Viral skin diseases

- Many childhood diseases show distinctive skin rashes, exanthems, caused by viruses carried to skin by the blood from the upper respiratory tract.
- These diseases are usually diagnosed by inspection of the rash and other clinical findings.
- If the disease does not show typical signs, other tests such as presence of virus specific antibody, and cultivation of the virus from skin lesions, upper respiratory secretions or other material can be performed.

Causative agent for chickenpox or shingles

- Chickenpox is the common name for varicella and it is the most common of the viral rashes of childhood.
- Reactivation of chickenpox is called singles or herpes-zoster.
- The causative varicella-zoster virus is a member of the herpes virus family and produces a latent infection (reactivation long after recovery from the initial illness).
- It is an enveloped, medium size, double-stranded DNA virus.

Chickenpox (varicella)

Symptoms

- Incubation period 10-21 days
- Most cases are mild and recovery is usually uncomplicated.
- The typical case has a rash which is diagnostic.
- The rash begins as small red spot called macules, little bumps called papules, and small blisters called vesicles, surrounded by a narrow zone of redness.
- The lesions can erupt anywhere on the body. However, they usually appear first on the back of head followed by face, mouth,main body, arms and legs.
- They can appear at different times, and within a day or so they change from macule to papule to vesicle to pustule, a pus filled blister.

Chickenpox (varicella)

- Pustules break, leaking virus-laden fluid, a crust forms, and then healing takes place.
- The lesions are pruritic (itchy) and scratching may lead to serious, even fatal, secondary infection by *Streptococcus pyogenes* or *Staphylococcos aureus*.
- Symptoms are more severe in older children and adults. In about 20% adults, pneumonia develops.
- Varicella is a major threat to newborn if mother develops the disease within 5 days before delivery to 2 days afterward.
- Congenital varicella syndrome develops in some babies if mother contracts varicella in pregnancy.
- The disease is a threat to immunocompromised patients of any age.

Shingles or herpes zoster

Symptoms

- Reactivation of chickenpox is called shingles, or herpes zoster. It can occur at any age and becomes increasing common with advancing age.
- It starts with pain in the area supplied by a sensory nerve, often on chest or abdomen but sometime on the face or an arm or leg.
- After a few days to two weeks, a rash characteristic of chickenpox appears, but unlike chickenpox the rash is usually restricted to an area supplied by the branches of the involved sensory nerve.
- The rash generally subsides within a week, but pain may persist for weeks, months or longer.
- In immunocompromised individuals like in AIDS patients, disease may spreads to involve the entire body, as in a severe case of chickenpox.

Chickenpox

Pathogenesis	Upper respiratory virus multiplication followed by dissemination via bloodstream to the skin; cytopathic effect of virus includes the formation of giant cells and intranuclear inclusion bodies.
• The virus enters the sensory nerves and the occurrence of shingles correlates with a decline in cell-mediated immunity.	
Epidemiology	Highly infectious. Acquired by the respiratory route; humans, both individuals with chickenpox and those with shingles, the only source; dissemination is from skin lesions and respiratory secretions
• Cases are infective from 1-2 days before the rash appears until all the lesions have crusted (~4 days)	
Prevention and treatment	Attenuated vaccine. Passive immunization with zoster immune globulin (ZIG) for immuno-compromised individuals; acyclovir or similar antiviral medication
• Vaccine is not given during pregnancy, and pregnancy should be avoided for 3 months after vaccination.	

Chickenpox

① Varicella-zoster virus is inhaled, infects nose and throat.

② The virus infects nearby lymph nodes, reproduces, and seeds the bloodstream.

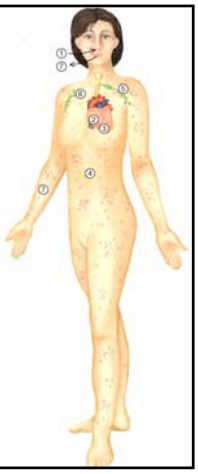
③ Infection of other body cells occurs, resulting in showers of virions into the bloodstream.

④ These virions cause successive crops of skin lesion which evolve into blisters and crusts.

⑤ Immune system eliminates the infection except for some virions inside the nerve cells.

⑥ If immunity wanes with age or other reason, the virus persisting in the nerve ganglia can infect the skin, causing herpes zoster.

⑦ Transmission to others occurs from respiratory secretions and skin.



Measles (Rubeola)

- Measles, 'hard measles', and 'red measles' are other common name for rubeola.
- Dramatic reduction in measles cases by immunizing children with an attenuated vaccine and it may be entirely eliminated from the world soon.

Symptoms

- Measles begins with fever, runny nose, cough, and swollen, red weepy eyes.
- Within a few days, a fine red rash appear on the forehead and spreads outward over the rest of the body.
- Unless complication occur, symptoms generally disappear in about 1 week.
- Many cases are complicated by secondary infections which cause earaches and pneumonia.
- In some cases, the rubeola virus itself can cause pneumonia and encephalitis.
- Very rarely, rubeola is followed 2 to 10 years later by a disease called 'subacute schlerosing panencephalitis' (SSPE), which is a slowly progressive degeneration of brain.

Measles

Incubation period	10 to 12 days
Causative agent	Rubeola virus, a single-stranded, negative-sense RNA virus of the paramyxovirus family
Pathogenesis	Virus multiplies in respiratory tract; spreads to lymphoid tissue, then to all parts of body, notably skin, lungs, and brain; damage to respiratory tract epithelium leads to secondary infection of ears and lungs
Epidemiology	Acquired by respiratory route; highly contagious; humans only source
Prevention and treatment	Attenuated virus vaccine after age 12 months; second dose upon entering elementary school or at adolescence. No antiviral treatment available at present.

Measles virus temporarily suppresses cellular immunity.

Mucous membrane involvement is responsible for an important diagnostic sign called 'koplik spots' (opposite of molars).

Measles vaccine is usually given together with mumps and rubella vaccines, MMR.

Measles

① Airborne rubeola virus infects eyes and upper respiratory tract, then the lymph nodes in the region.

② Virus enters the bloodstream and is carried to all parts of the body including the brain, lungs, and skin.

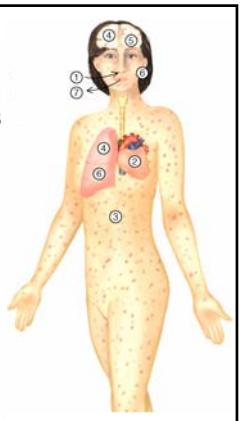
③ Skin cells infected with the rubeola virus are attacked by immune T cells, causing a generalized rash.

④ Virus replicating in the lungs can cause pneumonia; the brain can also be infected.

⑤ In rare cases, virus persisting in the brain causes subacute sclerosing panencephalitis, months or years after the acute infection.

⑥ Secondary infection of the ears and lungs is common.

⑦ Transmission is by respiratory secretions.



German measles

- 'German measles' and 'three day measles' are common names for rubella.
- In contrast to varicella and rubeola, rubella is typically a mild disease.
- However, infection of pregnant women can have tragic consequences.

Symptoms

- Characteristic symptoms are slight fever, mild cold symptoms and enlarged lymph nodes behind the ears and on the back of the neck.
- After about a day, a faint rash consisting of innumerable pink spots appear over the face, chest and abdomen.
- Unlike rubeola, no diagnostic mouth lesions in rubella infection.
- Adults commonly develops painful joints, with pain generally lasting 3 weeks or less. However, in pregnant women rubeola is a threat to fetus and causes 'congenital rubella syndrome'.

German measles

Pathogenesis •Incubation period: 14-21 days •Causative agent: Rubella virus, an RNA virus of the togavirus family.	Following replication in the upper respiratory tract, virus disseminates to all parts of the body and crosses the placenta; surviving fetuses often develop abnormally, and they excrete the virus for months after birth
Epidemiology	Virus possibly present in nose and throat from 1 week before rash to 1 week after; infection occurs via the respiratory route; humans are the only source
Prevention and treatment	Attenuated rubella virus vaccine administered to children at 12 to 16 months, repeated at 4 to 6 years of age. No specific antiviral treatment

German measles

① Airborne rubella virus infects nose and throat.

② Virus taken up by lymph nodes in the region.

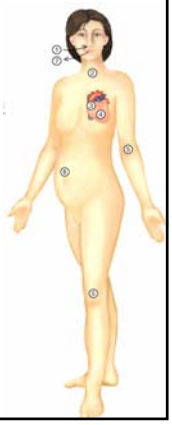
③ Rubella virus multiplies and enters the bloodstream.

④ Circulating virus reacts with antibodies, resulting in antibody-antigen complexes.

⑤ Antibody-antigen complexes lodge in the skin, causing a rash and pain in the joints.

⑥ In women during pregnancy, rubella virus crosses the placenta, infecting the fetus, resulting in congenital rubella syndrome.

⑦ Transmission to others by respiratory secretions.



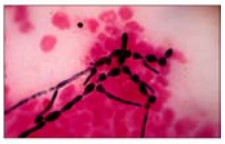
Fungal skin diseases

- Disease caused by fungi are called mycoses.
- The yeast *Candida albicans* may live harmlessly among the normal flora of the skin,
- But in some people it invades the deep layers of the skin and subcutaneous tissues; however, no precise cause for the invasion can be determined.

Superficial cutaneous mycoses

- Certain species of molds can invade hair, nails, and the keratinized portion of the skin.
- The resulting mycoses have colorful names such as jock itch, athlete's foot and ringworm etc.

Candida albicans: causing diaper rash



C. Albicans: yeast form and filamentous forms called pseudohyphae.

Superficial cutaneous mycoses

Symptoms:

- Most people colonized by these molds have no symptoms at all while others complain of itching, a bad odor, or a rash.
- In ringworm, a rash occurs at the site of the infection and consists of a scaly area surrounded by redness at the outer margin, producing irregular rings or a lacy pattern on the skin.
- Involved nails become thickened and brittle and may separate from the nailbed.
- Causative agents: The skin-invading molds belong to the genera *Epidermophyton*, *Microsporum*, and *Trichophyton* and are collectively termed dermatophytes.

Dermatophytosis: Tinea pedis caused by *Trichophyton* sp.

Spores of *Microsporum gypseum*, a cause of scalp ringworm

Superficial cutaneous mycoses

Pathogenesis:

- In conditions of excessive moisture, dermatophytes can invade keratinized structures.
- A keratinase enzyme enables them to dissolve keratin and use it as nutrient.

Prevention and treatment:

- Cleanliness and maintenance of normal dryness of the skin and nails effectively prevent dermatophytes.
- Certain powders and medications are available for treating dermatophytoses.

Next lecture

- Chapter 23: Respiratory system infections