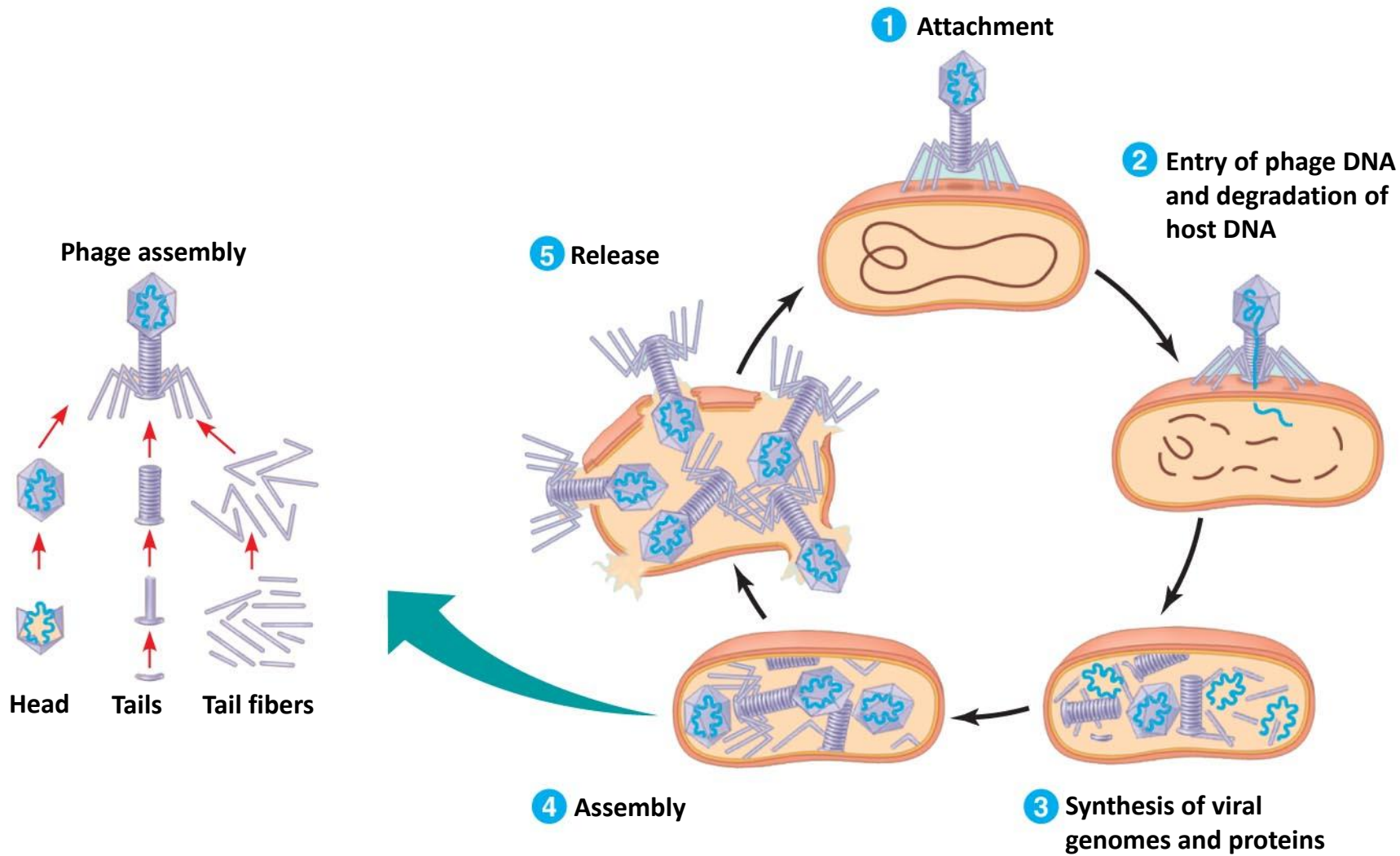


Viral reproduction

Lytic & Lysogenic cycle

Virus reproduction

- Viruses evolve and reproduce, but they are obligate intracellular parasites
- There are **4 main steps** to viral reproduction:
 - Virus **attaches** to cell and nucleic acid **enters** cell – either injects DNA/RNA or whole virus enters cell
 - Replicate parts – nucleic acid, capsid, envelope...=**Synthesis**
 - **Assemble** new viruses from parts
 - Cell lysis or viral **release** from infected cell
- Viruses infect bacteria by the lytic cycle or lysogenic cycle

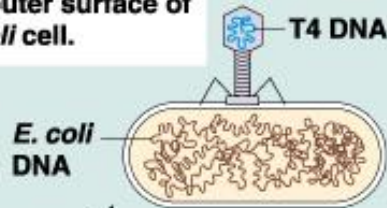


Lytic Cycle (Viral Reproduction)

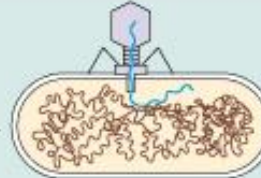
- virus attacks cell, kills it and releases more viruses right away - follows 4 steps of viral reproduction
- Virulent= how quickly a virus reproduces and is spread- tend to follow lytic cycle
- CAUSES the disease **right away**

Lytic cycle

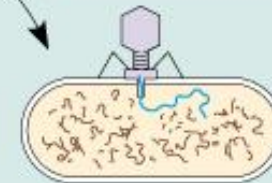
- 1** The T4 phage uses its tail fibers to stick to specific receptor sites on the outer surface of an *E. coli* cell.



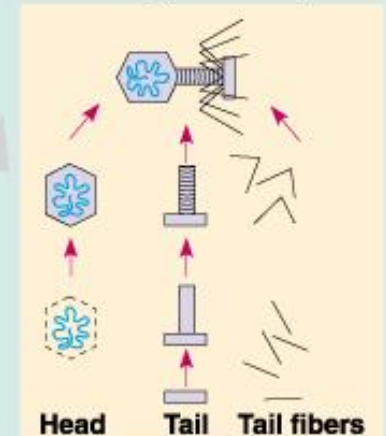
- 2** The sheath of the tail contracts, thrusting a hollow core through the wall and membrane of the cell. The phage injects its DNA into the cell.



- 3** The empty capsid of the phage is left as a "ghost" outside the cell. The cell's DNA is hydrolyzed.



Phage assembly



The phage then directs production of lysozyme, an enzyme that digests the bacterial cell wall. With a damaged wall, osmosis causes the cell to swell and finally to burst, releasing 100 to 200 phage particles.

- 4** The cell's metabolic machinery, directed by phage DNA, produces phage proteins, and nucleotides from the cell's degraded DNA are used to make copies of the phage genome. The phage parts come together. Three separate sets of proteins assemble to form phage heads, tails, and tail fibers.

- Lytic cycle

<http://www.youtube.com/watch?v=41aqxcxsX2w&feature=related>

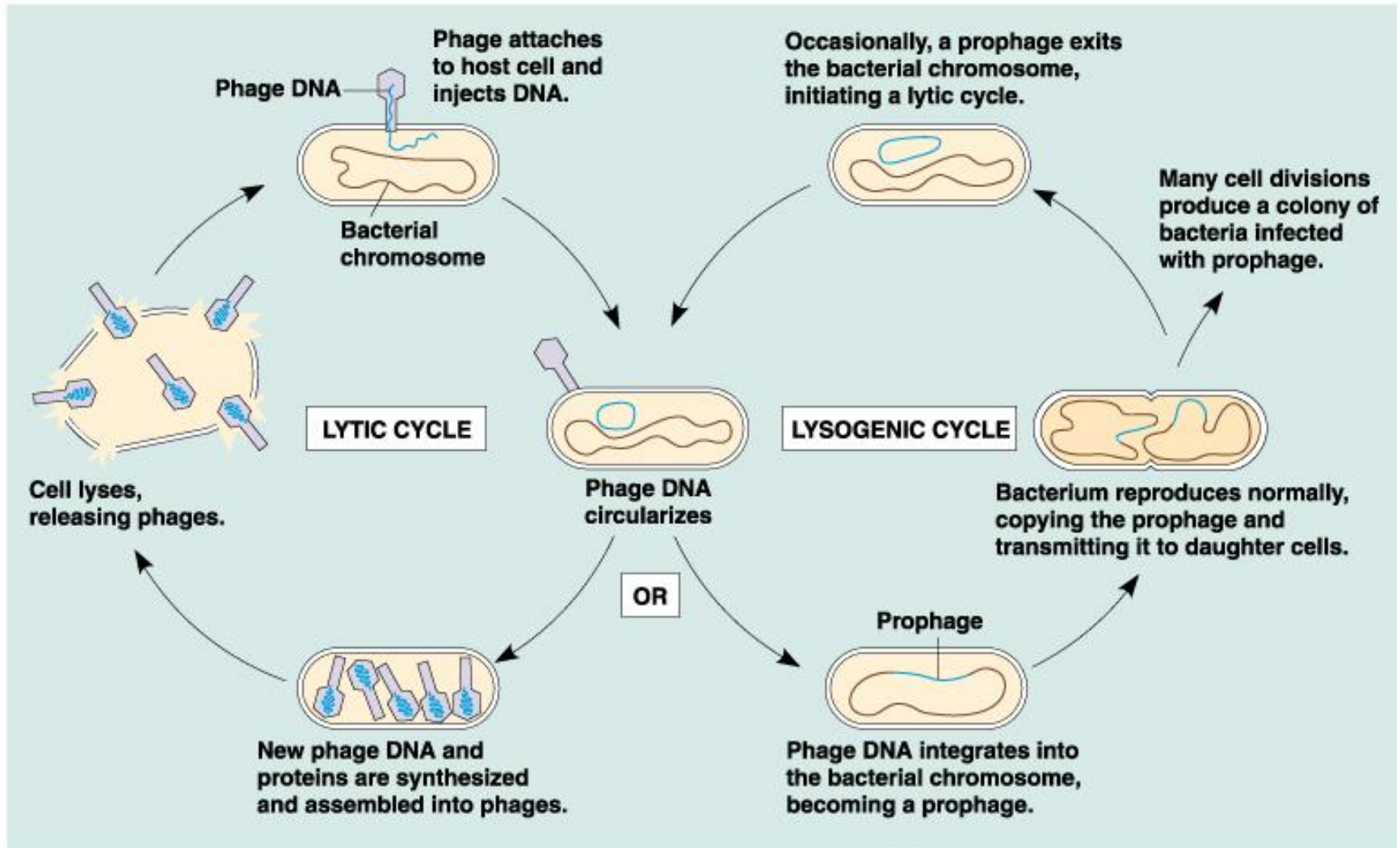
Flu

<http://www.youtube.com/watch?v=Rpj0emEGShQ&feature=related>

Lysogenic cycle (latent or hidden)

- lysogenic cycle: sometimes a virus doesn't kill host cell right away or immediately cause disease – coexist with host
 - virus stays dormant (as a **prophage**) in the cell for several generations
 - Prophage = host DNA + virus DNA
 - viral DNA gets copied at each replication of host cell – passed to offspring
 - Later, the virus is activated or triggered and causes the disease by entering the lytic cycle
 - Trigger may be time, stress, other illness...

Lysogenic vs. Lytic cycle



Retroviruses

- Has RNA as the genetic material
- RNA is converted into DNA copy inside the host cell by an enzyme called *reverse transcriptase*
- Follows the lysogenic pathway
- Can mutate easily – hard to make vaccines for these ones
- Infects mainly animal cells
 - Ex. HIV, influenza