Respiratory viruses-II

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Family Paramyxovirideae- Important pathogens

- Measles
- Mumps
- Parainfluenza viruses
- Respiratory Syncytial Viruses
- Nipah & Hendra viruses

Paramyxoviridae

- **Infections in children**

1. Localised respiratory infections:
   - RSV
   - Parainfluenza Virus

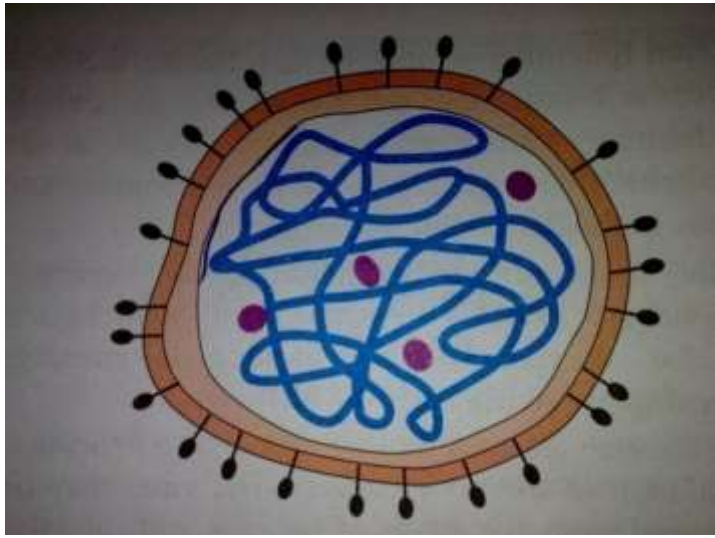
2. Disseminated infections: Highly contagious diseases
   - Mumps
   - Measles

- **Zoonotic infections:** Mainly Encephalitis

- Hendra Virus
- Nipah Virus

Measles (Rubeola) virus

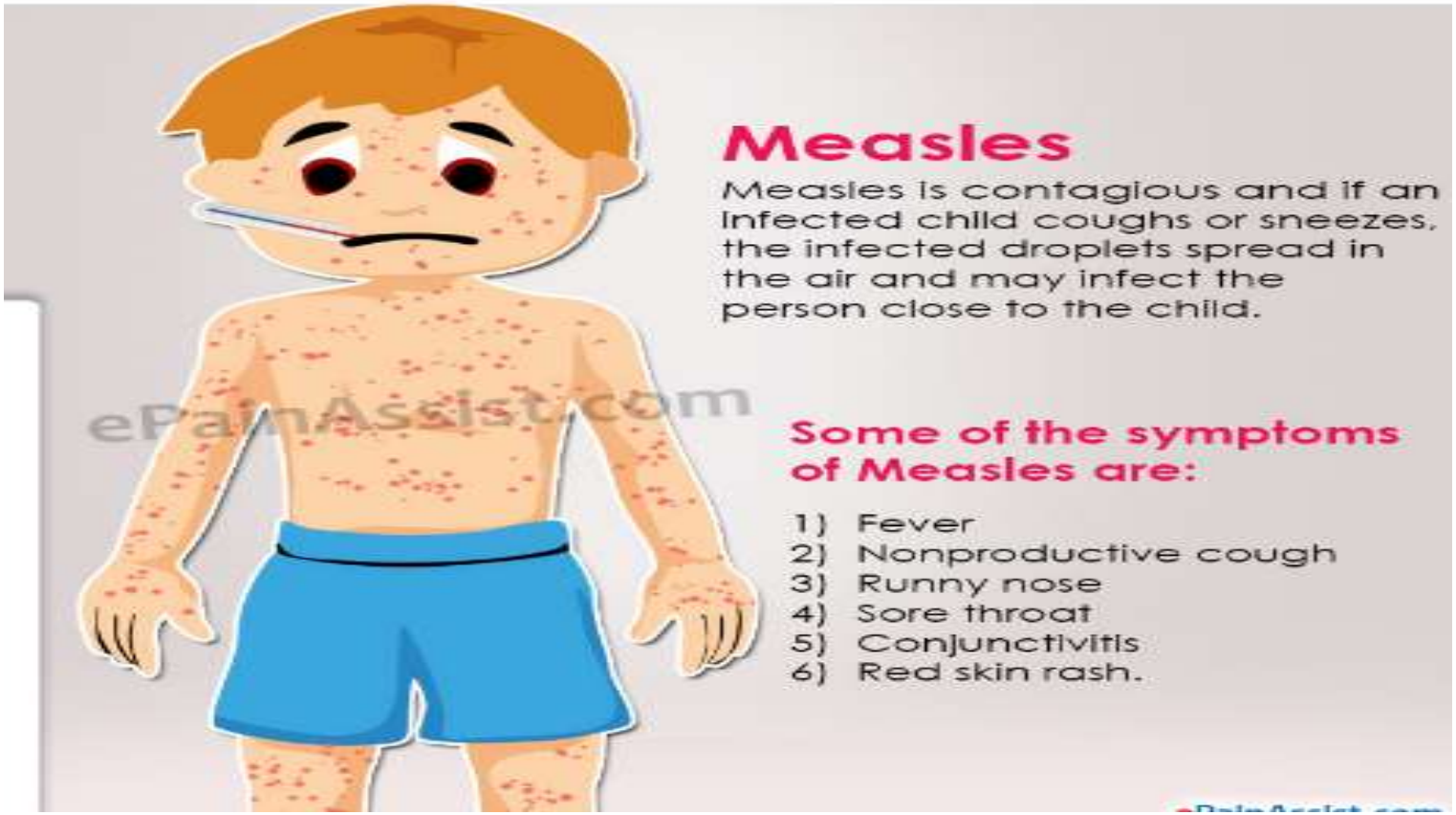
- Paramyxovirus but **neuraminidase spikes are absent**
- Highly infectious childhood disease (6mths- 3yrs) with typical maculopapular rash
- Spreads by respiratory secretions



- **Incubation period- 10-14 days**
- Only one serotype
- No carriers
- Life long immunity after one infection

Measles

- Sore throat
- Conjunctivitis
- Red skin rash.



Clinical features

1. Prodromal malaise, fever, conjunctival infection, cough, nasal discharge (**3 Cs**, cough, coryza, conjuntivitis)

- Koplik's spots appear on buccal mucosa,a day or two before rash

2. Eruptive phase: 3-4 days after prodromal illness,r ash appears

- Red, maculopapular rash appears on behind ears & spreads downwards,disappears in same sequence

- **Sequence Fever (10th D), Koplik spots (12th D), Rash (14th D)**

3. Post Measles Weight loss, weakness

- Complications
- Otitis media (mc),
- G I symptoms (Diarrhoea, malnutrition & vit a deficiency)
- Pneumonia (Giant cell/ Hecht's Pn)
- Encephalitis
- Subacute sclerosing encephalitis(SSPE)

Lab diagnosis

- **Specimen:**
  - Nasopharyngeal swab,
  - Resp secretions,
  - Conjunctival swab,
  - Blood & urine

- **Virus isolation:**
  - Monkey/ Human kidney cell lines
  - Shell vial culture

  CPE: Multinucleated giant cells **(Warthin Finkeldey cells)** with inclusion bodies both in nucleus & cytoplasm

- **Serology:** Antigen (DFA) & antibody detection (ag nucleoprotein antigen)
  - ELISA
  - Neutralization test

- **RT- PCR**

Vaccine

- **Live atenuated vaccine**

- Children at 9 months of age, & 16-20 mth
- SC, single dose

- **Edmonston-Zagreb strain**

- Given in combination with mumps rubella (MMR) & varicella (MMR-V).

Mumps virus

- Predominantly a disease of childhood, **predliction for glandular & nervous tissue**

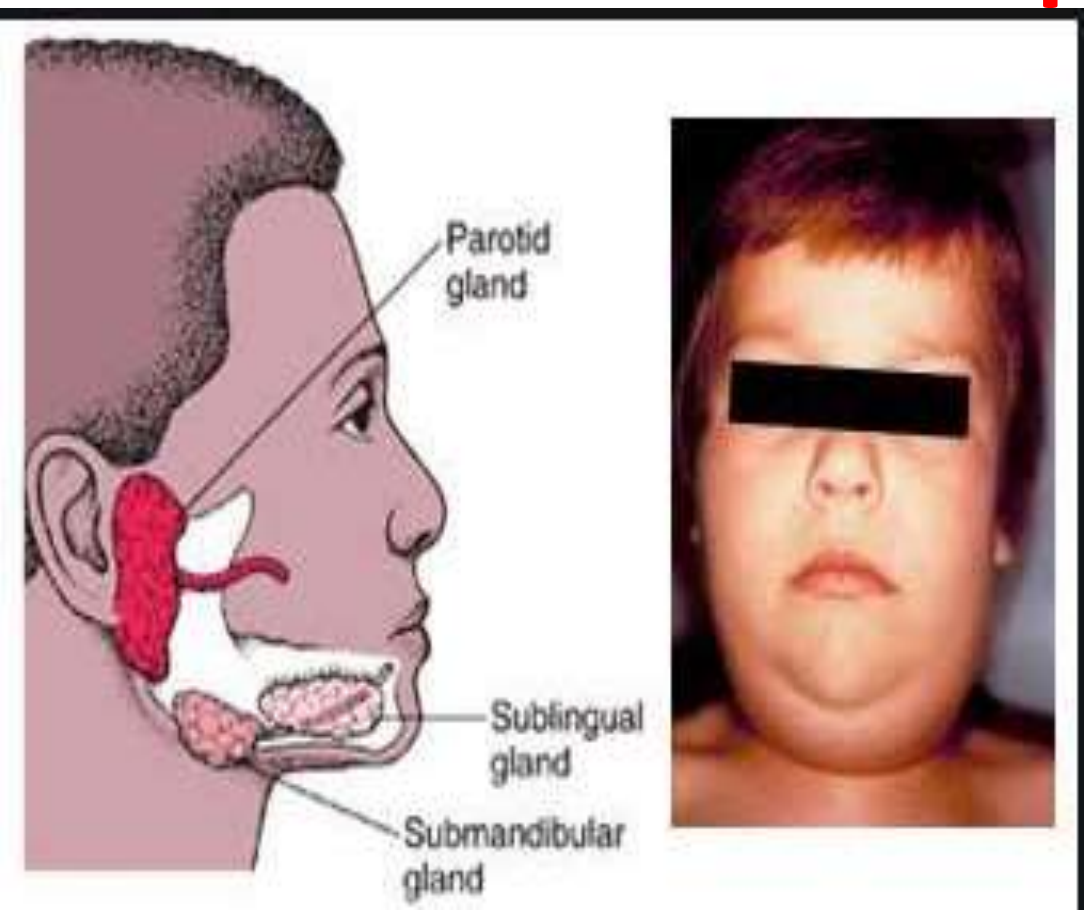
- **MC cause of parotid enlargement in chlidren** (bilateral, 70-90%)
- Also causes orchitis & aseptic meningitis

- Route of infection- infected saliva or aerosols
- Source of infection- Clinical/ Sub clinical cases

- **No carrier state**
- Humans are only reservoir
- **Incubation period- 14-21 days**

- Virus shed in saliva from six days before fever to two week after onset of parotitis

Mumps



Clinical features

- Cause non suppurative inflammation of parotid glands (may involve sublingual/ submandibular gland)
- Parotitis (70-90% of cases) accompanied by fever,local pain,tenderness.
- Complications –

  Aseptic meningitis (< 10% of cases)
  meningoencephalitis
  orchitis
  oophoritis
  pancreatitis
  nephritis

Laboratory diagnosis & Prevention

- It is diagnosed clinically

- Laboratory diagnosis for confirmation & atypical infection
- Samples – **buccal/oral swab,**
  saliva, urine, CSF, serum

- Direct demonstration by immunofluorescence

- Virus isolation by inoculating into primary monkey kidney, HEp-2 cell cultures

- Serology: ELISA for antibody detection

- PCR

- **Vaccine: LA, Jeryll Lynn strain** Chick embryo CL

Parainfluenza viruses

- Sendal V/ Hemagglutinating V of Japan/ Influenza V type D
- Spherical, enveloped, ss, RNA virus
- Parainfluenza virus (type 1,2,3,4)
- Cause **respiratory tract infections (type 3) in children**
- **Croup** (laryngotracheobronchitis) **(type 1 & 2)**
- **Otitis media** (mc complication)

Respiratory syncytial virus

- Cause LRTI, bronchiolitis, pneumonia **in infants** (mc cause)
- Important cause of common cold & otitis media in young adults
- Highly contagious, transmitted by contaminated hands and surfaces
- Incubation period- 3-5 days
- Shed in respiratory secretions for several days to weeks
- Imp characteristics: **Giant cells & Syntitium formation**
- **DOC: Ribavarin** in severe infection

Laboratory diagnosis

- **Samples –** nasopharyngeal swab, nasal swabs
- **Virus isolation:** HeLa & Hep-2 cell lines
- **Serology**
- **PCR**

Genus- Henipavirus

- 2 important zoonotic viruses
- Nipah virus
- Hendra virus

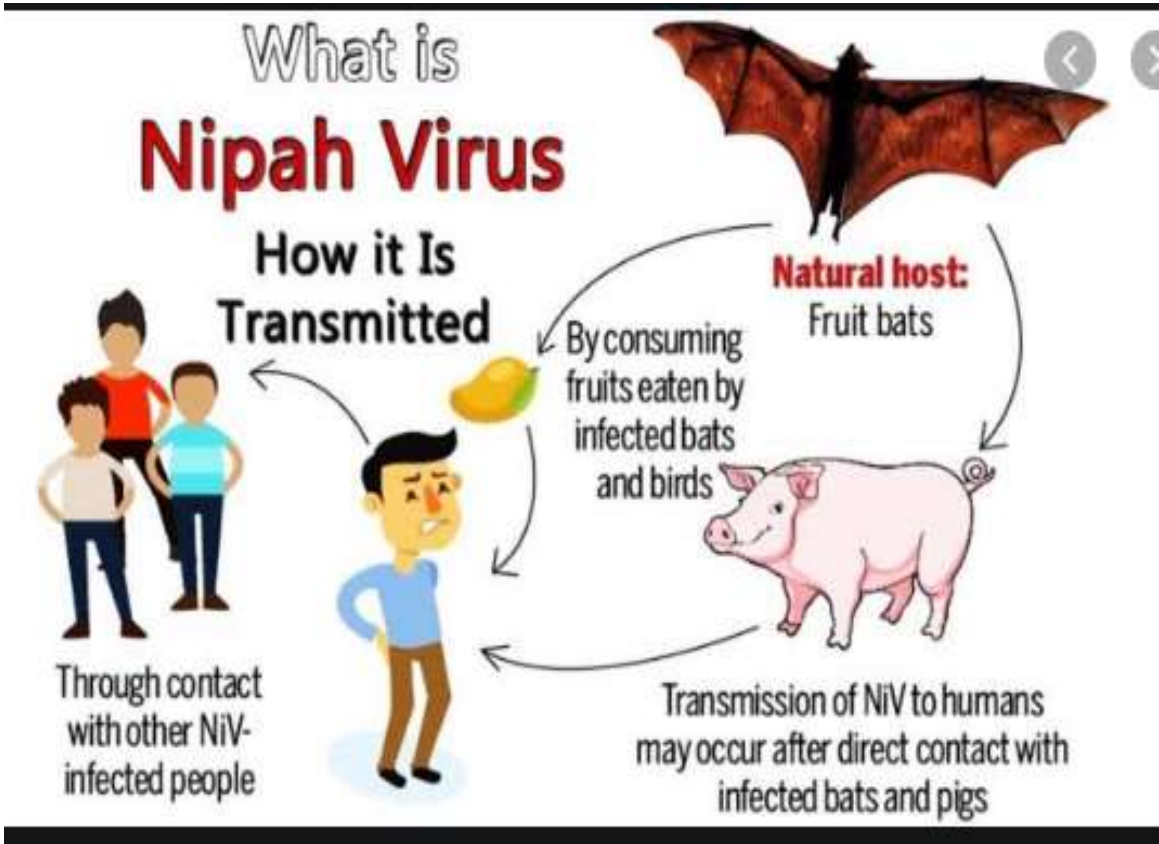
- Natural host: Fruit bat

- Very high mortality
- **Biosafety level 4 agents**

Nipah virus

- Causes
- Respiratory illness
- Encephalitis

- High Morbidity



Hendra viruses

- Caused death of many horses in Australia
- Some human cases also reported.

Hendra disease

SPECIES-TO-SPECIES TRANSMISSION

1 Flying foxes, which carry the Hendra virus but are not affected by it, secrete contaminated urine, reproductive fluids or birth matter

2 Horses eat food containing the infected material

3 Humans handle the horses and are exposed to nasal and respiratory secretions, saliva and urine. Humans cannot pass the virus to other humans

HOW IT AFFECTS HORSES

Early signs include fever, increased heart rate and restlessness; other common symptoms include difficulty breathing and/or weakness, neurological symptoms such as disorientation, an uncoordinated gait and agonising muscle twitching, quickly leading to death in most cases

Mortality rate: *70%-plus*

HOW IT AFFECTS HUMANS

An influenza-like illness that can lead to pneumonia, with fever, cough, sore throat, headache and tiredness

Or

Encephalitis (inflammation of the brain), with symptoms such as headache, high fever and drowsiness, which can progress to convulsions and/or coma and death

Mortality rate: *57%*

Togaviridae- Rubella/ German Measles

- Age grp: 3-10 yrs
- IP: 14-21 days

- Only one serotype
- Humans are only known reservoir

- No carrier state
- Life long immunity after infection

- **May present as Post natal or congenital infection**

German Measles

- **Clinical Features: -**

  -Subclinical infection in 50% patients

  - Prodrome

  - **Rash (on day 1)**

  - Lymphadenopathy (occipital & post auricular)

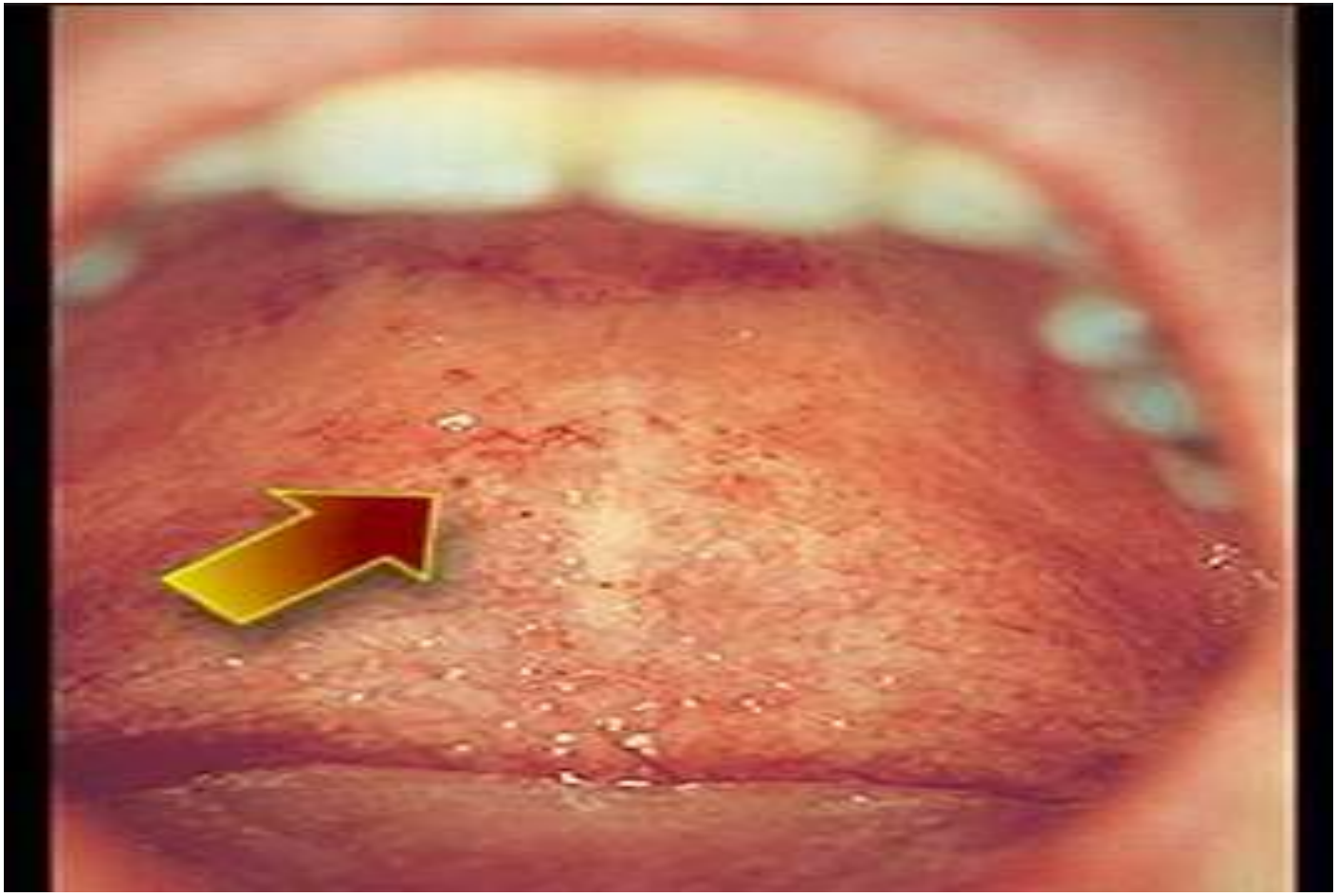
- **Forschheimer spots**

- **Complicaltions:**

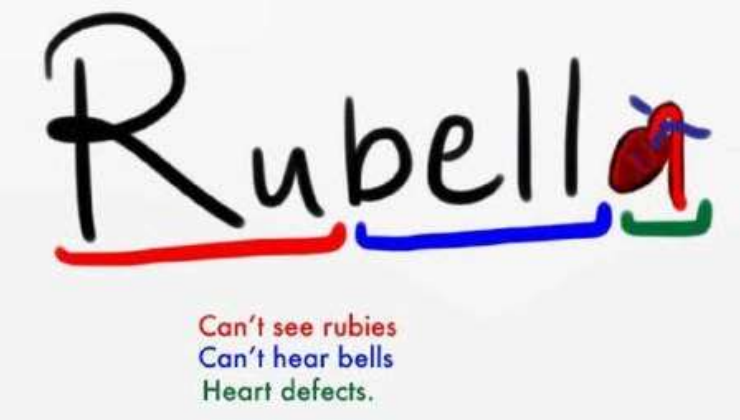
- Arthralgia
- Encephalitis
- Thrombocytopenia

Forschheimer spots

(Erythematous maculopapular rash)



Congenital rubella syndrome



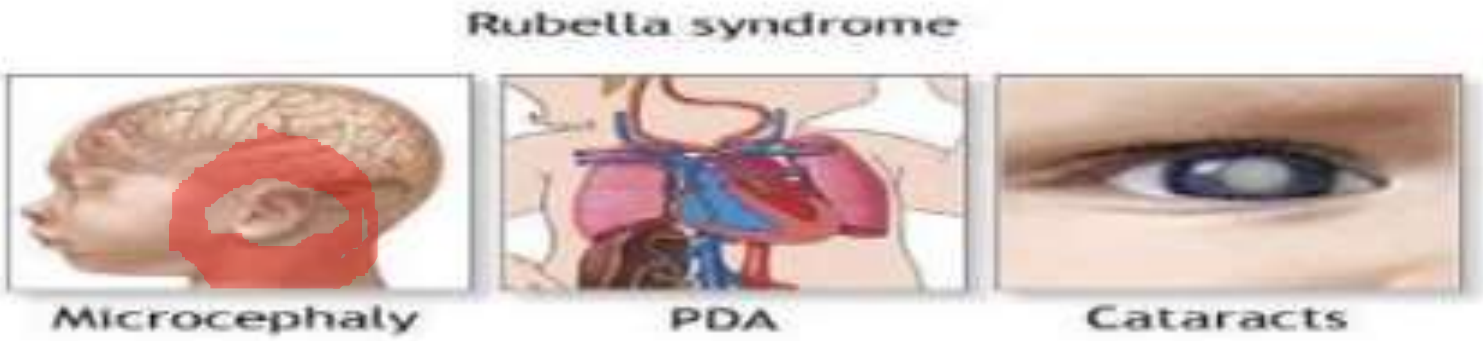
- Infection of placenta & fetus
- Included in TORCH complex

- **Classical triad: Cataract, Deafness, CHD**
  -SN deafness (mc defect)
  - Salt & Pepper retinopathy (mc ocular defect)
  - PDA (mc), PS, VSD

- **Gestational age** important
- **Max damage in 1st trimester**
- Infection in 2nd trimester; only deafness
- After 16 weeks: No major abnormalities

Classical Triad of congenital Rubella

- Cataract
- Cardiac abnormalities
- Deafness



Diagnosis & prevention

- Presence of IgM diagnostic at birth & also persistence of IgG after 6 months of age
- HAI & ELISA
- Virus isolation
- PCR

- **Vaccine:** LA **(RA 27/3),** (Human diploid fibroblast CL)
- Rubella vaccination indicated in all women of reproductive age group & children