

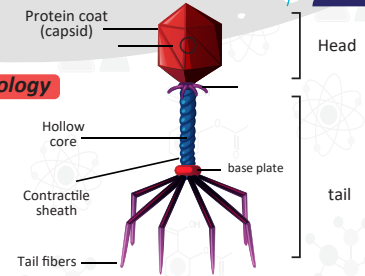
# Chapter 4 : Bacteriophage

**Def:** Virus that infect bacteria

### Practical uses

- 1- Cloning vector in Recombinant DNA technology
- 2- xxxx
- 3- xxxxx phage typing test

### Morphology



### Replication

#### Lytic cycle (Vegetative cycle)

ends by lysis of bact. and release of newly formed phages

#### 1- Adsorption

- Phage by its tail → attach to specific rec. on bact. cell
- Specific → Detect susceptibility of bact. to phages

#### 2- Penetration

- Tail contract
- N.acid is injected inside bact.

#### 3- Eclipse

- No Phages are detected inside bact.
- min. to hours → viral N.acids directs bact. metabolism for phage synthesis

#### 4- I.C. Synthesis

#### 5- Assembly

mature infectious phages

#### 6- Release by lysis

infect new bacteria

empty head and tail

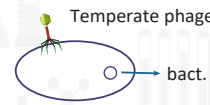
Phage DNA

New bact.

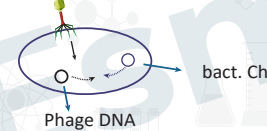
gene transfer from 1 bact. to another by bacteriophage  
Generalized Transduction

#### Lysogenic cycle (Temperate cycle)

#### 1- Adsorption



#### 2- Penetration



#### 3- Integration between Phage DNA (prophage) + bact. Ch.

Integrated phage genome (=prophage)

- Immune to inf. by other phage
- Acquire new characters by phage DNA

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Bact. carrying prophage (= lysogenic bact.)

Acquisition of new character coded for by prophage DNA → phage conversion or Lysogenic conversion

**E.g. Diphtheria bacilli** only produce toxin when lysogenized

#### Outcome of lysogenic bact.

prophage detach from bact. ch.  
→ start lytic cycle

prophage may carry few genes from bact. ch.

Carry prophage indefinitely passing it to daughter cells

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- 1- spontaneous detachment
- 2- inducer (U.V. rays) detachment

Gene transfer from 1 bact. to another by bacteriophage (specialized Transduction)

#### Generalized Transduction

- During lytic cycle
- lytic (virulent) phage
- Any piece of bact. DNA (ch. or plasmid) is transferred

#### Specialized Transduction

- During lysogenic cycle
- Temperate (lysogenic) phage
- Specific piece of bact. ch. is transferred (adjacent to prophage DNA insertion site)