

# **RUBELLA AND OTHER CONGENITAL VIRAL INFECTIONS**

**Dr. Mohammed J. M. Shallal**

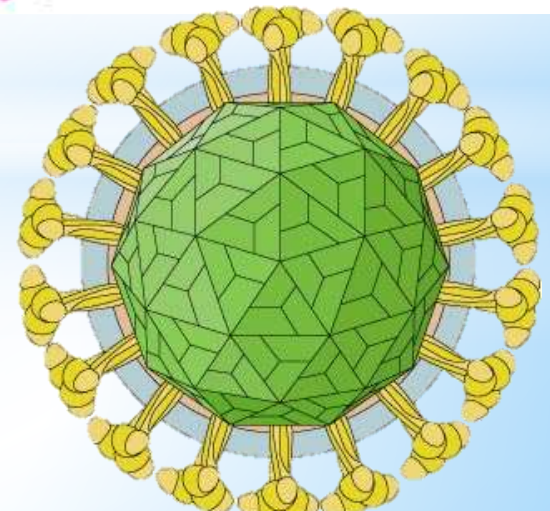
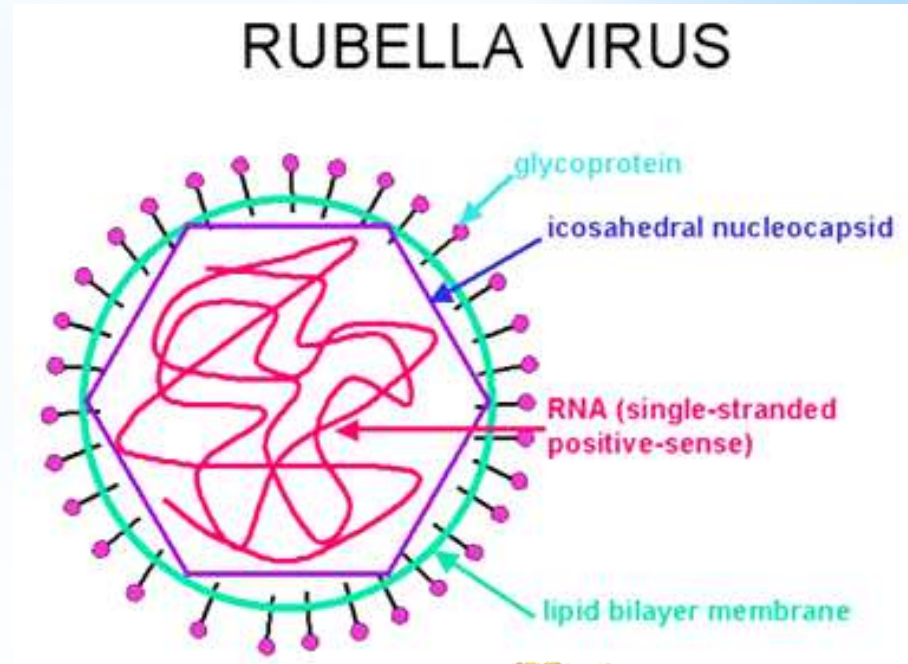
# RUBELLA VIRUS

## Disease:

- \* German measles
- \* Congenital rubella syndrome (CRS)

## Important properties:

- \* One piece of single-stranded RNA.
- \* Icosahedral nucleocapsid.
- \* Lipoprotein envelope.
- \* Surface spikes contain hemagglutinin.



## Transmission & Epidemiology:

- \*The virus is transmitted via droplets.
- \*Transplacentally, from mother to fetus
- \*The disease occur worldwide mainly during spring.
- \*For several years, cytomegalovirus rather than rubella virus has been the leading viral cause of congenital abnormalities.
- \*1<sup>st</sup> Trimester 85%, 2<sup>nd</sup> trimester 16%

## Pathogenesis & Immunity:

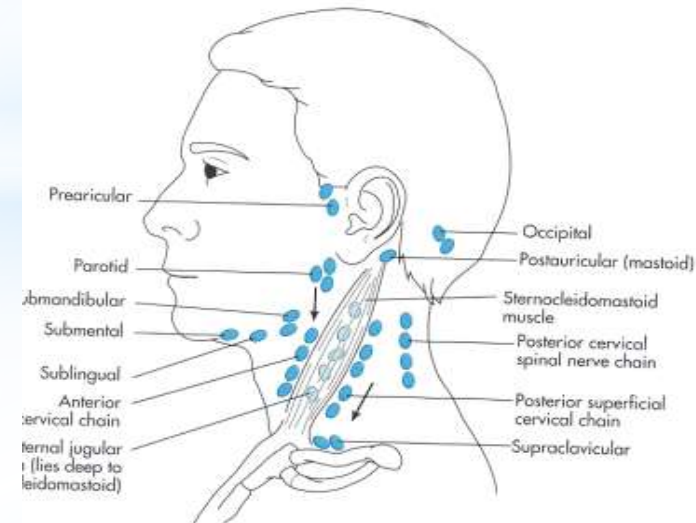
- \* Initial replication of the virus occurs in the nasopharynx and local lymph nodes. From there it spreads via blood to the internal organs and skin.
- \* The origin of the rash is unclear; it may be due to Ag-Ab-mediated vasculitis.
- \* Infection leads to lifelong immunity. Second cases of rubella do not occur; similar rashes are caused by other viruses, such as **coxsackievirus** and **echovirus**. Ab cross the placenta and protects the newborn.

# Clinical Findings:

## A- RUBELLA: German measles

It is a milder, shorter disease than measles. After an incubation period of 14-21 days, a brief prodromal period with fever and malaise is followed by a maculopapular rash, which starts on the face and progresses downward to involve extremities. Posterior auricular lymphadenopathy is characteristic. The rash typically lasts 3 days.

\*In 20-50% of cases, primary



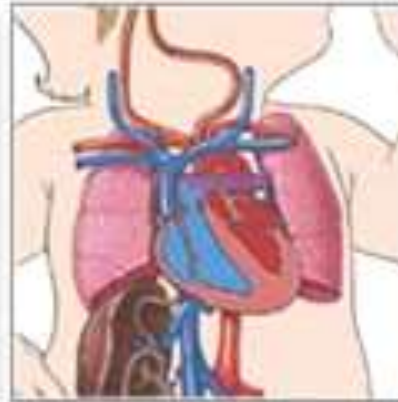
## **B- CONGENITAL RUBELLA SYNDROME (CRS):**

- \*the significance of rubella virus is as a teratogen. When a non-immune pregnant woman is infected during the 1st trimester, especially the 1st month, significant congenital malformations can occur as a result of maternal viremia and fetal infection.
- \*Rubella infection can also result in fetal death and abortion.
- \*Congenitally infected infants have significant **IgM** titers and persistent **IgG** titers long after maternal Ab has disappeared.
- \***Progressive rubella panencephalitis**, a rare complication that develops in the second decade of life in children with congenital rubella, is a severe neurologic deterioration that inevitably progresses to death

## Rubella syndrome



Microcephaly



PDA



Cataracts

\*The increased rate of abnormalities during the early weeks of pregnancy is attributed to organogenesis at that time. The malformations are widespread and involve primarily the heart (e.g., **patent ductus arteriosus**), the eyes (e.g., **cataracts**), and the brain (e.g., **deafness** and **mental retardation**). Classic CRS triad; cataracts, cardiac abnormalities, and deafness.

## \*Lab Diagnosis:

1-Virus can be grown in cell culture, but it produces little CPE, it is usually identified by its ability to interfere with echovirus CPE. If rubella virus is present in patient's specimen and has grown in the cell culture , no CPE will appear when the culture is superinfected with an echovirus.

2-Rising Ab titer 4-fold or greater between acute-phase and convalescent-phase sera in the hemagglutination inhibition test or ELISA.

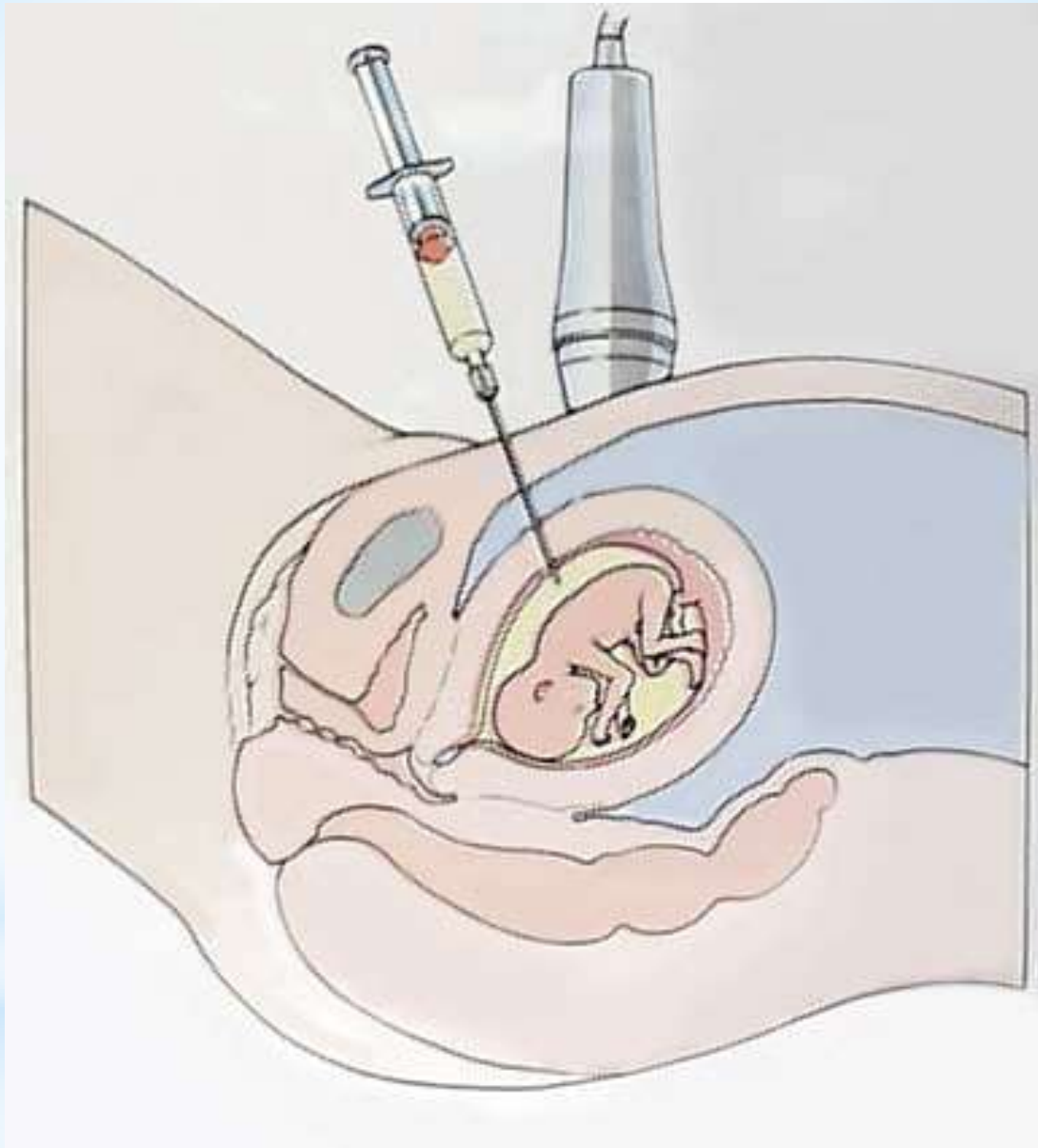


## Lab Diagnosis:

3-Observing the presence of **IgM** Ab in single acute-phase serum sample may help in diagnosis.

4-Pregnant woman exposed to rubella virus, the presence of **IgM** Ab indicates recent infection, whereas a 1:8 or greater titer of **IgG** Ab indicates immunity and protection of the fetus.

5-If recent infection has occurred, an **amniocentesis** can reveal whether there is rubella virus in amniotic fluid, which indicates definite fetal infection.



**Amniocentesis**

**Treatment:** No antiviral therapy.

**Prevention:**

\*Immunization with live attenuated vaccine with measles and mumps (**MMR**) subcutaneously at age of 15 months, and to un-immunized young **adult woman if they are not pregnant** and will use contraception for the next 3 months.

\*Vaccine should not be given to immunocompromized patients or to pregnant woman.

## Prevention

- \*Vaccine has caused significant reduction in the incidence of rubella and congenital rubella syndrome. It induces respiratory IgA interrupting the spread of the virus by nasal carriage.
- \*Immune serum globulins IG can be given to pregnant woman in 1st trimester, but it may fail to prevent fetal infection.

# **In utero infection results in**

**Five main consequences:**

- \*1. IUD**
- \*2. IUGR**
- \*3. Prematurity**
- \*4. Congenital defects**
- \*5. Persistent infection after delivery**

# **Why some viruses cause congenital defects and others not?**

**This depends on:**

- 1.the ability of the virus to be transmitted to the fetus**
- 2.the ability of the virus to cause damage to the fetus**
- 3.the stage of gestation???**

# Diagnosis of Congenital viral infections

- \*Prenatal: detection of IgM in the mother , or IgG rising titer.
- \*Postnatal: most importantly is detection of IgM in the neonate??
- \*Prenatally nowadays using amniocentesis and detect the virus directly mainly using molecular methods



**Thank you**

**Dr. Mohammed J. M. Shallal**