UNIVERSITY OF South Carolina

Measles Virus (Attenuated)

General Information

Measles virus is an enveloped, single-stranded RNA virus that belongs to the *Paramyxoviridae* family and the genus *Morbillivirus*. Live attenuated measles virus strains are used as vaccines. Vaccine strains are available as either monovalent vaccines or in combination with either rubella (MR) or mumps and rubella (MMR).

Host Range

Humans are the natural host. Nonhuman primates can also be a host.

Incubation Period

Since the attenuated measles virus is an immunizing agent, there is no incubation period. The time it takes to become immunized is usually 2-3 weeks.

Survival Outside Host

Less than 2 hours in the air or on objects and surfaces.

Laboratory Hazards

Wild-type measles virus is transmitted primarily by direct contact while airborne droplet and indirect contact are less common modes of transmission.

Symptoms of Exposure

Reactions to the vaccine can include soreness, redness, or rash at the site of inoculation and rash over the entire body. Fever and swelling of the glands in the cheeks or neck can occur as well. More serious but rare reactions include seizures, pain and stiffness in the joints and pneumonia.

Lab Acquired Infections (LAIs)

No reported cases for attenuated measles virus.

Personal Protective Equipment

Disinfection & Inactivation

Susceptible to many disinfectants including 70% ethanol, 1% sodium hypochlorite, formaldehyde, hydrogen peroxide, and phenolic disinfectants. Measles virus is rapidly inactivated by heat, sunlight, and acidic pH.

Waste Management

Refer to USC's Biological and Infectious Waste Management Plan .

Lab Containment

Biosafety Level 2 (BSL-2) for activities with materials and cultures known or reasonably expected to contain attenuated measles virus.

Animal Containment

Animal Biosafety Level 2 (ABSL-2) for activities with experimentally infected animals.

Medical Surveillance/Treatment

Surveillance: Monitor for symptoms, microbiological and serological testing for measles or anti-measles antibodies.
Prophylaxis: For wild-type measles virus, immunization with the MMR vaccine can be given up to 72 hrs. post exposure to prevent measles in unvaccinated individuals. If the vaccine is contraindicated, passive immunization with measles immunoglobulin can be given 72 hrs. to 6 days post exposure.
Vaccines: N/A
Treatment: Supportive care, no treatments currently exist.

Spill Procedures

See USC Biological Spill Procedures

Exposure Procedures

See USC Protocol for Post Exposure Evaluation and Follow-up . Use of sharps should be strictly limited. All procedures with the potential for creating aerosols should be performed in a biosafety cabinet.

References

Public Health Agency of Canada. Pathogen Safety Data Sheets: Infectious Substances – Measles virus

Baldo A, *et al*. Biosafety considerations for attenuated measles virus vectors used in virotherapy and vaccination. Human Vaccines & Immunotherapeutics 2016; 12 (5)