FACULTY OF ENGINEERING &TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

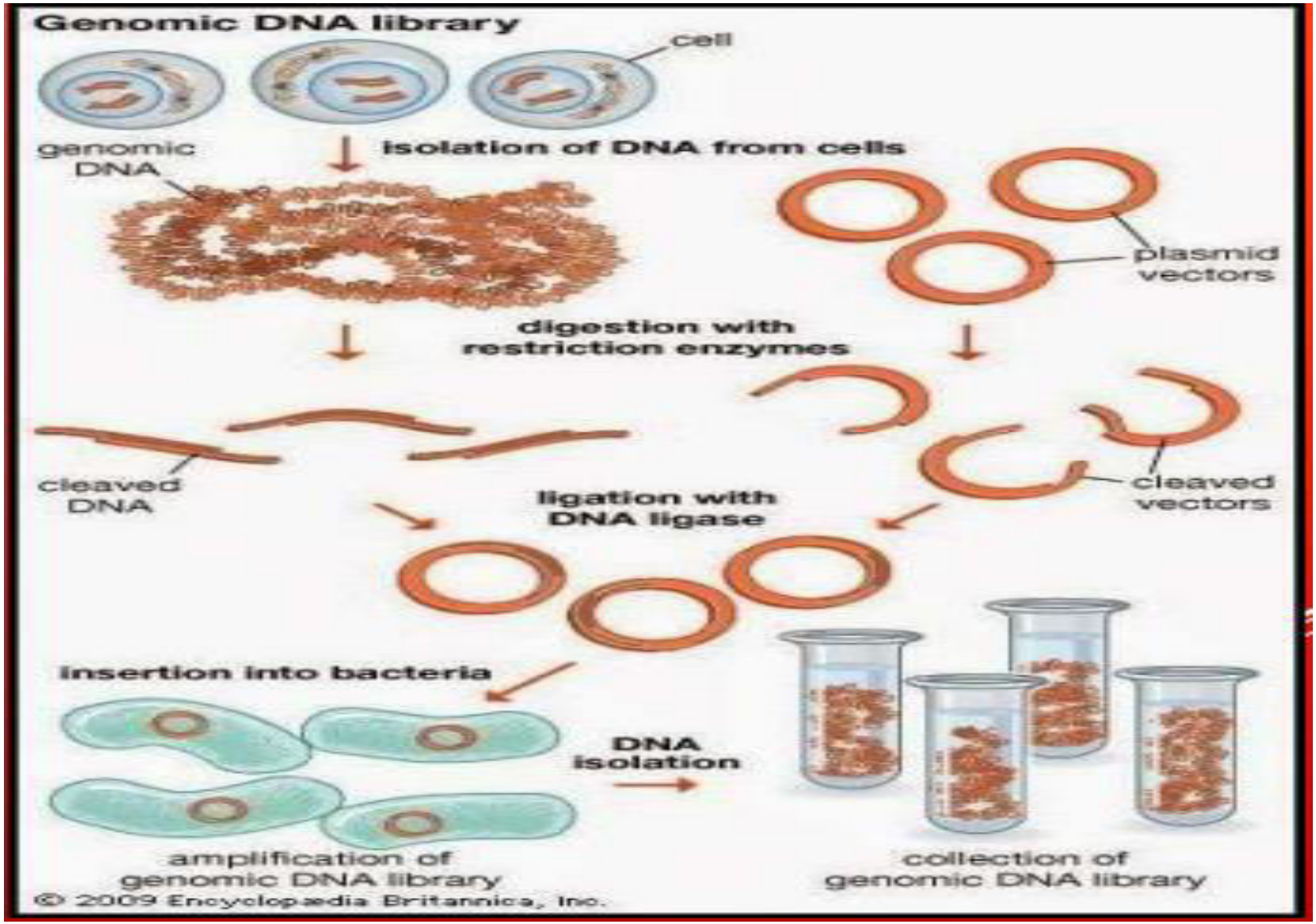
GENOMIC LIBRARY

- A genomic library contains all the sequences present in the genome of an organism.
- **Genomic library**: Gene bank or genomic library is a complete collection of cloned DNA fragments.
- DNA fragments which express the entire genome of an organism known as genomic library.
- In c-DNA library, mRNA is taken from particular cells of an organism, and then c-DNA synthesizes from mRNA in a reaction using an enzyme.
- In case of humans, about 25,000 genes exit among the 3 billion base pairs of DNA in the genome.
- The term "library" can refer to a population of organism, each of which carries a DNA molecule inserted into a cloning vector, or alternatively to the collection of all of the cloned vector molecules.
- Collection of DNA fragments that have been cloned into vectors so that researchers can identify and isolate the DNA fragments that interest them for further study.

Steps for the library preparation:

- Isolation of DNA from cells
- Digestion into small fragments
- Introduction into suitable vectors
- Insertion into bacteria
- DNA isolation from recombinant bacteria
- Collection of Genomic DNA library

GENOMIC LIBRARY CONSTRUCTION



GENOMIC LIBRARY CONSTRUCTION

- The organism's DNA is extracted from cells and then digested with a restriction enzyme to cut the DNA into fragments of a specific size.

- The fragments are then inserted into the vector using DNA ligase.

- The vector DNA can be taken up by a host organism - commonly a population of *Escherichia coli* or yeast - with each cell containing only one vector molecule.

- Using a host cell to carry the vector allows for easy amplification and retrieval of specific clones from the library for analysis.

- The fragments are then inserted into the vector using DNA ligase.

- Next, the vector DNA can be taken up by a host organism - commonly a population of Escherichia coli or yeast - with each cell containing only one vector molecule.

- Using a host cell to carry the vector allows for easy amplification and retrieval of specific clones from the library for analysis.

- Genomic libraries are commonly used for sequencing applications.

- They have played an important role in the whole genome sequencing of several organisms, including the human genome and several model organisms.