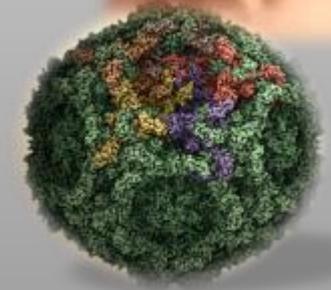


EPSTEIN BARR EBV VIRUS & PARVOVIRUS

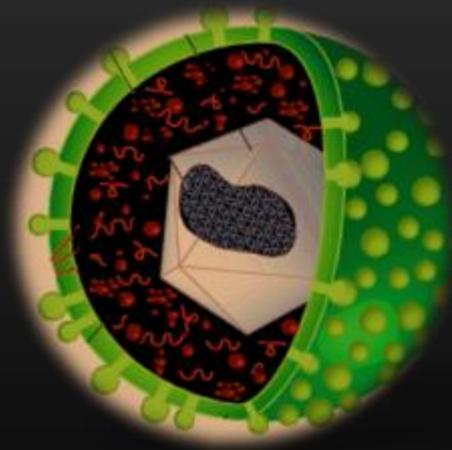
By:

Dr. Mohammad Odaibate



EPSTEIN BARR VIRUS

EBV



Diseases

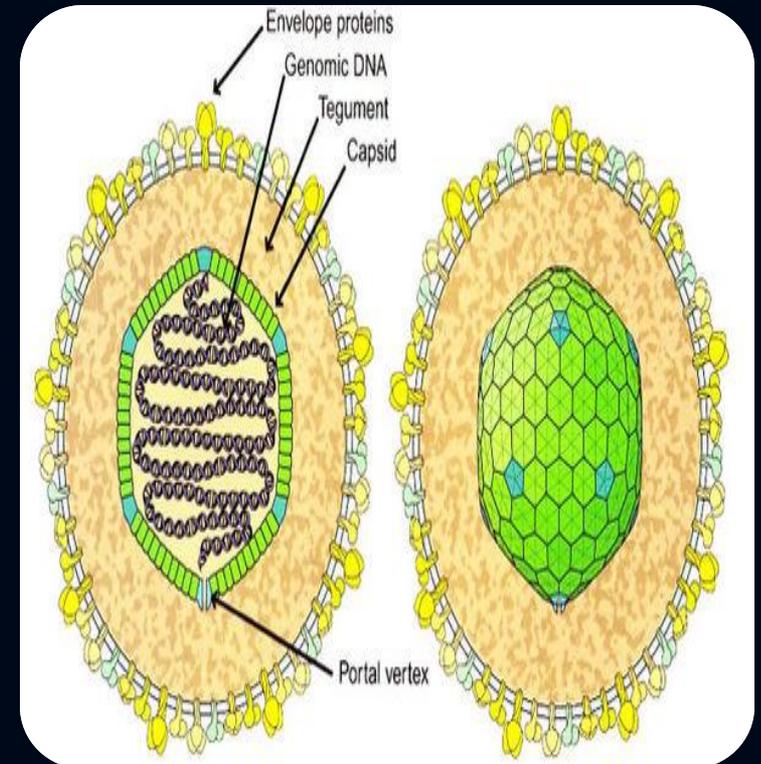
- ➔ Infectious mononucleosis.
- ➔ Burkitt's lymphoma.
- ➔ B-cell lymphomas.
- ➔ Nasopharyngeal carcinoma.
- ➔ Hairy leukoplakia.

Important Properties:

- EBV is also called **human herpesvirus 4 (HHV-4)**.
- **Infects** mainly lymphoid cells, primarily **B lymphocytes**.
- Infects **the epithelial cells of the pharynx**.
- **In latently infected cells**, EBV DNA is in the nucleus, not integrated. Some genes are transcribed.

Structure and genome:

- **Ds linear DNA enveloped virus.**
- Approximately **122 - 180 nm** in diameter.
- The nucleocapsid is surrounded by an **envelop** made of protein.



EBV antigens and proteins:

A. Latent proteins:

1. EB viral nuclear antigen complex (**EBNA**)
2. Latent membrane protein (**LMP**)
3. **Terminal protein**
4. Lymphocyte-detected membrane antigen (**LYDMA**)

B. Lytic cycle proteins:

1. Membrane antigen (**MA**)
2. Early antigen complex (**EA**)
3. Viral capsid antigen complex (**VCA**)

Transmission & Epidemiology

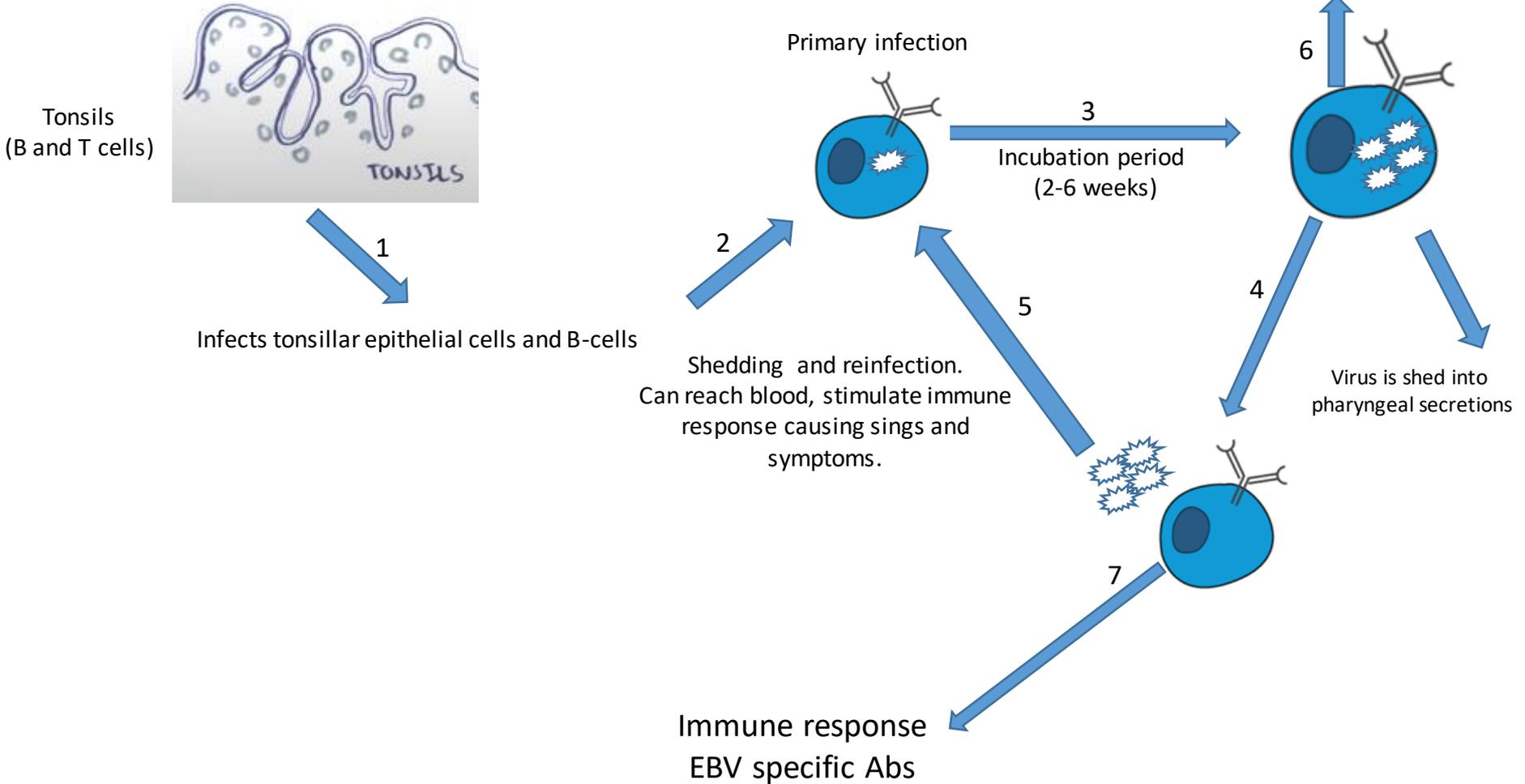
- Exchange of **saliva** (e.g., during **kissing**).
- **Blood transmission** → **very rare**.
- **Objects** such as drinking glass,....
- EBV infection is **worldwide**.
- In **the first few years** of life → **asymptomatic**.
- **Clinically apparent** infectious mononucleosis is **highest** in those who are **exposed** to the virus **later** in life (e.g., **college students**).

Pathogenesis & Immunity

- Oropharynx → blood → B lymphocytes (Latent). Cytotoxic T lymphocytes “atypical lymphs” react against the infected B cells.
- (Atypical lymphocytes are lymphocytes that have been activated to respond to a viral infection (occasionally a bacterial or parasitic infection).
- The immune response : IgM abs. to the VCA, IgG abs. to the VCA follows and persists for life.
- Lifetime immunity is based on antibody to the viral membrane antigen.
- Nonspecific heterophil antibodies → disappear within 6 months after recovery.

Pathogenesis & Immunity

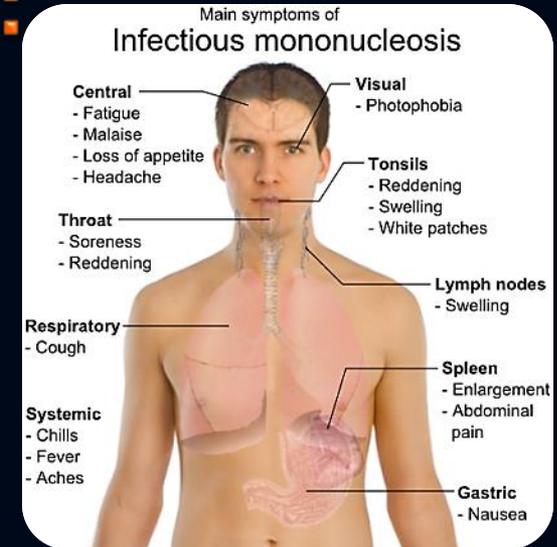
Saliva transmission



Clinical Findings:

■ Infectious mononucleosis :

- High risk group: 17-25 ys
- Acute, self-limiting
- Fever, sore throat, lymphadenopathy, anorexia , lethargy and splenomegaly. Hepatitis is frequent; encephalitis in some patients.
- Spontaneous recovery in 2 to 3 weeks.



Severe pharyngitis with diffuse pharyngeal inflammation and tonsillar swelling.

why is it called infectious mononucleosis?

an acute infectious disease accompanied by atypical large peripheral blood lymphocytes.



■ Hairy leukoplakia:

A whitish, non-malignant lesion with an irregular “hairy” surface on the lateral side of the tongue, in immuno-compromised individuals, especially **AIDS** patients.

- Burkitt’s lymphoma, Hodgkin’s lymphoma, nasopharyngeal carcinoma.
- post-transplant lymphoproliferative disorder (B-cell lymphoma).

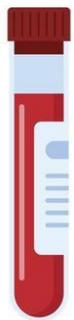


Diagnosis

EBV is suspected when patients having

- fever
- pharyngitis
- lymphadenopathy

Lab diagnosis



Full blood count

- Lymphocytosis
- -Atypical lymphocytes.
- Heterophile Abs
(monospot method)
- Agglutination



EBV special Abs

- VCA- IgM
- VCA- IgG
- EBNA- IgG



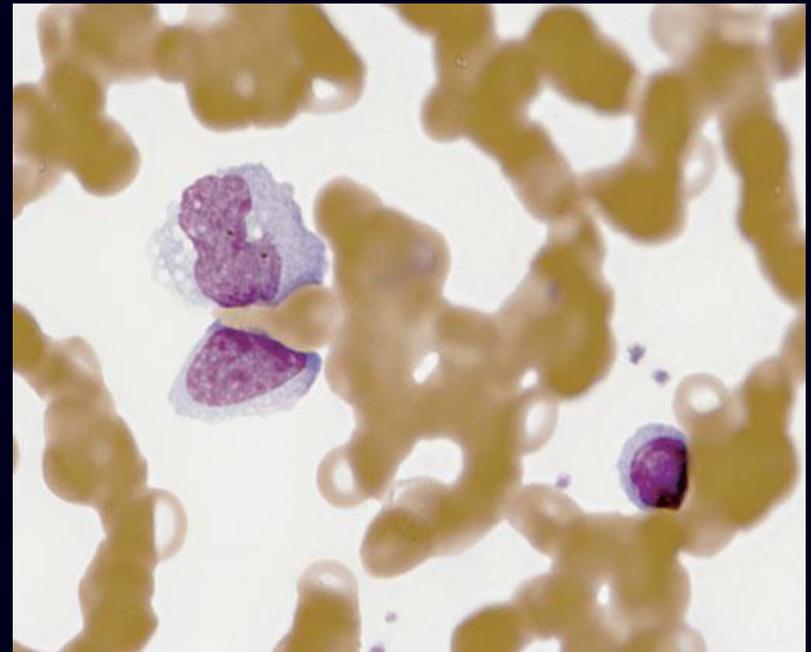
RT-PCR for
viral DNA



Laboratory Diagnosis:

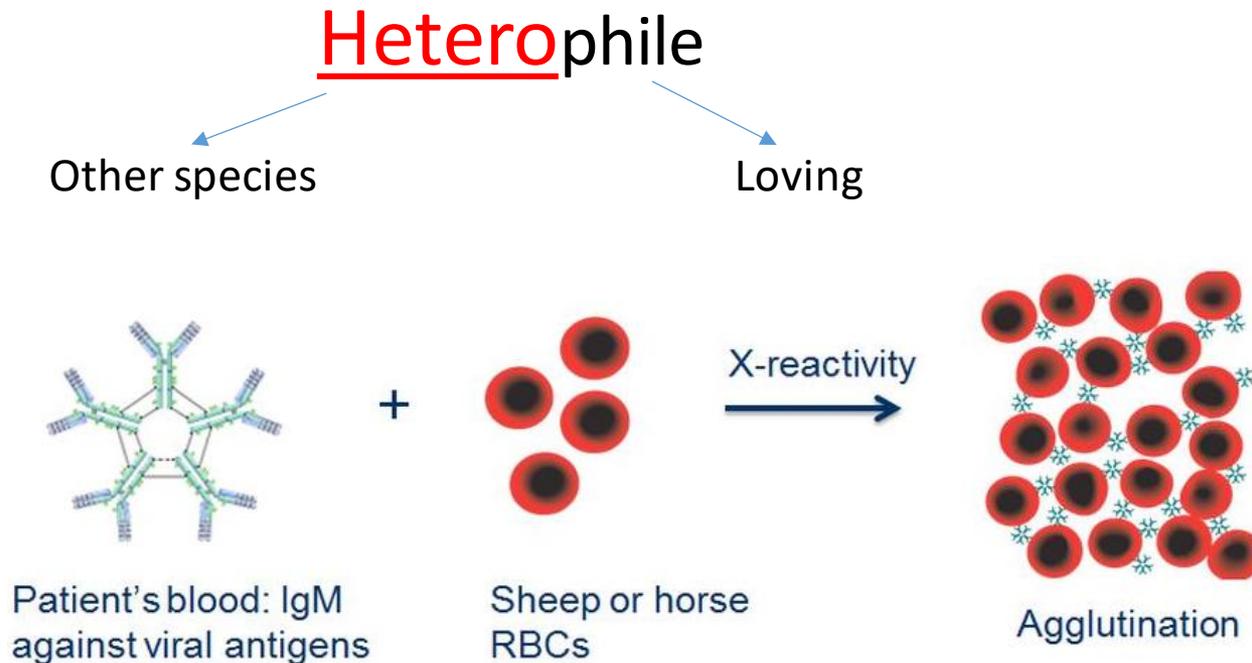
1. Hematologic :

- Absolute **lymphocytosis** with **>10%** abnormal lymphocytes.
- **Atypical lymph:** are enlarged cells, expanded nucleus, and an abundant vacuolated cytoplasm.



Heterophile Antibodies

- Are Abs produced by human immune cells in response to EBV infection.
- Negative in the incubation period and after the active infection has subsided.
- Heterophile means: they react with antigens other than the antigens that stimulated it.



2. immunologic:

- The **heterophil antibody**: early diagnosis of IM usually positive by week 2 of illness.
- The **EBV-specific antibody tests**: The IgM **VCA** for early illness; IgG **VCA** for prior infection, antibodies to **EA** and **EBNA**.

Molecular assays:

- Nucleic acid hybridization is the most sensitive means of detecting EBV in patient materials.

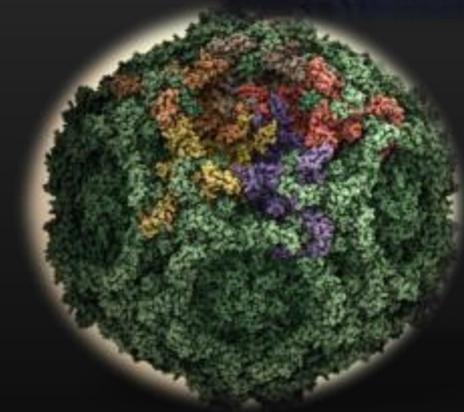
Treatment:

- None! Self-limiting
- Treat symptoms
- Misdiagnosis with streptococcal infection
- Acyclovir in high doses may be useful in life threatening EBV infections.



PARVOVIRUS

Parvovirus B19

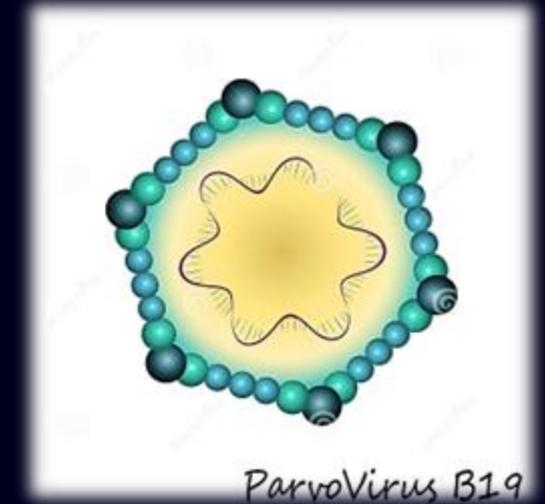


Diseases:

- **Erythema infectiosum** (slapped cheek syndrome, fifth disease)
- **Aplastic anemia.**
- **Hydrops fetalis.**

Important properties:

A **very small** (22 nm), **non-enveloped**, **icosahedral**, with a **single-stranded DNA genome**, **negative-sense**, no virion polymerase. There is **one serotype**.



Transmission:

- Respiratory route.
- Trans-placental.
- Blood donation.

Pathogenesis & Immunity:

- B19 virus **infects two types of cells**:
 - **Erythroblasts** in the BM → aplastic anemia.
 - **Endothelial cells** → rash.
- **Immune complexes** of virus and IgM or IgG → rash, arthritis.
- Infection provides **lifelong immunity** against reinfection.

Clinical Findings:

(1): Erythema Infectiosum (Slapped Cheek Syndrome, Fifth Disease):

- Mild disease, childhood, low-grade fever, coryza, and sore throat, rash



(2): Aplastic Anemia:

- Children with chronic anemia → severe aplastic anemia (aplastic crisis)

(3): Fetal Infections:

- First trimester → fetal death.
- Second trimester → hydrops fetalis.

(4): Arthritis:

- Adults, women, small joints of the hands and feet bilaterally.

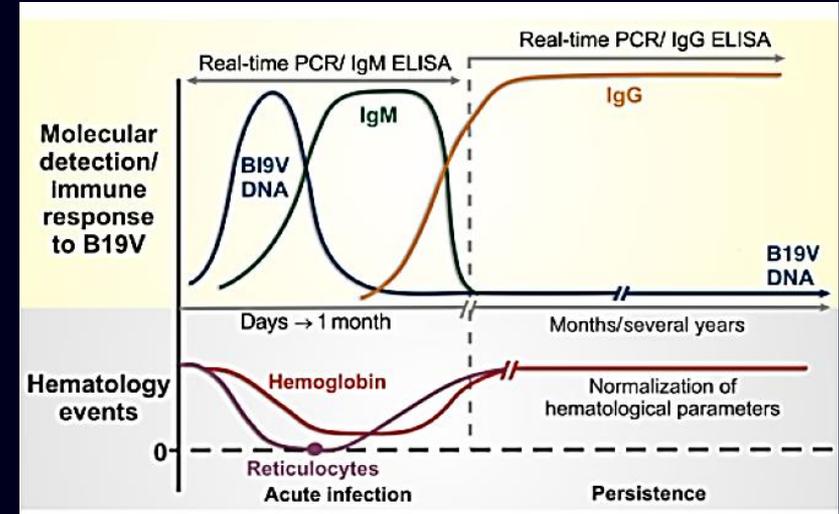
(5): Chronic B19 Infection:

- In immunodeficiencies: chronic anemia, leukopenia, or thrombocytopenia.



Laboratory Diagnosis:

- IgM antibodies.
- In immuno-compromised patients, viral DNA by PCR.
- Fetal infection : PCR of amniotic fluid.



Treatment & Prevention:

- No specific treatment.
- Immune globulins in immunodeficiencies.
- No vaccine.