

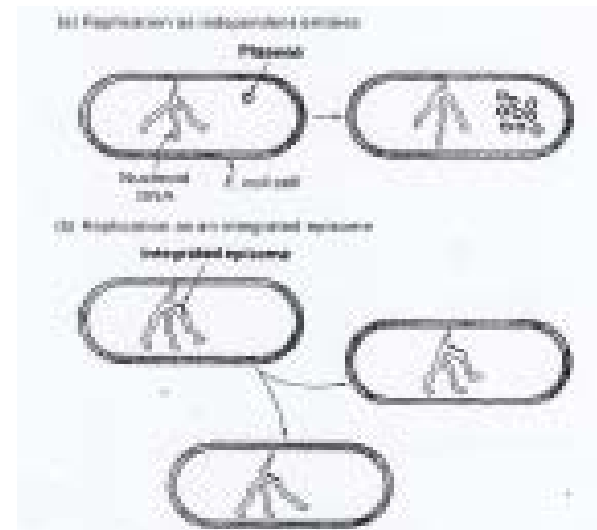
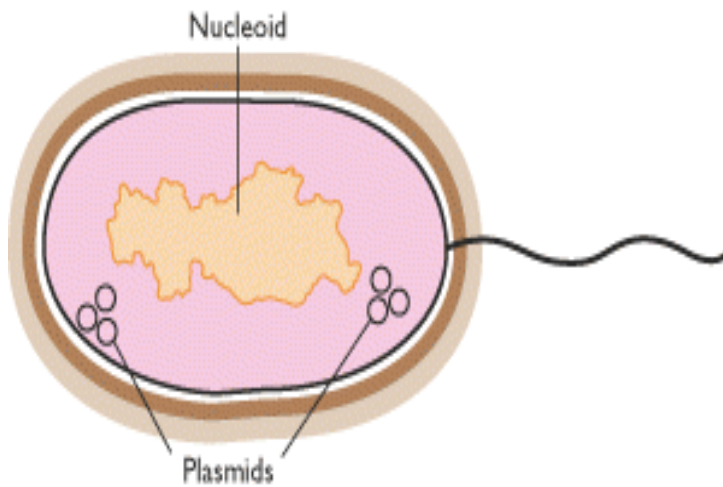
Genoma III

Plasmídeos

Plasmídeos

- **Geralmente moléculas de DNA circulares e cadeia dupla, com replicação independente do cromossoma bacteriano**
- **Existem em todos os tipos de bactérias**
- **Papel importante na adaptação e evolução bacteriana**
- **Codificam proteínas que na maioria dos casos conferem vantagens à célula**
- **Número variável de cópias**
- **Dimensões muito variáveis: 3kb-200 kb**
- **Células bacterianas podem conter mais do que um tipo de plasmídeo**
- **Grupos de incompatibilidade plasmídica**
- **Tipos de replicação dos plasmídeos**
 - Teta
 - Círculo rolante
- **Importantes ferramentas em engenharia genética**

Plasmids are small circular DNA molecules that are found inside some prokaryotic cells



Epissome

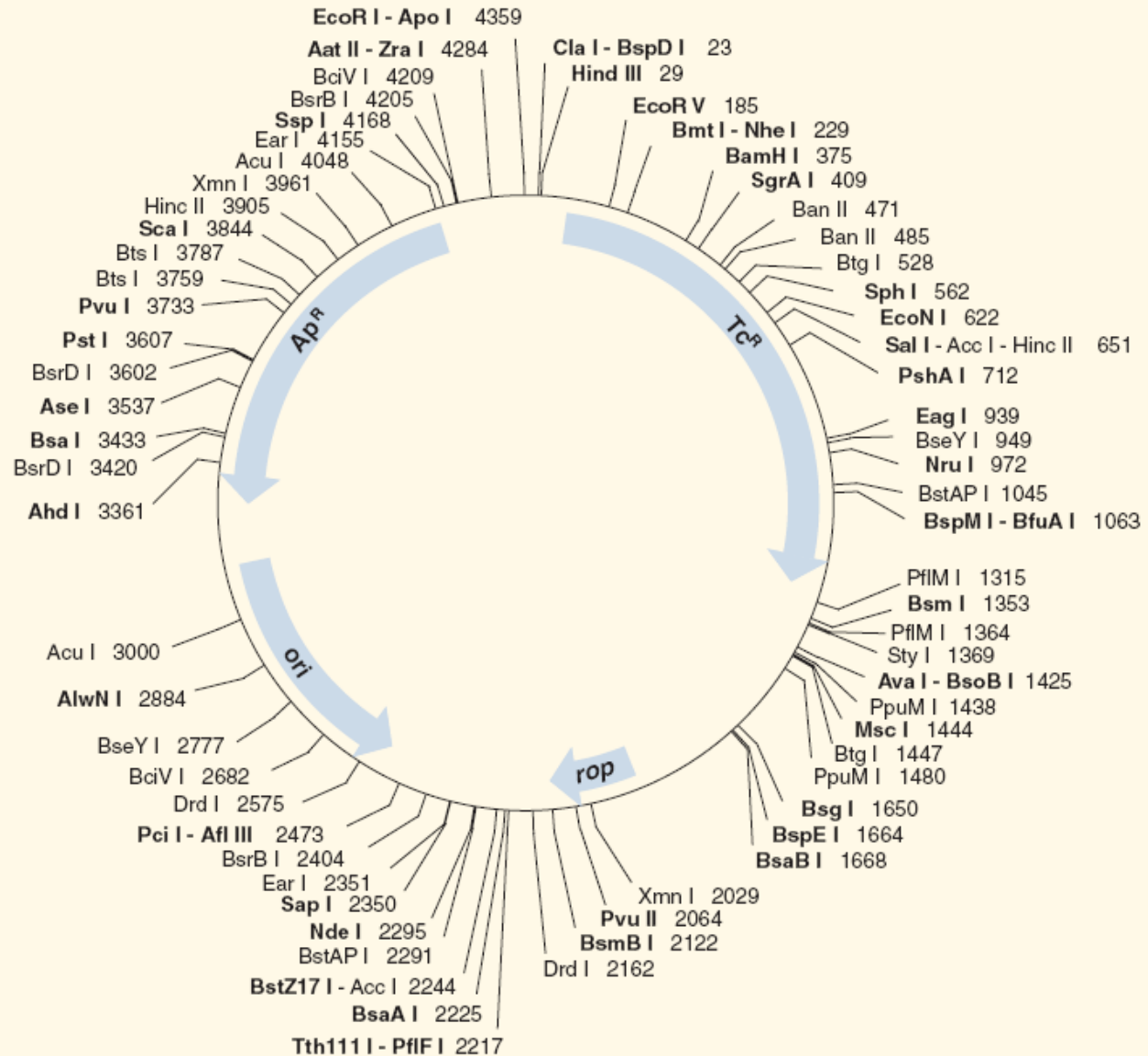
Type of plasmid	Gene functions	Examples
Resistance	Antibiotic resistance	Rbk of <i>Escherichia coli</i> and other bacteria
Fertility	Conjugation and DNA transfer between bacteria	F of <i>E. coli</i>
Killer	Synthesis of toxins that kill other bacteria	Col of <i>E. coli</i> , for colicin production
Degradative	Enzymes for metabolism of unusual molecules	TOL of <i>Pseudomonas putida</i> , for toluene metabolism
Virulence	Pathogenicity	Ti of <i>Agrobacterium tumefaciens</i> , conferring the ability to cause crown gall disease on dicotyledonous plants

Genetic Determinants Borne by Plasmids

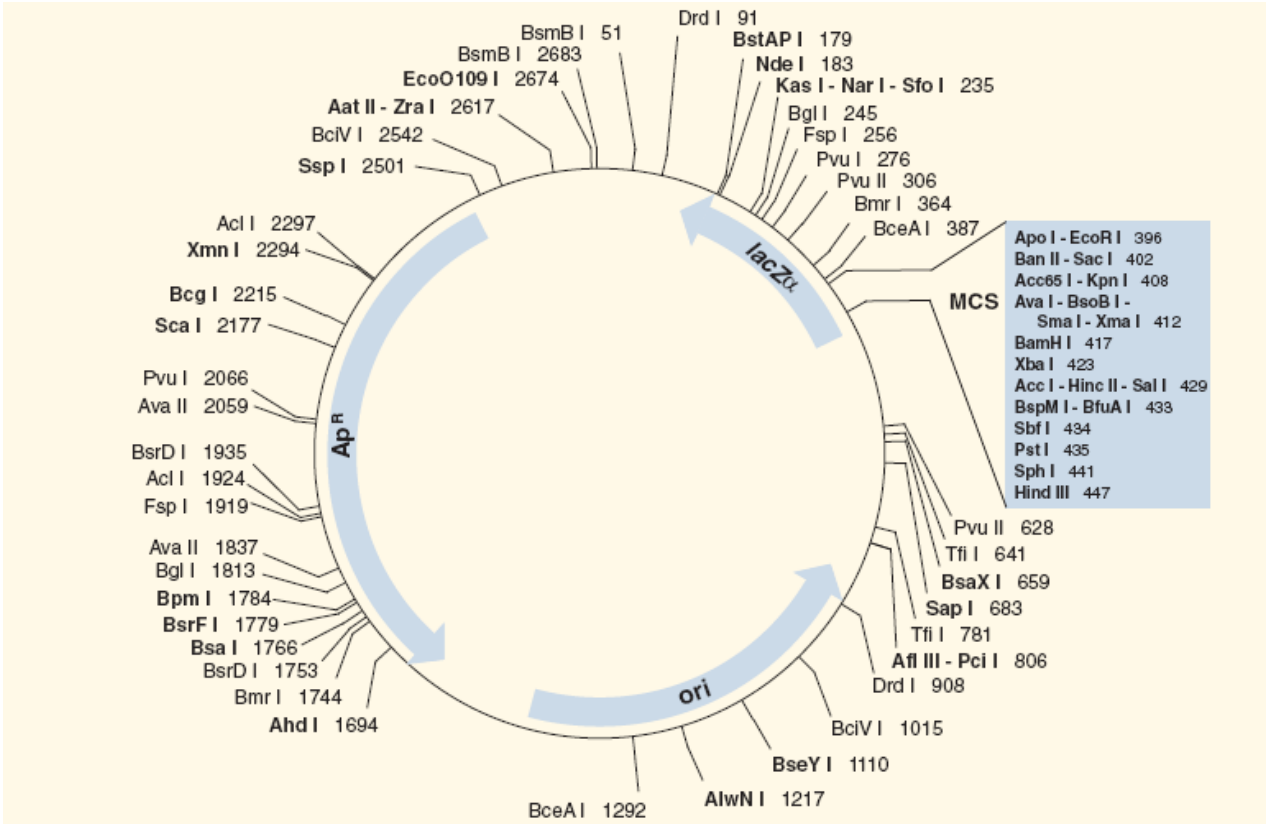
Characteristic	Plasmid examples
Fertility	F, R1, Col
Bacteriocin production	Col E1
Heavy-metal resistance	R6
Enterotoxin production	Ent
Metabolism of camphor	Cam
Tumorigenicity in plants	T1 (in <i>A. tumefaciens</i>)

Plasmídios- importantes ferramentas em engenharia genética

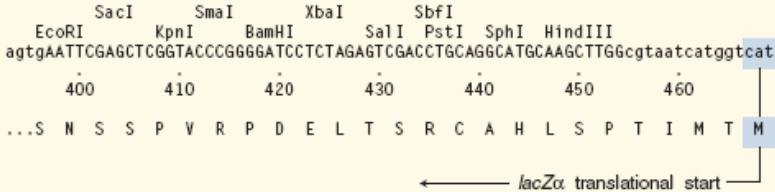
pBR322



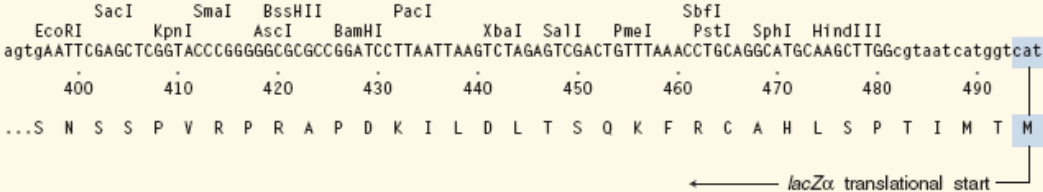
pUC19



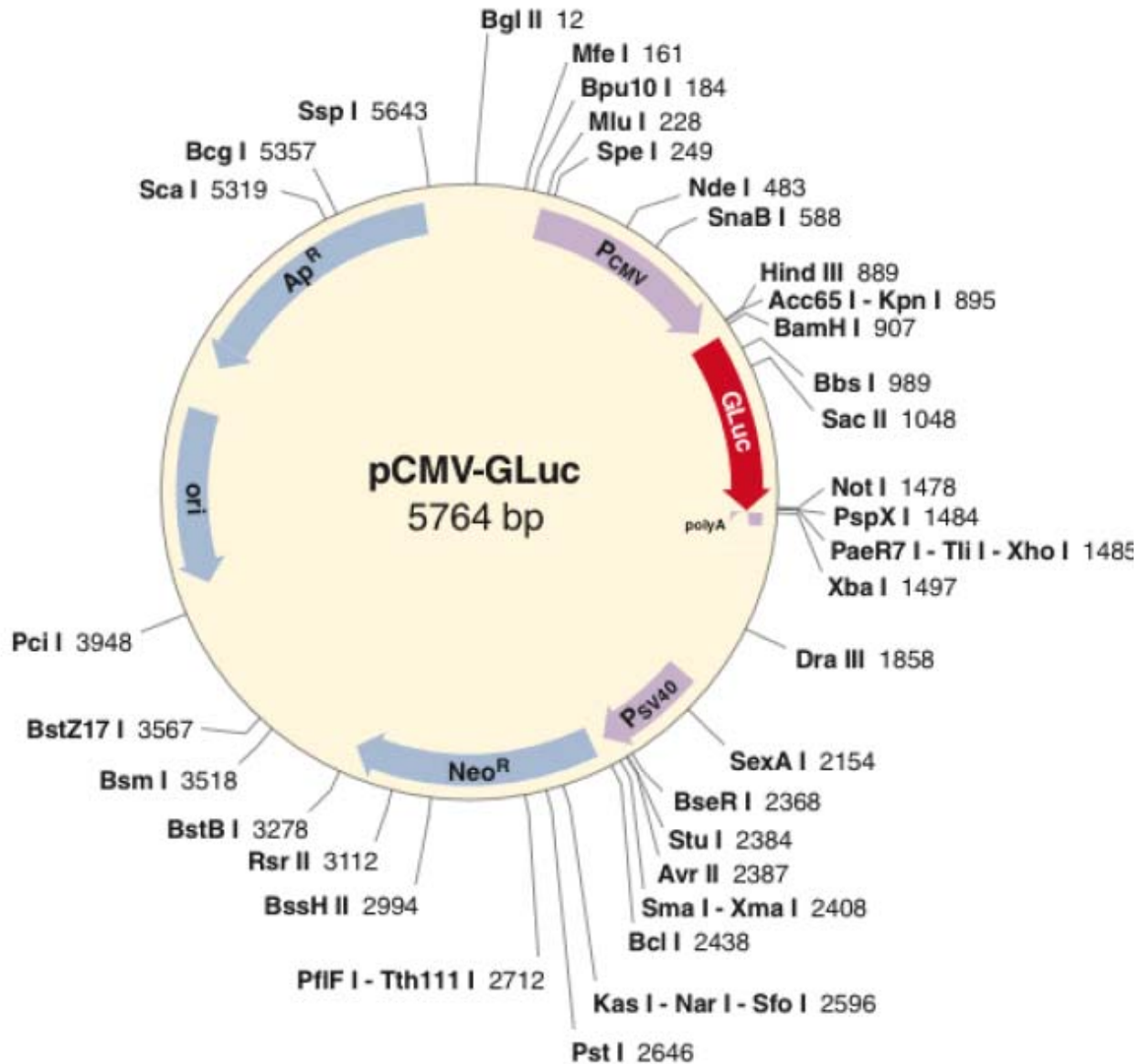
pUC19 MCS



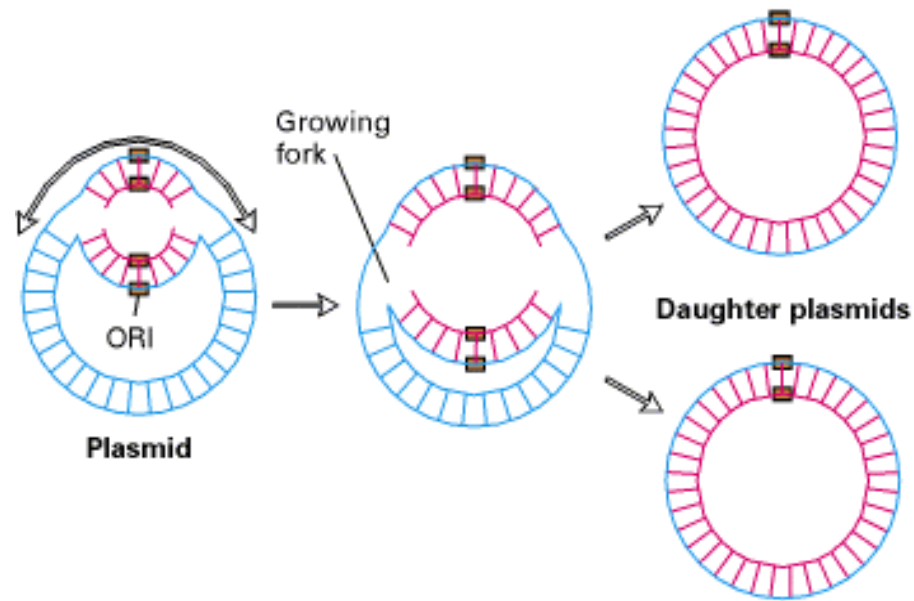
pNEB193 MCS



pCMV-GLuc



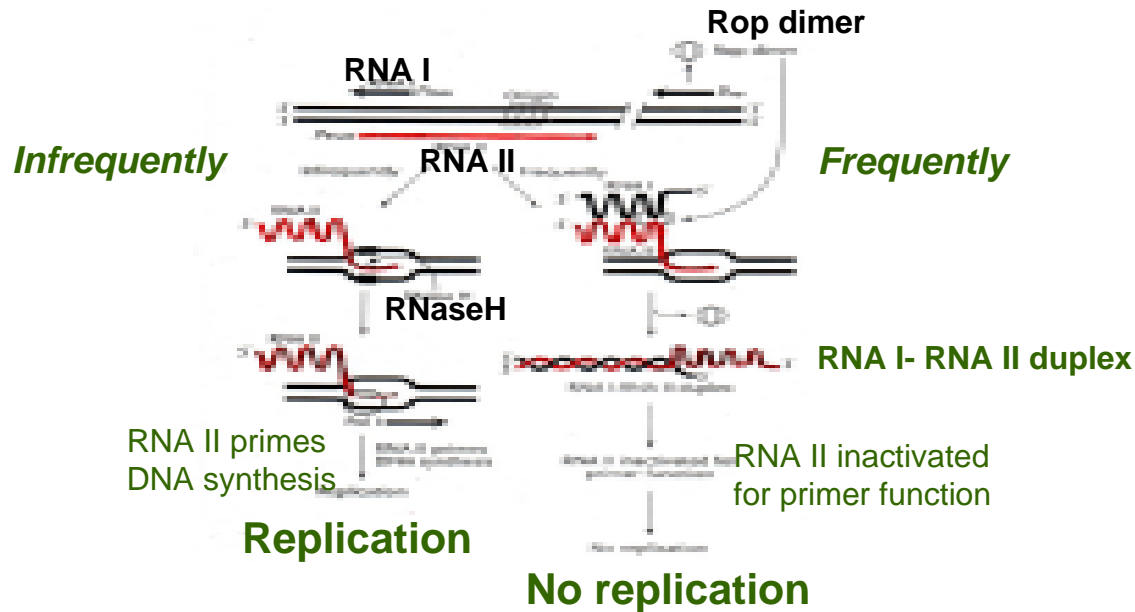
Plasmid DNA replication starts at *ori*



Regulation of replication of ColE1-derived plasmids

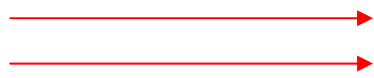
RNA I and RNA II involved in the initiation of plasmid replication that have a colE1 (or pBM1) origin

Rop protein dimer stabilizes the initial pairing of RNA I and RNA II



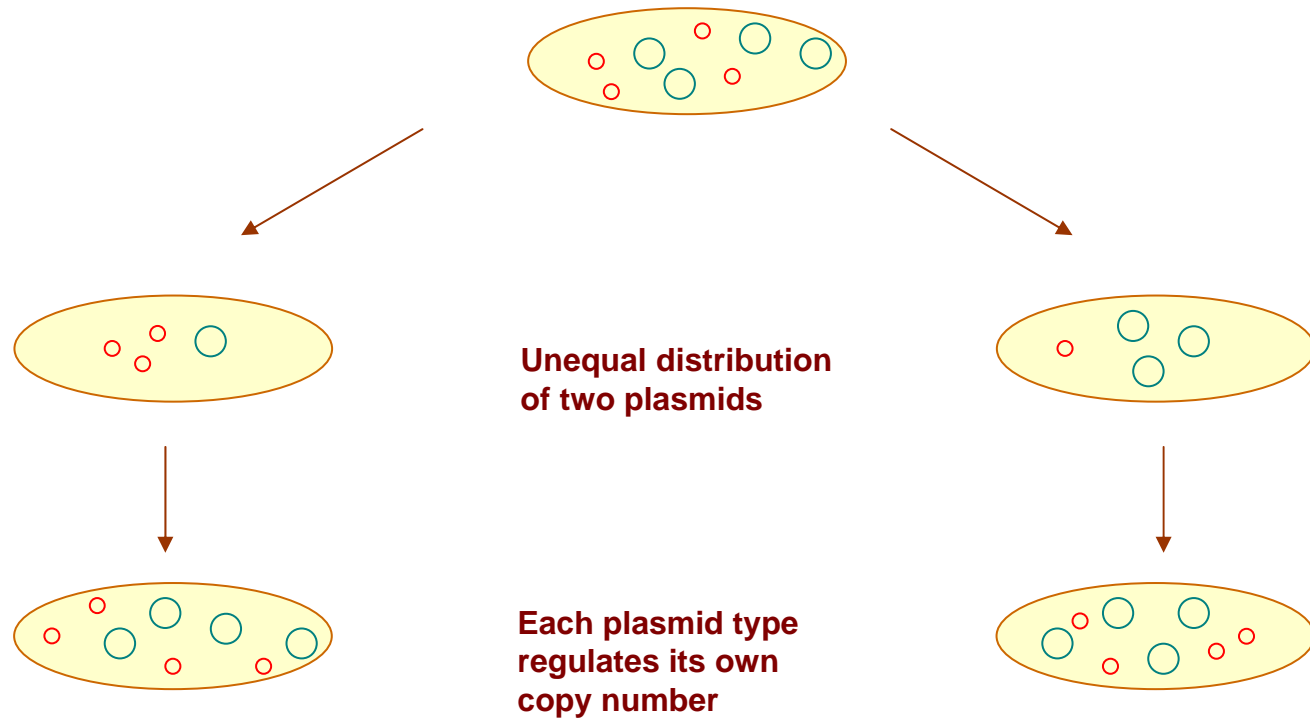
Replication:

- Stringent
- relaxed



- Low copy number plasmid (1-2 copies)
- High copy number plasmid (>10 copies)

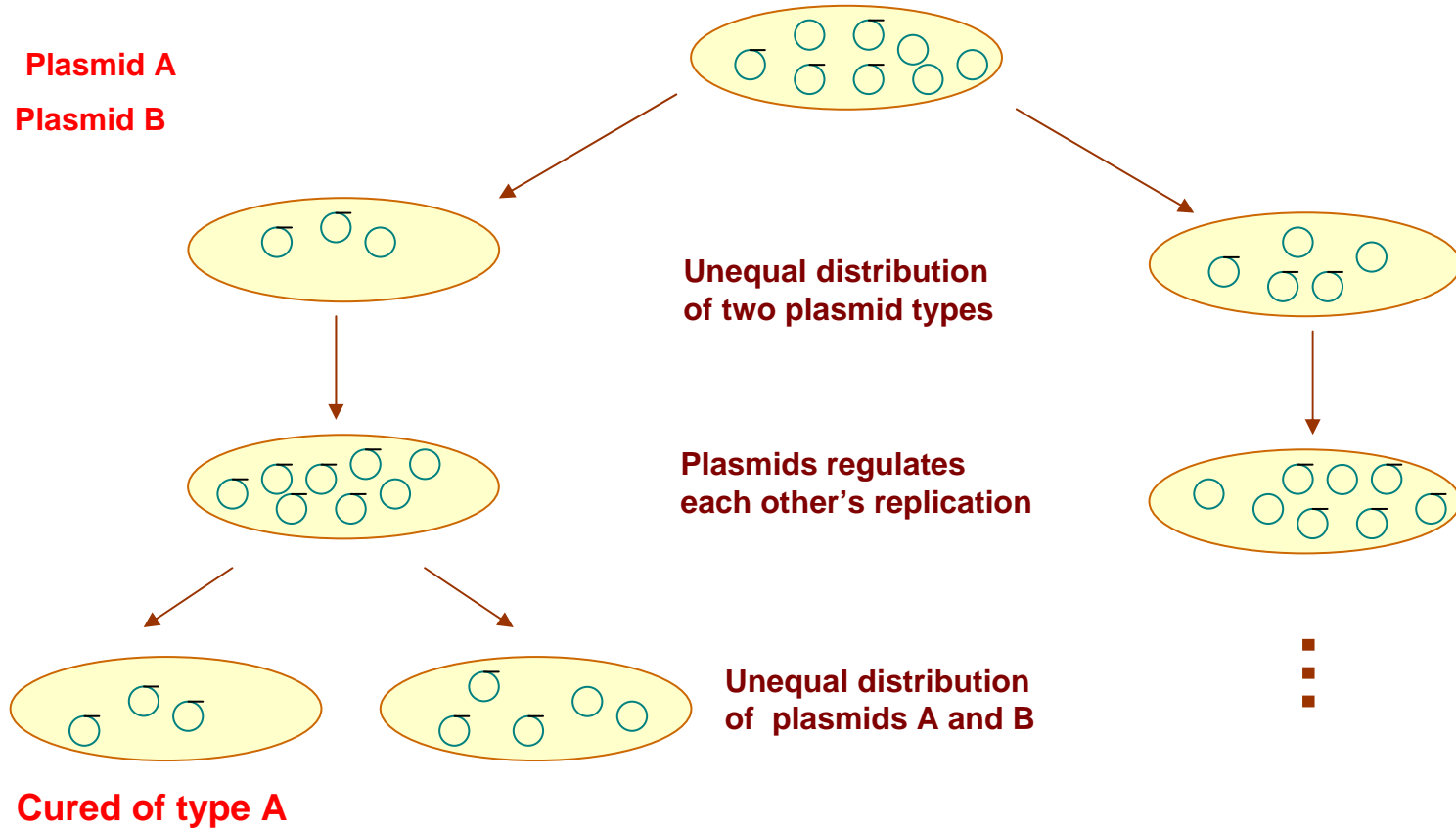
Coexistence of two plasmids of different Inc groups



After division, both plasmids will replicate to reach their copy number

Curing of cells of one of two plasmids when they are members of the same Inc group

○ Plasmid A
○ Plasmid B



The sum of the two plasmids will equal the copy number, but one may be underrepresented and lost in subsequent divisions. Eventually, most of the cells will contain only one or the other plasmid.