

VIRUS FAMILY: **PARAMYXOVIRIDAE**

I. DISTINGUISHING CHARACTERISTICS

- A. Envelope, Pleomorphic, Negative-stranded RNA; polymerase in the virion; Non-segmented genome (like Rhabdoviridae & Filoviridae) - The **Mononegavirales** [The term **myxo** (Greek, myxa: "mucous") Indicates the affinity Orthomyxoviruses and Paramyxoviruses have for mucopolysaccharides and glycoprotein (i.e sialic acid) located on the surface of cells receptors.
- B. **Respiroviruses** agglutinate mammalian and avian red blood cells and have a neuraminidase activity. **Morbillivirus** only agglutinate. **Pneumovirus** does neither.

II. STRUCTURE

- A. SIZE: **150 - 350 nm in diameter**
(filamentous np 100-1000 nm long)
- B. ENVELOPE: **YES**, made of lipoprotein; The glycoprotein is associated with the envelope do to the spikes i.e. HN & F
1. GLYCOPROTEINS: Made of **HN 80 kb** (Hemmagglutin & Neuraminidase glycoprotein) and **F 65 kb** (Fusion protein)
 - a. Respirovirus has **F & HN**
 - b. Morbillivirus has **F & H**
 - c. Pneumovirus has **G & F**
 2. OTHER PROTEINS: -Seven major proteins involved in all: (L, G, M, F, PN, P, 24kDa) [-**SH**(small hydrophobic) protein in virion RNA of the simian paramyxovirus **SV5**]
L and P - polymerase activity
 3. MATRIX PROTEIN: Also known as the **Membrane protein is 34kDa**; The Matrix protein lines the inner surface of the envelope.
- C. NUCLEOCAPSID
1. NUCLEIC ACID
 - a. TYPE: RNA BALTIMORE TYPE: V
 - b. STRANDED: **ss**
 - c. POLARITY: - (minus)
 - d. MOL. WT.: **7 MD, 15 kb**
 - e. # GENES: **7 -8**
 - f. Nucleocapsid is a **helix of 18nm** in dia.
 - g. N protein protects RNA against RNase **flexible** and **1000nm** in length.
 2. GENETIC (PHYSICAL) MAP: 15,894b

3' +--- NP -- P/V/C-- M -- F -- G(H) -- L -- 5'
VRNA- []-----[]-----[]-----[]-----[]-----[]-----[]-----[]
(50nt. leader) (polymerase)

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3. CAPSID

- a. SYMMETRY: **Helix**
- b. CAPSOMERS: NP 60kDa
- c. SIZE: 18 nm
- d. Pitch of helix 5-5.7nm
- e. COMPOSITION
 - (1) PROTEINS (ABOVE)
 - (2) OTHER COMPONENTS Virions contain .5% nucleic acid. Virions contain one molecule of linear mostly negative-sense, or positive-sense (template strands)

III. CLASSIFICATION AND CHARACTERISTIC MEMBERS

<u>GENERA</u>	<u>PROPERTIES</u>	<u>MEMBERS</u>
RESPIROVIRUS		PIV
MORBILLIVIRUS		MeV
RUBULAVIRUS		APMV-1, 2, ...
PNEUMOVIRUS		RSV, PVM

(SEE FOLLOWING CHART FROM)

<http://www.iah.bbsrc.uk/virus/Paramyxoviridae/taxon.htm>

Family: Paramyxoviridae

Subfamily: Paramyxovirinae

Genus: Respirivirus

- Species: Bovine parainfluenza virus 3 (BPIV-3)
- Species: Human parainfluenza virus 1 (HPIV-1)
- Species: Human parainfluenza virus 3 (HPIV-3)
- Species: Sendai virus (murine parainfluenzavirus1)
- Species: Simain parainfluenza virus 10 (SPIV-10)

Genus: Morbillivirus

- Species: Canine distemper virus (CDV)
- Species: dolphin distemper virus (DMV)
- Species: measles virus (MeV)
- Species: Peste des petits ruminants virus (PPRV)
- Species: phocine (seal) distemper virus (PDV)
- Species: porpoise distemper virus
- Species: rinderpest virus (RPV)

Genus: Rubulavirus

- Species: Avian paramyxovirus 2 (APMV-2)
- Species: Avian paramyxovirus 3 (APMV-3)
- Species: Avian paramyxovirus 4 (APMV-4)
- Species: Avian paramyxovirus 5 (APMV-5)
- Species: Avian paramyxovirus 6 (APMV-6)
- Species: Avian paramyxovirus 7 (APMV-7)
- Species: Avian paramyxovirus 8 (APMV-8)
- Species: Avian paramyxovirus 9 (APMV-9)
- Species: Human parainfluenza virus 2 (HPIV-2)
- Species: Human parainfluenza virus 4a (HPIV-4a)
- Species: Human parainfluenza virus 4b (HPIV-4b)
- Species: Mumps virus
- Species: Newcastle disease virus (avian paramyxovirus 1 (NDV; APMV-1))

Species: Porcine rubulavirus
Species: Simian parainfluenza virus 5 (SV-5)
Species: Simian parainfluenza virus 41 (SV-41)

Subfamily: Pneumovirinae

Genus: Pnuemovirus

Species: Bovine respiratory syncytial virus (BRSV)
Species: Human respiratory syncytial virus (HRSV)
Species: Pneumonia virus of mice (PVM)

Genus: Unnamed

Species: Turkey rhinotracheitis virus (TRTV)
Unassigned Members of the Family
Fer-de-Lance virus of reptiles (FDLV)
chiropteran Mapuera virus (MPRV)
rodent Nariva virus (NARV)
several viruses from penguins which are distinct
from avian
paramyxoviruses 1-9

IV. VIRAL MULTIPLICATION

- A. ABSORPTION-binds by the spikes which consist of the H protein with along with F protein binds to red blood cells
- B. PENETRATION
- C. UNCOATING
- D. GENE EXPRESSION-is on the negative-sense strand
- E. GENOME REPLICATION-similar to rhabdovirus
- F. ASSEMBLY-require L & NP enzyme action
- G. BUDDING AND/OR RELEASE

V. CLINICAL CORRELATIONS

- A. Standard strain of measles virus
 - 1. Edmonston
 - 2. Philadephia 26
 - 3. Sugiyama
 - 4. Tanabe
- B. measles virus may be a latent virus - associated with SSPE - subacute sclerosing panecephalitis

KEY FACTS ABOUT MEASLES

1. CAUSE

Measles is caused by infection with the measles virus.

2. TRANSMISSION

Measles is the most contagious disease known to man. Measles is spread by respiratory droplets too small to be seen by the human eye. These droplets are inhaled and the virus attaches to the lining of the airways and begins multiplying--causing disease.

3. PREVENTION

Measles can only be prevented by vaccination against the virus. The vaccine is safe and effective. Persons who have severe allergic reactions to chicken eggs, who are immunosuppressed, or who are pregnant or planning a pregnancy should talk with their physician about the vaccine and whether it is safe to receive it.

4. POPULATION

Many Americans are at risk of infection from the measles virus. School children, college students, adolescents, young adults, and health care workers are at particular risk of infection. For these individuals, two doses of vaccine are needed to fully protect against the disease. Unfortunately, the death rate among those who contract measles has risen recently in the United States from one in 1,000 cases to 3.2 in 1,000 cases. This higher death rate in people who contract measles seems to be due to infection of very young children who have not received the vaccine and older children and young adults who have not been fully vaccinated. Complications of measles infection such as inflammation of the brain, middle ear infections, and pneumonia can also result in hospitalization and disability.

5. SYMPTOMS

Measles causes symptoms about 10 days following exposure. Symptoms include high fever, red irritated eyes, runny nose, cough, and a bumpy red rash which usually starts on the head or face and spreads to the trunk and arms.

6. TREATMENT

There is no definitive treatment for measles. Measles can only be prevented by vaccination.

For other clinical information look under:

<http://home.cyberave.com/~hsquare/ndfiles/nd0616.ht>

http://www.babybag.com/articles/cdc_meas.htm