

# Plasmids

## I. Structure and Properties

Circular (with exceptions: can also be linear)

Supercoiling

Size

Genes found on plasmids

Rarely essential under all conditions

Antibiotic Resistance genes

Pathogenetic genes

Bactericidal genes

Unusual Carbon Source Metabolism genes

Addiction genes

Replicational regulation genes

Repair genes

Partitioning genes

(Biotech and Genetic Engineering: Gene expression, Gene fusions, many applications)

## II. Replication

The replicon: oriV autonomously replicating sequence

Theta (unidirectional or bidirectional), Rolling-circle

Isolating the Origin Sequence

Host Range (broad vs narrow)

How to determine host range

Copy Number (relaxed vs stringent)

How to determine copy number

ColE1 plasmid regulation

R1 plasmid regulation

Iteron Plasmids

## III. Partitioning

Resolution of Multimers (dif/cer)

par: partitioning genes

## IV. Plasmid Compatibility

Replication vs Partitioning

Determination of Compatibility Groups

## V. Purifying Plasmids

Alkali Lysis purification

CsCl purification

Pulsed-Field Gel Electrophoresis

## VI. Plasmid Cloning Vectors

Properties

Constructions

Uses