

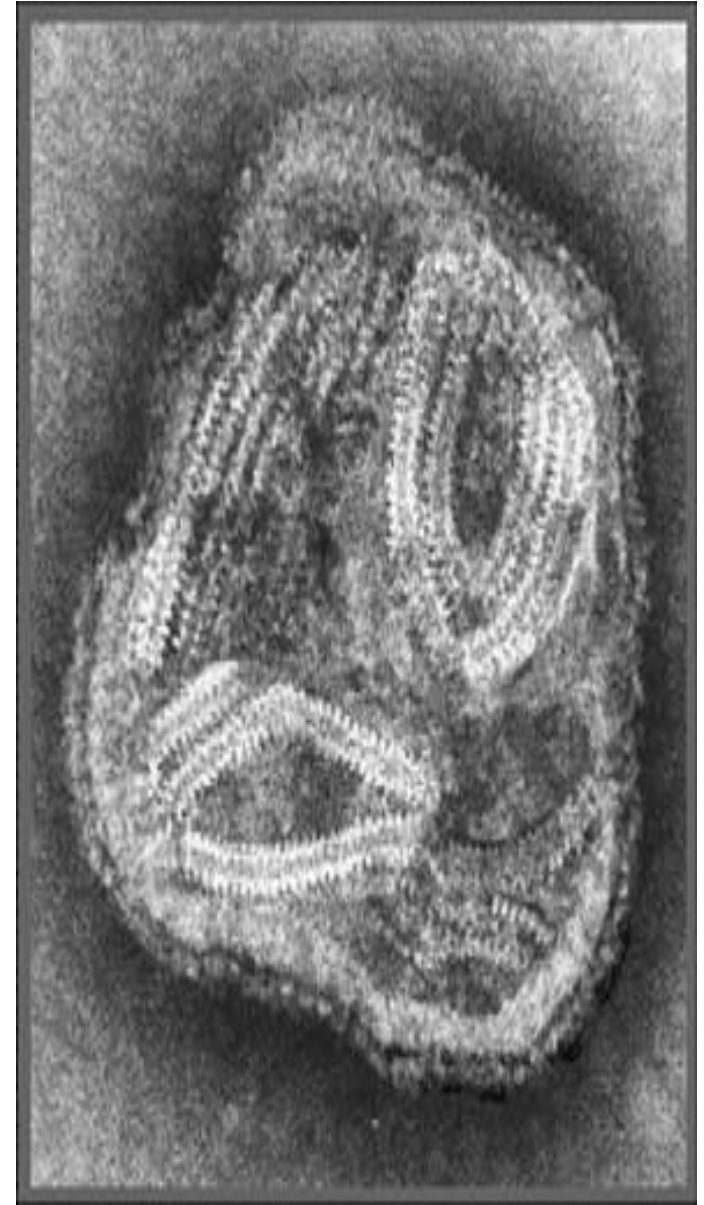
PARAMYXOVIRUS FAMILY

properties of attachment protein

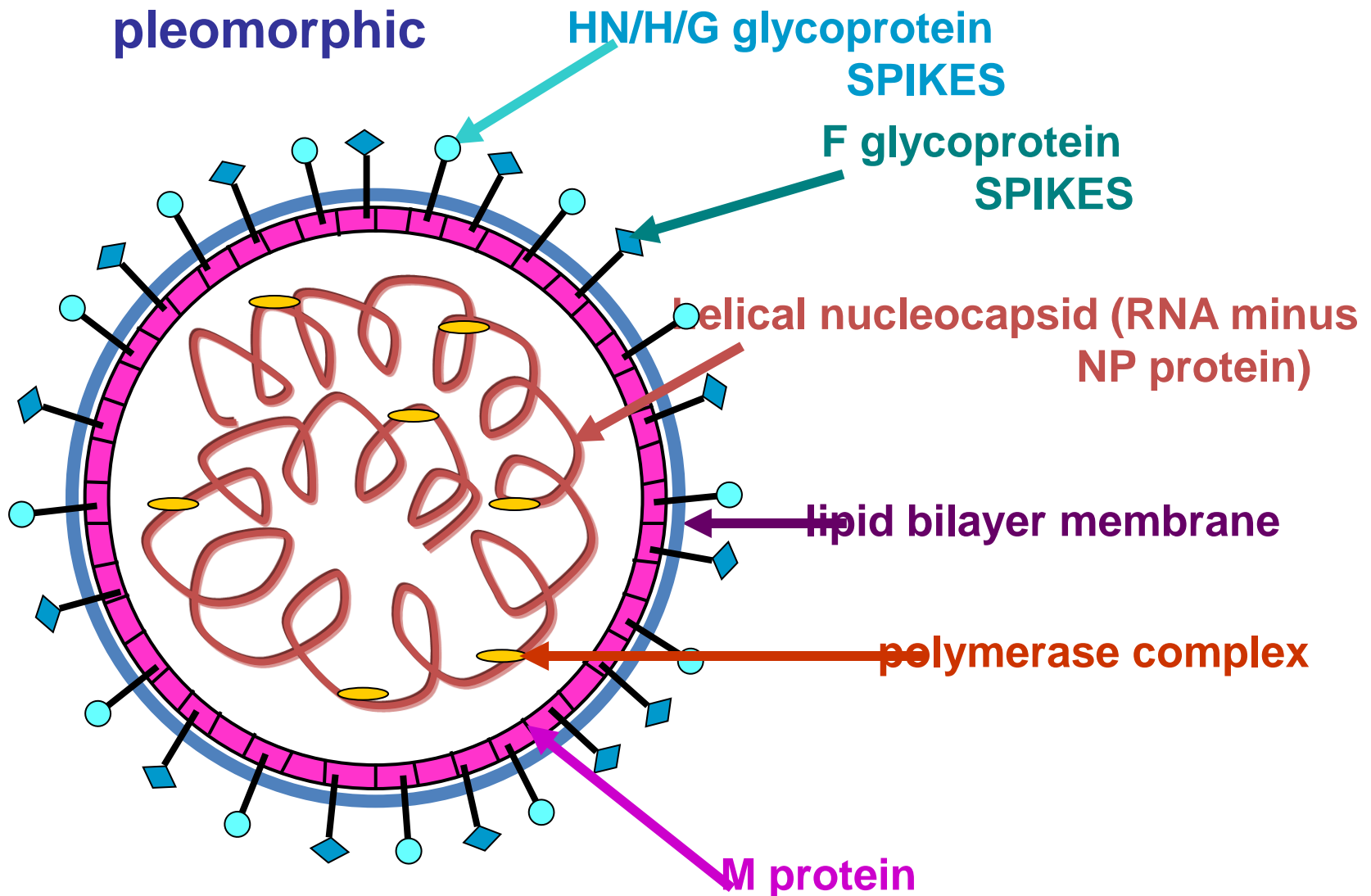
GENUS	GLYCOPROTEINS	TYPICAL MEMBERS
Paramyxovirus genus	HN, F	HPIV1, HPIV3
Rubulavirus Genus	HN, F	HPIV2, HPIV4 mumps virus
Morbillivirus genus	H, F	measles virus
Pneumovirus genus	G, F	respiratory syncytial virus

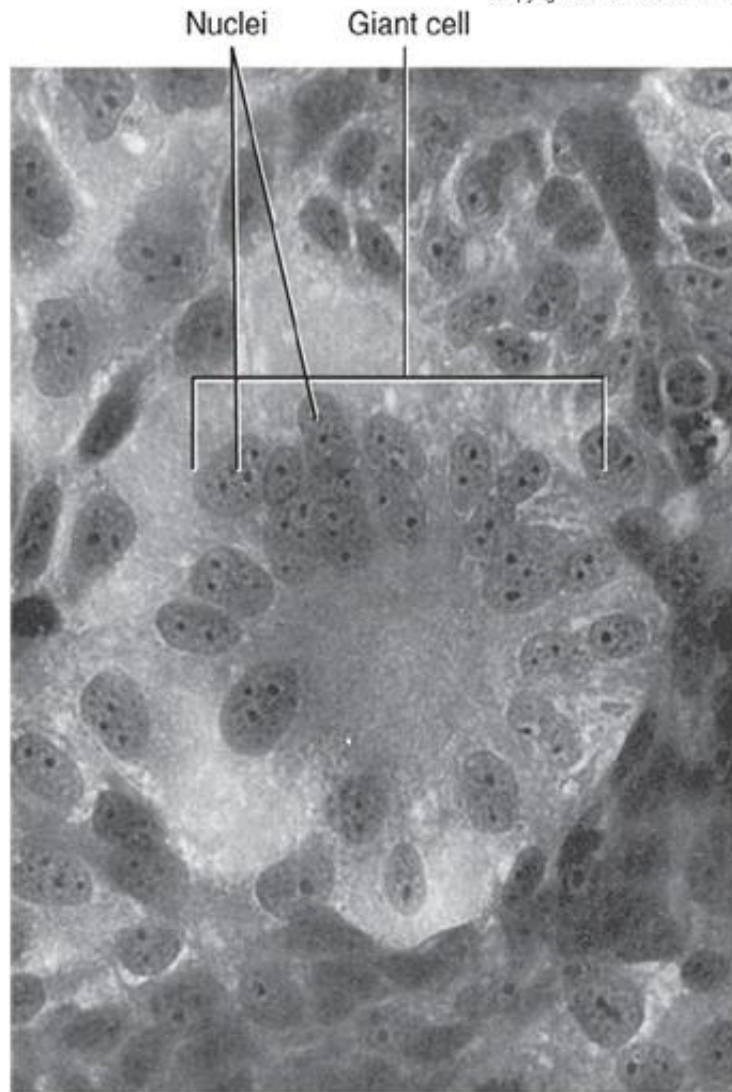
Virion

- Large virion consists of a negative RNA genome in a helical nucleocapsid surrounded by an envelope containing a viral attachment protein
- HN of paramyxovirus and mumps virus has hemagglutinin and neuraminidase.
- H of measles virus has hemagglutinin activity

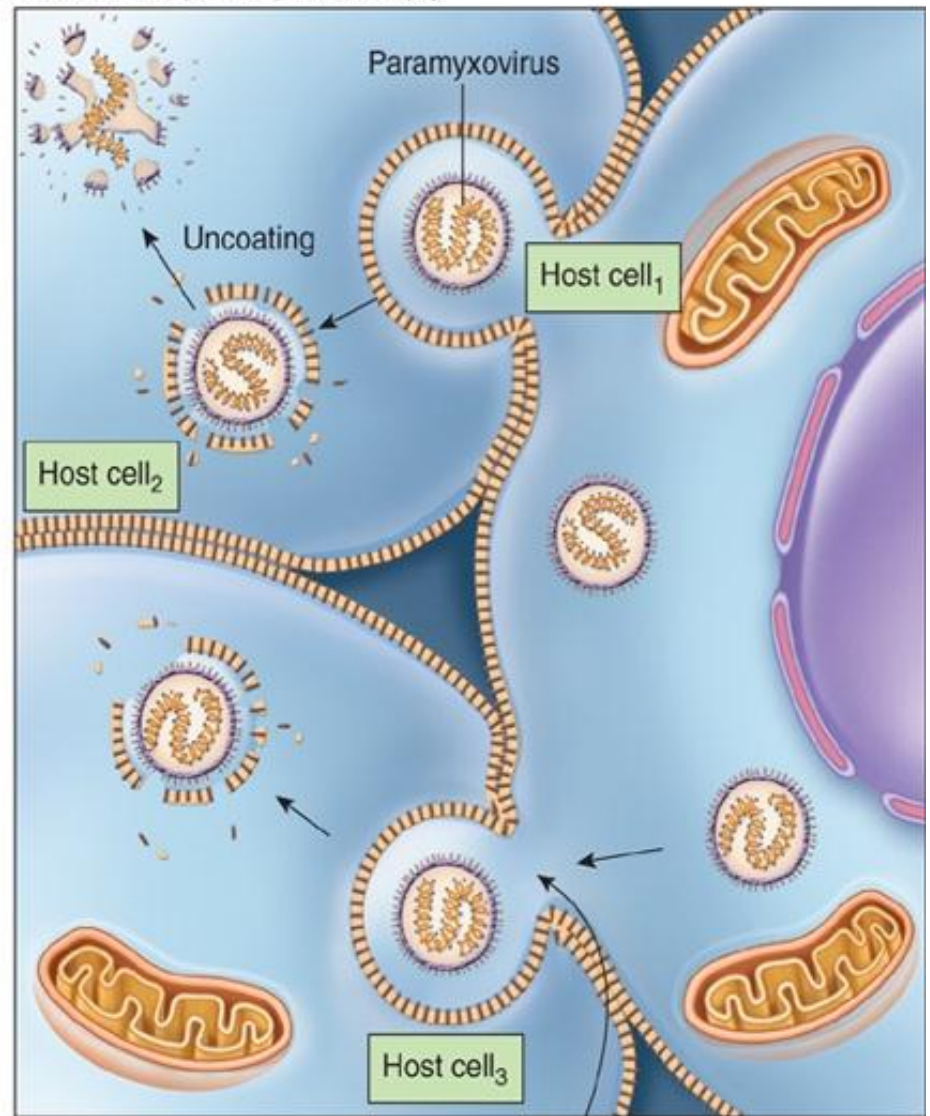


PARAMYXOVIRUSES





(a)



(b)

MUMPS (Epidemic Parotitis)

Mumps is an acute contagious disease characterized by a nonsuppurative enlargement of one or both of the parotid glands, although other organs may also be involved.

Properties of the Virus

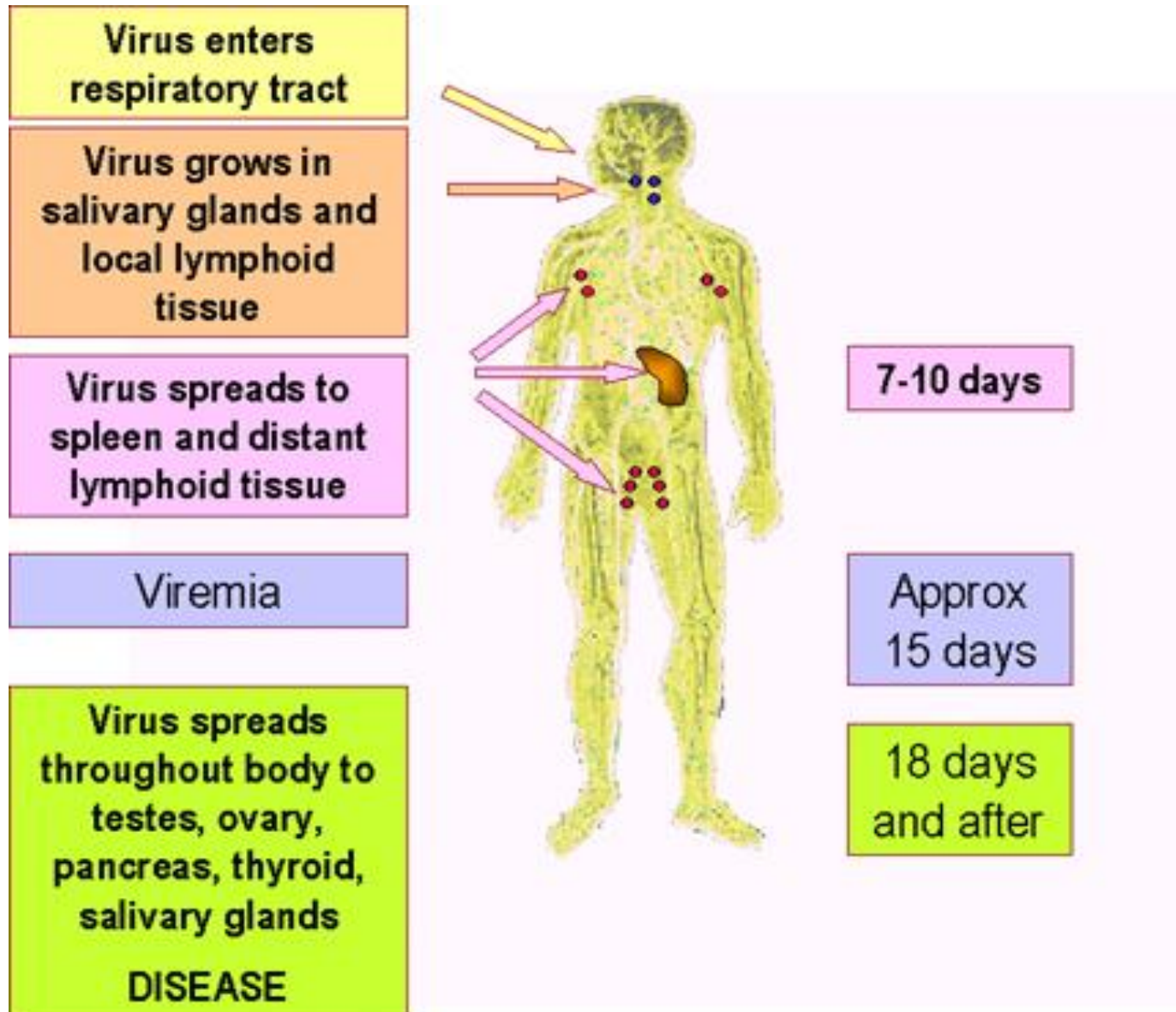
Mumps virus is a typical paramyxovirus.

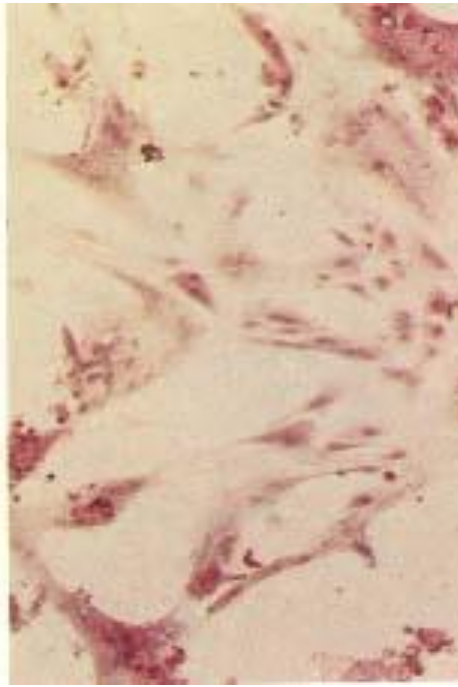
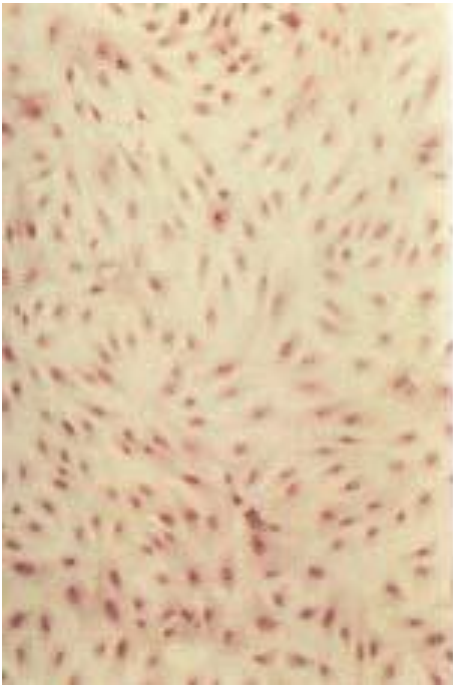
It has typical hemagglutination, neuraminidase, and hemolysin activities. Hemagglutination can be inhibited by specific antisera to mumps virus, and this inhibition can be used to measure antibody responses. Similarly, the nucleocapsid of the virus particle forms the major component of the "S" (soluble) complement-fixing antigen.

Mumps virus

- Droplets spread the infection via saliva and secretions from the respiratory tract.
- Incubation period of 2-3 weeks
- Malaise and fever is followed within a day by painful enlargement of one or both of the parotid (salivary) glands
- A possible complication in males after puberty is **orchitis** - painful swelling of one or both testicles.
- Inflammation of the ovary and pancreas can also occur.
- Disease is usually **self-limiting** within a few days
- Aseptic meningitis (usually resolving without problems) or postexposure encephalitis (can prove fatal) are the most serious complications associated with mumps.

Mumps pathogenesis





Mumps virus
CPE

Orchitis



Epidemic
parotitis

Prevention and treatment

- **Treatment:** none (passive immunization has been used).
- **Prevention:** one invariant serotype therefore vaccines are viable - both formalin-inactivated and live attenuated exist, the latter now being widely used - see MMR.

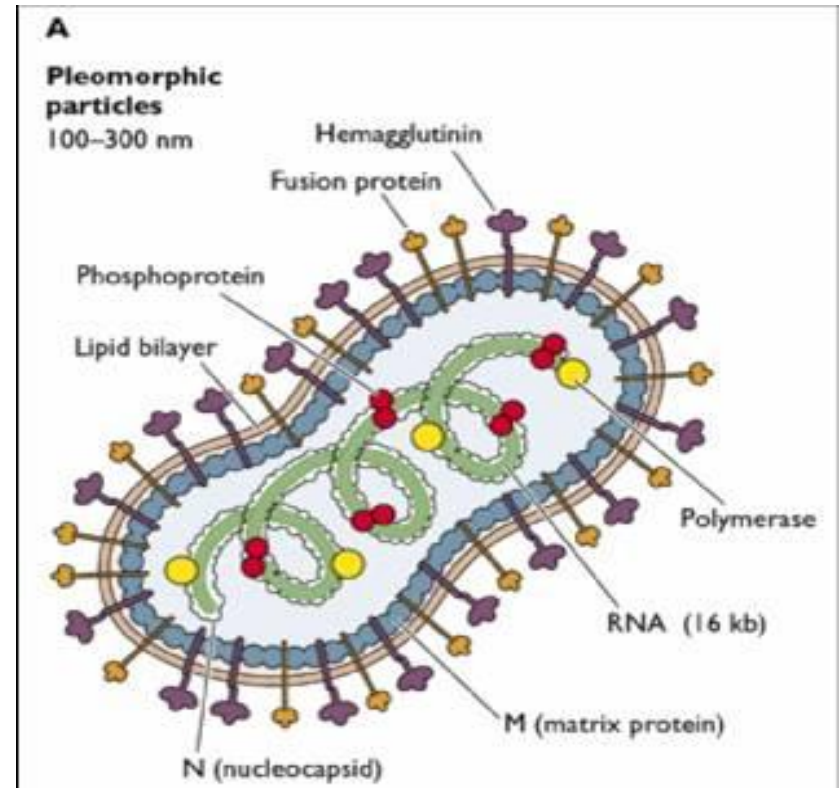
MEASLES (Rubeola)

Measles is an acute, highly infectious disease characterized by a maculopapular rash, fever, and respiratory symptoms.

Properties of the Virus:-

Measles virus is a typical paramyxovirus. They lack neuraminidase activity. Measles agglutinates monkey erythrocytes at 37 °C but does not elute, and it interacts with a distinct cell receptor. Measles virus also causes hemolysis, and this activity can be separated from that of the hemagglutinin.

In culture, produces characteristic ➤ intranuclear inclusion bodies and syncytial giant cells.



Pathogenesis and Immunity

- Childhood infection almost universal, protection resulting from this is probably lifelong. Both man and wild monkeys are commonly infected
- Transmission and initial stages of disease similar to mumps, but this virus can also infect via the eye and multiply in the conjunctivae. Viraemia following primary local multiplication results in widespread distribution to many organs.
- After a 10-12 day incubation period

Disease:

- ✓ Fever,
- ✓ Respiratory tract syndrom (dry cough, rhinorrhea, sore throat)
- ✓ conjunctivitis (virus may be excreted during this phase!), followed a few days later by the characteristic red,
- ✓ **maculopapular rash,**
- ✓ **Koplik's spots**



FIG. 19-17 A, Measles rash on first day in a caucasian child. A transient erythematous rash during the prodromal period may be confused with scarlet fever, but careful inspection of the mouth will usually disclose Koplik spots. The true rash appears behind the ears and along the hairline, quickly affects the face, and spreads progressively from above downward. On the first day of the rash the face is heavily covered but elsewhere the spots are scanty. B, Measles in an African-American child. Measles may be difficult to diagnose in a dark-skinned patient. Koplik spots may be found during the prodromal period.



Measles

- most serious complication is subacute sclerosing panencephalitis, a progressive neurological degeneration of the cerebral cortex, white matter and brain stem
- involves a defective virus spreading through the brain by cell fusion and destroys cells
- leads to coma and death in months or years
- attenuated viral vaccine MMR

**Subacute
sclerosing
panencephalitis**



Prevention

Both live and killed vaccines exist. Vaccination with the live attenuated vaccine has been practised since the 1960's with a dramatic decline in the incidence of the disease. ➤

Trivalent live attenuated vaccine (MMR) usually given - all of these viruses best avoided during pregnancy! ➤

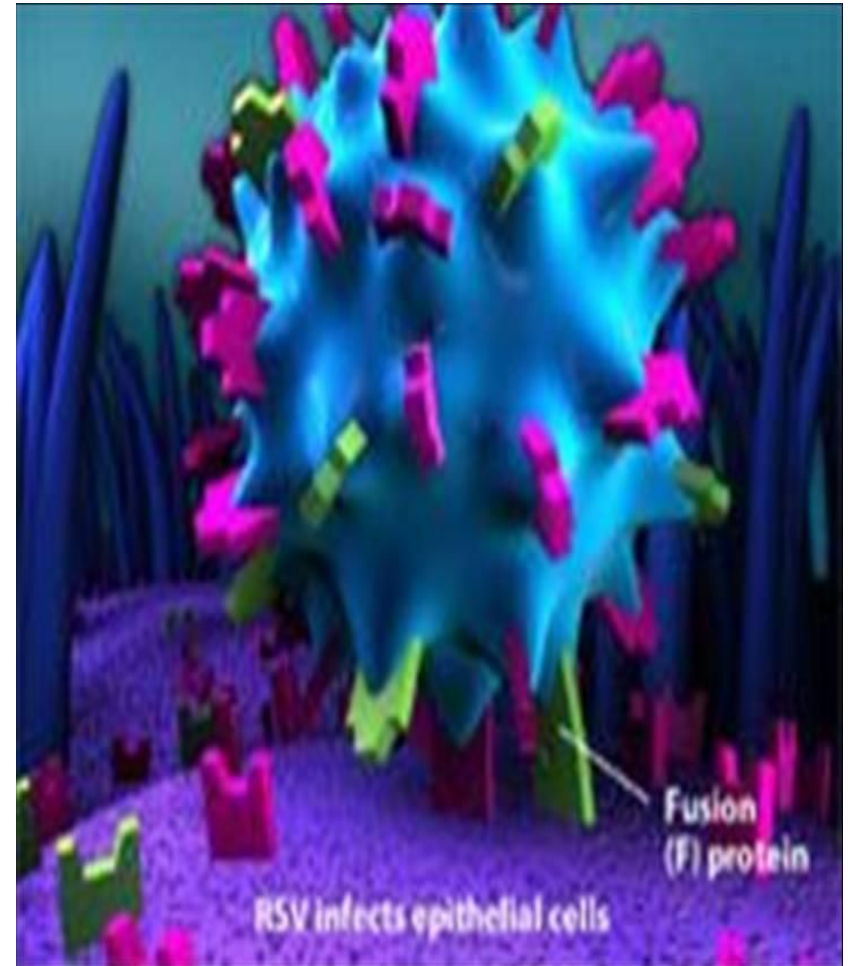
The particle is slightly smaller (80-120 nm) than other paramyxoviruses, and the nucleocapsid measures 11-15 nm.

RS virus does not hemagglutinate.

A soluble complement-fixing antigen can be separated from the virus particle.

This labile paramyxovirus produces a characteristic syncytial effect, the fusion of cells in human cell culture. It is the single most serious cause of bronchiolitis and pneumonitis in infants.

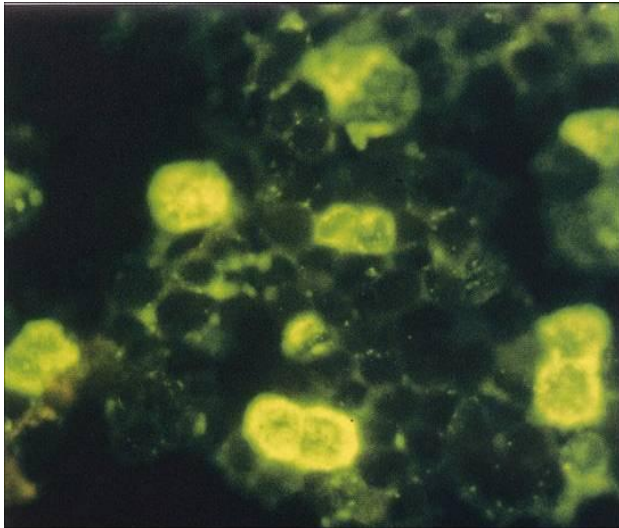
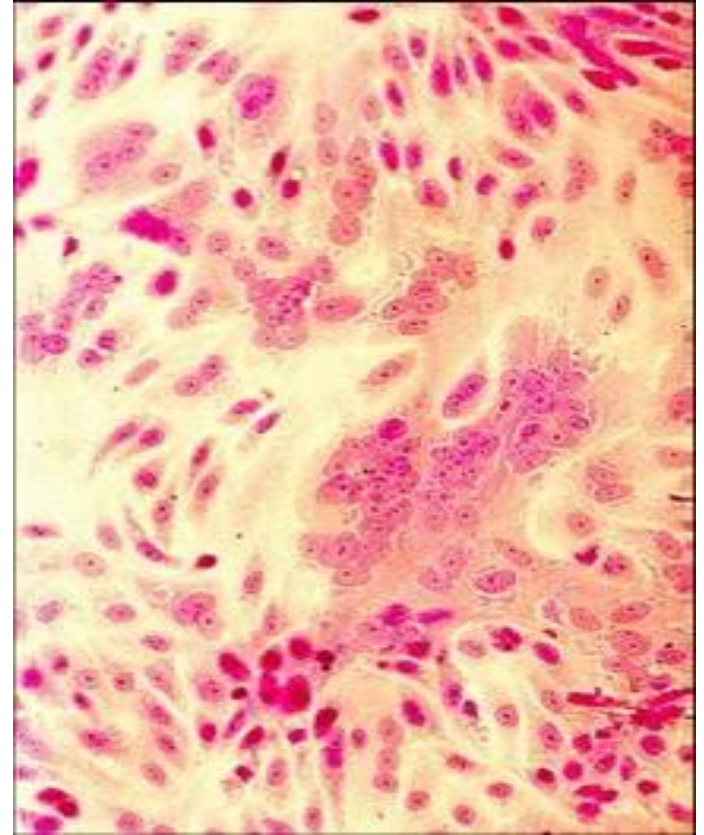
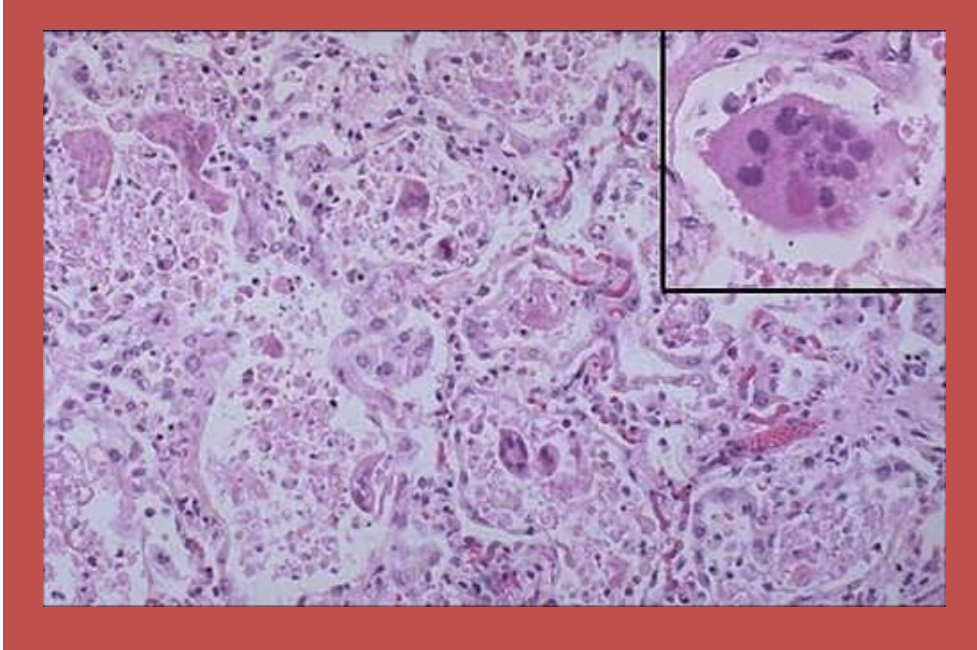
RESPIRATORY SYNCYTIAL (RS) VIRUS



Important Characteristics

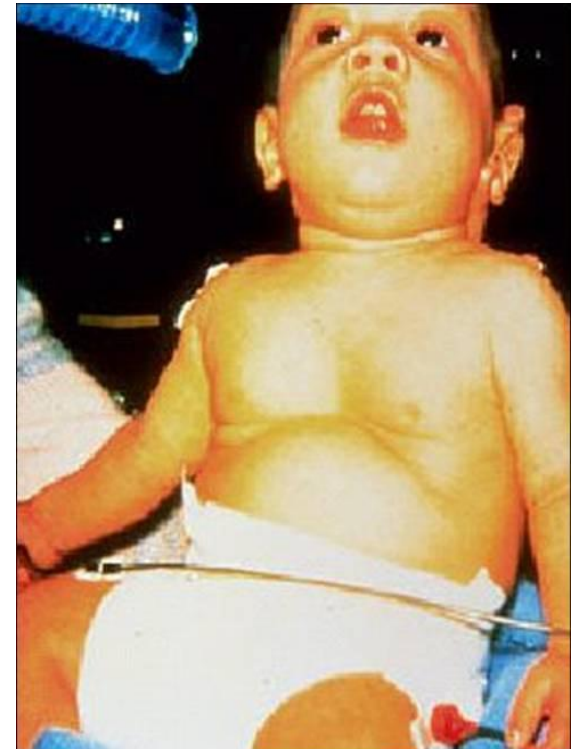
- RSV is highly infectious, transmission by respiratory secretions.
- Primary multiplication occurs in epithelial cells of URT producing a mild illness. In ~50% children less than 8 months old, virus subsequently spreads into the L.R.T. causing bronchitis, pneumonia and croup.
- Has been suggested as a possible factor in cot death and asthma.

RSV- syncytium formation



immunofluorescent stain

- RSV is a viral disease.
- Respiratory Syncytial Virus (RSV) is a very serious virus often found in children and infants under the age of three.
- Adults are at very low risk of catching RSV.
- **RSV Bronchiolitis - clinical features**



How is this disease transmitted?

- **This disease is transmitted by:**
- **coughing**
- **sneezing**
- **sharing wash cloths towels and other things with someone with RSV.**
- **Most people with RSV get it in fall and winter.**

Risk Group

Babies and elders are
most at risk of catching
RSV. ➤

Although adults do catch it, ➤
it appears to them as being
a common cold

This disease is extremely ➤
serious when it comes to
children and infants under
the age of 3 and elders.

This disease can result in ➤
death.



Symptoms for this disease are:

- **sneezing**
- **runny nose**
- **sore throat**
- **low fever**
- **common cold symptoms
just more severe.**



Treatments for Disease

- The main thing a doctor will tell you if you ask about treatments for RSV he will most likely say to let it run its course. Things you can do for the person that has RSV are:
 - comfort that person.
 - Things you can do if you have it are:
 - Drink plenty of fluids.
 - Get lots of rest

Antiviral Agents

- Ribavirin (*Virazole*), a synthetic guanosine analogue, given as an aerosol

Supportive

- Fluids, oxygen, respiratory support, bronchodilators.