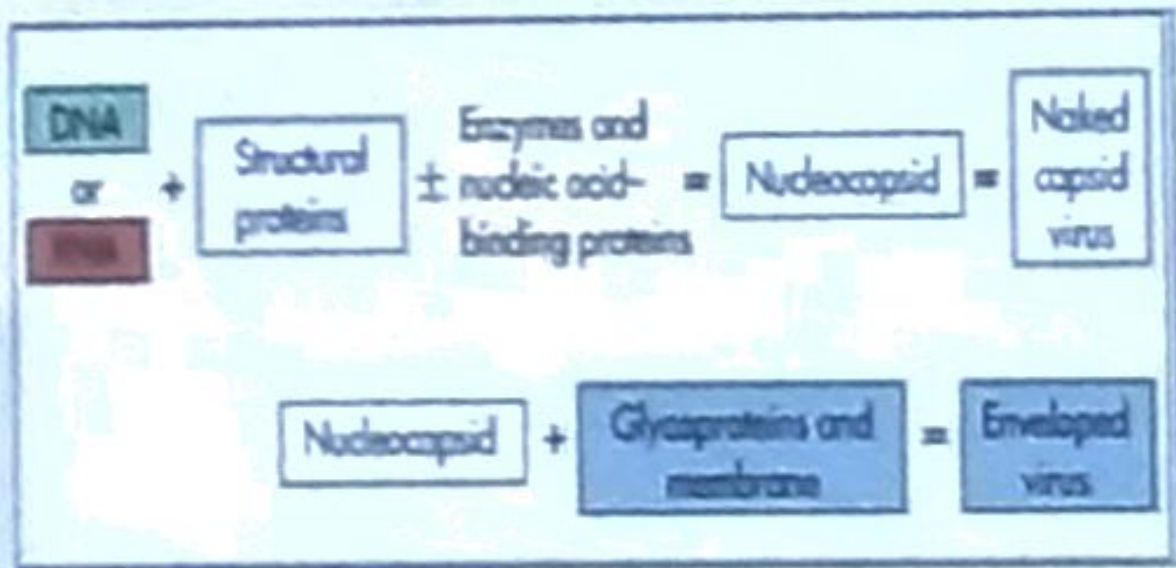
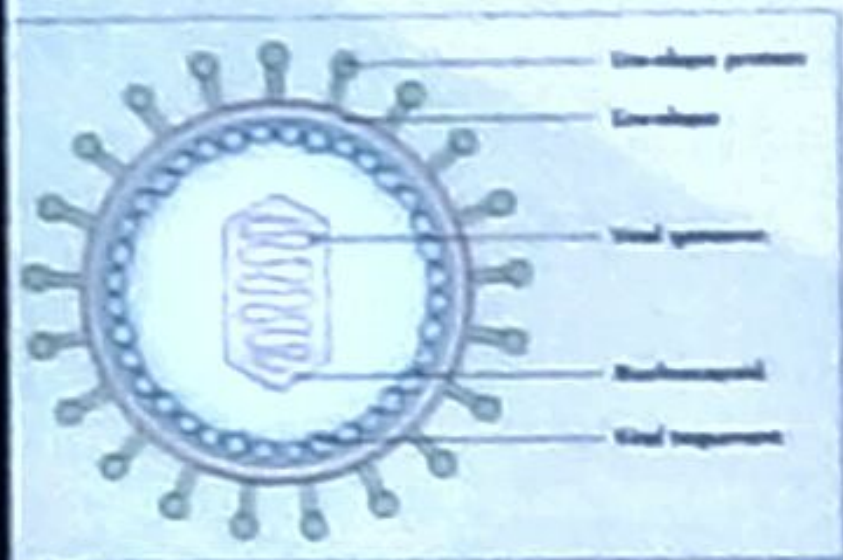


What are Viruses?

A virus is an obligate intracellular parasite containing genetic material surrounded by protein.

- They are none living organisms.
- They cannot produce energy or synthesize proteins independently, the host cell machinery is needed

Components of the virus



Differences between enveloped and naked viruses

Properties	Enveloped viruses	Naked viruses
Environmental stability	Are labile and destroyed by acids, detergents, drying.	Stable to temperature, acids, proteases, disinfectants and drying
Release from cells	Are released by budding and cell lysis	released from cell by lysis
Spread to hosts	Spreads in large droplets, secretions, transplanted organs, blood transfusion	Spread easily (by direct contact, and with dust, by small air droplets)
Stability outside cells	Must stay wet	Can dry out but retain infectivity
Effective immune response	May need antibody and cell mediated immunity for protection.	Antibodies may be sufficient for immunoprotection

Differences between bacteria and viruses

Viruses

- Obligate intracellular parasites
- No ribosomes
- DNA or RNA, not both
- Seen by EM
- 10-100s of genes
- Tangled phylogeny

Bacteria

- Usually free-living, but can be parasites
- Ribosomes
- DNA and RNA
- seen by Light Microscope
- 100s-1000s of genes
- Natural phylogeny

Classification of animal viruses

1. Traditional taxonomic approach

- Classification based on Taxonomy

System of Order, Family, Subfamily, Genus,

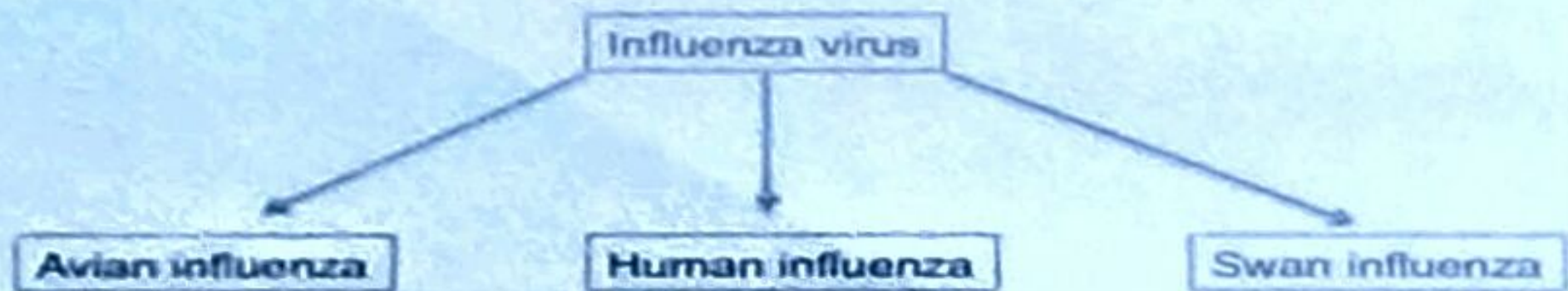
Species

- Order—virales = herpesvirales
- Family—viridae = herpesviridae
- Genera—virus = alpha-herpesviruses

Classification based on disease or Target organ.

- Respiratory viruses
- Central nervous systems viruses
- Gastrointestinal viruses
- Hepatitis viruses

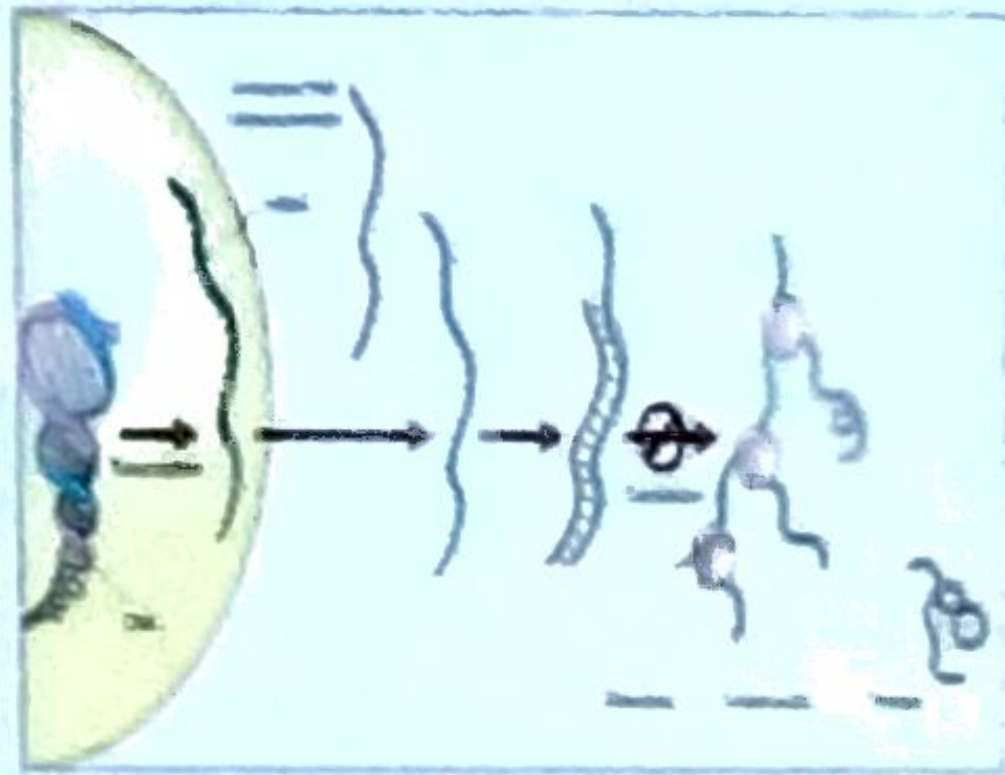
Classification based on the host range(avian flu)



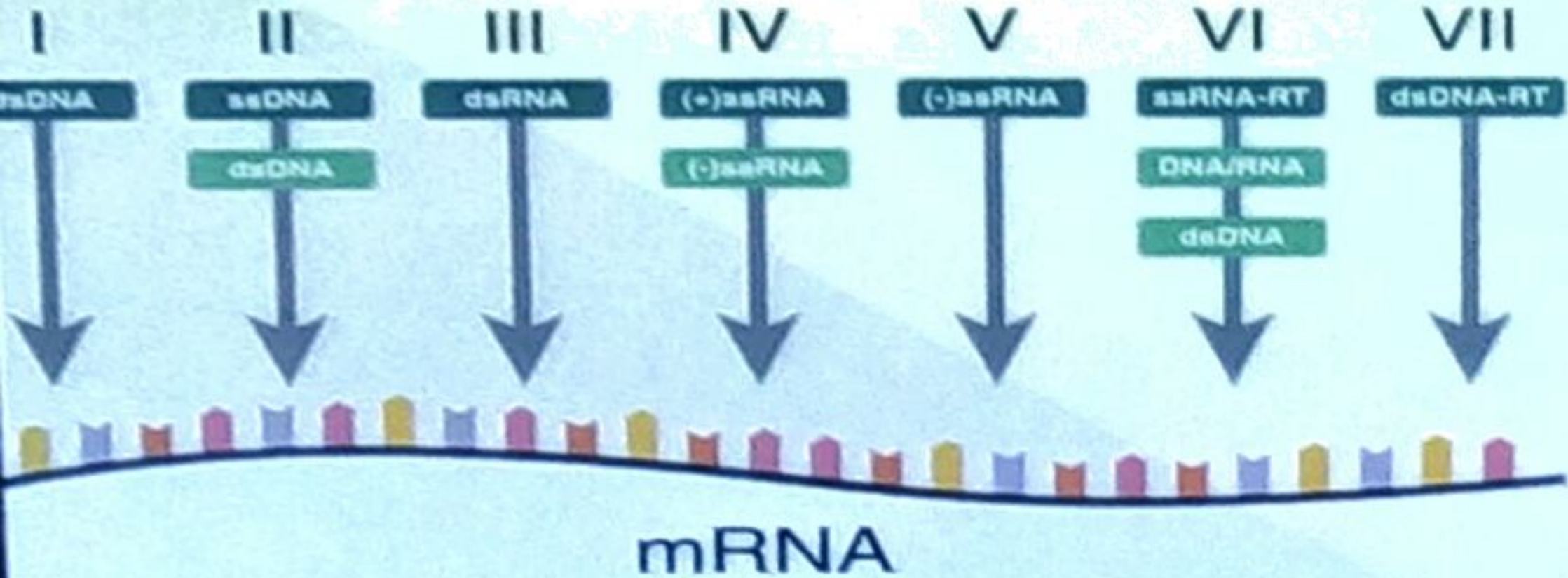
Baltimore classification of viruses

Classification based on relationship of viral genome to its mRNA.

Virus genomes [dsDNA, ssDNA, dsRNA, ssRNA(+/-)].



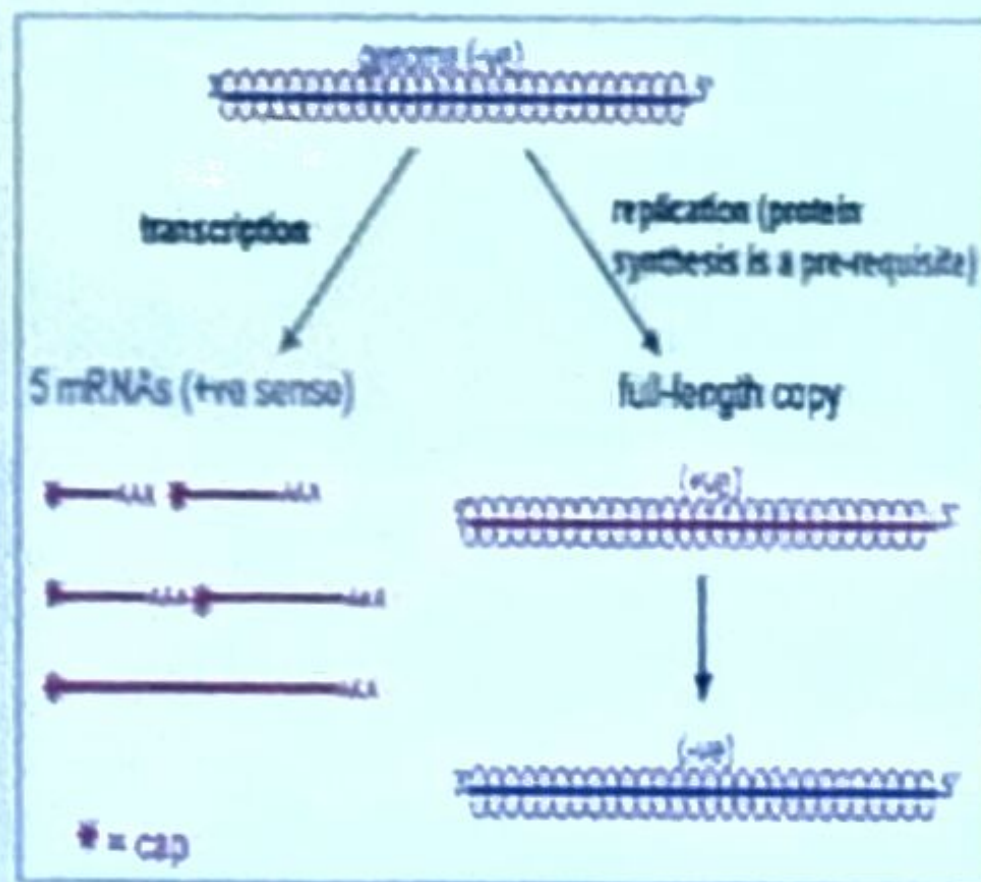
Class



mRNA and virus replication

Virus with ss-RNA with the same orientation as its mRNA – positive-strand RNA virus

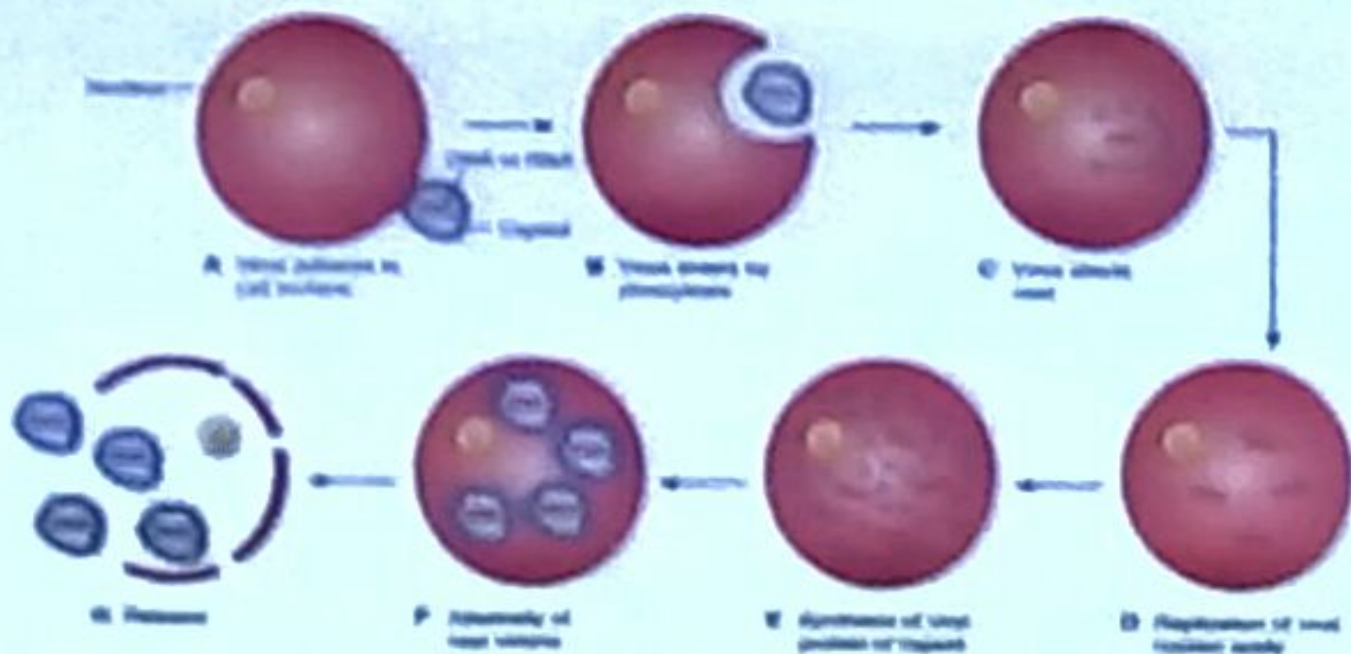
Virus with ss-RNA genome complementary to its mRNA – negative-strand RNA virus.



Replication of viruses

1. Attachment
2. Penetration
3. Uncoating
4. Transcription
5. Translation
6. Assembly
7. Release

Stages of Virus Replication



Transmission of viral diseases

Airborne transmission:

Examples – viruses shed from the upper respiratory tract (common cold, influenza); viruses shed from skin lesions (eg chicken pox, herpes viruses).

Faecal-oral transmission:

viruses shed in the faeces transmitted by contaminated water or food : e.g. Hepatitis A, rotavirus, enteroviruses (eg polio).

3. Body fluids transmission:

Viruses transmitted in blood or other body fluids. E.g Hepatitis B and C; HIV;

4. Vector transmission:

- o Viruses carried by insects and arthropods.
arboviruses (arthropod borne viruses).

VIRAL PATHOGENESIS

- Viral pathogenesis deals with the interaction between a virus and its host.
- Included within the scope of pathogenesis are the stepwise progression of infection from virus entry through dissemination to shedding, the defensive responses of the host and the mechanisms of virus clearance or persistence.
- Pathogenesis also encompasses the disease processes that result from infection, variations in viral pathogenicity and the genetic basis of host resistance to infection or disease.

EFFECT OF VIRUSES ON HOST CELLS

