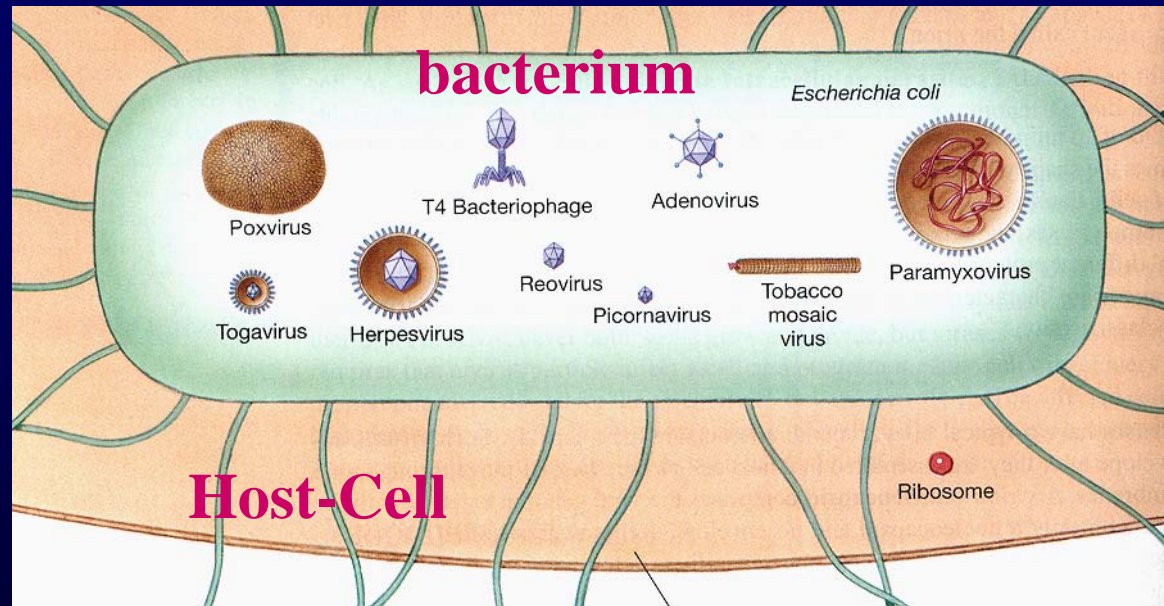


Viruses and Viral Diseases

Impact on human health has been great--Influenza pandemic of 1918 killed more people than WW I (500,000 Americans in 10 months)

What is a virus?

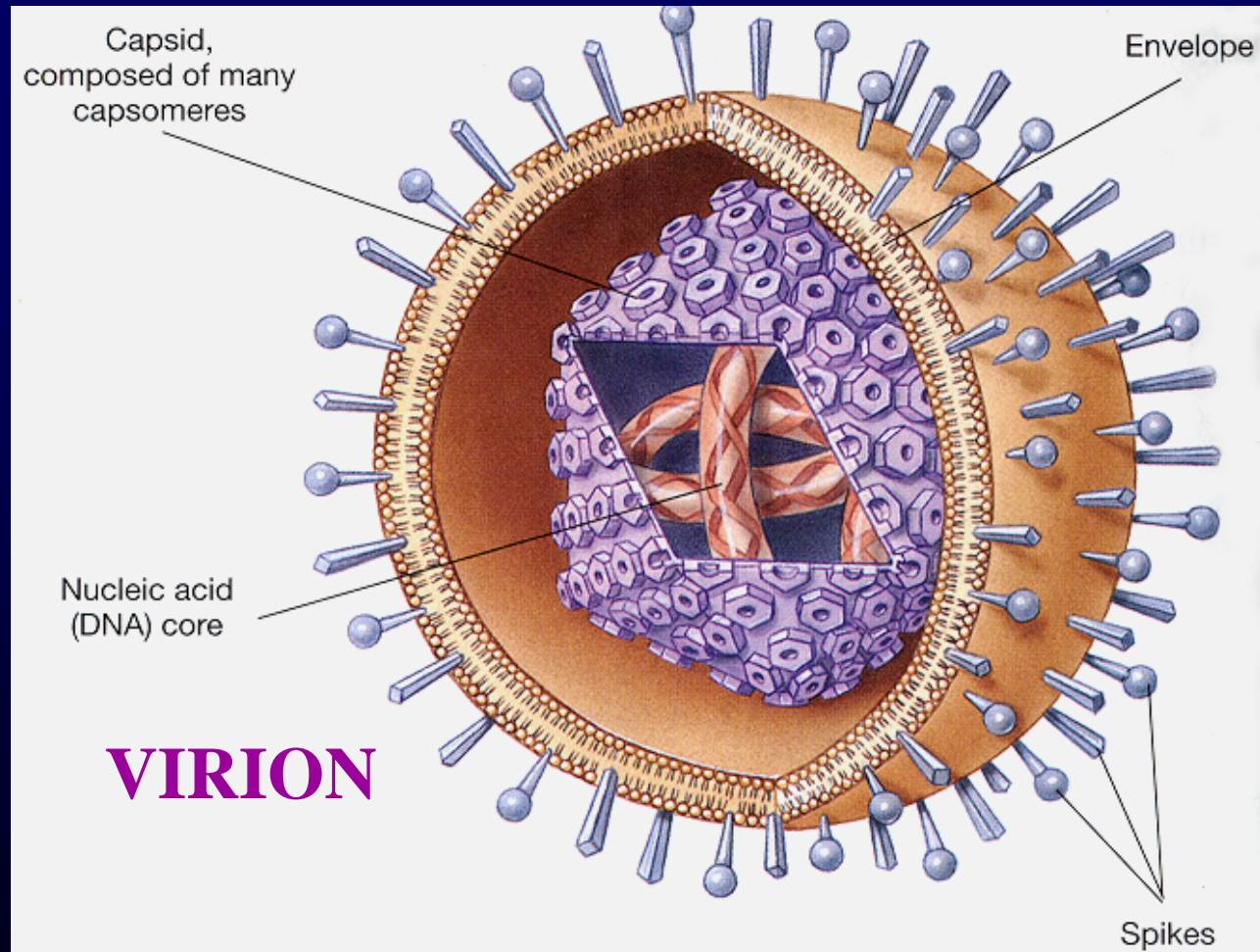
- Infectious, but non-cellular disease agent
 - no nucleus,
 - no cytoplasm,
 - no organelles,
 - no metabolism
- Obligate intracellular parasites
 - (*Chlamydia* and *Rickettsia* have nuclei & cytoplasm)
- Cells= DNA & RNA
 - viruses have one or the other



Viruses, sizes and variety

Viral Components

- Nucleic acid core
- Protein coat
 - capsid
 - capsomeres
 - nucleocapsid
- Virion
- Envelope
 - naked
 - budding
- Bacteriophages
 - viruses of bacteria



“...bad news wrapped in a protein”

Host Range and Specificity

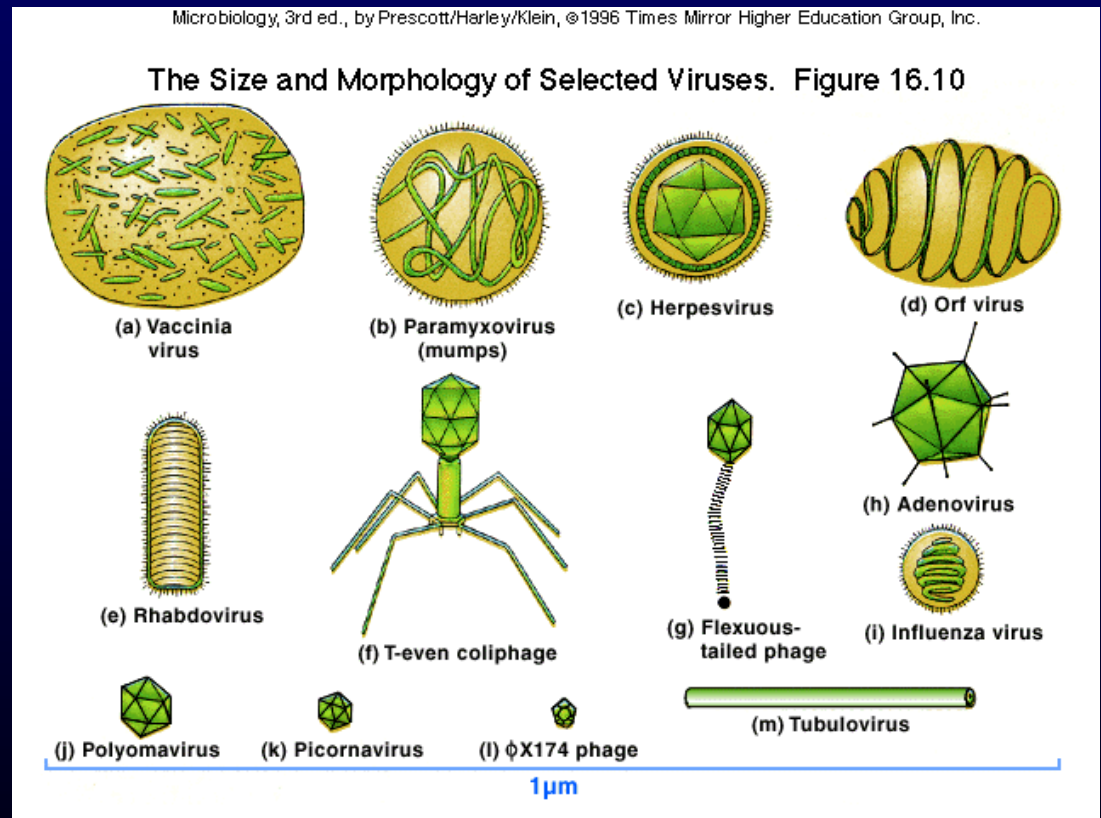
- Infect all living things
- Tissue & host specific
 - cell receptors
 - varied specificity
 - HPV
 - CMV
- Primary replication
- Secondary replication
- Viral spread in body
 - cell to cell
 - Proviruses & latency
 - transplacental



Poliomyelitis

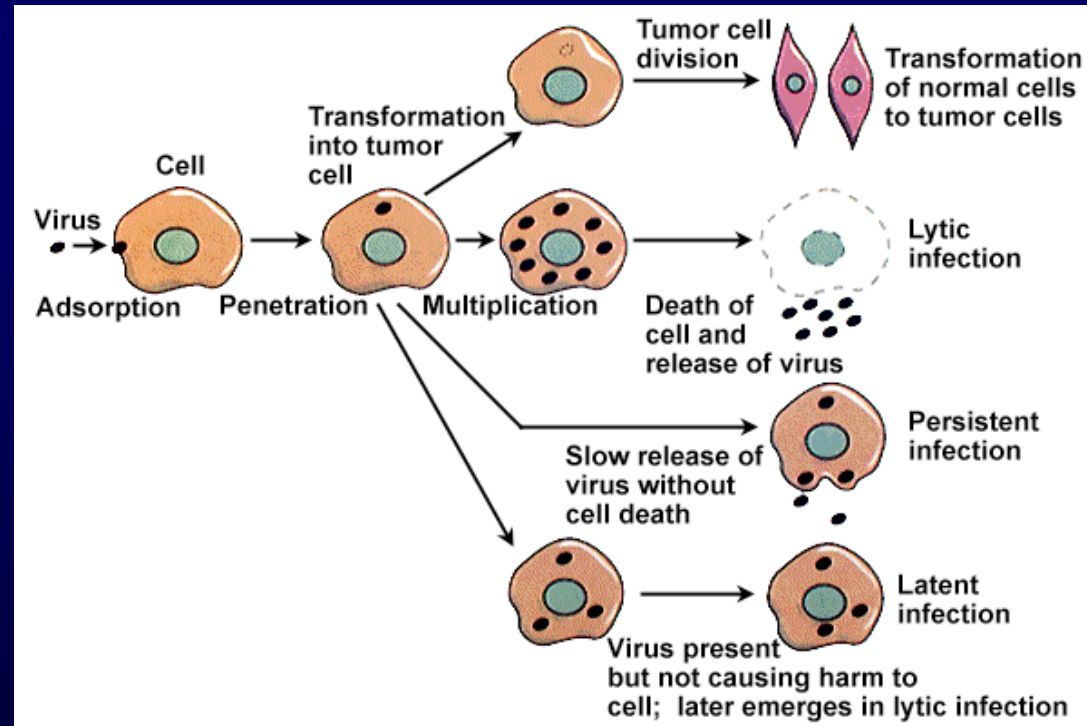
Classification of Viruses

- Type of nucleic acid
 - RNA viruses
 - ssRNA, dsRNA
 - Retroviruses
 - DNA viruses
 - ssDNA, dsDNA

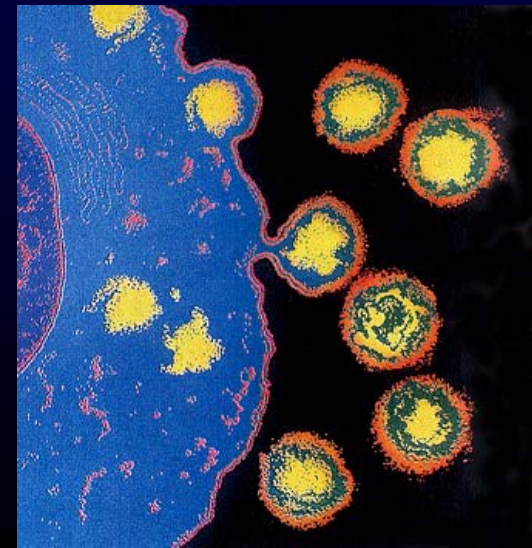


Viral Replication

- Generally 5 stages:
 - Adsorption
 - receptor attachment
 - Penetration
 - endocytosis, fusion
 - Synthesis
 - control of cell functions
 - Maturation
 - assembly of new virions
 - Release
 - cell lysis
 - budding
 - Kills or alters cells
 - transformation



Viruses budding from cell



Pathogenesis of Viral Infections

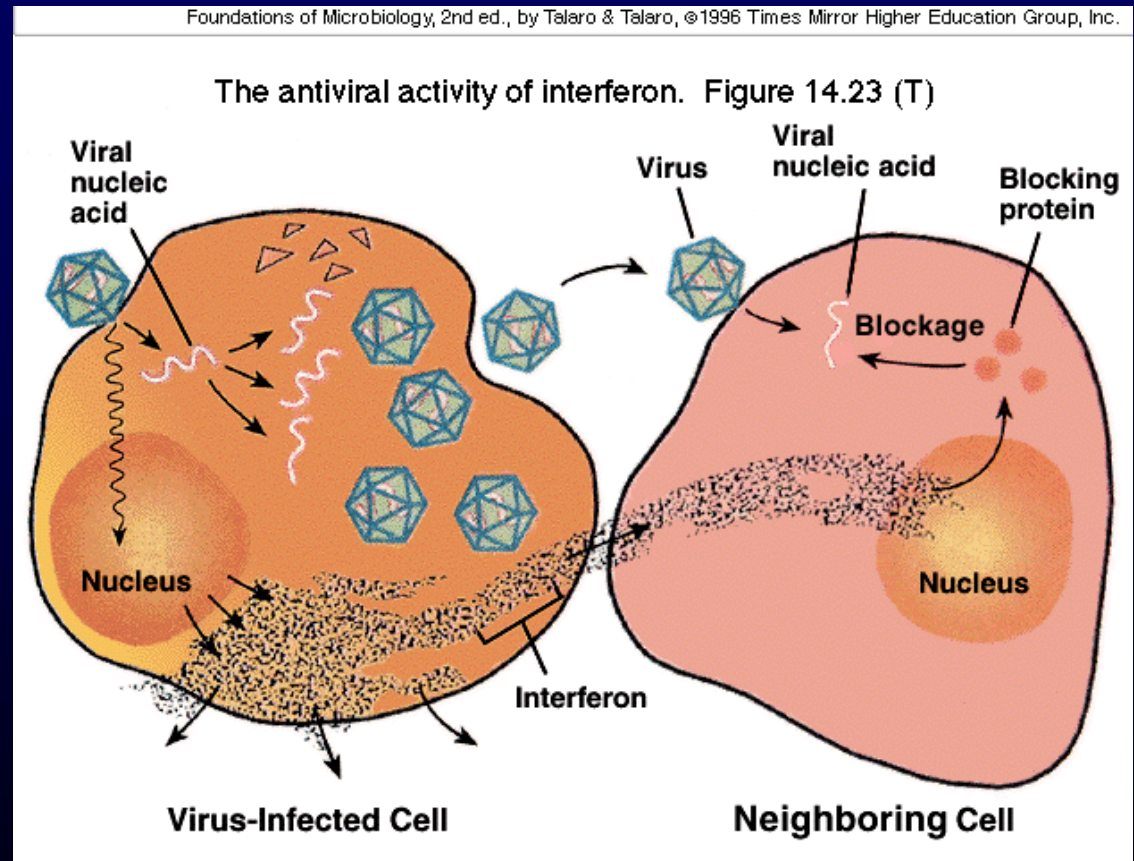
- Nature of host
 - age, in utero, etc
- Mode of entry
 - mucus membranes
 - *why not skin?*
 - Respiratory, GI, sexual
 - Arbovirus injection
 - Transplacental
- No toxins
 - cell death & alterations
 - teratogens
 - transformations
 - 6 known cancer viruses



Burkitt's Lymphoma

Responses to Viral Infections

- Host responses:
 - Interferons
 - promotes immunity
- Viral responses
 - syncytial bridges
 - neural transmission
 - latency
 - proviruses



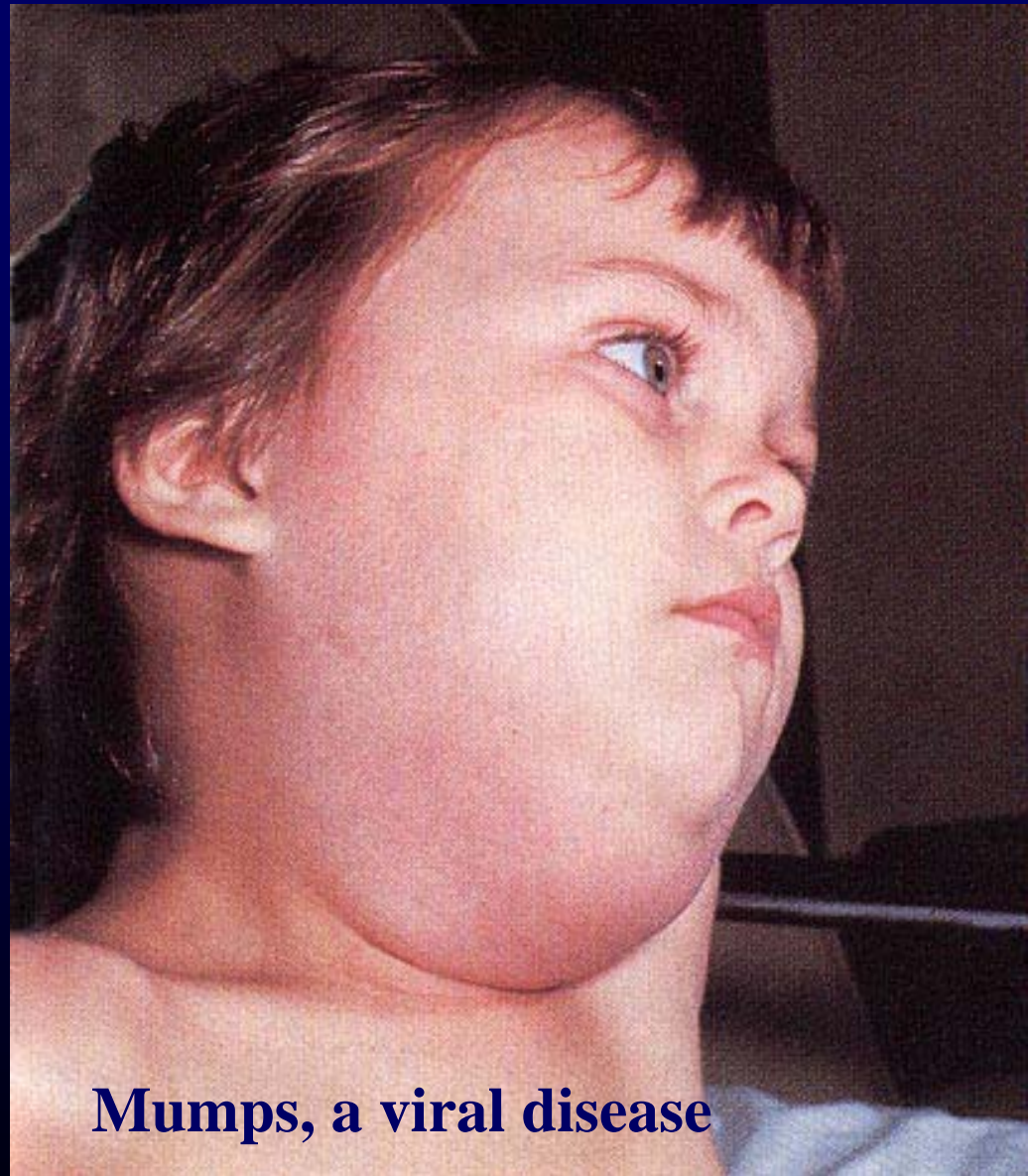
Interferon and virus infections

Some Important RNA Viruses

- Picornaviruses
 - enteroviruses
 - hepatoviruses
 - rhinoviruses
- Togaviruses
 - encephalitides
 - rubella
- Flaviviruses
 - yellow fever
 - Hepatitis C
- Retroviruses
 - transforming (HTLVs)
 - cytopathic (HIV)
- Paramyxoviruses
 - mumps, measles, viral pneumonia
- Rhabdoviruses
 - rabies
- Orthomyxoviruses
 - Influenza A & B
- Filovirus
 - Ebola & Marburg
- Bunyaviruses
 - Hantavirus
- Reoviruses
 - rotaviruses

Some Important DNA Viruses

- Adenoviruses
 - 80 different types
- Herpes viruses
 - proviruses
 - varicella/zoster, etc.
- Poxviruses
 - small pox, et al.
- Papovaviruses
 - polyoma, papilloma
- Hepadnaviruses
 - Hepatitis B



Mumps, a viral disease