* Genomic & CDNA library

→ DNA library → Collection of cloned restriction fragment of DNA of an organism

→ 2 type → genomic libraries
Complementary DNA [CDNA] libraries.

→ genomic libraries :→ Contain copy of every DNA nucleotide sequence in genome
- Introns & control region of gene present.

→ CDNA libraries :→ Contain those DNA sequence that only appear as processed messenger (mRNA) molecules
- Differ according to cell type & environmental condition.
- Lack intron & control region of gene.

→ Genomic DNA library :-

Digestion of total DNA of organism with restriction endonucleases
↓
ligation to appropriate vector
↓
recombinant DNA molecule replicate within host bacteria
↓
amplified DNA fragment collectively represent entire genome of organism
↓
called genomic library.

Disadvantage :- If digestion is allowed to go to completion
↓
if gene of interest contain more than one restriction site, it is fragmented.

* To avoid this - Partial digestion performed by either amount or time of action of enzyme is limited.

* Complementary DNA libraries :-

Use mRNA as template
↓ reverse transcriptase
cDNA - double stranded

- Template mRNA isolated from tRNA & rRNA by presence of its poly A tail.

- Amplify cDNA by PCR (or) by biologic cloning.

- cDNA can be used as a probe to locate gene that encode original mRNA in mixture containing many unrelated DNA fragment.

- cDNA - No introns
  - Can be cloned into expression vector for synthesis of eukaryotic proteins by bacteria.

- Expression vector [special plasmid]
  ↓
  Contain bacterial promotor for transcription of cDNA & SD [shine - Dalgarno] sequence that allow bacterial ribosome to initiate translation of resulting mRNA molecule.
- cDNA is inserted downstream of promotor & within a gene for protein that is expressed in bacterium, such that mRNA

produced contain SD sequence, a few codons for bacterial protein & all codon for eukaryotic protein.

↓

allows more efficient expression & results in production of fusion protein.

e.g. Therapeutic human insulin is made in bacteria through this technology.