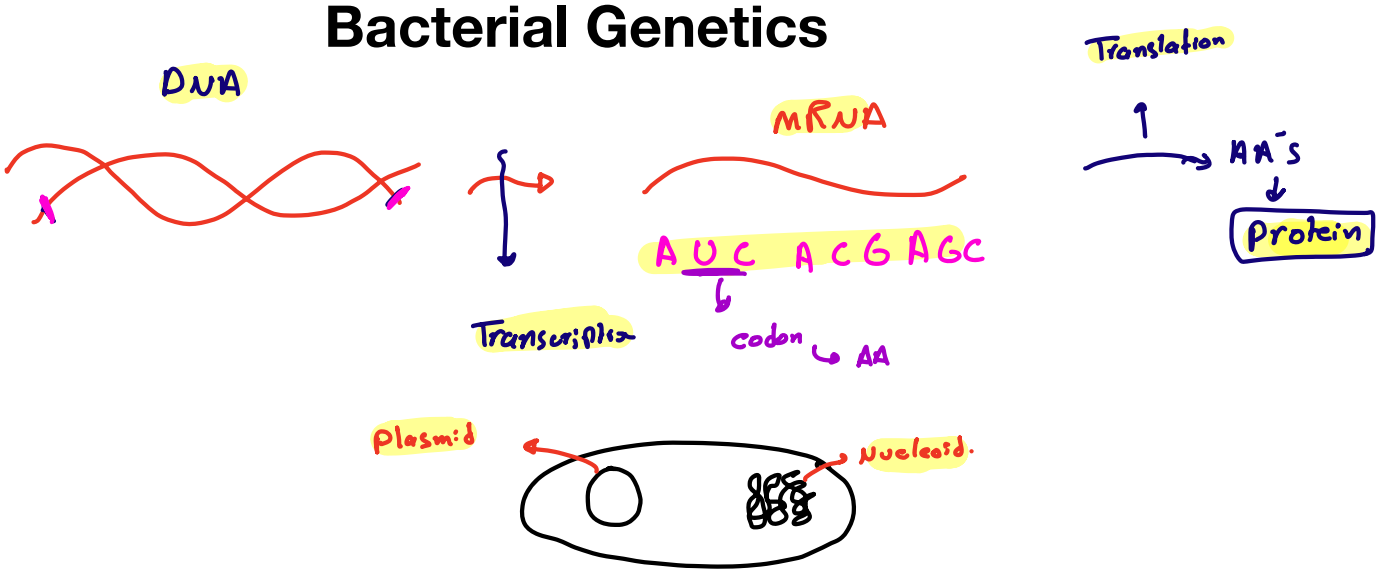
Bacterial Genetics



* Plasmid:

- Extra chromosomal, circular, Double stranded DNA
- Replicate Independently
- Carry at Least one Gene → Give trait Ex: AB resistance
  resistance to heavy metals
  virulence Factors
  Metabolic Functions Etc.

Factors affecting Bacterial Genes

Mutations:

GCGATTCAC
GCGATTGCT

Natural Induced

↑↑ : Beneficial
↓↓ : Lethal / harmful
– : Silent.

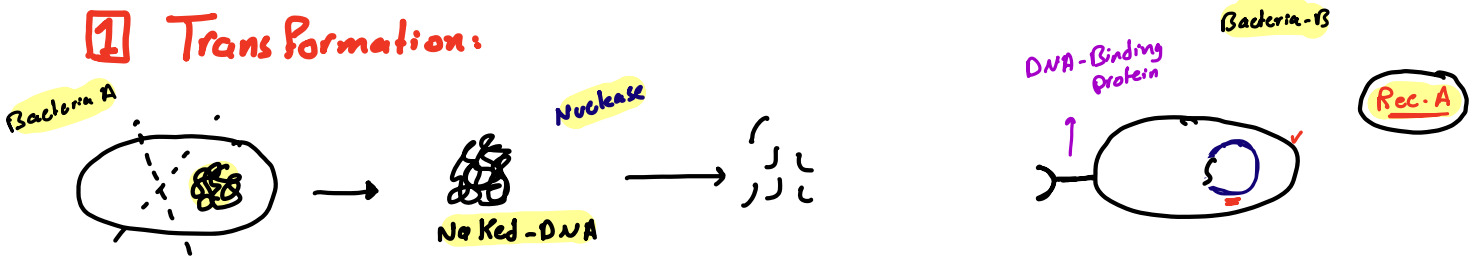
Aquring of New Genes

GCGATTCAC
GCGATTCAC AAGUTA (New)

Other Bacteria

- Transformation: Naked DNA ✓
- Transduction: viruses
- Conjugation: sex / F pilli

1 Transformation:



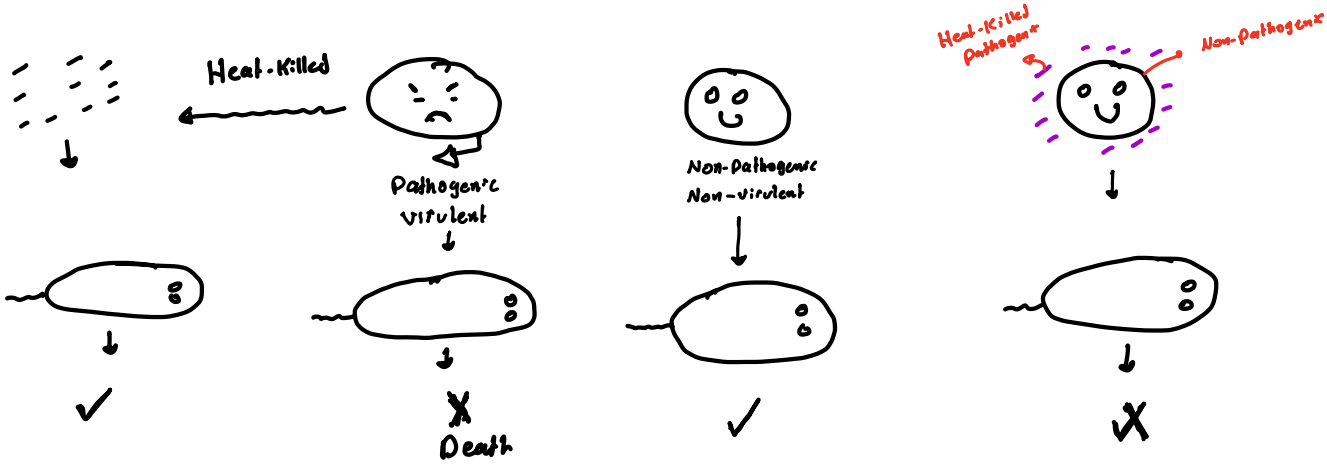
- uptake of Naked DNA

* - G+ve : بتوخذ single stranded DNA → synthesis complementary DNA

G-ve : Double Stranded DNA

? ↑ virulence

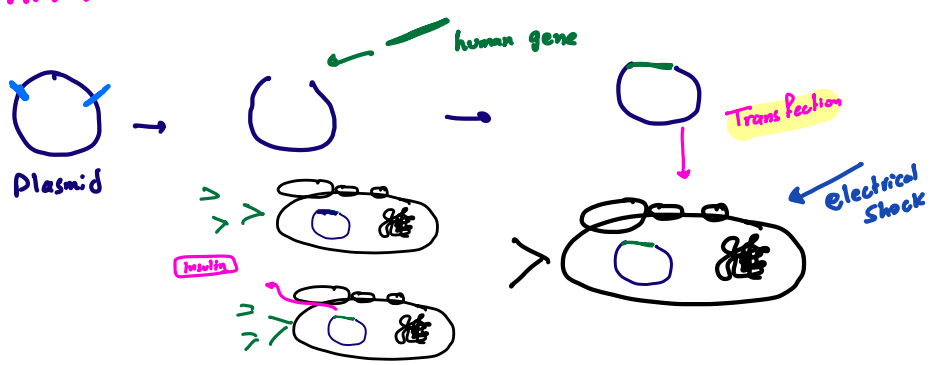
* Griffith Experiment:



Carbs	X	✓	✓	✓	✓
Lipids	✓	X	✓	✓	✓
proteins	✓	✓	X	✓	✓
RNA	✓	✓	✓	X	✓
DNA	✓	✓	✓	✓	X
	↓	↓	↓	↓	↓
	X	X	X	X	✓

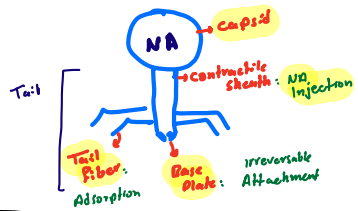
Tranforming Factor: DNA

Artifial Transformation: (cloning):



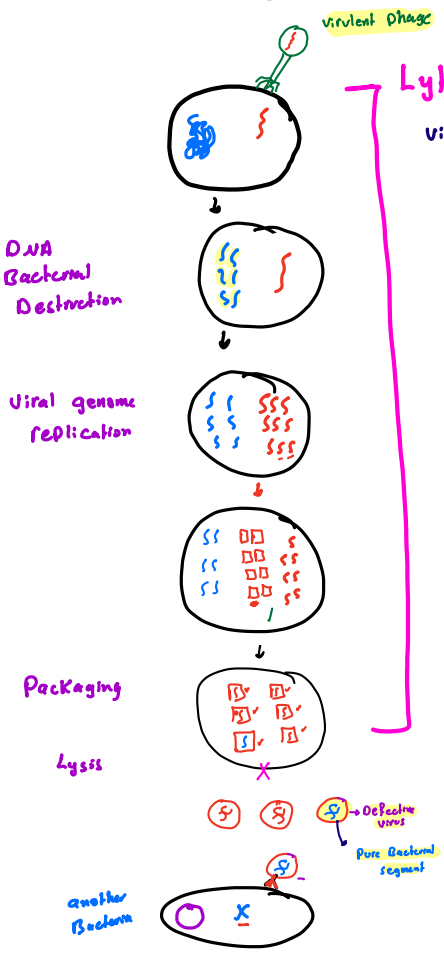
2 Transduction:

- Transfer of DNA Between Bacteria by viruses (Bacteriophage = phage)



Generalized Transduction

Can Transfer any Gene



Lytic cycle:

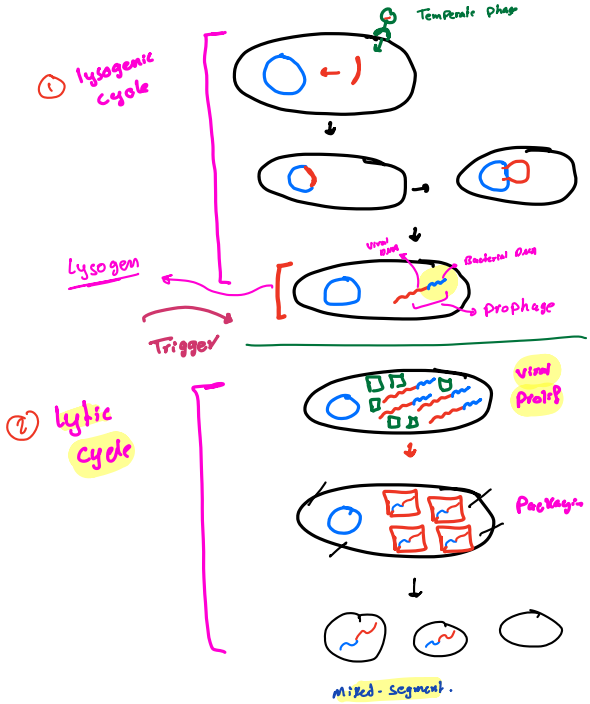
Virus replication

↓

Cell Lysis

Specialized Transduction

Transfer certain Genes



[3] Conjugation:

- Transfer of DNA element (plasmid) by sex / conjugate / F pillus.

* Transposones / Jumping Genes:

DNA element that can Hop / Jump.