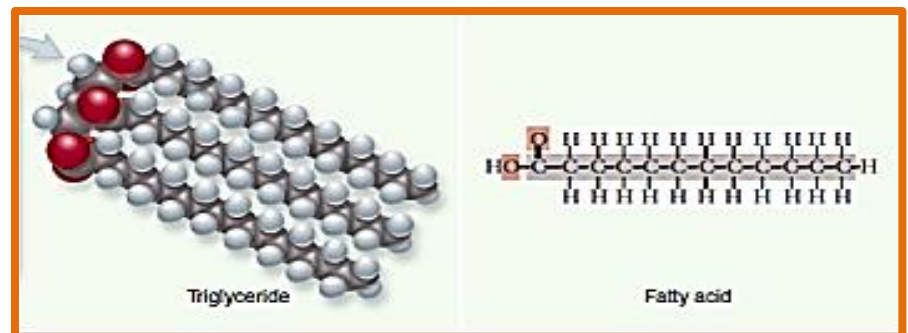
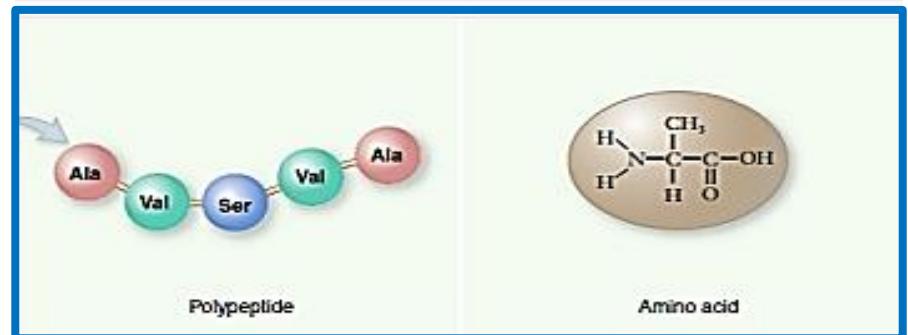
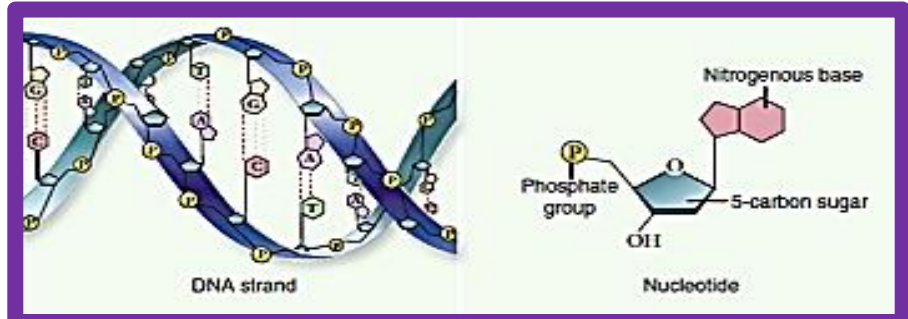


- Carbohydrates
- Nucleic acids-
today

Four major classes
of intracellular
macromolecules
(large biological
molecules)

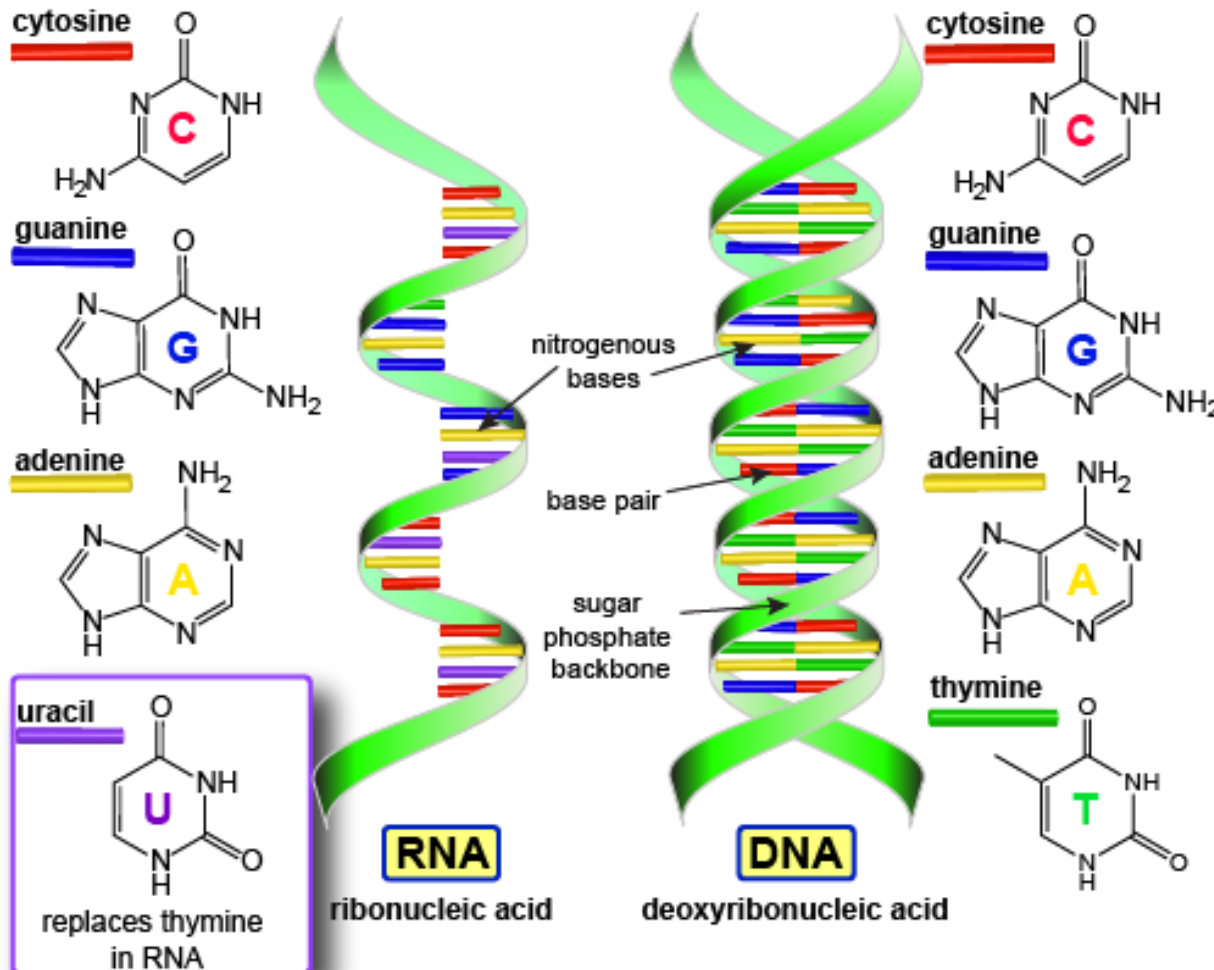
- Proteins

- Lipids



Nucleic Acids: Hereditary Material

All cells store information required to build and maintain the cell (*genetic information*) and constantly use it.



Nucleic acids are the molecules that

contain (Deoxyribonucleic acid, DNA)

and

help express (ribonucleic acid, RNA)

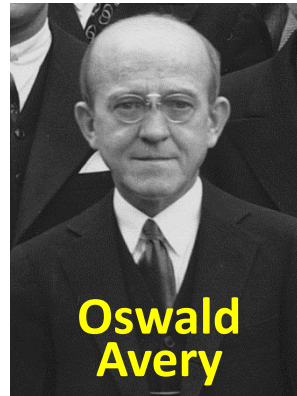
this information.

DNA Discovery

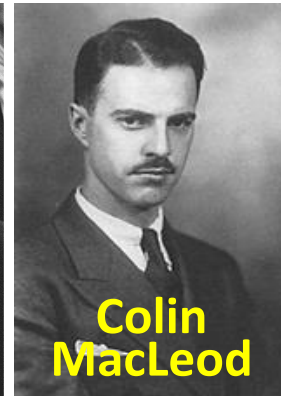


Friedrich
Miescher

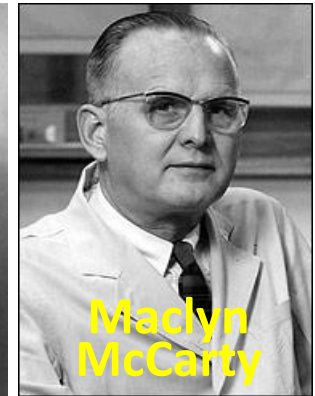
- Swiss physician **Friedrich Miescher** discovered DNA (“nuclein”) in **1869**, although scientists did not understand what it was until...



Oswald
Avery



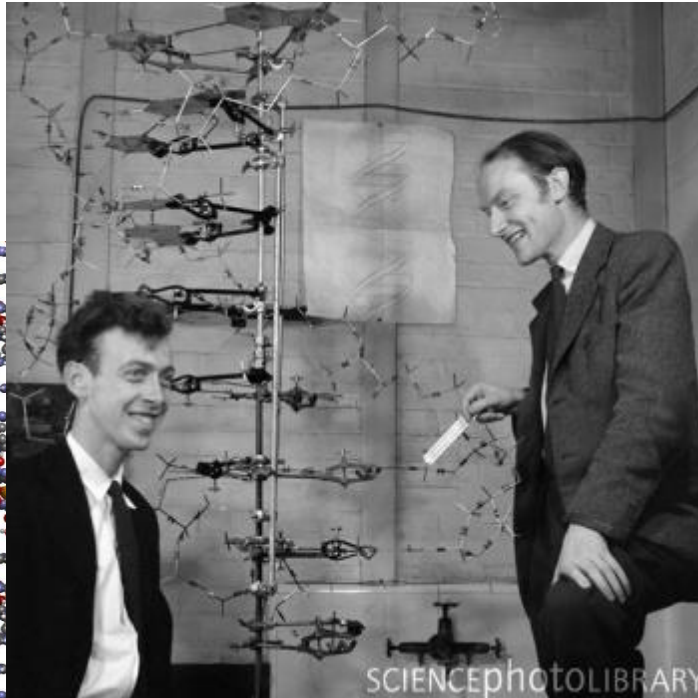
Colin
MacLeod



Maclyn
McCarty

...**1943**: **Avery-MacLeod-McCarty** experiment showed that DNA is the **hereditary material** in bacteria.

- In **1953**, **James Watson and Francis Crick** suggested the **double-helix model of DNA structure** based on a single X-ray diffraction image.



James Watson and Francis
Crick with their DNA model



DNA is a long polymer made from repeating units called **nucleotides**, or *bases*

- Four types of bases:
 - T - Thymine** (Uracil in RNA)
 - A - Adenine**
 - G - Guanine**
 - C - Cytosine**
- In living organisms **DNA does not usually exist as a single molecule**, but instead as a pair of molecules that are held tightly together, entwined in the shape of a **double helix**.
- Within cells, DNA is organized into long structures called *chromosomes*.

