

Anbar University

Science College

Biotechnology Department

**DNA enveloped viruses**

Lecturer.D.Al-Moghira Khairi Al-Qaysi

Virology, Stephen N.J. Korsman, Gert U. van Zyl, ... Wolfgang Preiser  
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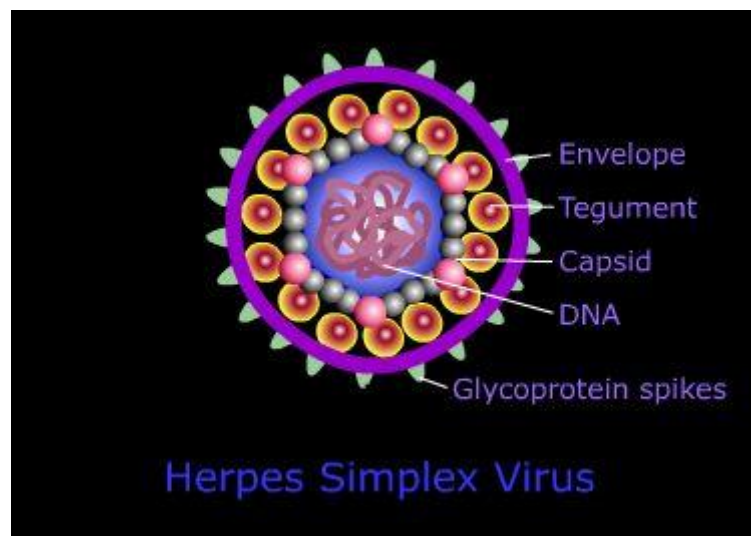
Jawetz Melnick & Adelbergs Medical Microbiology, Stefan Riedel  
(Author), Stephen Morse (Author), Timothy Mietzner (Author), Steve  
Miller.

**Viruses, Pandemics, and Immunity, By Arup K. Chakraborty  
and Andrey S. Shaw**

## DNA Enveloped Viruses

Which are included five important human pathogens:

- 1- Herpes simplex virus 1 ( HSV)
- 2- HSV- 2
- 3- Cytomegalovirus ( CMV)
- 4- Varicella – zoster virus (VZV)
- 5- Epstein – Barr virus (EBV)



### Characters of Herpes viruses

1. DS – DNA Linear genome
2. Icosahedral symmetry
3. enveloped viruses
4. they are only viruses which acquire their envelope by budding from nuclear membrane
5. they are 120-200 nm ((large)second in size after pox)
6. not contain polymerase enzyme so replication occur in nucleus lead to intra nuclear inclusion body
7. cause latent infection

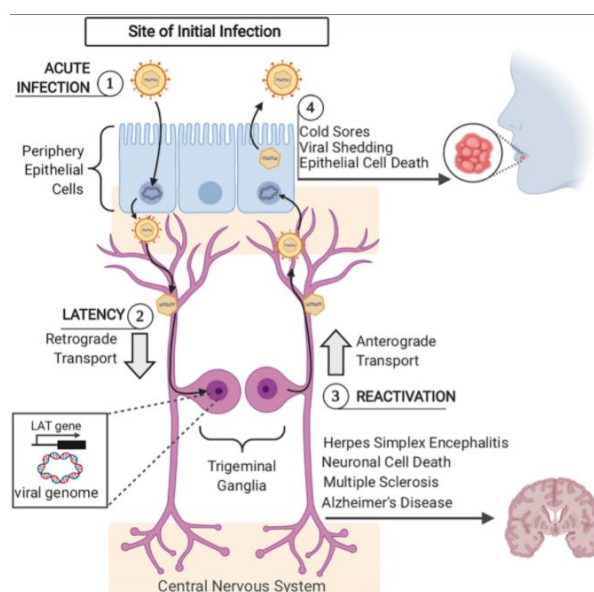
8. Certain herpes viruses cause cancer in human like EBV associated with nasopharyngeal carcinoma

## HERPES SIMPLEX VIRUS: MORE SIMILARITIES THAN DIFFERENCES

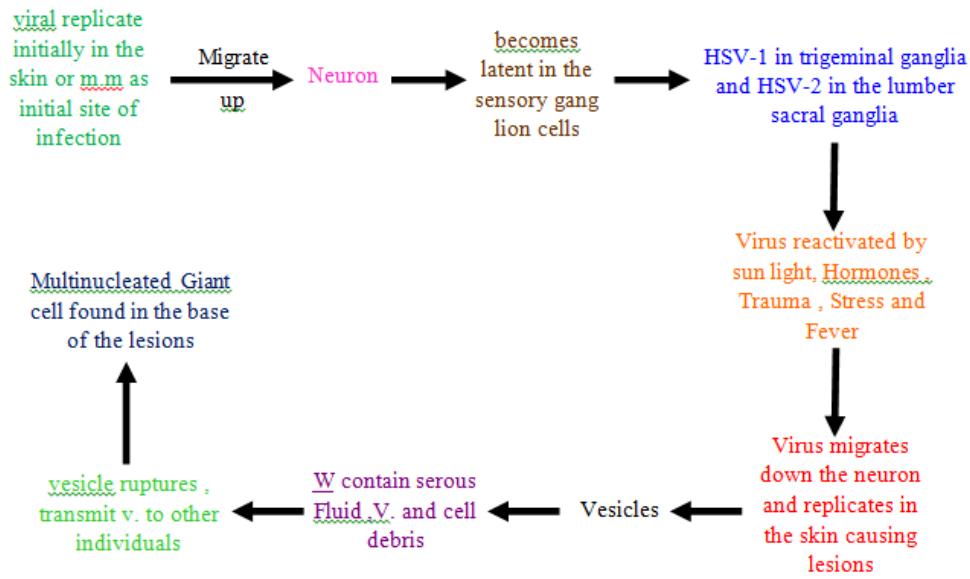
HSV-1	BOTH	HSV-2
CAN BE TRANSMITTED THROUGH ORAL-TO-ORAL CONTACT	MEMBERS OF HERPESVIRIDAE FAMILY	PRESENTS GENITALLY
WHEN INFECTION PRESENTS ORALLY, LABELED AS "COLD SORES" OR "ORAL HERPES"	PRODUCE SIMILAR SYMPTOMS (PAINFUL SORES, ULCERS, LESIONS)	CAN PRESENT ORALLY (BUT IS RARE)
	CAN PRESENT GENITALLY	TYPICALLY CARRIES A HEAVIER STIGMA THAN ORAL MANIFESTATIONS
	MOST CONTAGIOUS WHEN SYMPTOMS ARE PRESENT	
	MOST ARE ASYMPTOMATIC, BUT CAN STILL BE TRANSMITTED	
	FREQUENCY OF OUTBREAKS VARIES BY PERSON	
	LIFELONG INFECTIONS	
	GENITAL HSV INCREASES RISK OF HIV	
	CAN TRANSMIT FROM MOTHER TO INFANT DURING VAGINAL BIRTH	
	CARRY STIGMA	

SEX EDUCATION  
EMILY L. DEPASSE

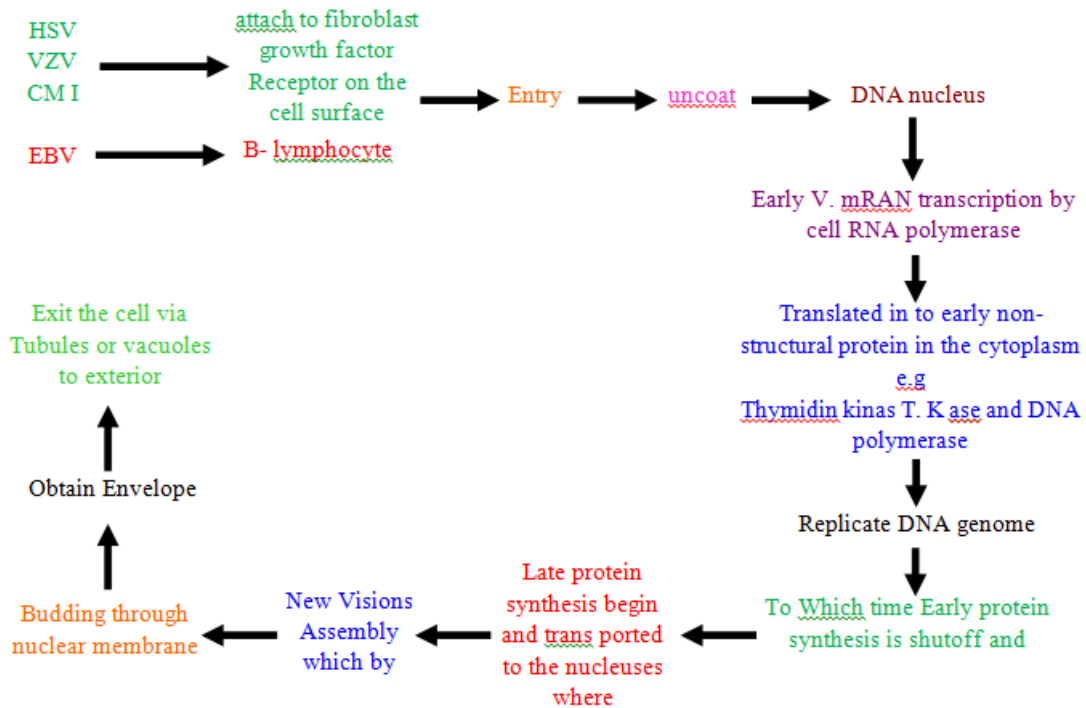
### Pathogenesis of HSV-1, HVS-2



**Pathogenesis and immunity of HSV-1 , HVS-2**



**Replication**



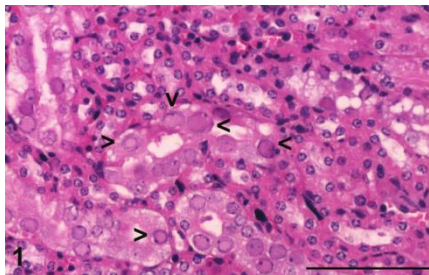
Virus	Infection
<b>HSV Type 1</b>	Herpes labialis ('cold sores') Keratoconjunctivitis Finger infections ('whitlows') Encephalitis Primary stomatitis Genital infections
<b>HSV Type 2</b>	Genital infections Neonatal infection (acquired during vaginal delivery)
<b>Varicella zoster virus (VZV)</b>	Chickenpox Shingles (herpes zoster)
<b>Cytomegalovirus (CMV)</b>	Congenital infection Disease in immunocompromised patients Pneumonitis Retinitis Enteritis Mononucleosis like generalized syndrome
<b>Epstein-Barr virus (EBV)</b>	Infectious mononucleosis Burkitt's lymphoma Nasopharyngeal carcinoma Oral hairy leukoplakia (AIDS patients)

## Lab diagnosis

### CMV-----

#### Histological

Staining to see inclusion bodying in urine and tissue



#### Serology

Detect Ag by using fluorescent technique using (Florescent Ab)

#### Tissue culture

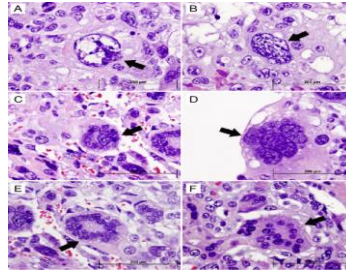
Isolation of virus we can see cytopathic effect (very slow need 1-2 week) Also Most of virus produce latent or remain cell associated

#### Serology

To detect Ab

**Varicella zoster-----**

**Tzank smear:** to see multinuclear giant cells



**Tissue culture:** For virus isolation

**Serology:** Ab-detection

**EB virus-----**

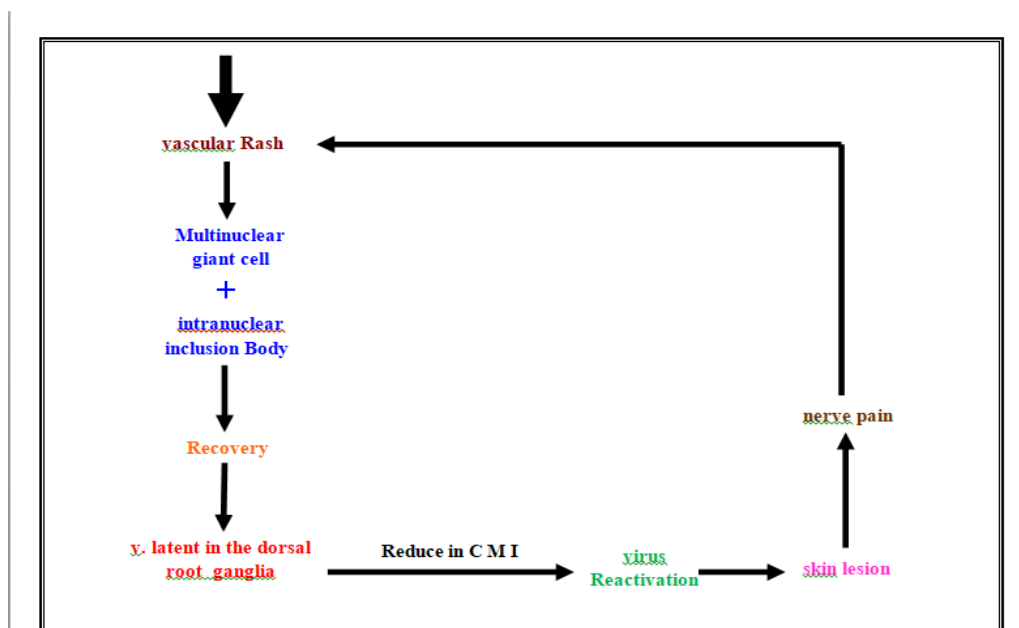
**Hematological approach:**

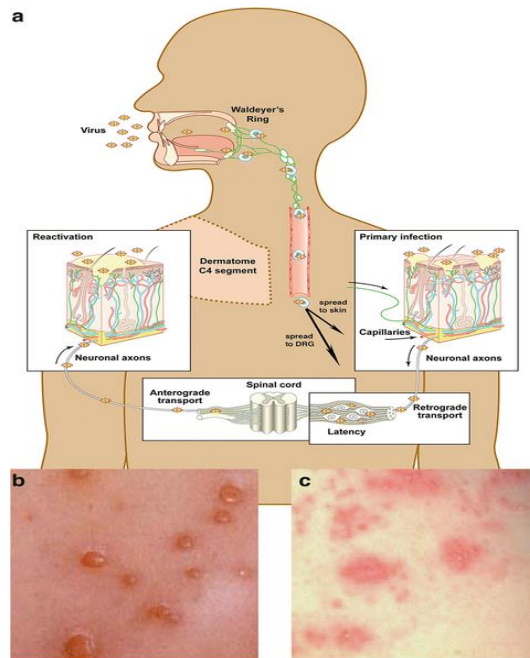
- a. lymphocytosis + 30% abnormalities
- b. Atypical lymphocyte which are large, lobular nucleus, and vacuolated basophilic cytoplasm

**Immunological approach:** by specific Ab

**Pathogeneses of V Z virus**

Virus infects membrane of upper respiratory tract then blood and skin lead to vascular rash.





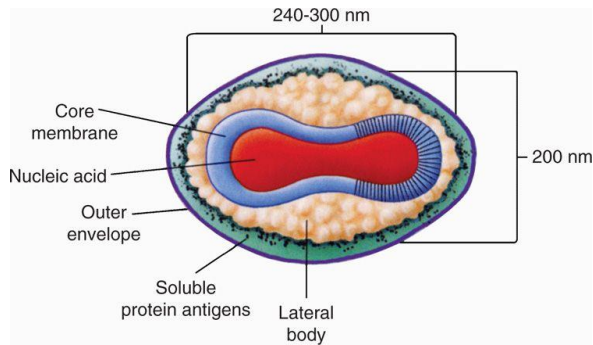
## Clinical finding

Varicella is characterized by fever concurrent with a self-limiting rash on the skin and sometimes mucosa. Headache, malaise, and loss of appetite are also seen. The rash begins as macules, rapidly progresses to papules, followed by a vesicular stage and crusting of lesions.

## EBV pathogenesis

Initial infection in oropharynx (Epithelial cells, lymphoid tissue) then spread to the blood, they infect of B-lymphocyte, they remain latent and few copies of DNA of virus are integrated, and many copies in cytoplasm. T. lymphocyte react against B lymphocyte which seen as Atypical lymphocyte in the Blood smear.

## Pox viruses



The pox virus' family includes three viruses medically important:

- 1- Small pox v. also called variola virus
- 2- Vaccinia virus
- 3- Molluscum contagious virus

## Properties

- 1- DS – DNA linear
- 2- Brick – shape particles
- 3- Disk – shape core within double membrane
- 4- Lipoprotein envelope
- 5- Contain DNA – dependent RNA polymerase within particle which helps the viral replication in cytoplasm.

## Replication cycle of pox virus

Viruses penetrate the cell then uncoating. Early mRNA are synthesized by Virus DNA dependent RNA polymerase, translated to early nonstructural protein (Enzymes required for virus DNA replication). Late structural protein were formed, proteins assembled and acquired envelopes by budding from cell membrane then release.



Pathogenesis and immunity of pox v.

