Transformation and Transduction

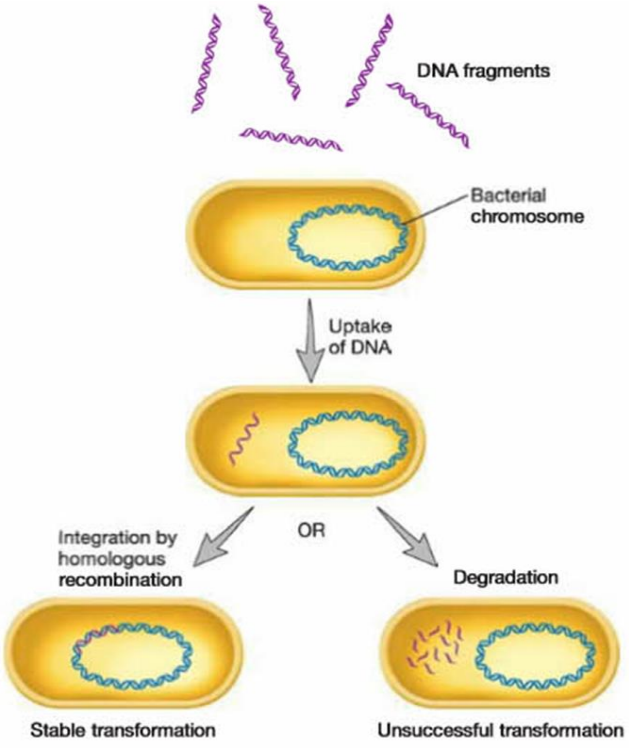
Transformation

Is the direct uptake or horizontal transfer of the naked DNA from a recipient bacterial cell to a bacterial cell and it's trapped with bacterial chromosome.

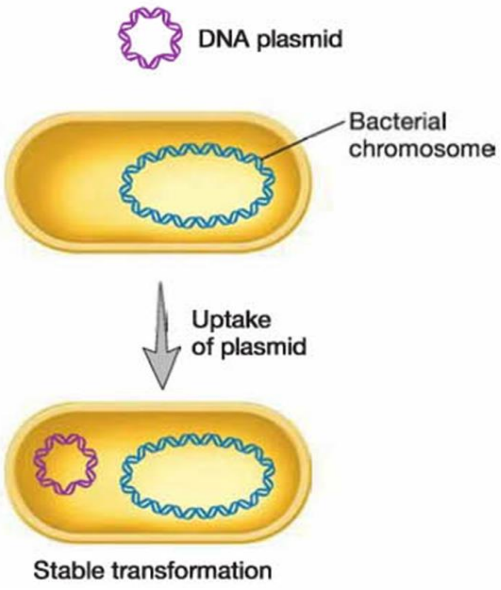
Steps of Transformation:

1- Transferring of naked DNA.

2- Trapping the DNA into bacterial cell.



(a) Transformation with DNA fragments



(b) Transformation with a plasmid

Frederick Griffith experiment, reported in 1928 by Frederick Griffith, was the first experiment suggesting that bacteria are capable of transferring genetic information through a process known as transformation.

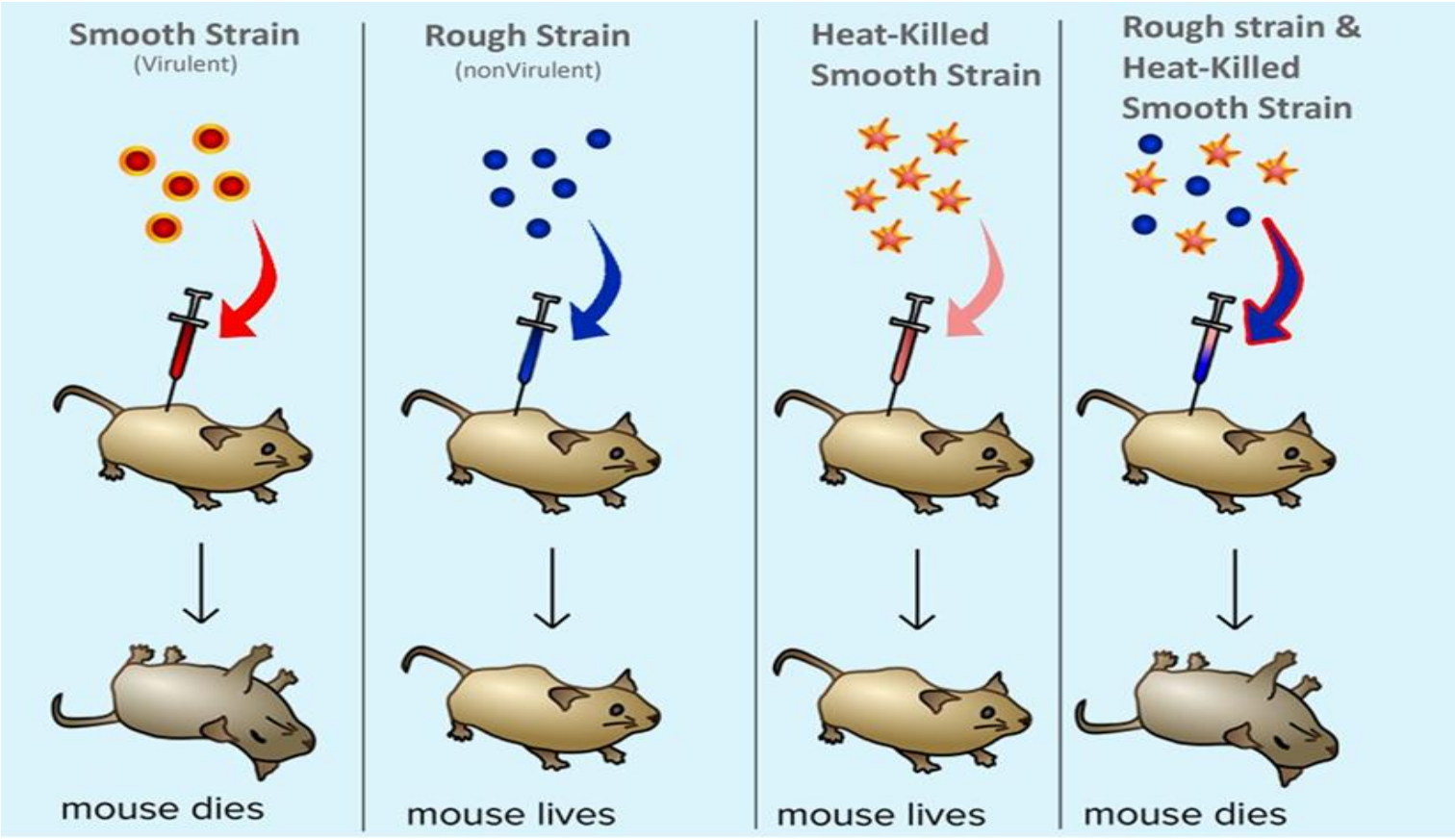
Frederick Griffith experiment was to inject different status of bacteria and they were:

Smooth strain (capsulated) “Virulent “

Rough strain (non – capsulated) “Non virulent “

Heat killed Smooth strain

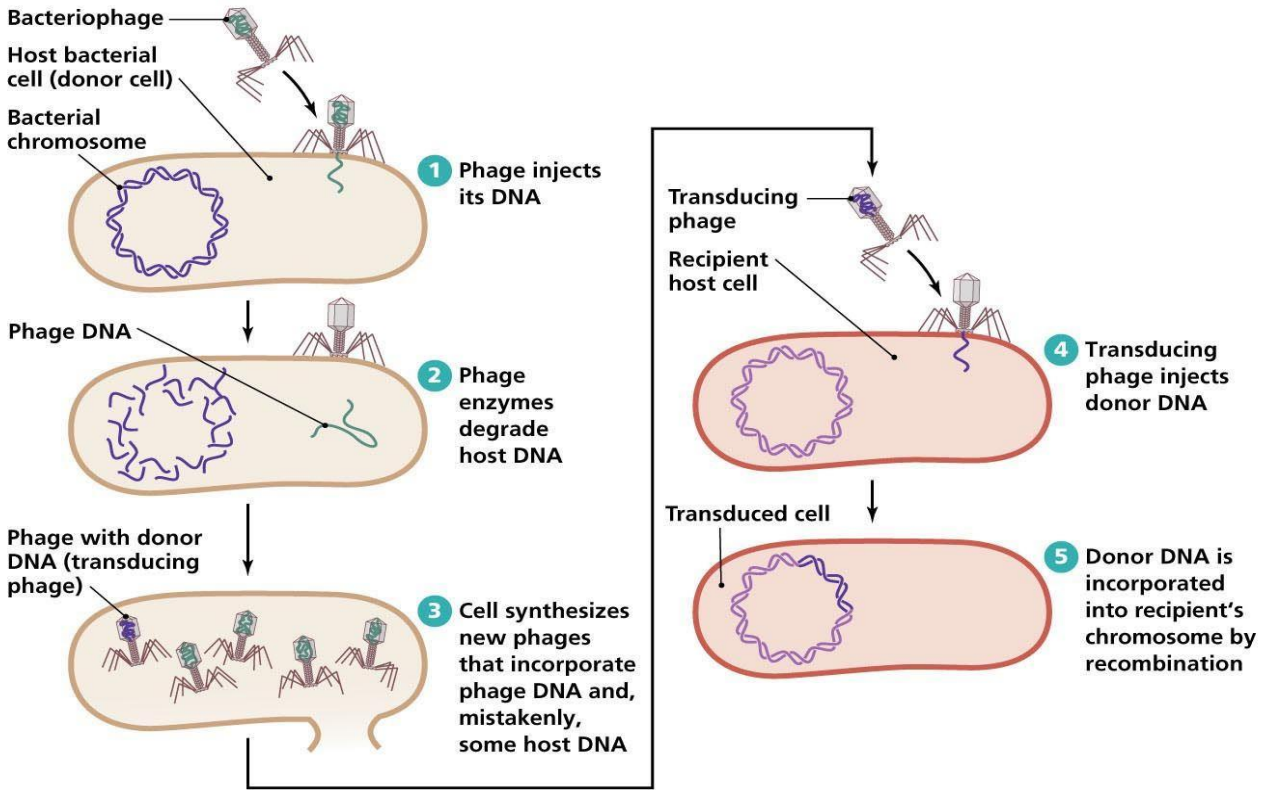
Rough strain and Heat killed Smooth strain



Griffith concluded that R strain bacteria had been transformed by S strain bacteria. The R strain inherited some 'transforming principle' from the heat-killed S strain bacteria which made them virulent. And he assumed this transforming principle as genetic material.

Transduction

Is the process by which a virus (Bacteriophage) transfers genetic material from one bacterium to another.... Later, when one of these bacteriophages infects a new host cell, this piece of bacterial DNA may be incorporated into the genome of the new host.



There are two types of transduction: **Generalized and Specialized**

Generalized transduction occurs when random pieces of bacterial DNA are packaged into a phage.

Specialized transduction is the process by which a restricted set of bacterial genes is packaged into a phage and transfer to another bacterium.