What is the overall structure of the DNA molecule?

The Components and Structure of DNA

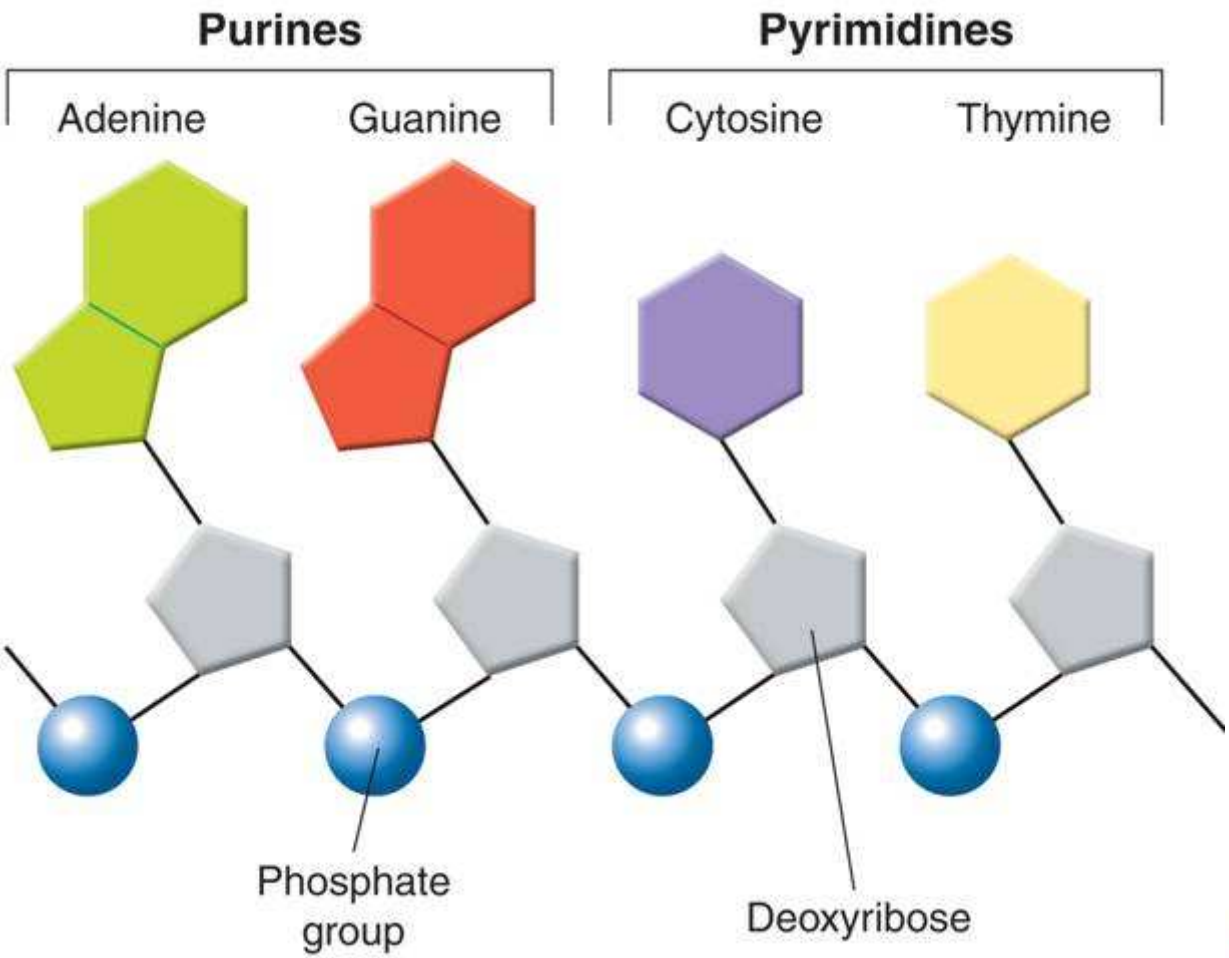
DNA is made up of **nucleotides**.

A nucleotide is a **monomer** of nucleic acids made up of a five-carbon sugar called deoxyribose, a phosphate group, and a nitrogenous base.

DNA = deoxyribonucleic acid

There are four kinds of bases in DNA:

- adenine
- guanine
- cytosine
- thymine



The backbone of a DNA chain is formed by sugar and phosphate groups of each nucleotide.

The nucleotides can be joined together in any order.

Chargaff's Rules

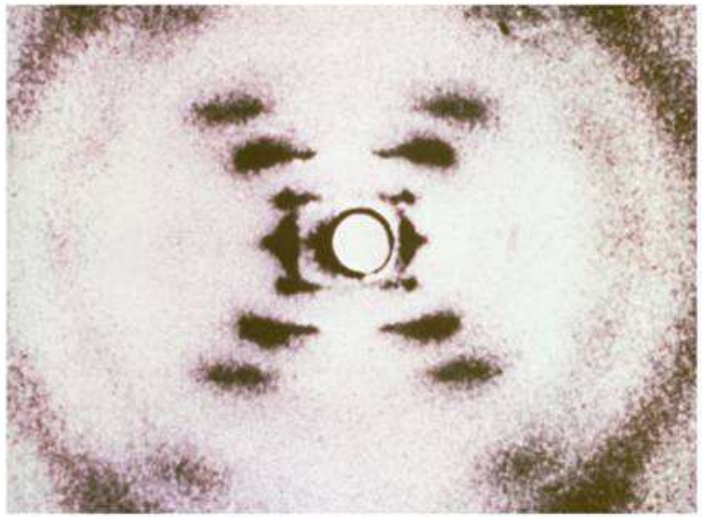
Erwin Chargaff discovered that:

- The percentages of guanine [G] and cytosine [C] bases are almost equal in any sample of DNA.
- The percentages of adenine [A] and thymine [T] bases are almost equal in any sample of DNA.

X-Ray Evidence

Rosalind Franklin used X-ray diffraction to get information about the structure of DNA.

She aimed an X-ray beam at concentrated DNA samples and recorded the scattering pattern of the X-rays on film.

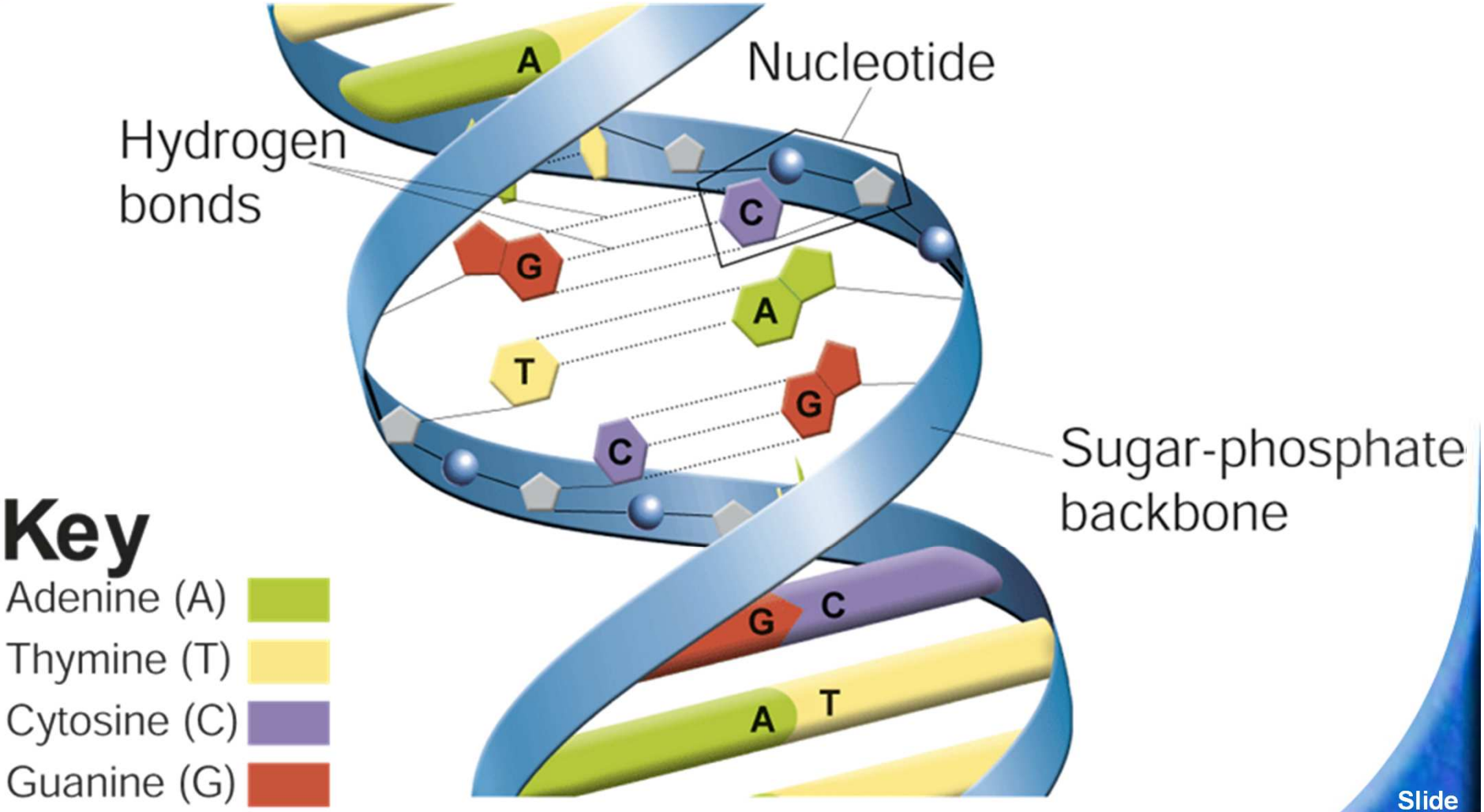


The Double Helix

Using clues from Franklin's pattern, James Watson and Francis Crick built a model that explained how DNA carried information and could be copied.

Watson and Crick's model of DNA was a double helix, in which two strands were wound around each other.

DNA Double Helix



Watson and Crick discovered that hydrogen bonds can form only between certain base pairs—adenine and thymine, and guanine and cytosine.

This principle is called **base pairing**.

So…

A-T

C-G