

Viruses

Pages 330 - 341; 343 - 350

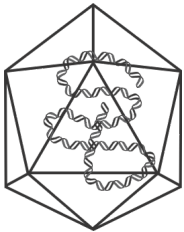
1. Viruses

- Obligate Intracellular Parasites
- Host Range
 - * Bacteriophages (Phages) (Page 330)

A. Results

- i. Cell Death
- ii. Cell Proliferation
- iii. Altered Cell Differentiation
- iv. No Change

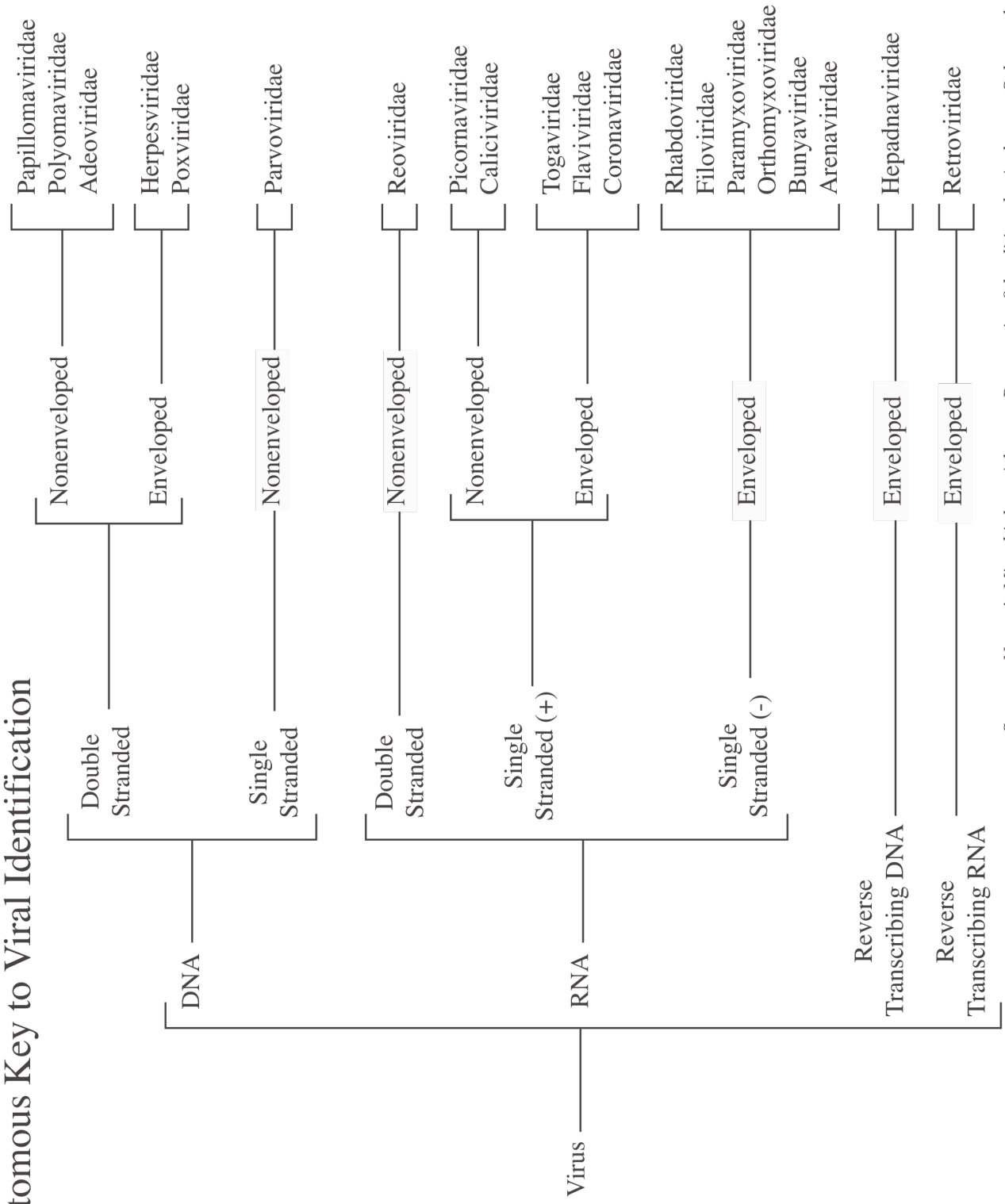
B. Anatomy of a Viron Particle (Pages 332 - 335)



- i. Nucleocapsid
 - a. Nucleic Acid
 - dsDNA
 - ssDNA
 - dsRNA
 - ssRNA
 - Segmented Genome

- b. Capsid (Page 332 - 333)
 - Capsomeres
 - Enzymes
 - Spikes (Page 333)
 - * Hemagglutinin
 - * Neuraminidase
- c. Envelope
 - Nonenveloped Viruses
 - Enveloped Viruses
- d. Viron Morphology (p. 373)
 - Polyhedral
 - * Icosahedral
 - ✓ Polio Virus
 - Helical
 - * Rabies
 - Complex
 - * Bacteriophages

Dichotomous Key to Viral Identification



Source: Nester's Microbiology A human Perspective 8th edition by Anderson, Salm, and Allen

3. General Classifications (Page 335)
 - A. Enteric Viruses
 - B. Respiratory Viruses
 - C. Arboviruses (arthropod borne)
4. Bacteriophages (Pages 336 - 343)
 - A. Lytic Cycle (Pages 336 - 337) SEE HANDOUT - “Lytic Cycle Stages”
5. Temperate Phage (Pages 338 - 339)
 - A. Lysogenic Cycle (Pages 338 - 339) SEE HANDOUT - “Lysogenic Cycle”
 - i. Prophage or Temperate Phage
 - ii. Integrase (Page 338)
 - B. Potential Outcomes of Medical importance (Page 339 - Table 13.3)

Lysogenized Bacterial Species	Metabolic Byproduct	Disease
<ul style="list-style-type: none"> • <i>Corynebacterium diphtheriae</i> • <i>Streptococcus pyogenes</i> • <i>Clostridium botulinum</i> • <i>Escherichia coli</i> 0157:H7 • <i>Vibrio cholerae</i> 	Diphtheria Toxin Erythrogenic Toxin Neurotoxins Shiga toxin Cholera toxin	Diphtheria Scarlet Fever Botulism Disentary Cholera

- C. Generalized Transduction (Page 340) SEE HANDOUT
- D. Restricted Transduction (Page 340) SEE HANDOUT

6. Animal Virus Replication (Pages 343 - 348)

Pull out handout on Viral Lifecycle

A. Adsorption (Attachment) (Pages 343 - 344)

- i. Host Range and receptor limitations (Page 344)

B. Penetration

- i. Enveloped Viruses

- a. Fusion

- b. Receptor Mediated Endocytosis

- ii. Nonenveloped Viruses

- a. Receptor Mediated Endocytosis

C. Uncoating and Nucleic Acid Release

D. Replication (Biosynthesis)

i. DNA Viruses (SEE HANDOUT !!) (Pages 345 - 346)

a. Replication in nucleus

ii. RNA Viruses (SEE HANDOUT !!) (Page 346)

a. Replication in cytoplasm

b. Viral Types

- dsRNA Viruses

- * Example: Reoviridae

(R: respiratory; E: enteric; O: orphan)

- Sense (+) Strand → Antisense (-) Strand

- * Example: Polio

- Antisense (-) Strand → Sense (+) Strand

- a. Rhabdoviridae (Rabies)

iii. RNA Viruses with Segmented Genome (SEE HANDOUT !!) (Page 346)

- Influenze

a. Antigenic Drift

b. Antigenic Shift (See Handout)

iv. Retroviruses (Page 346 - 347)

E. Assembly (Maturation) (Page 347)

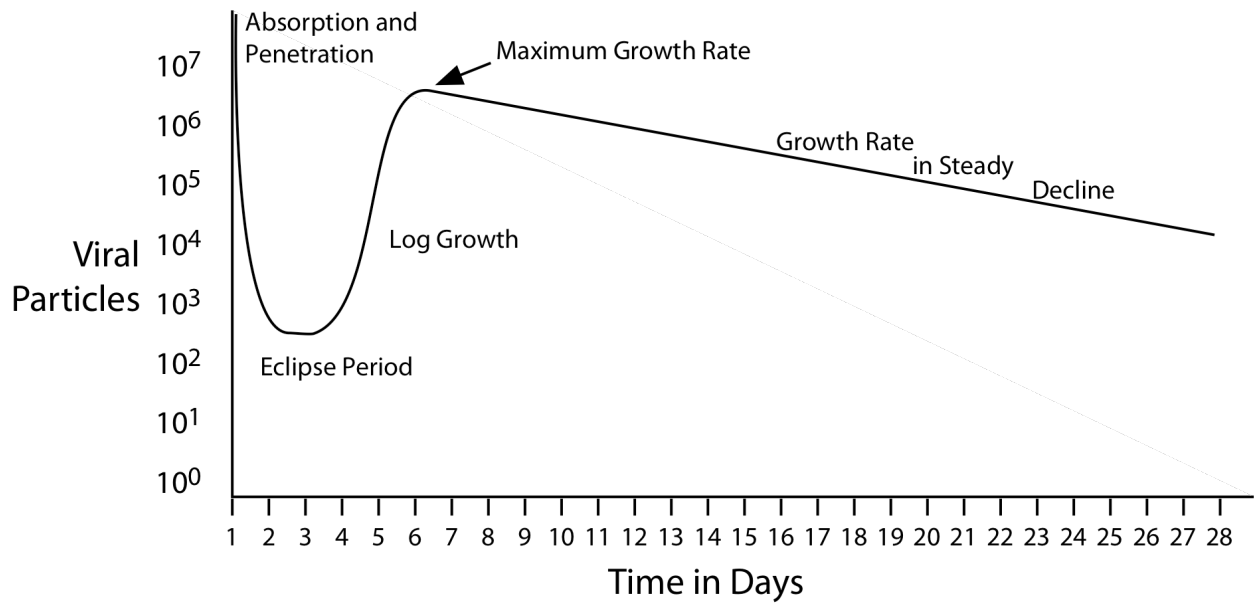
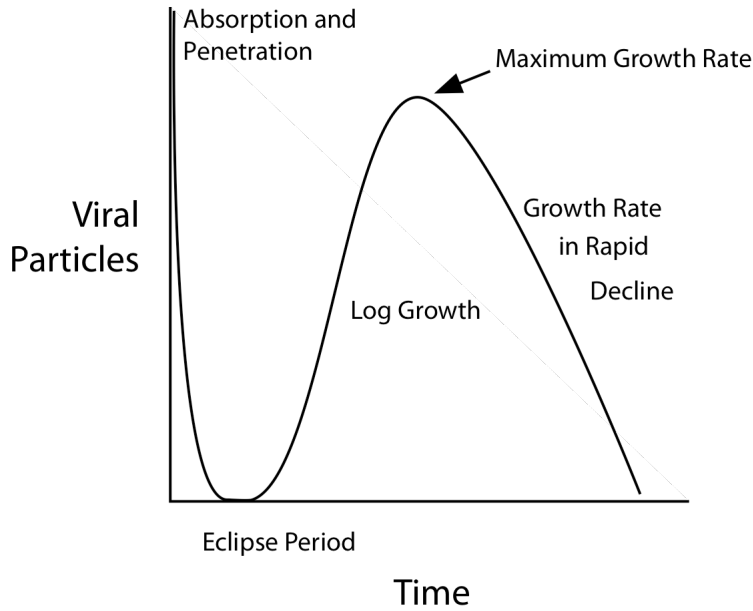
F. Release (Page 347)

i. Lysis

ii. Budding

iii. Exocytosis

7. Acute Infections (Page 348)



Adapted from: http://www.nature.com/nri/journal/v5/n10/fig_tab/nri1706_F2.html

7. Persistent Infections (Page 348)

A. Persistent Chronic Infections

i. Hepatitis B

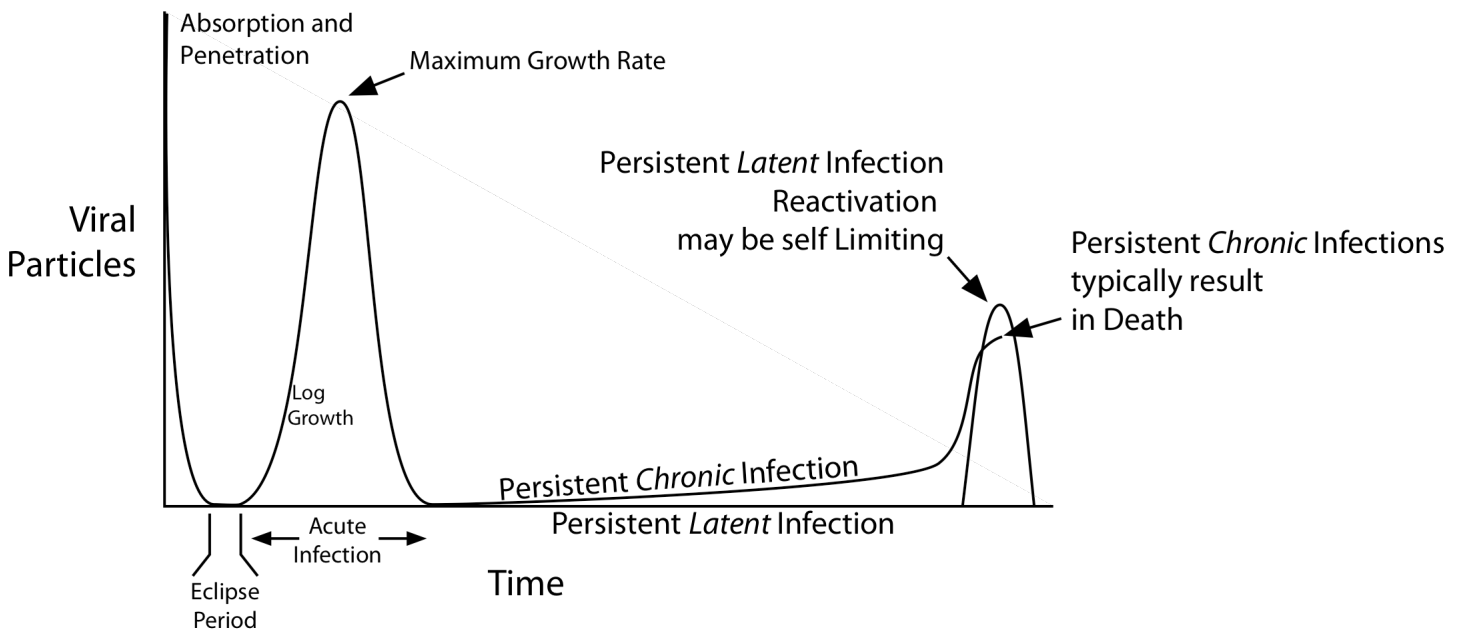
B. Persistent Latent Infections

i. Varicella Zoster Virus (VZV)

a. Chickenpox

b. Provirus

c. Shingles



7. Cancer and Viruses (Page 350) SEE HANDOUT !!
 - A. Regulation of Normal Cell Division
 - i. Oncogenes (or Proto-oncogenes)
 - ii. Tumor Suppressor Genes
 - B. Oncovirus or Oncogenic Virus
 - C. Transformation
 - D. DNA Oncogenic Virus Example: Hepatitis B → Liver Cancer
8. Phage Therapy