DNA LIBRARY

The DNA library is a collection of DNA fragments that is stored and propagated in bacteria or in yeast through the process of recombinant DNA technology.

There are basically two types of DNA libraries:

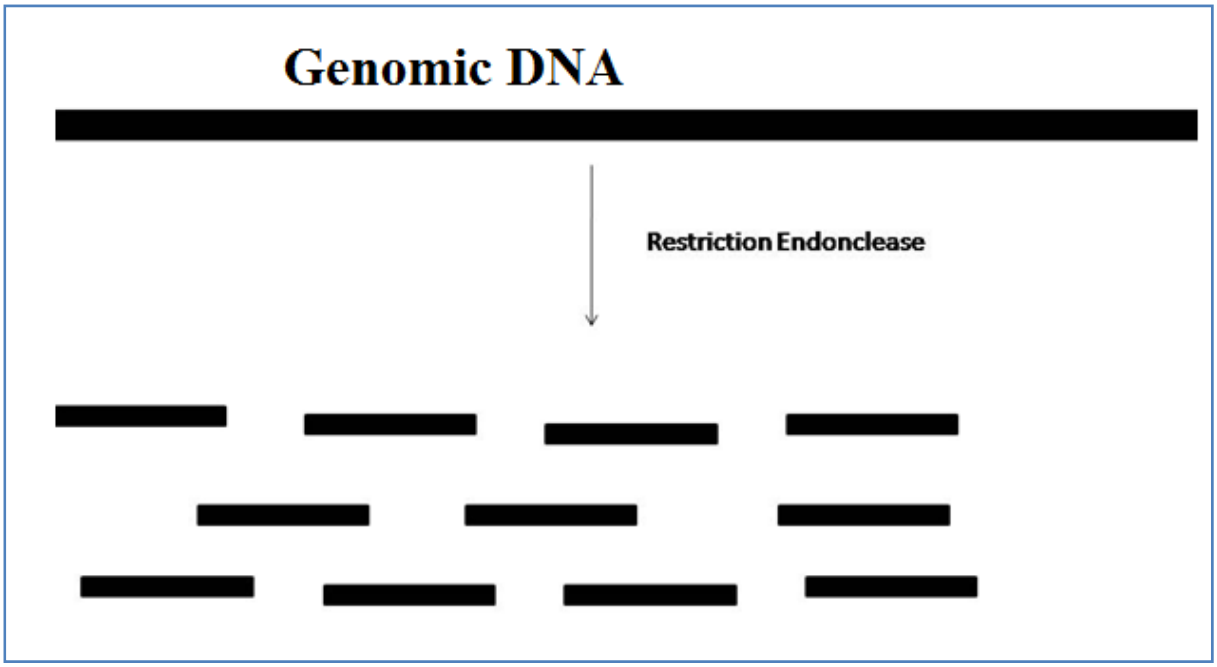
1. Genomic DNA libraries.
2. cDNA libraries.

Genomic DNA libraries:

The Genomic DNA libraries contains the DNA fragments and each of these fragments represents the genomic DNA of the organism. A Genomic DNA library can be prepared from digestion of total genomic DNA using restriction endonucleases. Upon digestion of DNA using restriction endonucleases, the genomic DNA breaks into several DNA fragments. These DNA fragments may be ligated to a plasmid vector to produce recombinant DNA molecule. These recombinant DNA molecules are transformed into a host bacteria (Molecular Biology strain of *E. coli*).

Applications:

1. It is used as a repository for maintaining complete genome of an organism.
2. It can be used for discovery of a new gene.



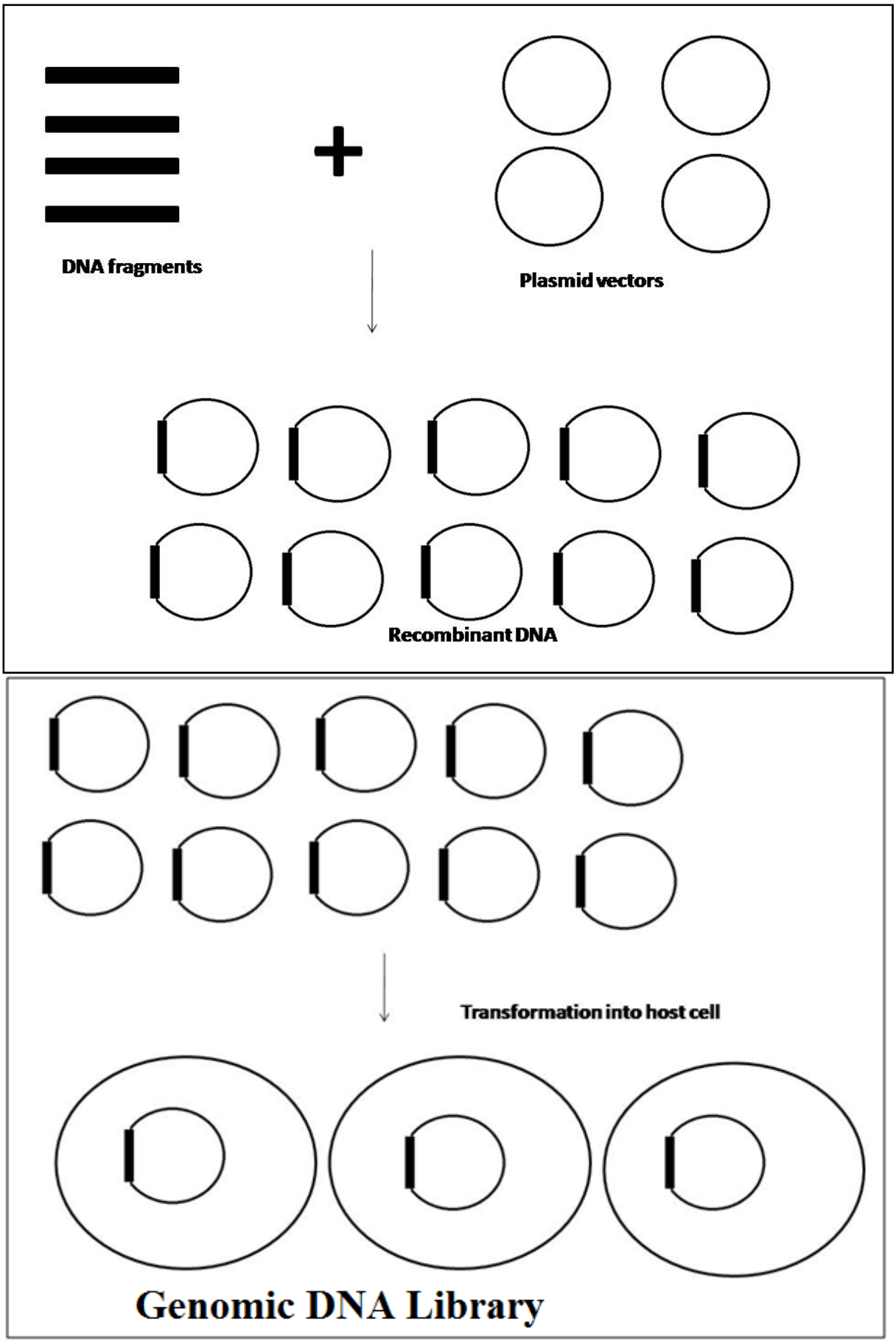


Fig: Step wise construction of genomic DNA library.

cDNA libraries:

The cDNA libraries represents the genes that are expressed in a particular tissue in a particular condition. For the construction of cDNA library, the whole cell RNA is collected (These RNA molecules represent those genes that are transcribed in a particular condition). The whole cell RNA are converted to DNA that is called complementary DNA (cDNA) with the help of an enzyme called *reverse trasncriptase*. The cDNA generated is ligated to a plasmid vector and subsequently transformed into a bacterial host cells.

Applications of cDNA libraries:

1. Study of the genes that are expressed in a particular condition in a particular cell type. Ex. Cancerous cDNA libraries represents those genes that are expressed in timorous cells.
2. Discovery metabolic pathways.
3. Discovery of gene functions.

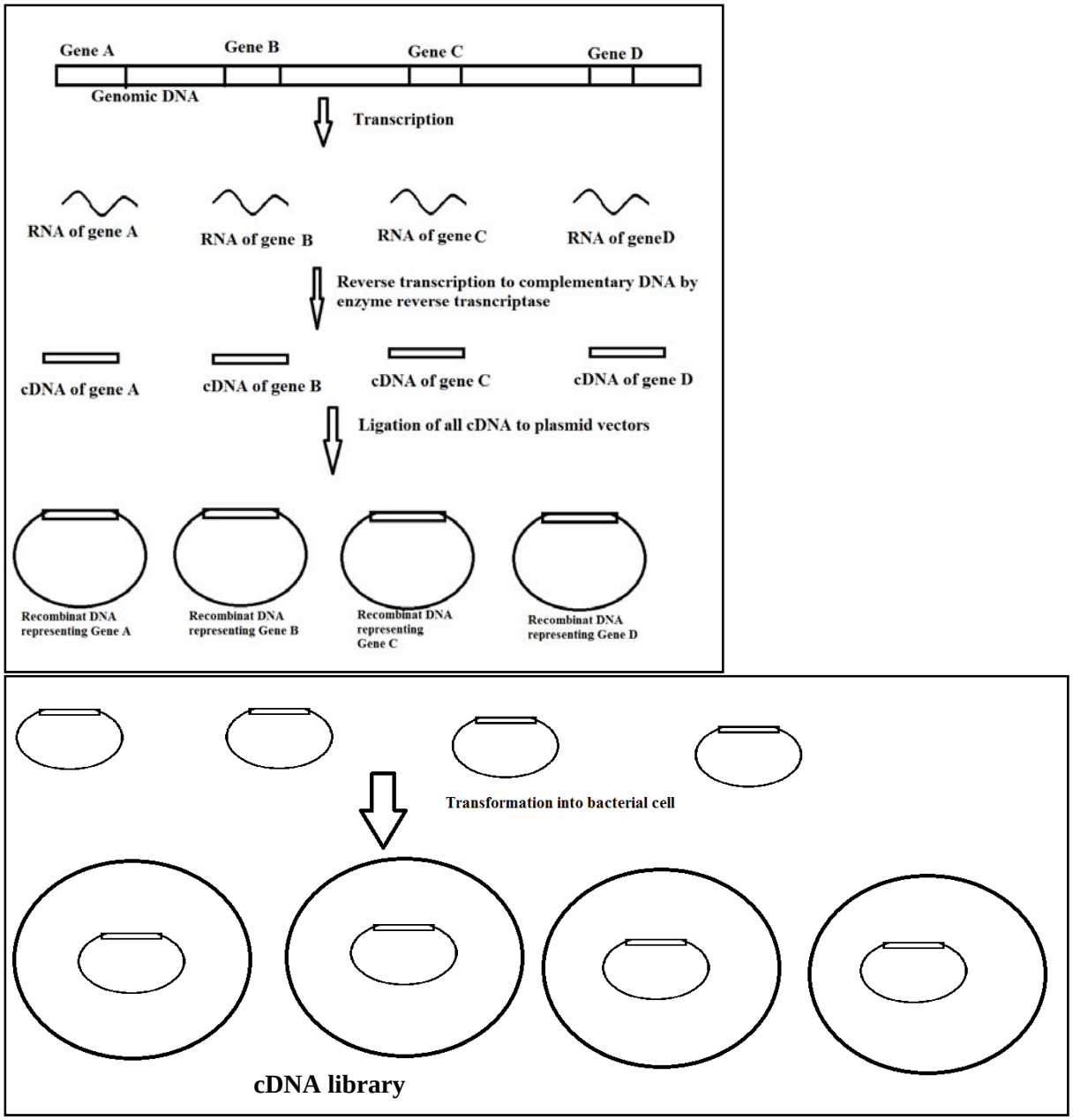


Fig: Stepwise construction of cDNA library