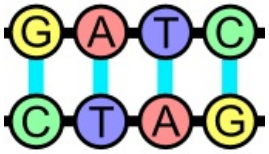
Restrictases

Restriction endonucleases (restrictases for short) are a large group of originally bacterial enzymes that cleave ester bonds in the **dsDNA** chain . It probably serves bacteria as a protection against disruption of their genome by foreign (e.g. viral) DNA.

Classification



DNA sequence

Restriction endonucleases are divided into four groups according to cleavage specificity, structure and other properties. In some literature, only three types are distinguished.

Type I

Endonucleases of the first type have a subunit structure (the molecule contains three different subunits), are capable of DNA methylation and cleave only the unmethylated chain. Although they distinguish specific sequences on the molecule, the site of cleavage is not precisely determined.

Type II

Due to the specificity of the cleavage, this type has the greatest application in genetic engineering, the unmethylated DNA molecule is cleaved at (or near) the recognition sequence, which is usually symmetrical. A molecule is composed of two identical subunits.

Type III

Endonucleases belonging to this group are composed of two subunits. It cleaves unmethylated DNA at a distance of 25–27 dp from the recognition site.

Type IV

It cleaves methylated DNA.

Use

Restrictases are of great importance, especially in genetic engineering, research and forensic medicine (personal identification). Information about individual restriction endonucleases, microorganisms from which they were isolated, target sequences, etc. is collected by REBASE (http://rebase.neb.com/rebase/rebase.html) (The Restriction Enzyme Database).

Links

related articles

- DNA cleavage
- Separation of DNA fragments by electrophoresis
- Identification of restriction fragments
- Restriction fragment length polymorphism

References

- SOMETIMES, Oldrich. *General biology for medical schools.* 3rd edition. Jinočany : H+H, 2000. ISBN 80-86022-46-3 .
- LAPKOUSKI, Mikalai. *Structure of the motor subunit and translocation model for EcoR124I restriction-modification complex.* Nové Hrady : University of South Bohemia, Institute of Physical Biology and Academy of Sciences from the Czech Republic, Institute of Systems Biology and Ecology, 2008.