BHARATHIDASAN UNIVERSITY

Tiruchirappalli-620024 Tamil Nadu, India

Programme: M.Sc., Biomedical Science

Course Title : Medical Virology

Course Code : BM59C19MV

Unit-III

Paramyxo Virus

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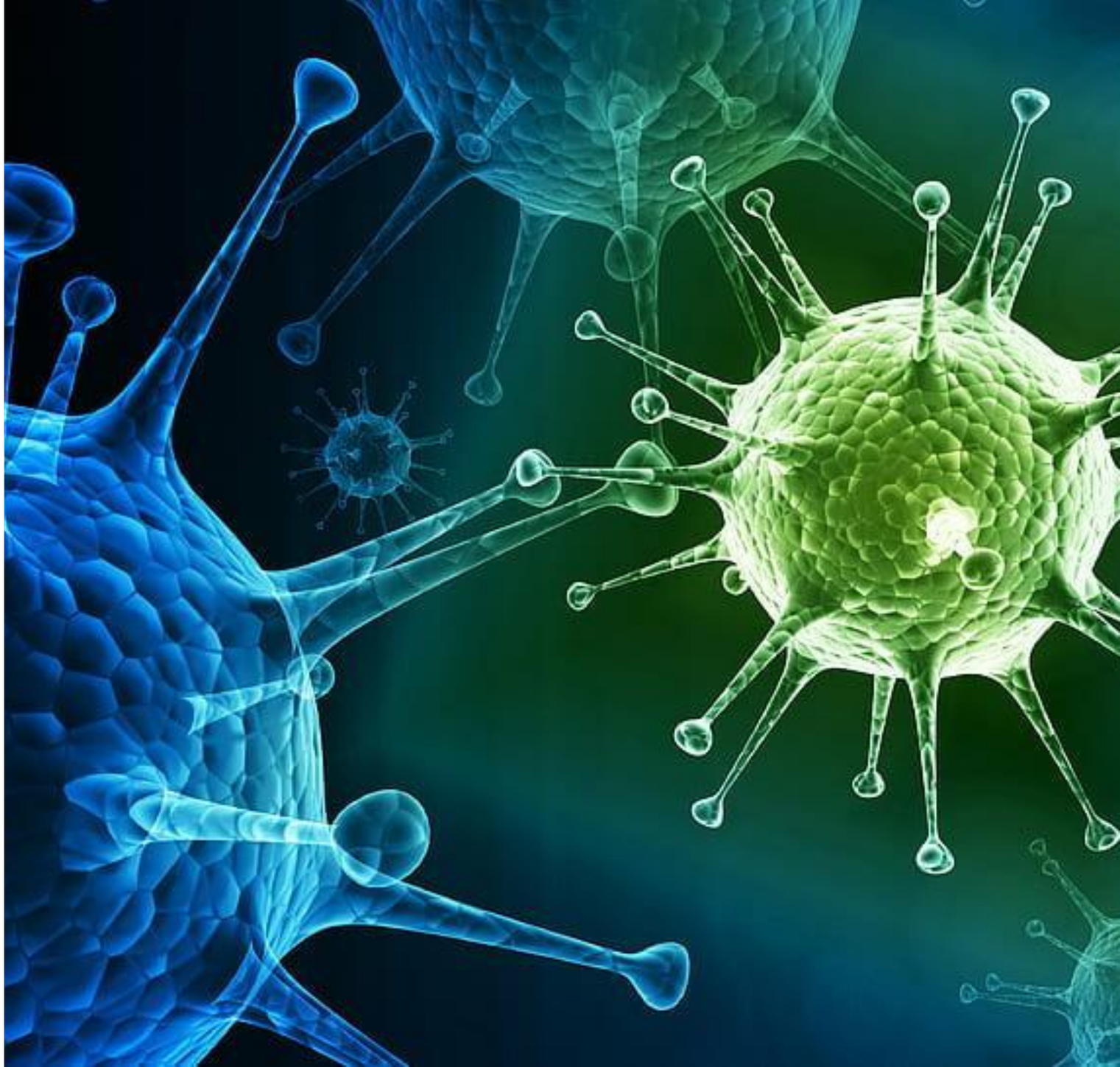
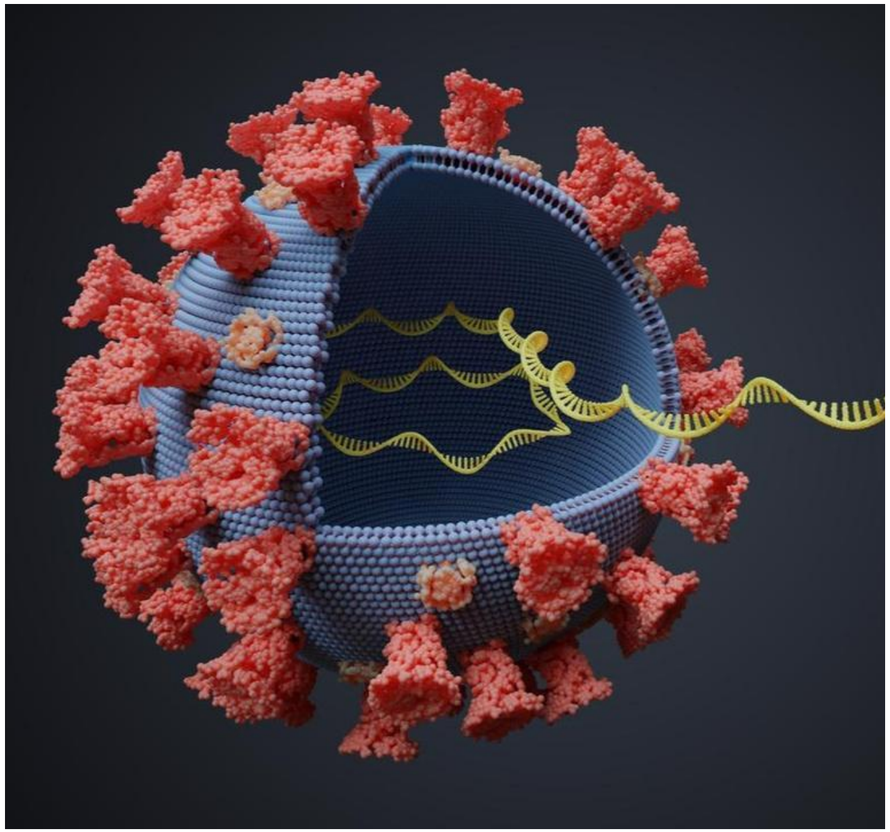
RNA VIRUS:

Paramyxo virus

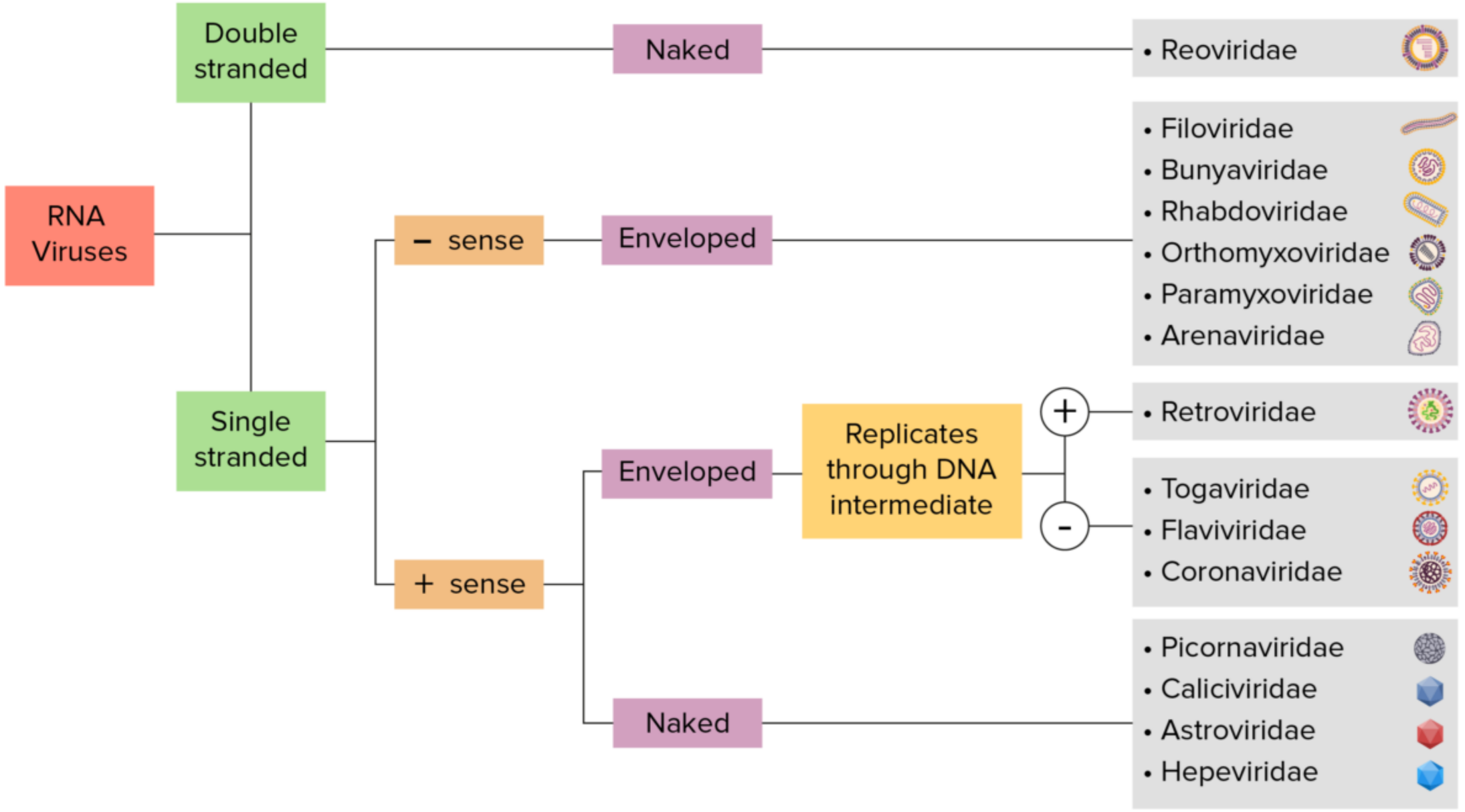


RNA VIRUS..

- An RNA virus is a virus—other than a retrovirus—that has ribonucleic acid (RNA) as its genetic material.[1] The nucleic acid is usually single-stranded RNA (ssRNA) but it may be double-stranded (dsRNA).[2] Notable human diseases caused by RNA viruses include the common cold, influenza, SARS, MERS, COVID-19, Dengue virus, hepatitis C, hepatitis E, West Nile fever, Ebola virus disease, rabies, polio, mumps, and measles.



Classification



Positive strand RNA virus

- RNA viruses can be subdivided into groups based on type of RNA that serves as the genome. Positive or plus (+)-strand RNA viruses have genomes that are functional mRNA.

- The first synthetic event in the replication cycle is protein synthesis.

- Families include: Picornaviridae, Flaviviridae, Togaviridae, Hepeviridae, Coronaviridae, Arteriviridae, Toroviridae, among many others..

Negative strand RNA virus

- There are three additional groups of RNA viruses whose genomes are not mRNAs. They are the negative or minus (–)-strand RNA viruses, the closely related ambisense RNA viruses, and double-stranded RNA.

- Families of negative-strand RNA viruses include Orthomyxoviridae, Paramyxoviridae, Rhabdoviridae, Bornaviridae, and Filoviridae..

Paramyxovirus

In 2001, van den Hoogen et al. reported the discovery of a new paramyxovirus identified in children with respiratory tract disease

- The Paramyxoviridae is a family of single-stranded RNA viruses known to cause different types of infections in vertebrates.
- Examples of these infections in humans include the measles virus, mumps virus, parainfluenza virus, and respiratory syncytial virus (RSV).

Classification

There are 3 genera in paramyxoviridae family:

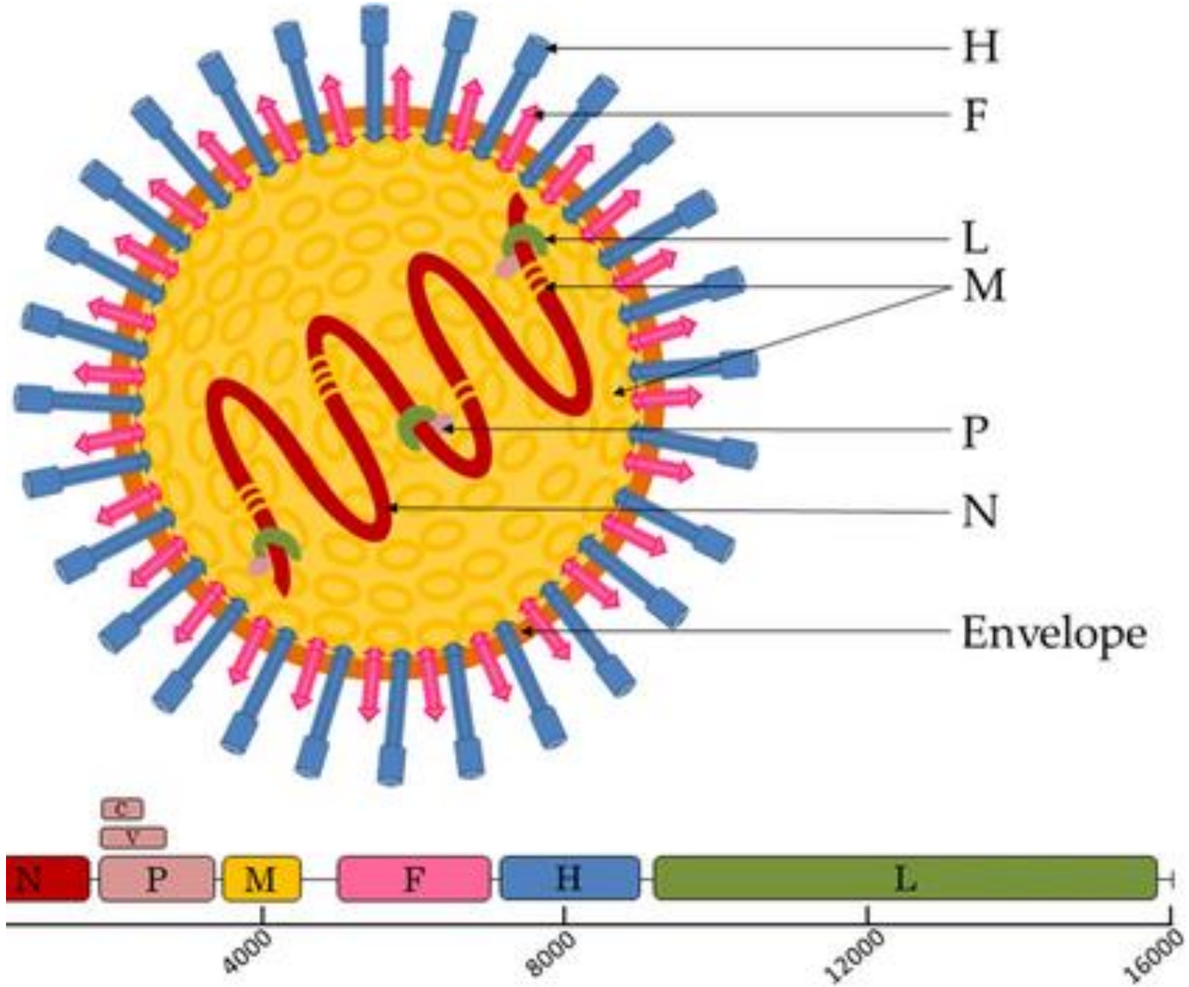
(1) PARAMYXOVIRUS: have both hemagglutinins & neuraminidase on their envelopes, includes Parainfluenza viruses & Mumps virus.

(2) MORBILLIVIRUS: express only hemagglutinins on their envelopes, it include Measles virus.(Rubella).

(3) PNEUMOVIRUS: don't express neither neuraminidase nor hemagglutinins on their envelopes, Respiratory Syncytial virus.

Structure

- Paramyxoviruses consist of negative-sense, single-
stranded ribonucleic acid (RNA) (5 to 8×106 Da) in
a helical nucleocapsid surrounded by a pleomorphic
envelope of approximately 156 to 300 nm .
- They are similar in many respects to orthomyxovirus but are larger and do not have the segmented
genome of the influenza viruses.



MEASLES VIRUS

- Measles is one of the five classic childhood exanthems,
along with rubella, roseola, fifth disease, and chickenpox.

- Measles causes a red, blotchy rash that usually appears first on the face and behind the ears, then spreads downward to the chest and back and finally to the feet.

Measles-Mumps-Rubella (MMR) Vaccine

COMPOSITION: Live attenuated viruses

MEASLES: Schwartz or Moraten substrains of Edmonston B strain

MUMPS: Jeryl Lynn strain

RUBELLA: RA/27-3 strain

VACCINATION SCHEDULE: At age 15-24 months and at age 4-6 years or before junior high school (12 years of age)

EFFICIENCY: 95% lifelong immunization with a single dose

EPIDEMIOLOGY

DISEASE/VIRAL FACTORS

- Virus has large enveloped virion that is easily inactivated by dryness and acid.
- Contagion period precedes symptoms and may occur in absence of symptoms.
- Host range is limited to humans. Reinfection can occur later in life.

TRANSMISSION

- Inhalation of large-droplet aerosols.

WHO IS AT RISK?

- Children: At risk for mild disease or croup.

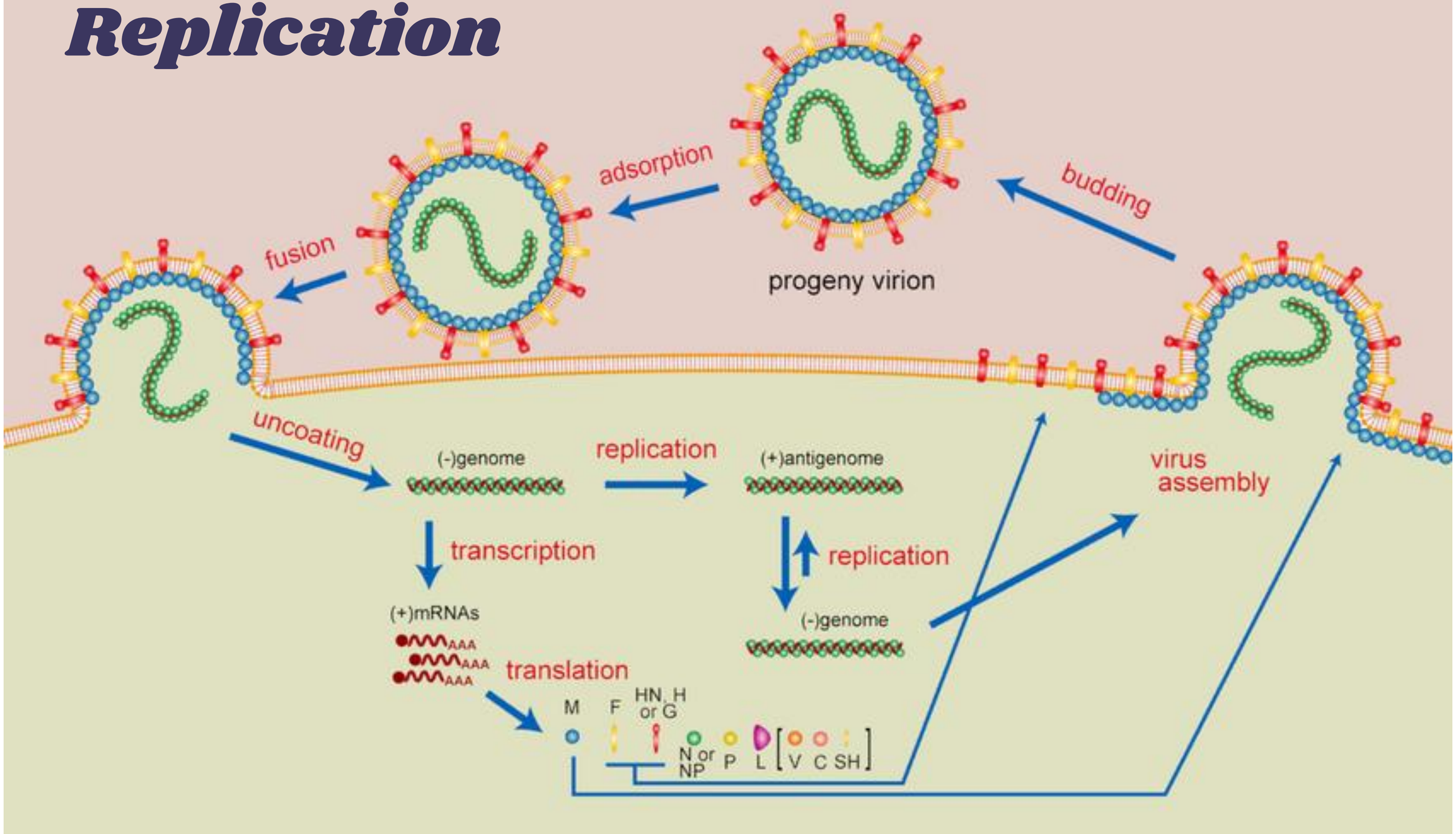
Adults: At risk for reinfection with milder symptoms.

GEOGRAPHY/SEASON

- Virus is ubiquitous and worldwide.

Incidence is seasonal.

Replication

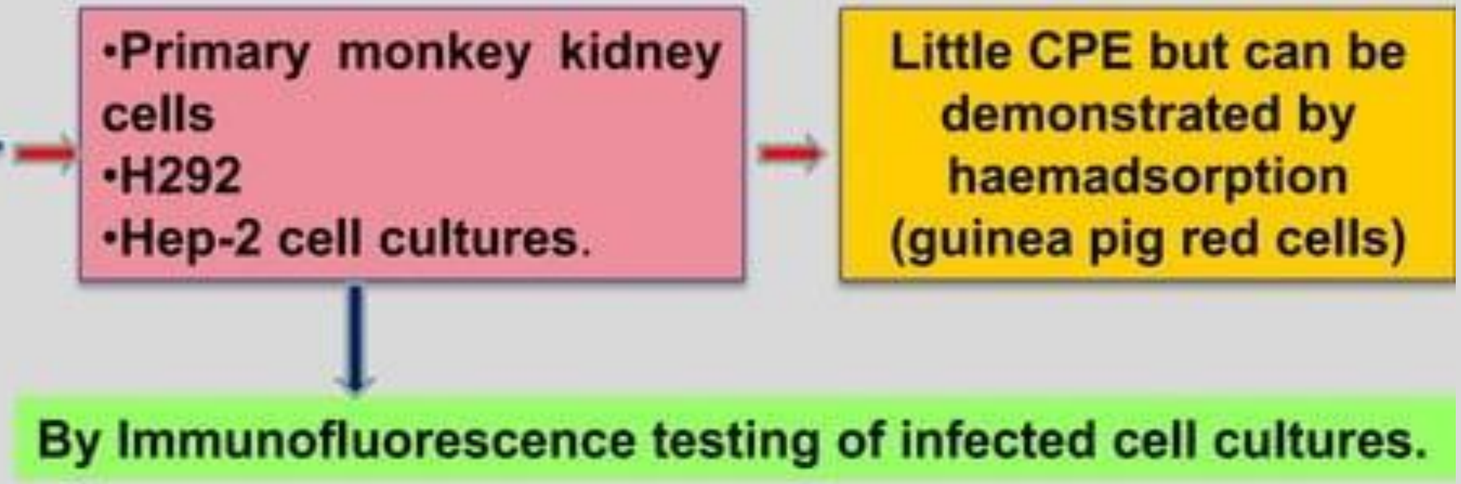


PATHOGENESIS

- Transmission of this virus primarily by droplet infection through the URT,IP.~2 weeks.
- Rubella virus replicate in the cervical L.N.leads to viremia, this occurred ~7-14 days after exposure & is followed by a rash that lasts 2-3 days.
- The virus may be found in the urine & feces during viremic phase.
- The disease characterized by 3 days rash with generalized lymphadenopathy,& following the rash there is transient arthritis and joint pain.

Diagnosis

- **Direct demonstration**
  - Immunofluorescence → secretions of throat and saliva → demonstration of viruses.
- **Isolation**
  - Virus isolated from
    - Saliva
    - Throat swab
    - CSF
    - Urine



- **Serology**
  - IgM Ab
  - ELISA
- **PCR**

Treatment & prevention

- Aerolised ribavirin can be used for infants with severe infection,and for those at risk of severe disease.
- There's no vaccine available.
- RSV immunoglobulin can be used to protect infants at risk of severe RSV disease.

REFERENCES

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THANK YOU!