

# VIROLOGY LECTURE

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# Herpes Simplex Virus Type –II (HSV-2)

## Primary Infections:

- Genital herpes
- Neonatal herpes

## Recurrent Infection

- Genital herpes

# Genital Herpes

## Viral etiology:

- Both HSV-2 and HSV-1 can cause genital herpes
- About 90% of genital herpes are caused by HSV-2 and only 10% by HSV-1
- The signs and symptoms are similar in both cases

## Virology:

- All herpes viruses have similar structure
- They consist of an outer envelope and internal nucleocapsid.
- The nucleocapsid is icosahedral and contains linear ds- DNA genome.

# Genital Herpes (Continued)

## Transmission:

- HSV-2 is transmitted sexually
- The virus is transmitted by direct skin contact with herpetic lesions, vesicle fluid, vaginal and urethral secretion
- From infected mother to neonate (**neonatal herpes**) mainly perinatally (**during labor and delivery**)

## Target Group:

- HSV-2 infects sexually active adults, especially those with multiple sexual partners.

# Genital Herpes (Continued)

## Pathogenesis:

- HSV-2 enters the body through the mucous membrane of the genitalia, or through abraded or traumatized skin
- After entry, the virus replicates at the portal of entry
- After resolution of primary infection, the virus travels along the neurons to the sacral ganglia and remains latent for life.
- The latent virus may be reactivated under certain stimuli and recurrent herpetic infection occurs
- When the virus is reactivated, it travels back from the sacral ganglia through nerve axon to the same site of primary infection
- The virus remains latent in an episomal form (**plasmid**)
- During latency, no viral genes are expressed.

# Genital Herpes (Continued)

## 1. Primary Genital Herpes:

- Primary infection is usually asymptomatic
- Symptomatic infection is characterized by:
  - Localized pain
  - Erythema
  - Edema
  - Inguinal lymphadenopathy
  - And the development of localized vesicular rash
  - Vesicles rupture to form ulcer
  - Herpetic lesions appear on the glans or shaft of the penis in man, and on vulva, vagina, and cervix in woman.
- In both sexes the urethra can be involved
  - Lesions heal after 12 days
  - After resolution of primary infection the virus travels from the genitalia via neurons to the sacral ganglion. The virus remain latent.

# Genital Herpes (Continued)

## 2. Neonatal Herpes:

- Neonatal herpes is a rare condition and often fatal to the neonate
- It occurs when the mother is shedding the virus at the time of delivery (primary infection)
- The neonate acquires the virus during the passage in the birth canal\
- Since the neonate is not immune to HSV-2, the virus spread to many organs such as lungs, liver, and the CNS.
- Neonatal herpes may take three forms:

### A. Generalized Infection:

- The virus disseminates through the neonatal organs and often fatal
- Clinical features include:

# Genital Herpes (Continued)

- Hepatosplenomegaly
- Thrombocytopenia
- Pneumonia
- Encephalitis

## B. Encephalitis:

- Due to direct invasion of the brain
- The mortality rate is high

## C. Cutaneous Lesions:

- Confined to the skin
- Prognosis is good



# Genital Herpes (Continued)

## Recurrent Infection:

- Recurrent infection is usually mild and lasts for few days (5 days)
- Usually few vesicles develop on the external genitalia, with mild local symptoms such as pain and itching
- Lesions usually last 2-5 days.

The reactivated virus travels back from the sacral ganglion through neurons to the genital areas.

## Lab Diagnosis:

1. Isolation of the virus in tissue culture, followed by identification of the isolated virus.
  - Inoculate: Vero, hep-2
  - Observe: for development of CPE
  - Identify the isolated virus by direct IF.

# Genital Herpes (Continued)

## Lab Diagnosis:

2. Scraping from the base of the vesicles
  - Method of diagnosis: direct IF
3. Detection of IgM-Ab
4. Detection of HSV-2 DNA using PCR
  - This method is limited to life threatening conditions such as encephalitis.

## Vaccine:

- There is no vaccine is available yet for HSV-2.

## Prevention:

- Avoid sexual contact with individuals who have genital herpes
- Practice safe sex, by having one sexual partner

# Genital Herpes (Continued)

## Treatment:

- Acyclovir (orally)
  - 400 mg thrice daily for 10 days
- Famciclovir
  - 250 mg orally thrice daily/5 days
- Valacyclovir
  - 1 g orally twice daily / 10 days.

## The link between HSV-2 and Cervical Cancer:

- Recent study showed that:
  - HSV-2 infects the tissue of the surface of the cervix, causing ulcerated lesions.
  - Therefore, they serve as co-factor for HPV infections and subsequent cervical cancer.
  - HSV-2 makes it easier for HPV to get deeper into the cervical tissue.