Nucleic acid

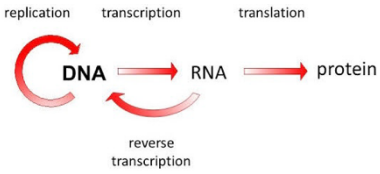
Among the discoveries of 20th century biology, the three-dimensional structure and chemical nature of genetic material are one of the most notable.

Nucleic acid

Nucleic acids are nucleotide polymers that constitute DNA and RNA. They store and transmit genetic information. In addition, some RNA molecules have catalytic function in supramolecular complexes.

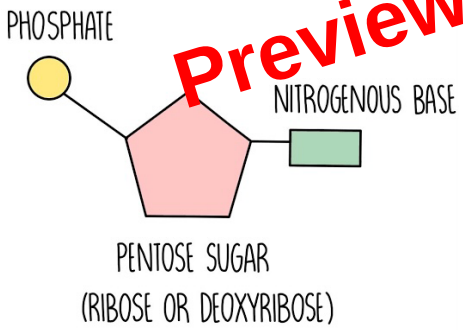
Nucleotides = Nucleic Acids

- Central dogma of molecular biology



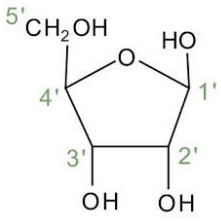
Nucleotides

Nucleotides can be in conjunction with some structure, or they can be free (derived). They perform a wide variety of metabolic functions unrelated to genetic information. Examples: ATP, NAD, FAD.
Structure: they have 3 specific components: nitrogenous base (purine 2A or pyrimidine 1A), sugar (pentose), one or more phosphates.

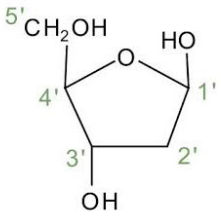


Nucleotides - Pentose

Nucleic acids have two types of pentose DNA - 2'-deoxy-D-ribose or deoxyribose RNA - D-ribose or ribose



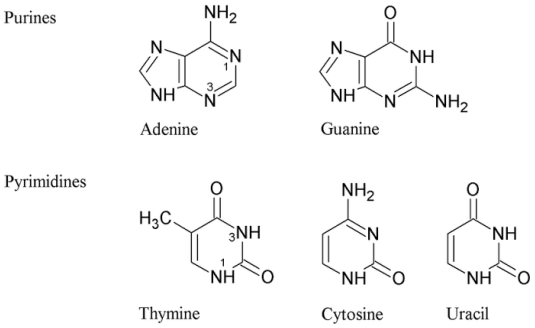
β-Ribose
(found in RNA)



β-2-Deoxyribose
(found in DNA)

Nitrogen Bases

They are hydrophobic at pH 7.



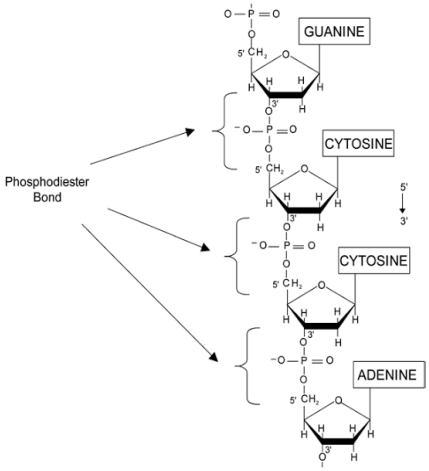
ADN: Adenine and thymine, guanine and cytosine.
RNA: adenine and uracil, guanine and cytosine.

Phosphate

The phosphate is esterified on the pentose carbon. Cells also contain nucleotides with phosphate groups at other positions. The nucleotide base is covalently linked at the N-1 of pyrimidines and the N-9 of purines by an N-beta-glycosidic bond to the 1' carbon of the pentose and is esterified at carbon 5.

Phosphodiester bond

The nucleotides of both DNA and RNA are covalently linked by bridges of phosphate groups, in which the 5-phosphate group of one nucleotide unit is linked to the 3-hydroxyl group of the next nucleotide.
Covalent backbone formed by phosphate and alternating pentose residues. Nitrogenous bases as side groups (hydrophobic). Hydrophilic backbone.



Nitrogen Bases Properties

All bases absorb UV light, make hydrogen bonds (A pairs with T or U and G bonds to C).