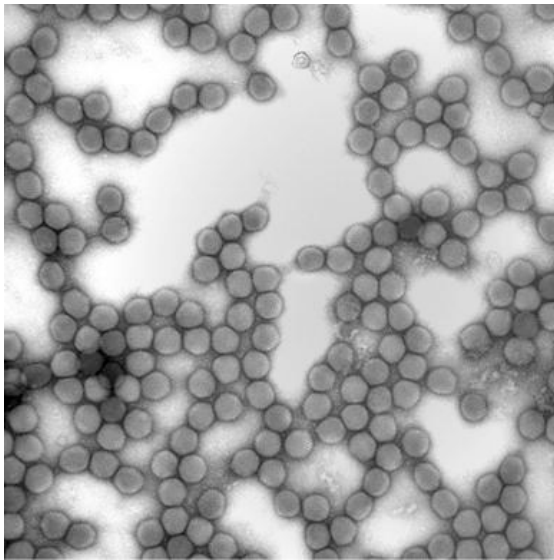


# Introduction to Virology

# What is a virus?

- viral particle (aka virion; show some photos)
  - nucleic acid
  - protein coat
  - (envelope)
- can only replicate in a living cell



**adenovirus**



**influenza A virus**

# Viral genome

- DNA or RNA
- single- or double-stranded
- single segment or multi-segmented

# Viral structural proteins

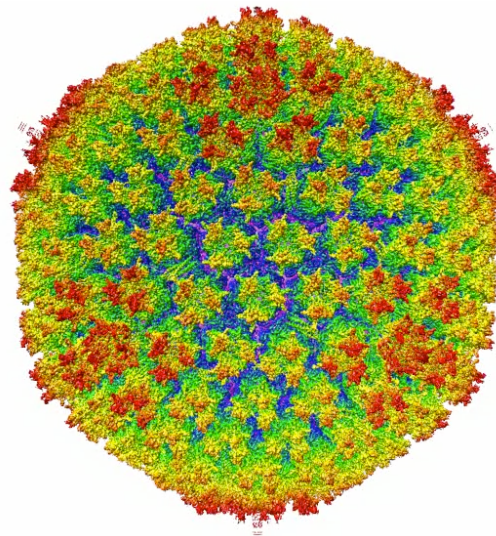
- histone-like proteins that coat the genome
- proteins involved in binding and entry into cells
- proteins that are required to begin genome replication

# Terminology

- core: genome plus histone-like proteins
- capsid: structural proteins that give virus its characteristic shape
- nucleocapsid: core plus capsid
- envelope: lipid bilayer derived from host cell that surrounds the nucleocapsid

# Capsids

- usually symmetric
- metastable structures
  - stable enough to persist outside cell
  - unstable enough to disassemble upon infection of new cell



# Virus classification

- complicated
  - type of genome
  - morphology
  - replication mechanism
- viruses in the same family can cause widely different diseases



# Viral life cycle

- bacteria grow and divide
- viruses synthesize parts and assemble

# Virus life cycle

- binding and entry
- protein and genome synthesis
- assembly
- egress
- (will have a figure to illustrate this)

# Cellular outcomes

- lytic replication
- persistence/latency
- abortive infection
- oncogenic transformation

# Pathology of infection - 1

- direct effects of virus
  - inhibition of host protein synthesis
  - apoptosis
  - cell lysis

# Pathology of infection - 2

- indirect effects due to immune response
  - cytokine effects
  - cell-mediated immunity
  - antibody-mediated pathologies

# Immune response

- innate
  - humoral
  - cytokines
  - cell-mediated
- 
- viral evasion

# Host outcomes

- local replication and clearance
- viremia
- persistent infection
  - latency
  - chronic infection
- oncogenesis
- systemic disease

# Transmission

- major routes
  - respiratory
  - sexual
  - fecal-oral
  - parenteral
  - insect vectors



# Diagnostic tests

- serology
- PCR
- cell culture-based assays
- ELISA