

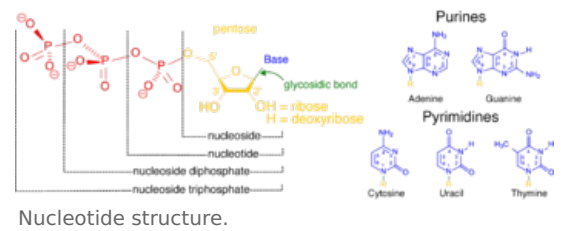
Nucleotide



A nucleotide is a phosphorylated nucleoside. Its molecule contains a five-carbon sugar – pentose, which is 2'-deoxyribose in DNA and ribose in RNA. An N-glycosidic bond is attached to the pentose at the 1'C carbon nitrogen base (in DNA it is **A**denine and **G**uanine – purines; **C**ytosine and **T**hymine – pyrimidines and in RNA instead of **T**hymine **U**racyl – pyrimidine base).

Three residues phosphoric acid - inorganic phosphates can be attached to the 5'C pentoses via an ester bond and are connected to each other by two phosphodiester bonds (e.g. ATP). The individual phosphors in this triphosphate are labeled in order from pentose α , β , and γ . The cleaved diphosphate (β and γ) is called pyrophosphate. When the first phosphate is cleaved from the end of the nucleotide molecule, 30 kJ/mol of energy is released, when the second phosphate is cleaved, 36 kJ/mol is released.

File:Nucleotide num.svg
general structure of nucleotide



Function:

- Physiologically, nucleotide triphosphates are the substrate for DNA replication by DNA polymerases. The energy to form a bond between two nucleotides is obtained from the macroergic bond P~P of the cleaved pyrophosphate. Individual nucleotides are included in the chain in the direction 5'→3'. The resulting chain is called a polynucleotide.
- Artificially prepared dNTPs (deoxyriboNucleotideTriPhosphates) are used in molecular biology for PCR.
- For Sanger sequencing method, ddNTPs (dideoxyNTPs) are also used, which lack oxygen even at 3'C.

Links

Related Articles

- DNA (nucleic acid)
- RNA
- Nucleotide Metabolism

References

- MATOUŠ, Bohuslav, et al. *Basics of medical chemistry and biochemistry*. 2010. edition. Prague : Galen, 2010. 540 pp. ISBN 978-80-7262-702-8.