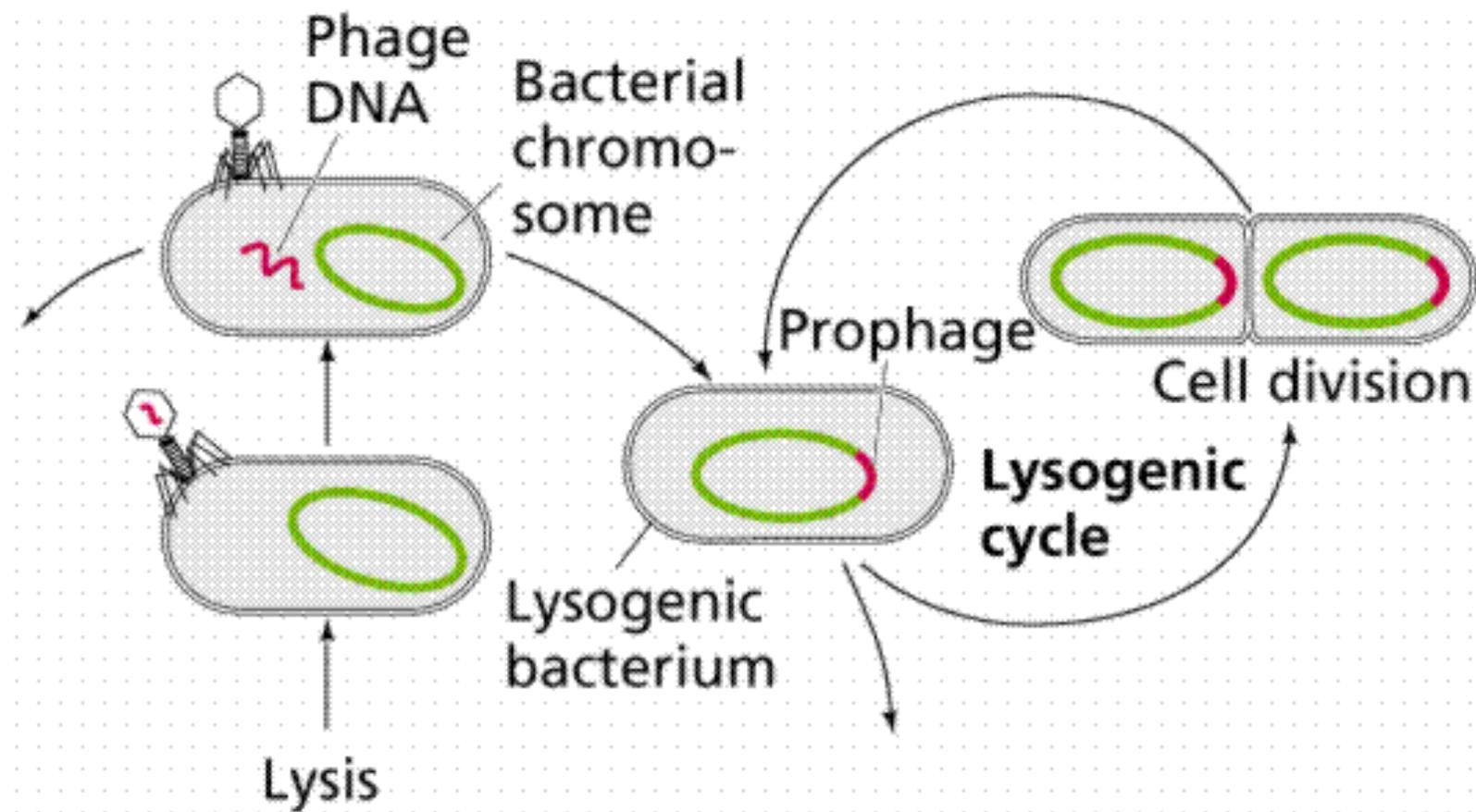


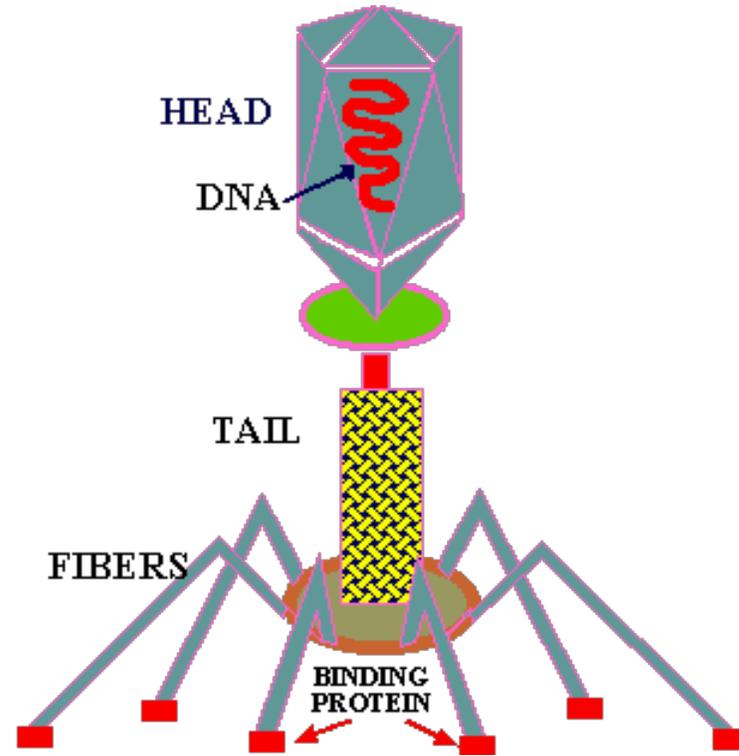
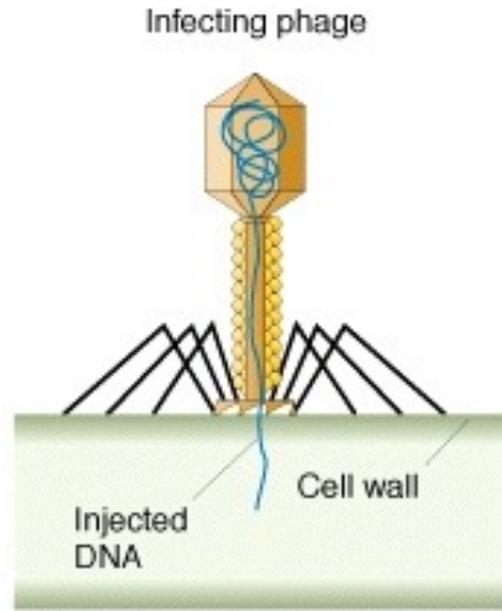
TRANSDUCTION

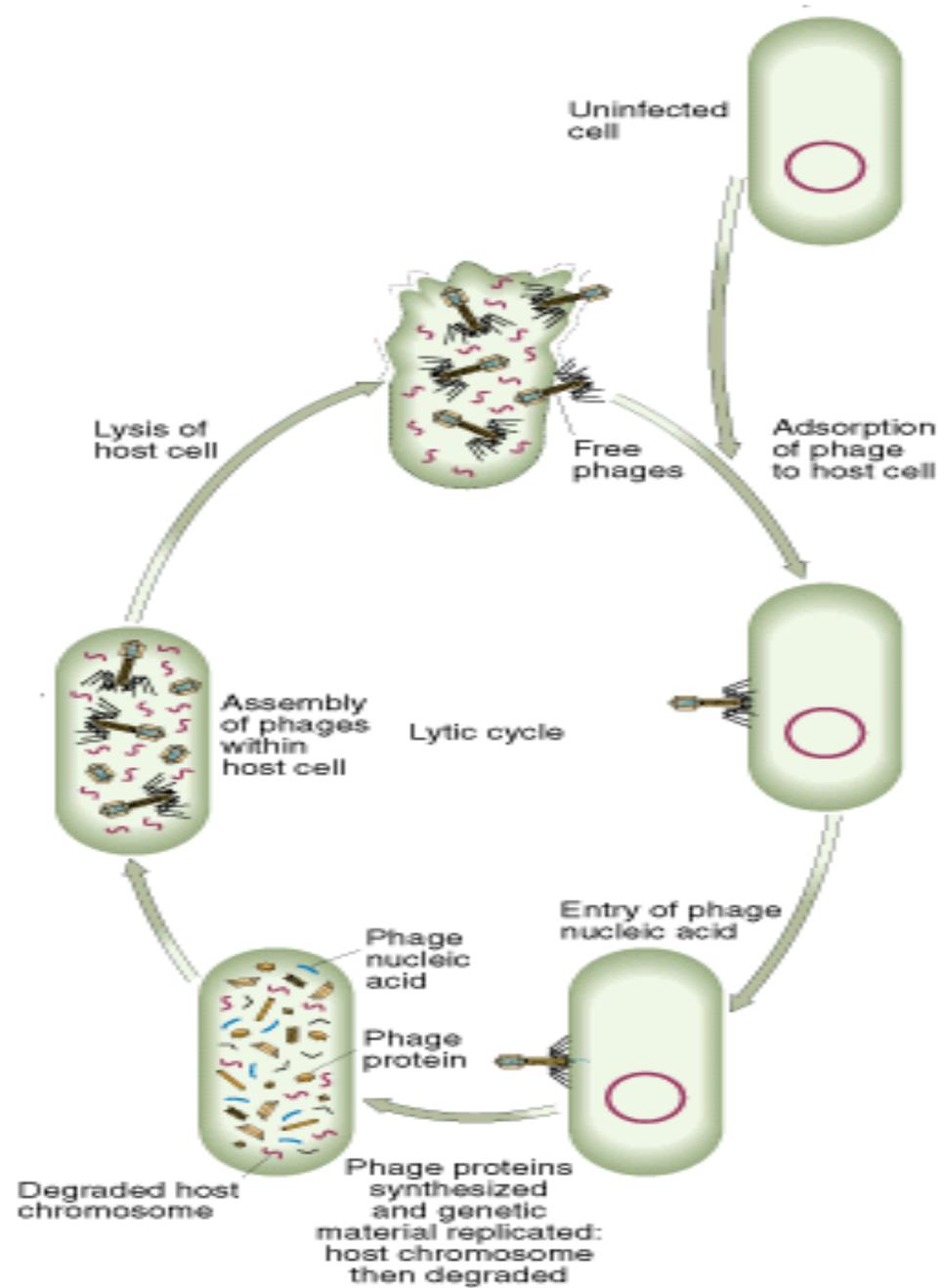
- The transfer of genetic material from a donor bacterium to a recipient bacterium via phages is called transduction.
- Gene transfer by transduction could be seen both in Gram-negative (*Salmonella*, *E. coli*, *Shigella*, *Proteus*, *Vibrio*, *P. aeruginosa*) and Gram-positive microorganisms (staphylococci and bacilli)
- Phages are viruses (bacteriophages) that break down or lyse bacteria. It is host specific and has species specificity among bacterial phages.

Bacteriophages Types

- *virulent or vegetative phages that replicate after entering the host cell and lyse the bacterium*
- *Bacteriophages those do not lyse the infected cell; temperate phages*
- *Those that combine with the host DNA; prophages*
- *cells containing bacteriophages as prophages; lysogenic cells*





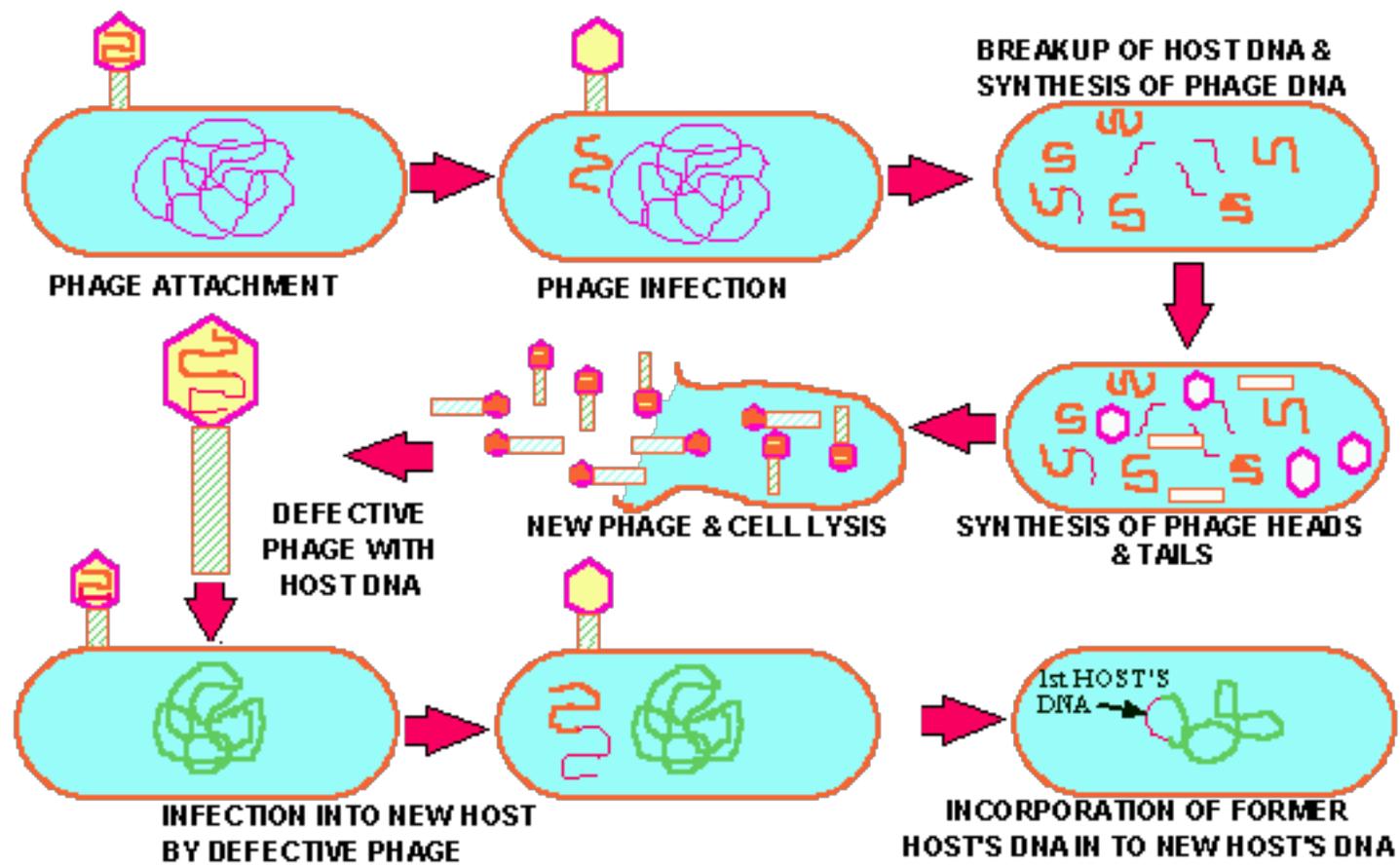


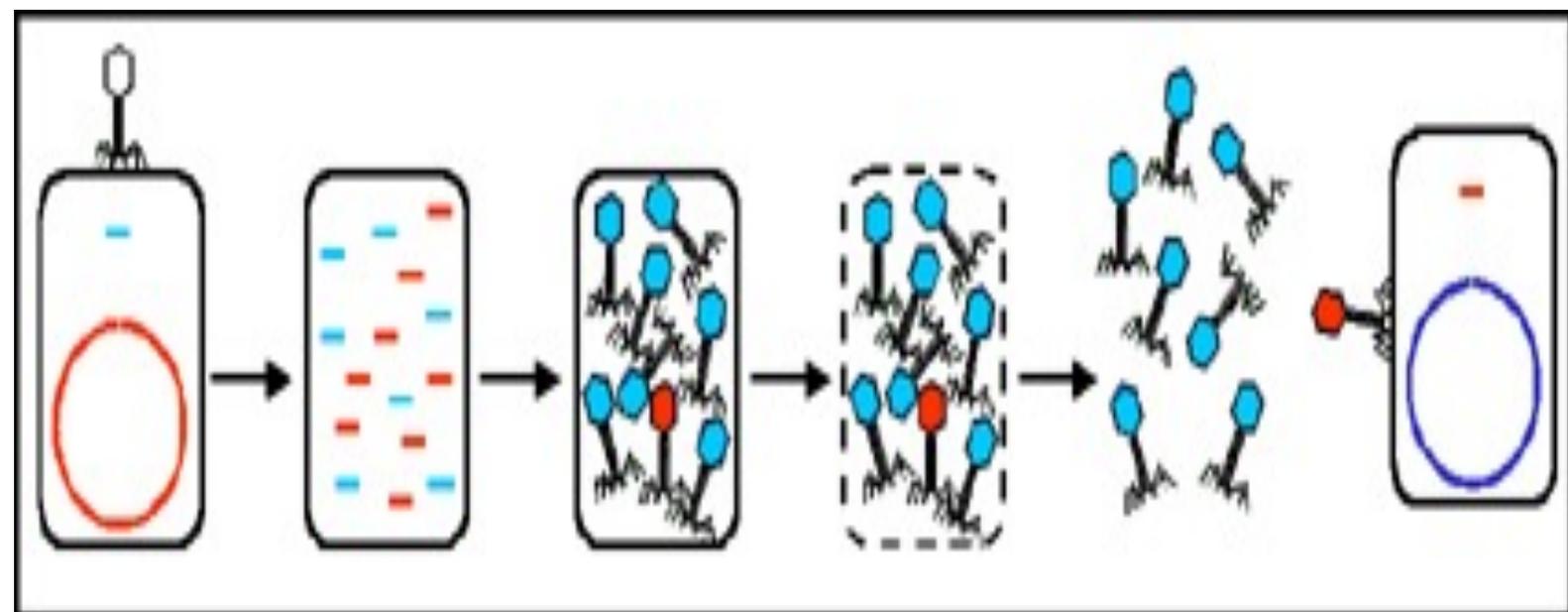
Transduction Types

1. Generalized transduction
2. Special transduction
3. Abortive transduction

1. Generalized transduction

- While the phage is maturing in the bacterial cell, a segment from the fragmented host DNA may enter the phage capsid (inside the head of the phage) that is synthesized in a separate place by chance.
- Thus, when this phage infects another bacterium, it transfers its host DNA along with its own DNA to the recipient cell.
- If the phage combines with the host cell genome together with the bacterial DNA it carries, it makes the recipient cell positive in terms of the characteristics it carries.
- After several cross-overs, the recipient cell chromosome and the phage+bacteria DNA segment combine, replicating and transcribing together.
- The information in the gene it carries is transferred to the mRNA exactly and participates in the translation.





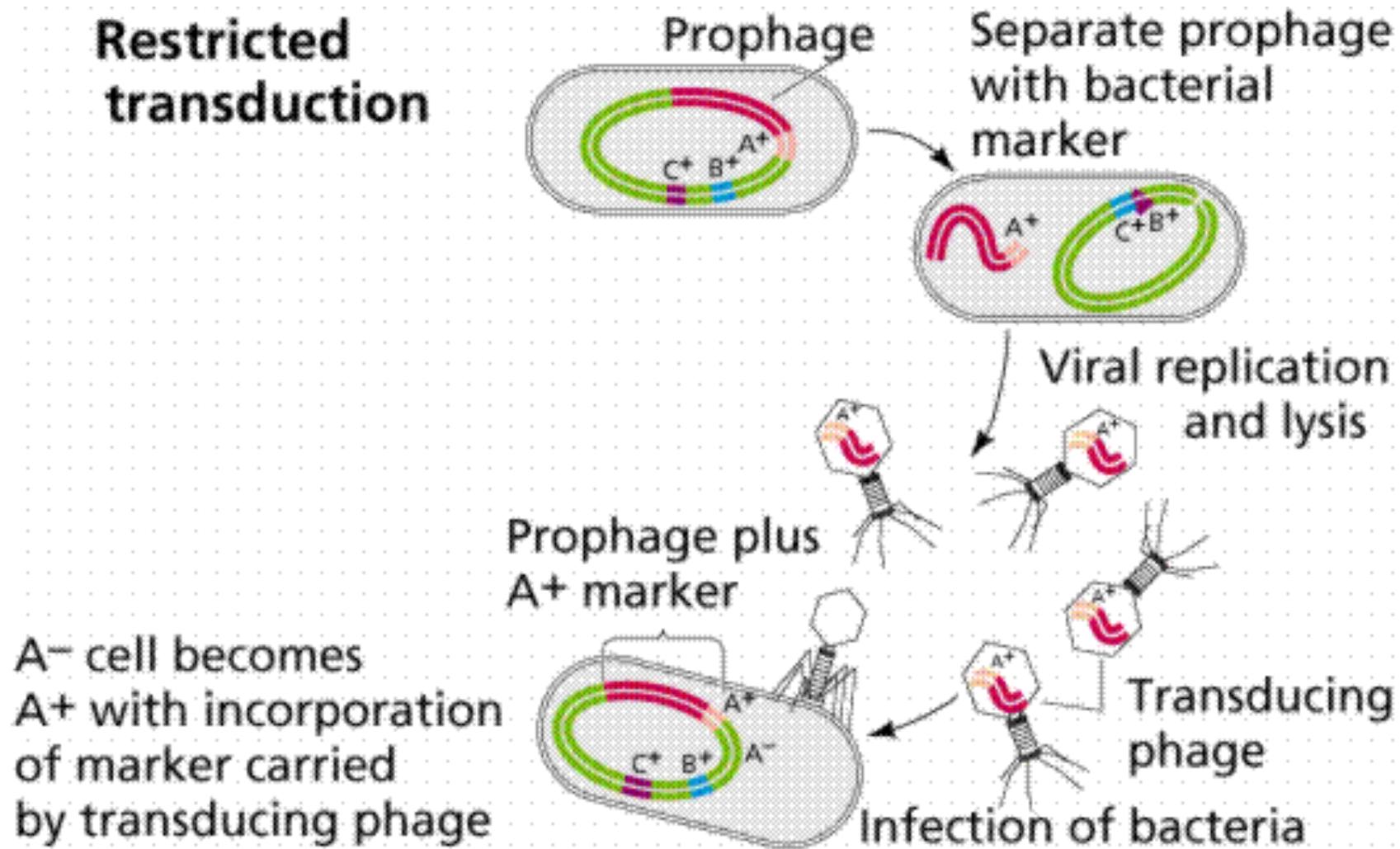
2. Special Transduction

- The phages that form in special transduction settle next to certain genes in the host DNA and combine with the cell DNA and turn into prophages.
- When separating from the DNA, they are separated by taking the gene belonging to the bacteria that they are with or attached to.
- When such a phage infects another cell, it transfers the gene it carries to that bacterium and makes the bacterium positive for the special characters found in the gene.

Restricted transduction

- In some cases, the prophage may leave some of its own DNA on the host DNA as it cleaves from the host DNA and takes a segment from the host DNA.
- In this way, the missing phage genome cannot replicate and mature in another cell that it has infected. Such transduction is called restricted transduction.

Restricted transduction



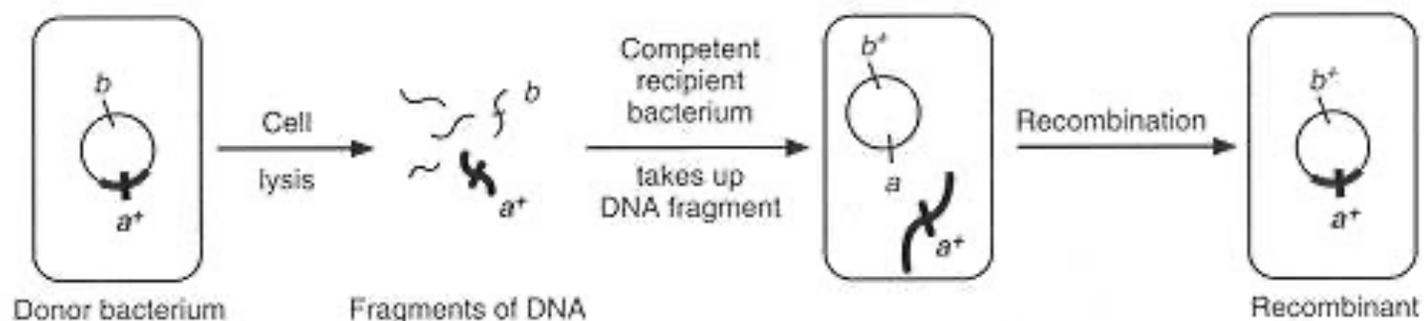
3. Abortive transduction

- The DNA segment taken by the phage from its host and carrying some characters (genes) is transferred to this cell when the phage infects another cell.
- However, this piece of DNA remains inside the cell and does not combine with the bacterial DNA.
- Although it exists independently in the cell, it cannot replicate simultaneously with the cell's DNA.
- It can make the cell positive in terms of the characters it carries.
- Each time the bacterium divides, this exogenote stays in a sister cell, making it positive.

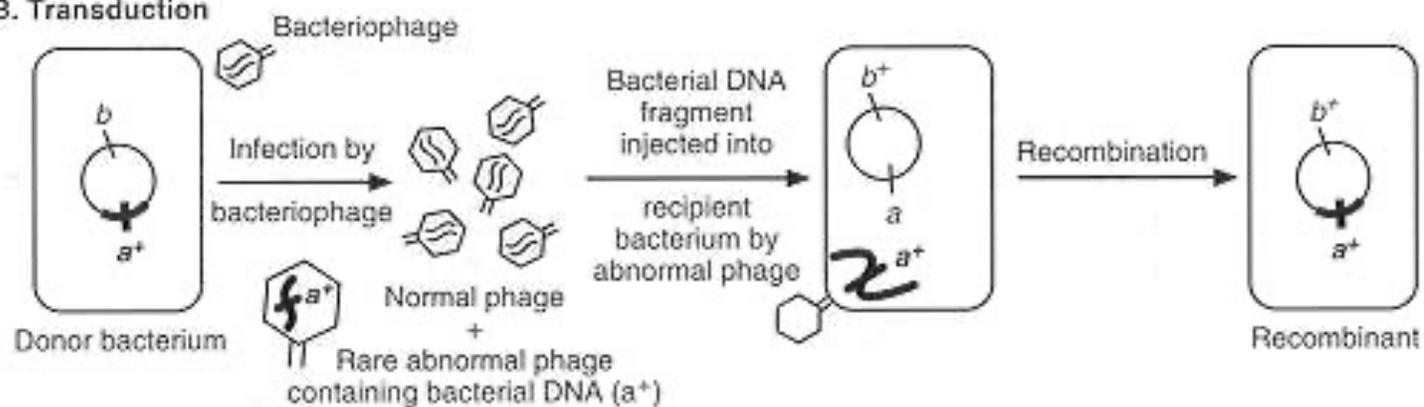
Lizogeny and antigenic conversion

- Some bacteria become infected with phages and acquire the characters they have when they become lysogenic.
- i.e. The non-toxic strain of *C. diphtheriae* becomes virulent (toxigenic) if lysogenized by beta phage.
- Expression of some specific antigenic components in phage-infected bacteria
- i.e. Some special somatic polysaccharide antigens in *Salmonella* and *Shigella*

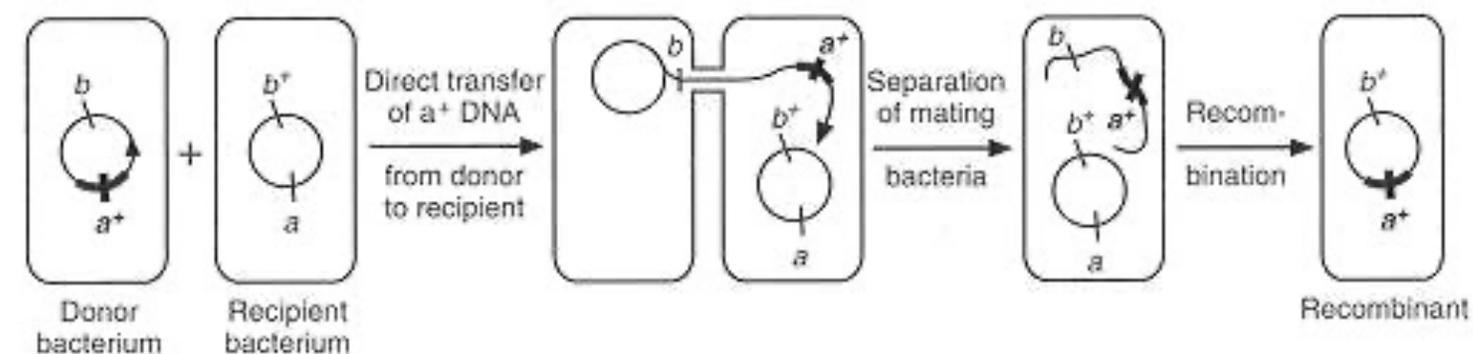
A. Transformation



B. Transduction



C. Conjugation





**Thank you for your
patience&interest.**