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DNA Library

It may also be referred to as gene library. As the term library signifies, DNA library is the collection of clones carrying different DNA sequences from an organism so a DNA library is a mixture of many DNA sequences which have been cloned in to vector. A DNA library is beneficial of an organism and also for storage and analysis of different genes.

On the basis of source of DNA and used DNA library are of two types.

1. Genomic library
2. CDNA library

Genomic Library

It is the collection of clones of DNA that is directly derived from the genome of an organism. A genomic library represents the complete genome of an organism steps for construction of genomic are

- a) Entire genomic DNA is extracted from the organism and is purified.
- b) This purified DNA is then broken into fragments of size appropriate for cloning fragmentation of DNA can be done either by using restriction endonuclease enzyme or by physical methods like shearing or ultrasonic waves etc.
- c) Fragments are then inserted into cloning vectors to obtain recombinant DNA molecules. Each vectors consists of different fragments of DNA.
- d) This population of sec DNA molecules is the transferred to the host cell for cloning
- e) A collection of such fragments cloned in their way is referred to as genomic library.

The genomic library for organism with larger genomes are constructed with λ phage or artificial chromosome vectors like YAC BAC etc while plasmid vectors are employed for construction of genomic library for organisms having smaller genomes like bacteria.

cDNA library:

cDNA stands for complementary DNA, A cDNA library is prepared from mRNA by the use of enzyme reverse transcriptase.

Steps for construction of cDNA library are

- a) mRNA are isolated from the curative tissues which synthesize proteins.
- b) An appropriate oligonucleotide primer is added to 3' end of mRNA.
- c) Reverse transcriptase enzyme extends the primer and forms a complementary cDNA strand.
- d) As a result a RNA-DNA hybrid is obtained from which the RNA is removed by alkaline hydrolysis or by RNase enzyme.
- e) Now there is only a cDNA strand which synthesized its own complementary strand by using its 3' end as a primer.
- f) A hair pin loop is formed which digested by a specific enzyme resulting in the formation of a DNA duplex.
- g) A no. of such DNA duplexed are generated by using different mRNA templates and are collected as a cDNA library.