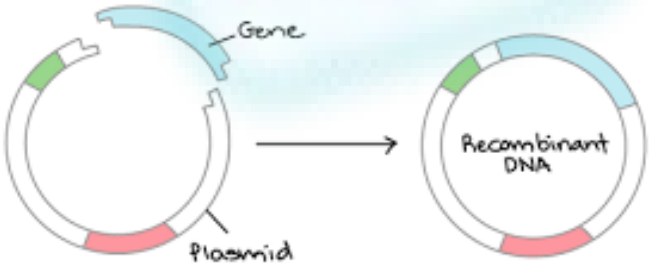
Vectors In Gene Cloning

Plasmids



Subject- Genetic Engineering
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Cloning Vectors used in Genetic Engineering

- 1973 Plasmid
- 1974 Bacteriophage Lambda
- 1977 Plasmid pBR322
- Bacteriophage M13
- 1978 Cosmid
- 1987 Yeast Artificial Chromosome (YAC)
- 1990 Bacteriophage P1
- 1992 Bacterial artifical chromosome (BAC)
- 1994 P1 artificial chromosome (PAC)
- 1997 Human artifical chromosome (HAC)
- 2007 Maize mini-chromosomes

Plasmid Characteristics

- Autonomous Replication
- Small size
- Presence of selectable markers gene(s)
- Presence of unique Restriction Enzyme site
- Nonconjugative and Nonmobilizable
- Replicon under relaxed control

Natural Plasmid vectors for *E.coli*

pSC101

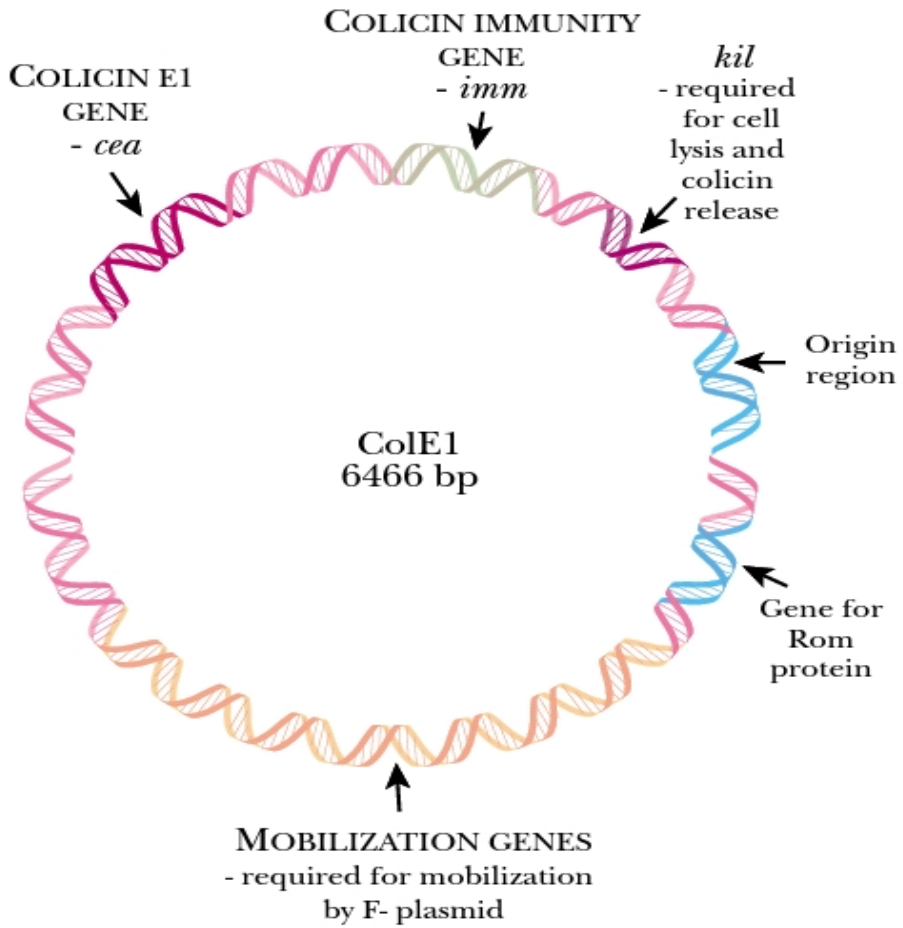
- 9 kbps in size and has low copy number.
- Single *Eco* R1 site where DNA can be inserted.
- Carries selectable marker gene for tetracycline resistance.
- Used in invitro cloning of eukaryotic DNA.
- Disadvantage: large size stringent control and low insert capacity.

pSF2124

- Mobilizable plasmid, high copy number and has got ampicillin resistance gene.
- Has got single site for *Bam* H1 and *Eco* R1.
- Has got the ability to produce colicin toxin.

Col E1 Plasmid

- Small, circular, colicinogenic plasmid which encodes 57 kDa protein toxin (colicin E1) and kills other E.*coli* cells.
- Size of plasmid – 6,466 kbps
- Under relaxed control with multiple copies/cell.
- Single *Eco* R1 in cea region.


COLICIN IMMUNITY GENE - *imm*
COLICIN E1 GENE - *cea*
kil - required for cell lysis and colicin release
Origin region
ColE1 6466 bp
Gene for Rom protein
MOBILIZATION GENES - required for mobilization by F- plasmid

Reference

- Genetic Engineering by Rastogi and Pathak