

Recombinant DNA Technology is DNA cloning

Foreign DNA



vector DNA



- 1) Identification of DNA desirable gene
- 2) Introduction of the identified DNA into the host.
- 3) Maintenance of introduced DNA in the host and transfer of the DNA to its progeny.

Foreign DNA

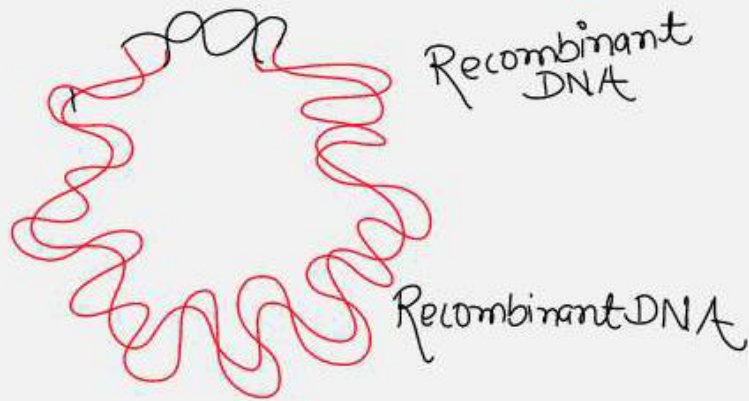


Same restriction enzyme
(restriction Endonuclease)

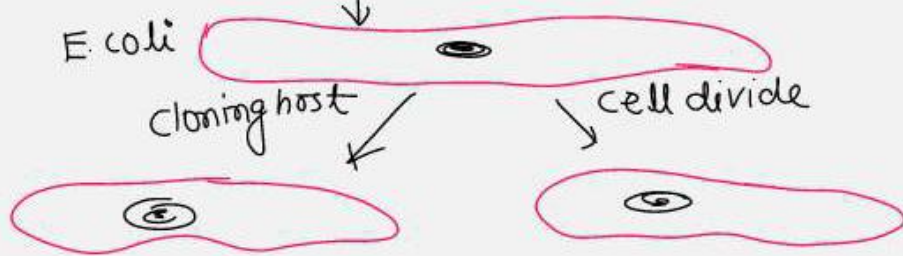
Vector DNA
(plasmids)



Cutting both foreign DNA
and Vector DNA at specific
region point



Transformation



to introduce these into host organisms and thus change the phenotype of the host organism.

- (ii) **Bioprocess engineering**: Maintenance of sterile (microbial contamination-free) ambience in chemical engineering processes to enable growth of only the desired microbe/eukaryotic cell in large quantities for the manufacture of biotechnological products like antibiotics, vaccines, enzymes, etc.

Let us now understand the conceptual development of the principles of genetic engineering.

You probably appreciate the advantages of sexual reproduction over asexual reproduction. The former provides opportunities for variations and formulation of unique combinations of genetic setup, some of which may be beneficial to the organism as well as the population. Asexual reproduction preserves the genetic information, while sexual reproduction permits variation. Traditional hybridisation procedures used in plant and animal breeding, very often lead to inclusion and multiplication of undesirable genes along with the desired genes. The techniques of genetic engineering which include creation of **recombinant DNA**, use of **gene cloning** and **gene transfer**, overcome this limitation and allows us



and services’.

11.1 PRINCIPLES OF BIOTECHNOLOGY

Among many, the two core techniques that enabled birth of modern biotechnology are :

- (i) Genetic engineering : Techniques to alter the chemistry of genetic material (DNA and RNA),

→ DNA
→ RNA

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BIOLOGY

to introduce these into host organisms and thus change the phenotype of the host organism.

- (ii) **Bioprocess engineering**: Maintenance of sterile (microbial contamination-free) ambience in chemical engineering processes

