Viral Skin Infections

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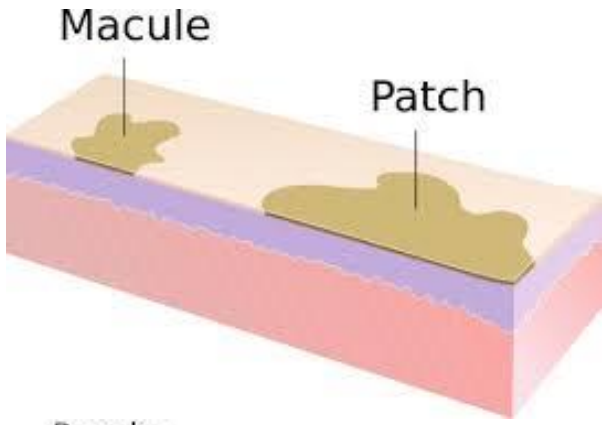
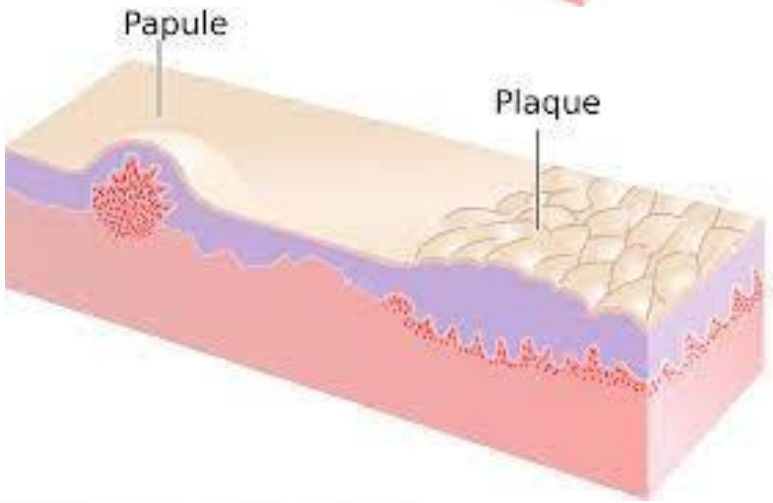
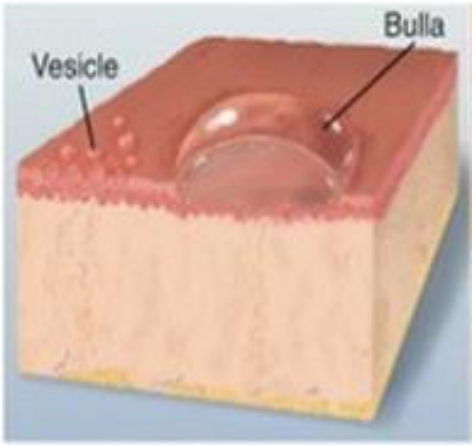
MSS Module

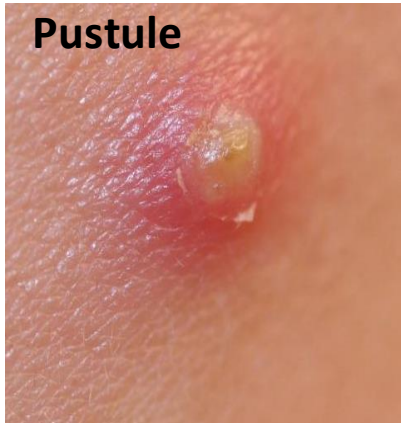
Terminology

- **Macule**: Flat, nonpalpable lesions usually <10 mm in diameter.
- **Patch**: A large macule.
- **Papule**: Elevated lesions usually <10 mm in diameter that can be palpated
- **Plaque**: Palpable lesions >10 mm in diameter that are elevated or depressed compared to the skin surface.
- **Vesicle**: Clear, fluid-filled blisters <10 mm in diameter
- **Bulla**: Clear fluid-filled blisters > 10 mm in diameter.
- **Pustule** : Pus filled blisters <10 mm in diameter.
- **Reticulated**: Networked pattern









Viral skin infections

Localized

- Herpes simplex (cold sores and genital herpes)
- Herpes zoster (shingles)
- Molluscum contagiosum
- Viral warts (genital warts or condylomas and squamous cell papillomas)

Childhood viral infections cause widespread rashes (exanthems)

- Measles (**morbilli**, rubeola, red measles, English measles).
- German measles (rubella)
- Chickenpox (varicella)
- Erythema infectiosum (parvovirus)
- Roseola (herpes virus 6 and 7)

Herpes Simples Virus (HSV)

HSV-1 and HSV-2:

Transmission

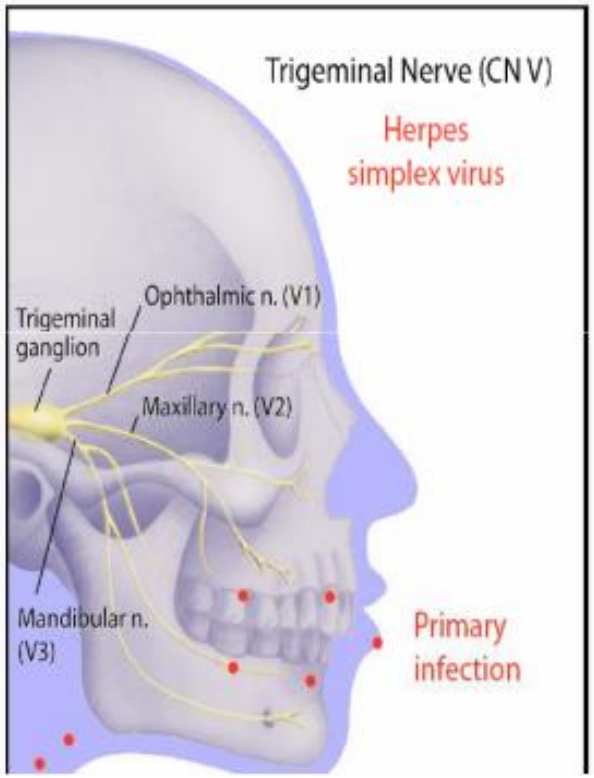
- **HSV1:** Saliva or direct contact with virus from the vesicle.
- **HSV2:** Sexual contact and during birth.

Diseases

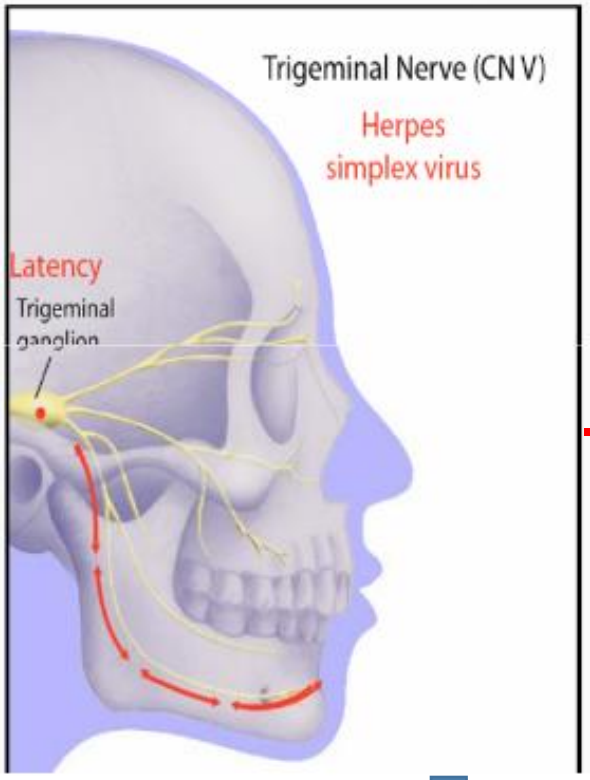
- HSV-1 (lesions are above the waist):
  - acute gingivostomatitis, recurrent herpes labialis (cold sores), keratoconjunctivitis (keratitis),herpetic whitlow and encephalitis.
  - the virus travels up the axon and becomes latent in sensory (trigeminal) ganglia.
- HSV-2 (lesions are below the waist):
  - herpes genitals (genital herpes), neonatal herpes, and aseptic meningitis.
  - latent in sensory (lumbar or sacral) ganglion cells.

Pathogenesis

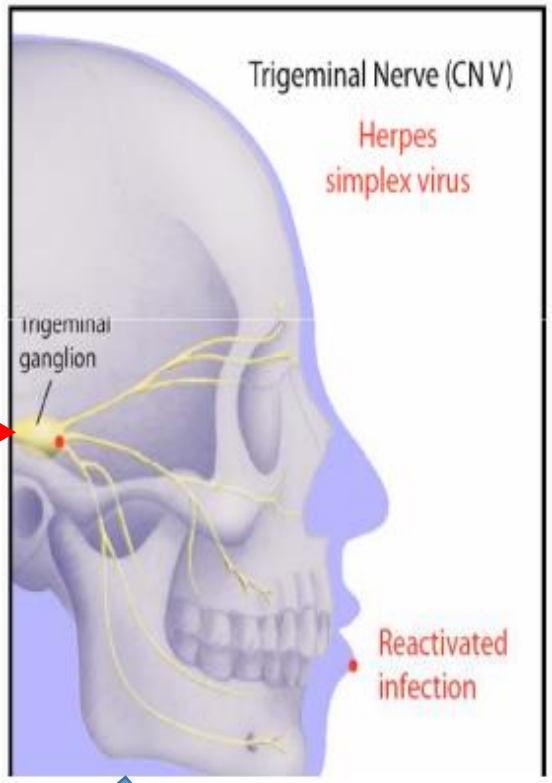
Primary infection



Latent infection



Reactivation

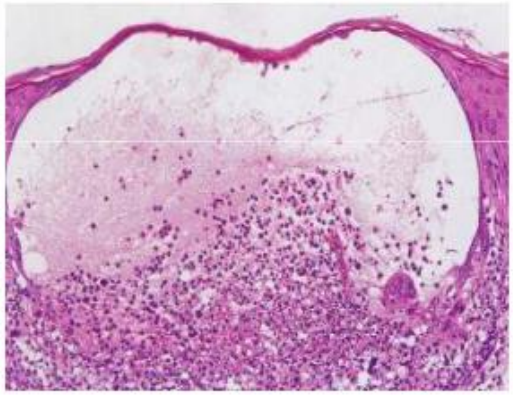


Reactivation

Cold
fever
Surgery
Stress
Trauma
unknown

HSV-1 &HSV-2/ Pathogenesis

Intraepidermal vesicle produced by profound degeneration (Ballooning) of epidermal cells → marked 2ry acantholysis.



Acantholysis: loss of coherence between epidermal cells due to the breakdown of intercellular bridges.

Laboratory Diagnosis:

- Cytopathic effect (CPE) in cell culture.
- Tzanck smear of cells from the base of the vesicle reveals multinucleated giant cells with intra-nuclear inclusions.
- A rise in antibody titer can be used to diagnose a primary infection but not recurrences.
- HSV-1 encephalitis by PCR.

Herpes Simples Virus (HSV)

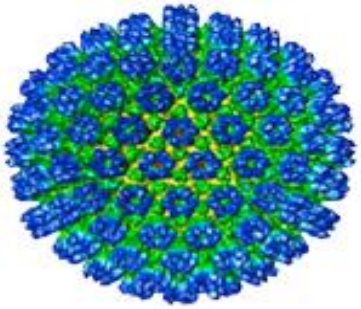
Treatment and Prevention:

- Protection from exposure to vesicular lesions.
- Recurrences can be prevented by avoiding the specific inciting agent.
- Acyclovir can reduce recurrences.
- Neonatal infection can be prevented by cesarean section.
- No vaccine is available.

Human herpes viruses 6 and 7

Cause a benign disease of young children between 6 months and 2 years old called **exanthem subitum (roseola),** which is characterized by a rapid onset fever and an immune-mediated generalized rash.

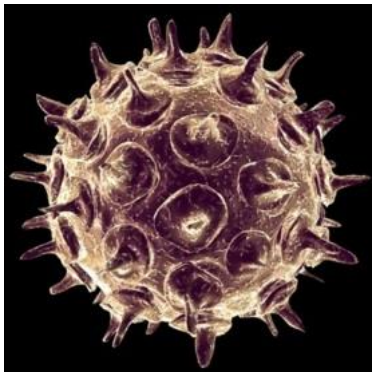
Human Herpes virus 8



- Causes Kaposi's sarcoma, especially in AIDS patients.
- Purple color of lesions due to collections of venous blood.
- Transmitted sexually.
- Diagnosis made by biopsy.
- No specific antiviral treatment and no vaccine.

Kaposi's sarcoma

Varicella-Zoster Virus

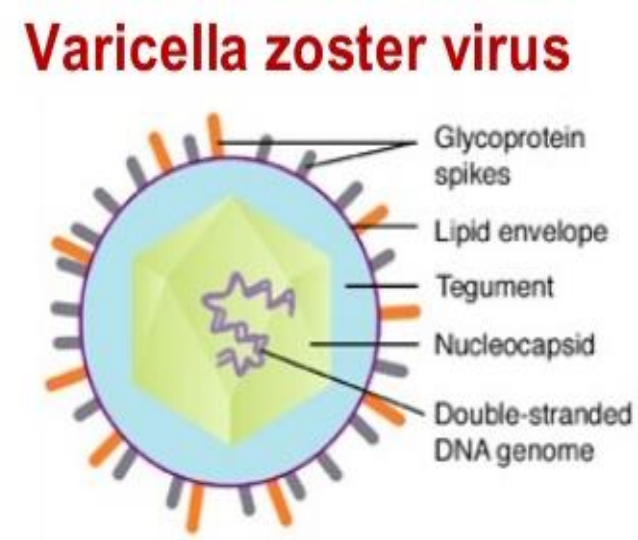


Diseases:

- Varicella (chickenpox) in children
- Zoster (shingles) in adults.

Characteristics:

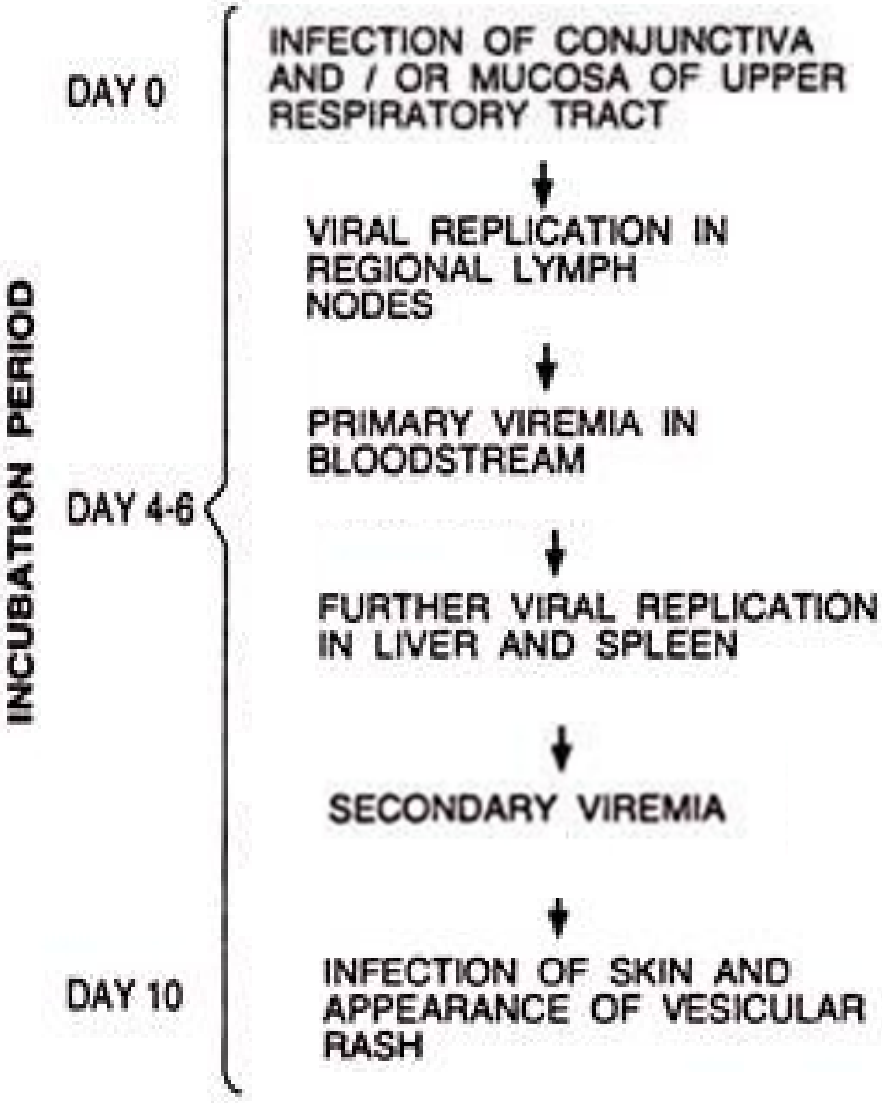
- Enveloped virus with icosahedral nucleocapsid and linear double-stranded DNA.
- One serotype.

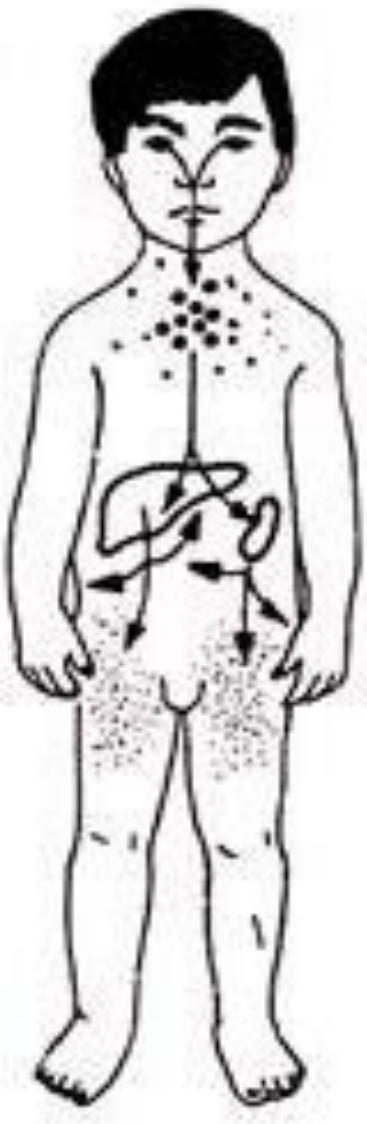


Pathogenesis of Varicella (chickenpox)

Transmission

Varicella →respiratory droplets.





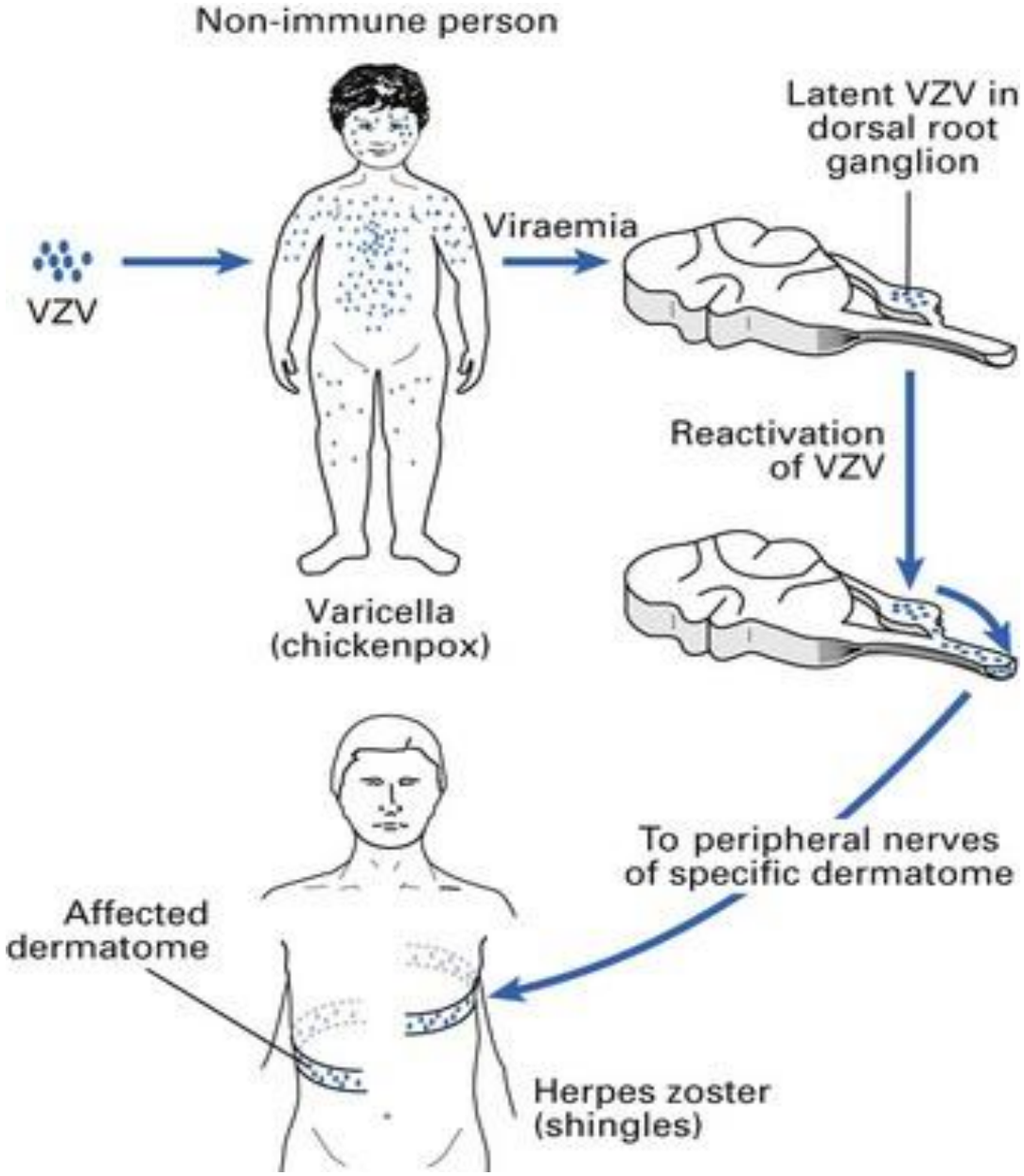
Manifestations

Varicella (Chickenpox)

- Lesions generally appear on the back of the head and ears, and then spread centrifugally to the face, neck, trunk, and proximal extremities.
- Involvement of mucous membranes is common.
- Fever may occur early in the course of disease.
- Skin lesions form rapidly as fluid-filled vesicles that are itchy.
- Immunocompromised children may develop progressive varicella, visceral dissemination as well as pneumonia, encephalitis, hepatitis, and nephritis (mortality rate of 20%).
- After the acute episode of varicella, the virus remains latent in the sensory ganglia and can reactivate to cause zoster years later, especially in older and immunocompromised individuals.

Pathogenesis of Zoster

Shingles



Manifestations

Herpes Zoster (Shingles)

- Reactivation of VZV is associated with shingles.
- Shingles greatly increases with advancing age.
- Clinically, pain in a sensory nerve distribution may sign the onset of the eruption, which occurs several days to 1 or 2 weeks later.
- The vesicular eruption is usually unilateral, involving one to three dermatomes.
- Immunosuppressed patients may develop localized zoster , visceral infection, bacterial superinfection is also possible.

Varicella-Zoster Virus

Diagnosis

- Based on clinical symptoms
- A four-fold or greater rise in antibody titer in convalescent-phase serum is diagnostic.
- Immunofluorescent staining or PCR

Treatment

- VZV is less susceptible than HSV to acyclovir, so the dosage for treatment is substantially higher.
- Famciclovir or valacyclovir are more effective.

• Prevention

High-titer immune globulin (VariZig) administered within 96 hours of exposure is useful in preventing infection or ameliorating disease in patients at risk for severe primary infection.

Smallpox Virus

Disease:

Smallpox

One serologic type.

Transmission:

Respiratory droplets or direct contact

Pathogenesis:

- The virus infects the mucosal cells of the URT→ the local lymph nodes → viremia → the liver and spleen → later the skin.
- Skin lesions: macule, papule, vesicle, pustule, crust.

Laboratory Diagnosis:

- CPE in cell culture, Electron microscopy ,Viral antigens in the vesicle fluid by precipitin tests.

Treatment: None.

Prevention: vaccine contains live, attenuated vaccinia virus.

Molluscum Contagiosum Virus

- Causes:
  - pinkish, papular skin lesions with an umbilicated center.
  - Lesions usually on the face, especially around the eyes.
- Transmitted by direct contact.
- Diagnosis made clinically.
- There is **no** antiviral **therapy** and **no vaccine**.
- Cidofovir may be useful in the treatment of the extensive lesions that occur in immunocompromised patients.

Parvovirus B19

Causes Fifth Disease or erythema infectiosum.

- known for a rash that makes a child's cheeks bright red "slapped cheek rash ".
- Spreads in droplets.
- Affect kids ages 5 to 15.
- A few days later, the rash spreads down to the trunk, arms, and legs. It usually lasts 1 to 3 weeks.
- The rash can be itchy. After a few days, it takes on a lacy net-like appearance.

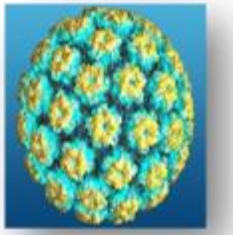
What Are the Signs & Symptoms of Fifth Disease?

- Usually asymptomatic, Low fever, headache
- a stuffy or runny nose
- Then rash appears
- **How Is Fifth Disease Diagnosed?**
- Clinically, P CR, Serologic tests.

How Is Fifth Disease Treated?

- In most cases, it is a mild illness that clears up on its own, so no medicine is needed.

Human Papillomavirus (HPV)



Diseases:

- Papillomas (cutaneous warts); condylomata acuminata (genital warts); associated with carcinoma of the cervix and penis.
- There are at least 60 types

Transmission:

Direct contact of skin or genital lesions.

Human Papillomavirus

Pathogenesis:

- Two early viral genes, E6 and E7, encode proteins that inhibit the activity of proteins encoded by tumor suppressor genes (p53 gene and the retinoblastoma gene, respectively).

Laboratory Diagnosis:

- Diagnosis is made clinically
- DNA hybridization tests are available

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Human papillomavirus as an independent risk factor of invasive cervical and endometrial carcinomas in Jordan

Mohammad A. Abu-Lubad[a,*], Dua'a A. Jarajreh[a], Ghada F. Helaly[a,b], Hamed M. Alzoubi[a], Weliam J. Haddadin[c], Mahmoud D. Dabobash[d], Eman M. Albataineh[a], Amin A. Aqel[a], Nedal A. Alnawaiseh[e]

Measles Virus (rubeola)

Transmission:

- Airborne transmission

Pathogenesis:

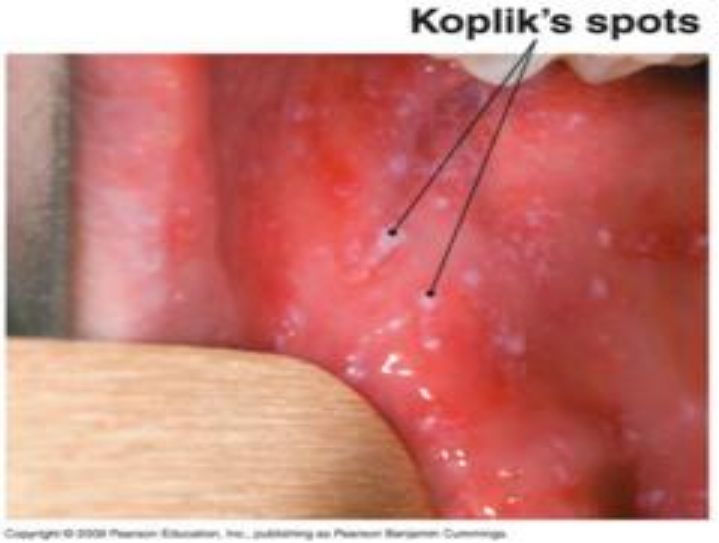
Upper respiratory tract → local lymph nodes → blood →to other organs, including the skin.

Disease:

Measles : maculopapular rash , Koplik spots on buccal mucosa.

Complications including

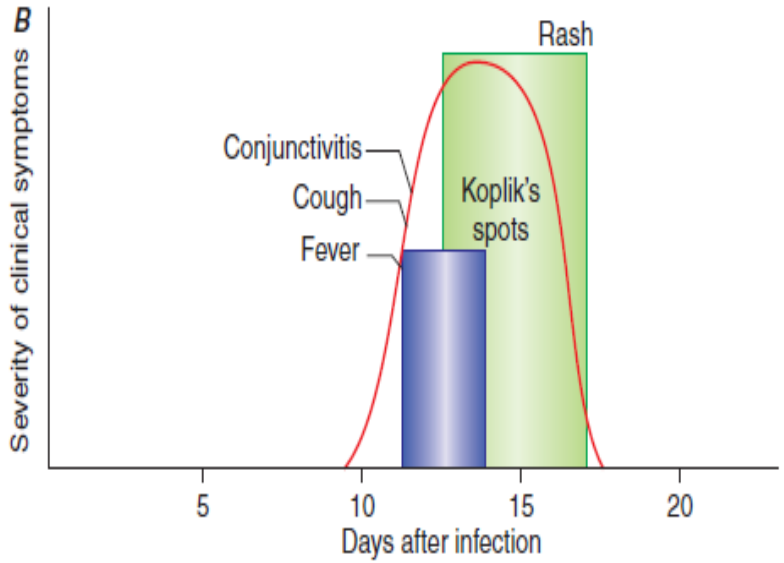
- post-infectious encephalitis
- giant cell pneumonia
- Subacute sclerosing panencephalitis (SSPE)



highly characteristic of the prodromal pha
measles and regarded as a pathognomon
feature of measles

Pathogenesis

- The incubation period for measles is ~10 days to fever onset and 14 days to rash onset. It is up to 3 weeks in adults.



B: Appearance of clinical signs and symptoms, including Koplik's spots and rash.

Sings and symptoms:

- Malaise
- **C**ough, **C**oryza, and **C**onjunctivitis -the three "C"s -.
- A pathognomonic enanthema (Koplik spots) followed by a maculopapular rash.

Laboratory Diagnosis:

- Clinical diagnosis.

Treatment: No antiviral therapy.

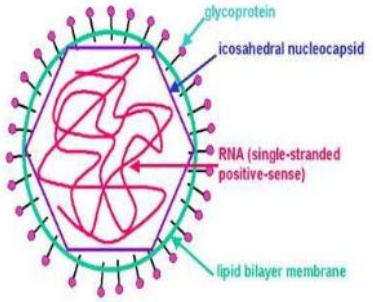
Prevention: live, attenuated vaccine.

German Measles (Rubella Virus)

Disease:

Rubella: subclinical or symptomatic.

- Symptoms include a 3- to 5-day rash and swollen neck and sub-occipital lymph nodes.
- More severe disease in adults, complicated by arthralgia, arthritis, and a post-infectious encephalitis
- Congenital rubella syndrome is characterized by congenital malformations, especially affecting the cardiovascular and CNS, and by prolonged virus excretion.



German Measles (Rubella Virus)

Transmission: Respiratory and trans-placental

Pathogenesis: nasopharynx→ to local lymph nodes→ blood→ skin.

During maternal infection, infection during the first trimester→ congenital malformations .

Laboratory Diagnosis: PCR assay, IgM, IgG antibody

Treatment: No antiviral therapy.

Prevention: live, attenuated Vaccine.

The name rubella is derived from Latin, meaning "little red." Rubella was initially considered to be a variant of measles or scarlet fever. It was not until 1814 that it was first described as a separate disease in the German medical literature, hence the common name "German measles."

Three-Day Measles

Viral infections of the skin

Maculopapular rash, does not involve palm and sole

Rubella (German measles)

- Erythematous papular rash begins on face then spreads to trunk

Congenital infection is highly pathologic (major birth defects and death)

Viral infections of the skin

Macules to Papules, Vesicles to Crust

Viral infections of the skin

Why called fifth disease: comes from its place on the standard list of rash-causing childhood diseases

1- measles (first), 2- scarlet fever (second)

3- rubella (third),

4- Dukes' disease (fourth)

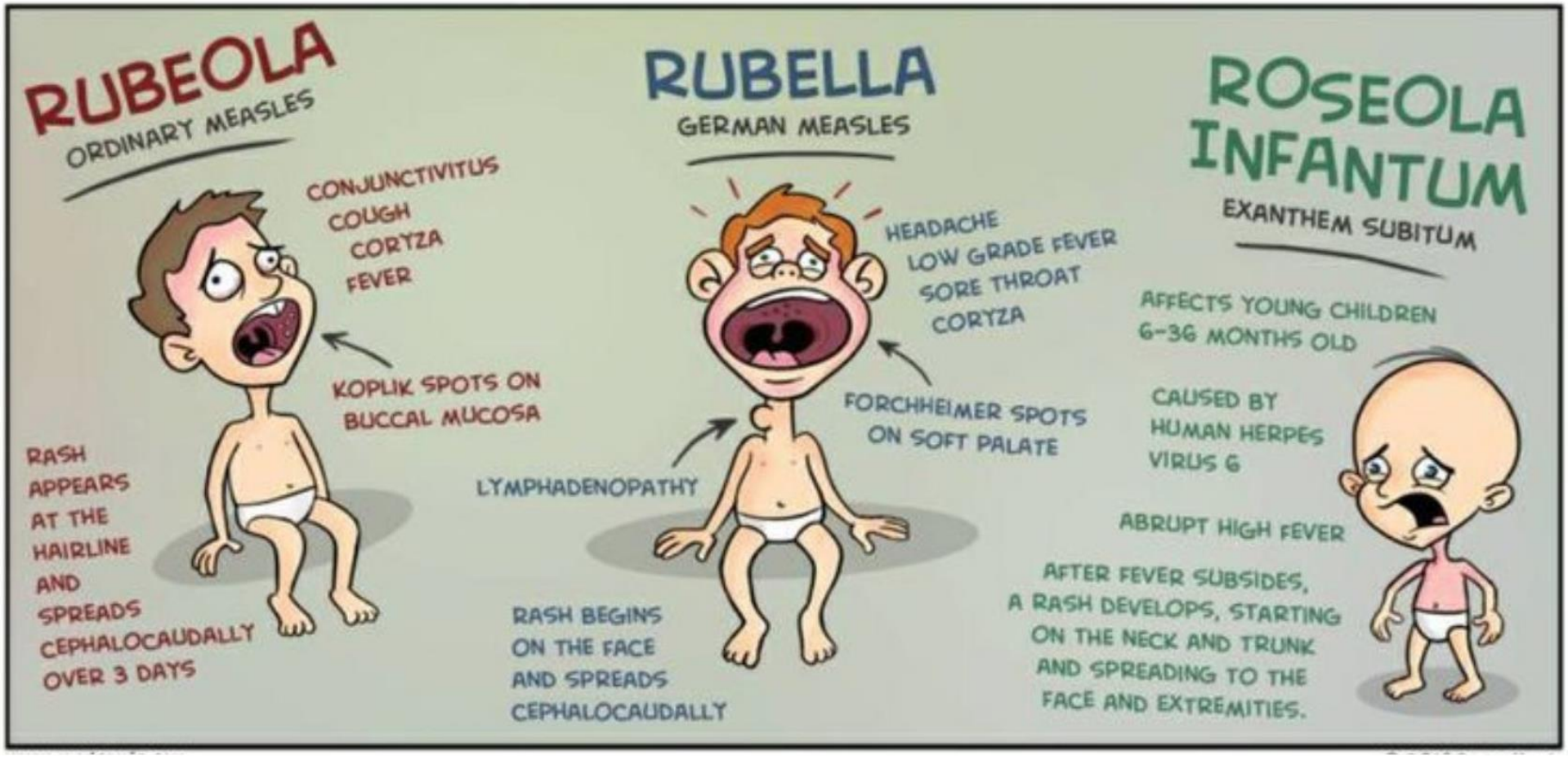
5- erythema infectiosum (fifth).

Erythema Infectiosum

or fifth disease

Slapped Cheek Syndrome

Rubeola vs. Rubella vs. Roseola Infantum



Viral Infections of the Skin and Eyes

Disease	Pathogen	Signs and Symptoms	Transmission	Antimicrobial Drugs
Fifth disease	Parvovirus B19	May have initial cold-like symptoms; “slapped cheek” rash	Highly contagious via respiratory secretions of infected individuals	None
Herpes keratitis	Herpes simplex virus 1 (HSV-1)	Inflammation of conjunctiva and cornea; irritation, excess tears, sensitivity to light; lesions in cornea leading to blindness	Direct eye contact with discharge from herpes lesions elsewhere in the body or from another infected individual	Acyclovir, ganciclovir, famiclovir, valacyclovir
Oral herpes	Herpes simplex virus 1 (HSV-1)	May cause initial systemic symptoms; cold sores	Highly contagious via direct contact with infected individuals	Acyclovir, penciclovir, famiclovir, valacyclovir
Papillomas	Human papillomavirus (HPV)	Common warts, plantar warts, flat warts, filiform warts, and others	Contact with infected individuals	Topical salicylic acid, cantharidin
Roseola (roseola infantum, exanthem subitum)	Human herpesvirus 6 (HHV-6), human herpesvirus 7 (HHV-7)	Initial cold-like symptoms with high fever, followed by a macular or papular rash three to five days later	Spread by viral and respiratory secretions of infected individuals	Typically none; ganciclovir for immunocompromised patients
Viral conjunctivitis	Adenoviruses and others	Inflammation of the conjunctiva; watery, nonpurulent discharge	Associated with common cold; contagious via contact with eye discharge	None