# CHAPTER - 11

# BIOTECHNOLOGY

## - PRINCIPLES AND PROCESS

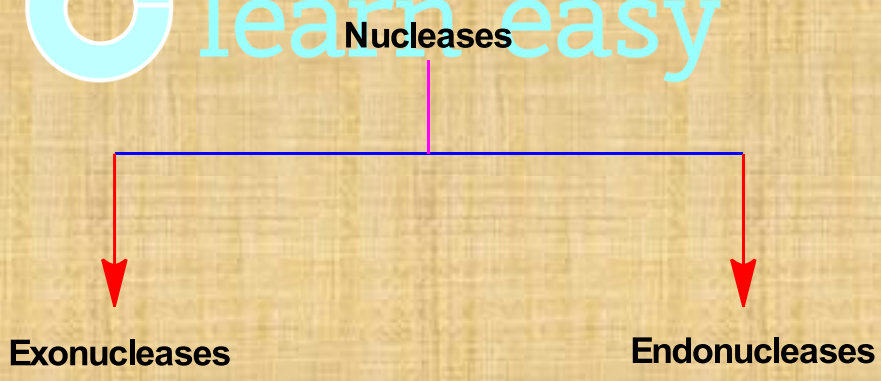
**Restriction Enzymes:**

In 1963, two enzymes for restricting the growth of bacteriophage in E.coli were isolated.

1) One adds methyl group to DNA.

2) Other cuts the DNA.

The enzyme, which can cut the DNA is called restriction endonuclease. It belongs to class of enzymes called Nucleases.




- The first restriction endonuclease is Hind II.
- Hind II always cut DNA molecule at specific sequence of six base pairs.
- This is called Recognition sequence.(Palindrome sequence).
- The palindrome is a specific sequence that reads same on the two strands when orientation of reading kept in same direction.

5| ---------- GAATTC ---------- 3|

3| ---------- CTTGAA ---------- 5|

When cut by same restriction enzyme it forms sticky ends. These sticky ends can be joined by same ligase enzyme.

Besides Hind II more than 900 enzymes isolated from 230 strains.

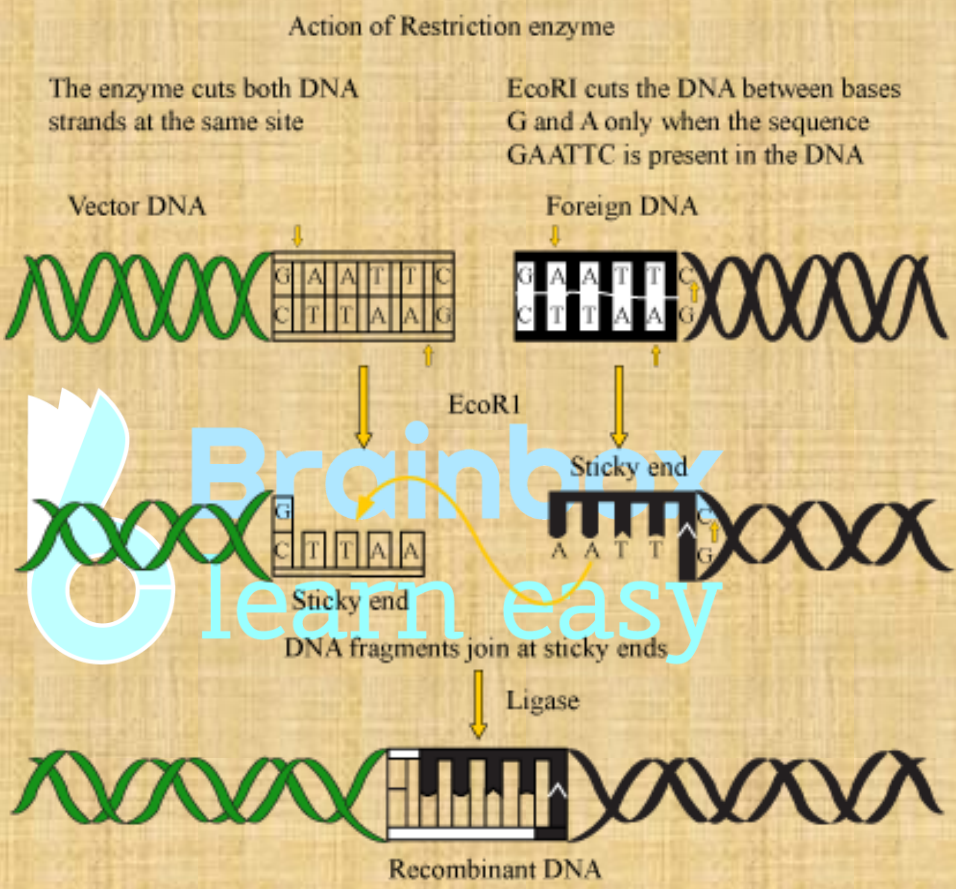



**Fig**. Steps in formation of recombinant DNA by action of restriction endonuclease enzyme – EcoRI

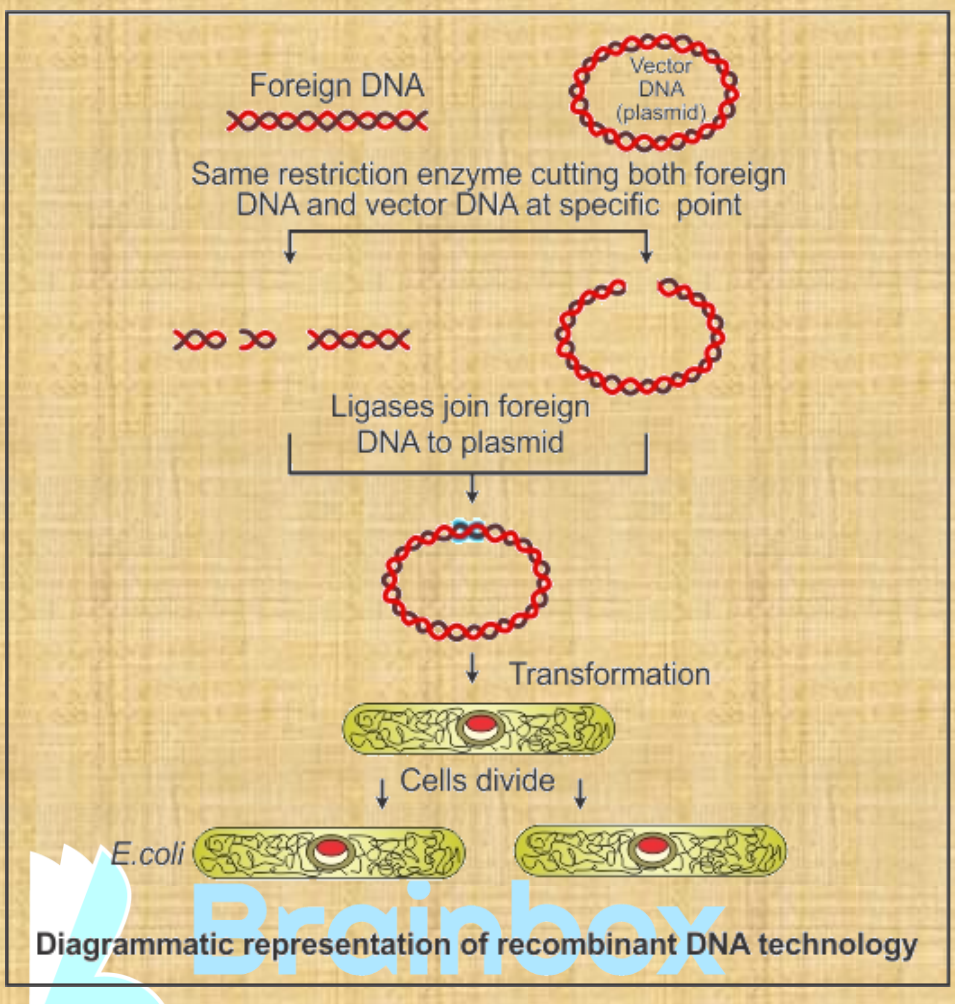



**Fig**. Diagrammatic representation of recombinant DNA technology

**Nomenclature of Restriction Endonuclease:**

1st letter – Generic name

2nd letter – Species name

3rd letter – Strain name

4th letter – Order in which enzyme is isolated.

**Ex.** EcoRi

The letter 'R' is derived from the name of strain. 'I' indicates order of isolation.