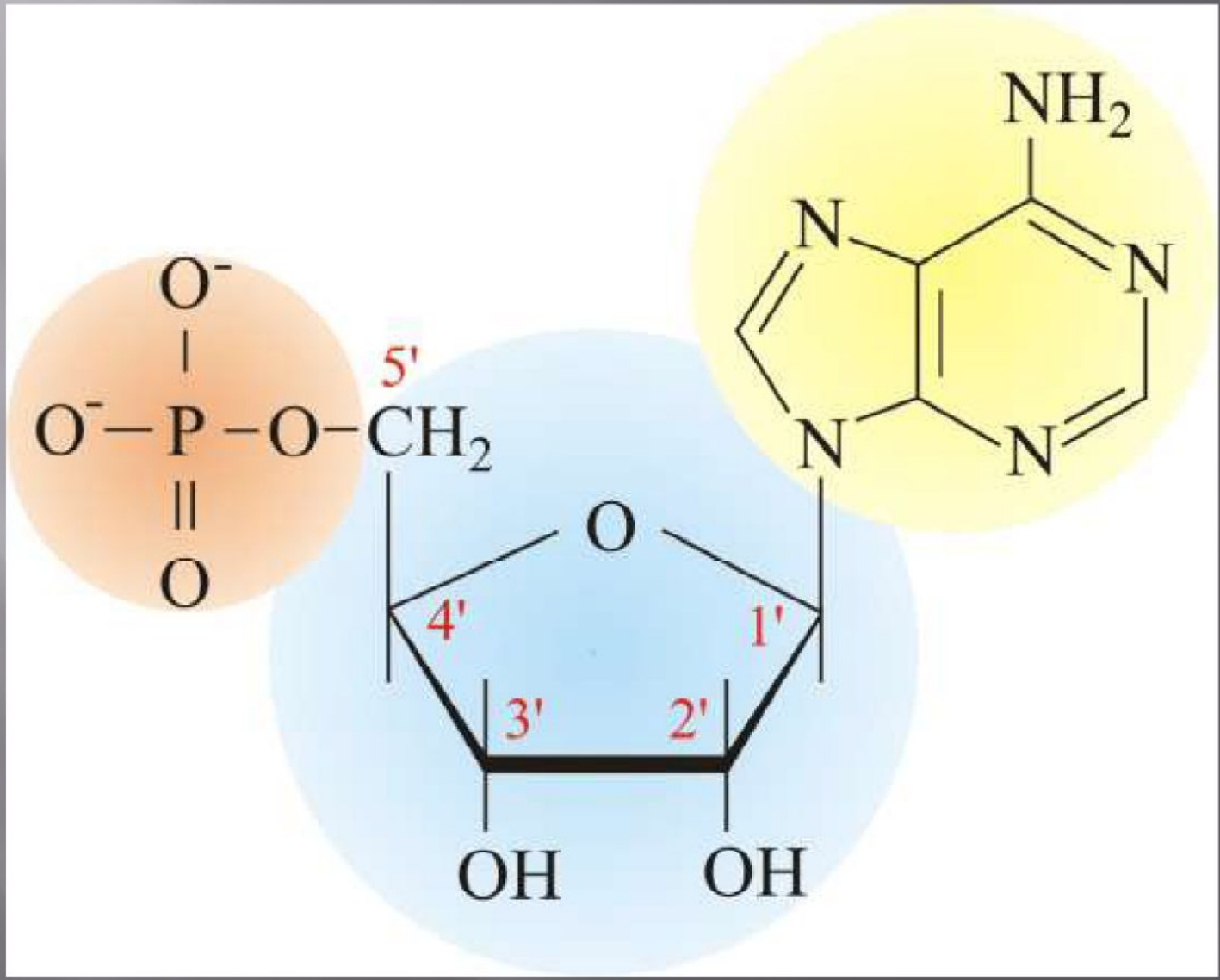
The nitrogen containing base (purines and pyrimidines) attaches to deoxyribose (5-carbon sugar) to form a 'nucleoside'

To keep track of where things attach, we number the Carbons

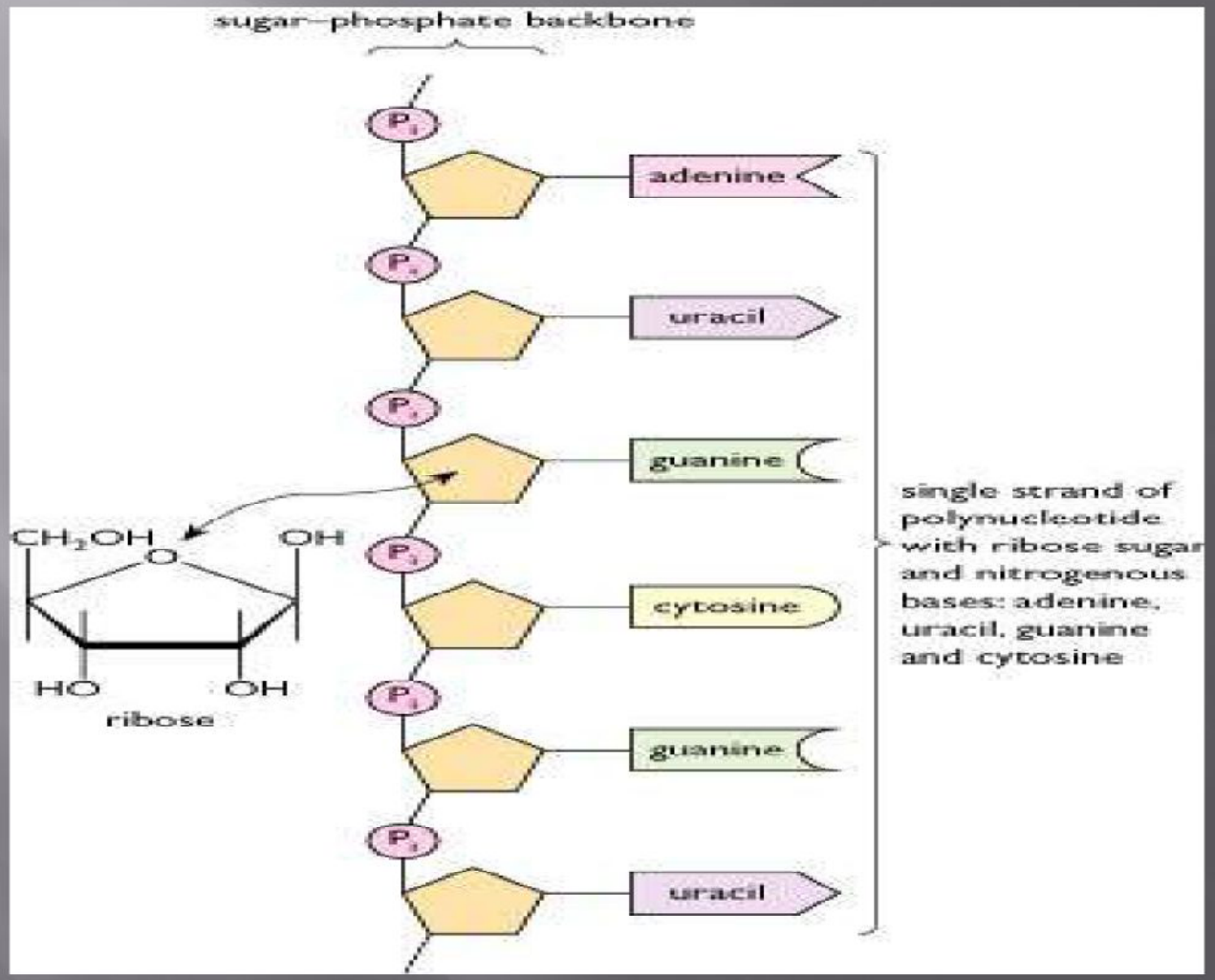
Answer this question:
Which carbon is the nitrogen base attached to?



A nucleo**tide is a nucleoside with an attached phosphate group (attached where?)**

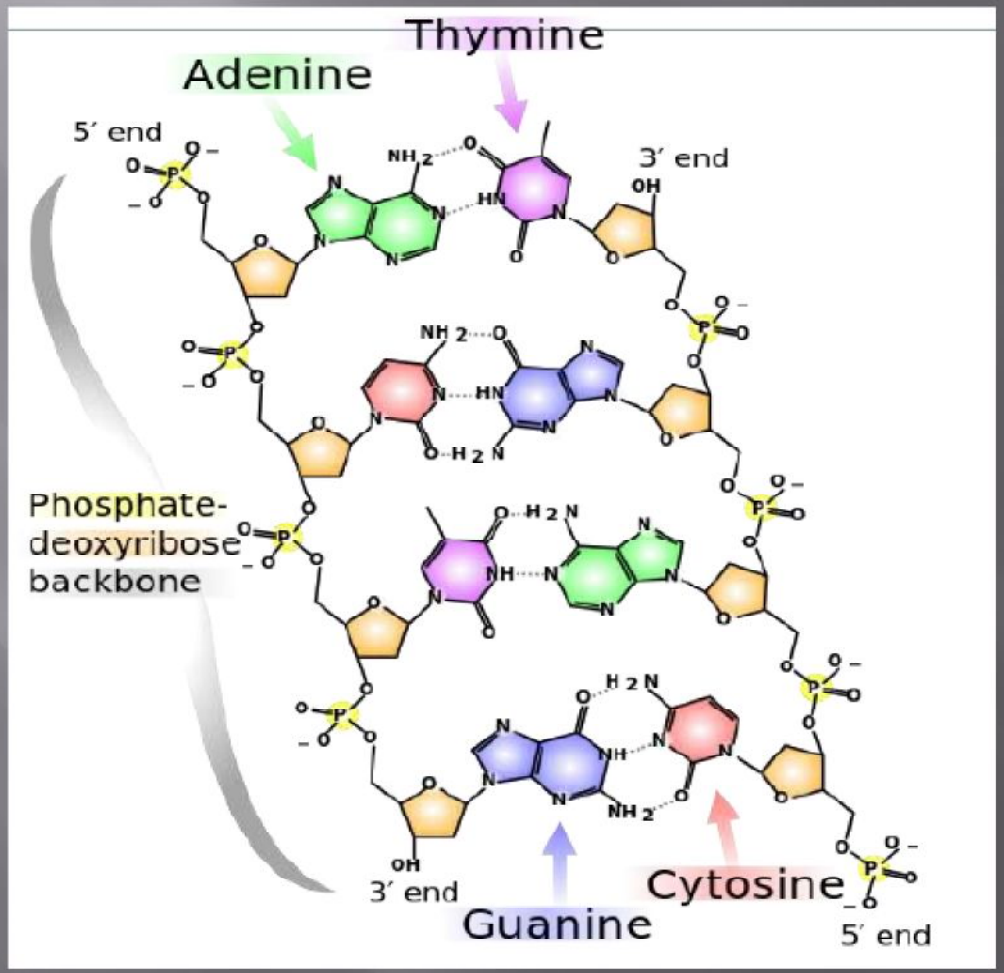


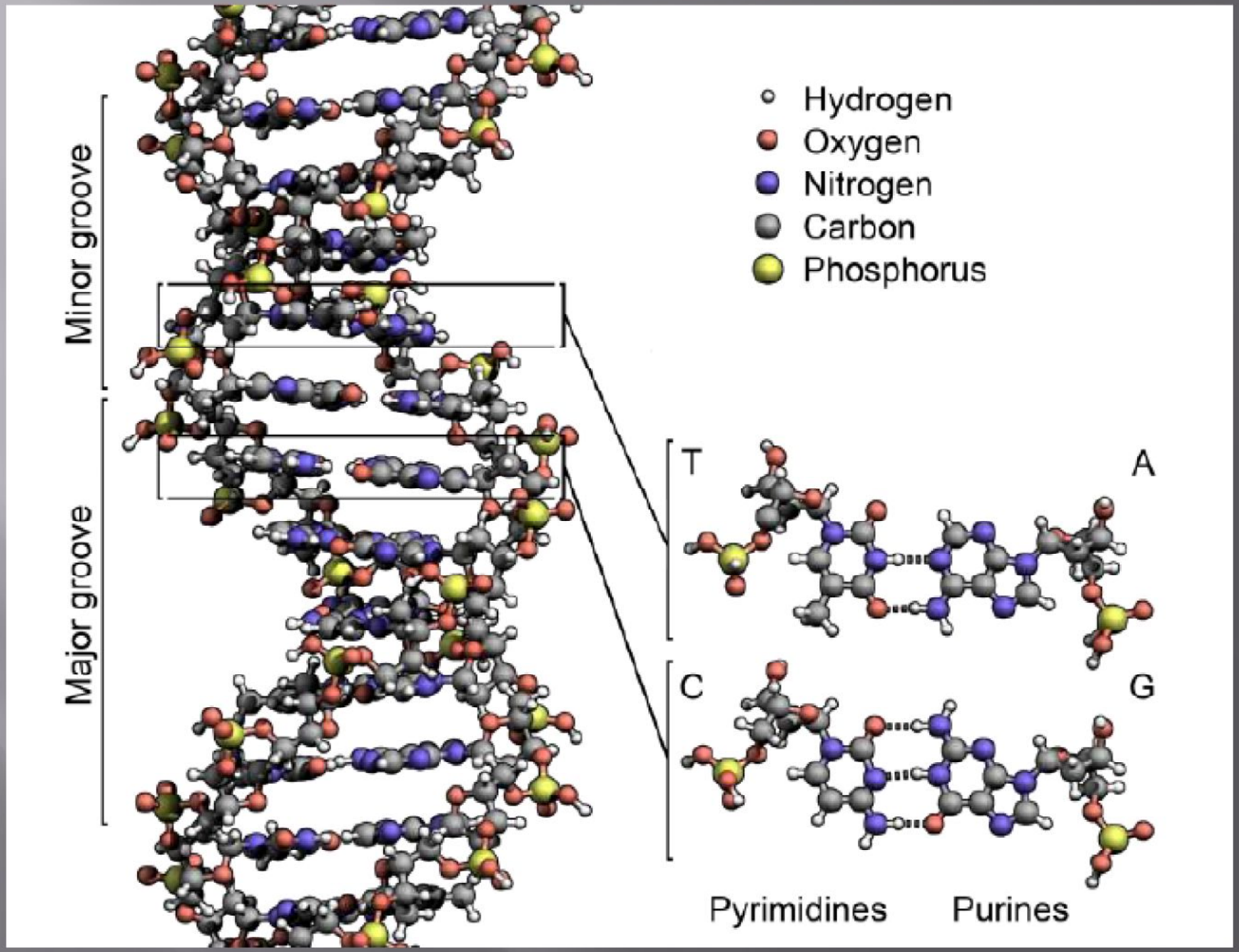
Phosphate groups join the deoxyribose sugars together in a chain-like fashion



DNA is made of 2 complimentary chains of nucleotides where…

- **A forms 2 hydrogen bonds with T**
- **G forms 3 hydrogen bonds with C**
- The bases (A, T, G, C) are hydrophobic
- Where will they go?




Minor groove
Major groove
Hydrogen
Oxygen
Nitrogen
Carbon
Phosphorus
T
A
C
G
Pyrimidines
Purines

The series of nucleotide units makes one organisms'

DNA different from another

- Different DNA = Different Traits
- Every cell of a multicellular organism has the same

DNA (remember, we all start as one cell)

Thank U