
REOVIRUS

MAMMALIAN ORTHOREOVIRUS 1 (ATCC VR-230)

REOVIRUS TYPE 2 (ATCC VR-231)

REOVIRUS 3 (ATCC VR-824)

PATHOGEN SAFETY DATA SHEET / INFECTIOUS SUBSTANCES

INFECTIOUS AGENT

NAME: Reovirus

GENERAL: *Reoviridae* is a family of viruses that can affect the gastrointestinal system and respiratory tract. Viruses in the family *Reoviridae* have genomes consisting of segmented, double-stranded RNA (dsRNA). The name "*Reoviridae*" is derived from respiratory enteric orphan viruses. The term "orphan virus" means that a virus is not associated with any known disease. Even though viruses in the *Reoviridae* family have more recently been identified with various diseases, the original name is still used.

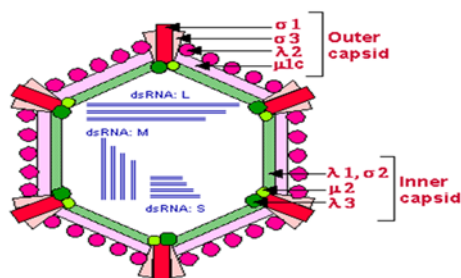
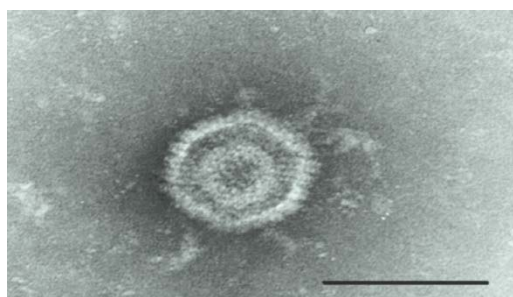
Reovirus infection occurs often in humans, but most cases are mild or subclinical. Rotavirus, however, can cause severe diarrhea and intestinal distress in children. Reovirus can be readily detected in feces, and may also be recovered from pharyngeal or nasal secretions, urine, cerebrospinal fluid, and blood. Despite the ease of finding reovirus in clinical specimens, their role in human disease or treatment is still uncertain.

The reovirus has been demonstrated to have oncolytic (cancer-killing) properties and has encouraged the development of reovirus-based therapies for cancer treatment. Reolysin is a formulation of reovirus that is currently in clinical trials for the treatment of various cancers.

Some viruses of this family infect plants. Examples are Phytoreovirus and Oryzavirus.

CHARACTERISTICS: Reoviruses are non-enveloped and have an icosahedral capsid (T-13) composed of an outer and inner protein shell. The genomes of viruses in *Reoviridae* contain 10-12 segments which are grouped into three categories corresponding to their size: L (large), M (medium) and S (small). Segments range from ~ 3.9 kbp – 1kbp and each segment encodes 1-3 proteins. *Reoviridae* proteins are denoted by the Greek character corresponding to the segment it was translated from (the L segment encodes for λ proteins, the M segment encodes for μ proteins and the S segment encodes for σ proteins).

Since these viruses have dsRNA genomes, replication occurs exclusively in the cytoplasm and the virus encodes several proteins which are needed for replication and conversion of the dsRNA genome into (+)-RNAs. The virus can enter the host cell via a receptor on the cell surface. The receptor is not known but is thought to include sialic acid and junctional adhesion molecules (JAMs). The virus is partially uncoated by proteases in the endolysosome, where the capsid is partially digested to allow further cell entry. The core particle then enters the cytoplasm by a yet unknown process where the genome is transcribed conservatively causing an excess of (+) sense strands, which are used as mRNA templates to synthesize (-) sense strands. Viral particles begin to assemble in the cytoplasm 6–7 hours after infection.



Electron microscope micrograph of avian reovirus virus¹⁾

Reovirus structure²⁾

NAME:

Mammalian orthoreovirus 1 (ATCC VR-230), classification: *Reoviridae*, Orthoreovirus

Reovirus type 2 (ATCC VR-231), classification: *Reoviridae*, Reovirus

Reovirus 3 (ATCC VR-824), classification: *Reoviridae*, Orthoreovirus, mammalian orthoreovirus

HAZARD IDENTIFICATION

These substances are not hazardous as defined by OSHA 29CFR 1910.1200 however these products (Mammalian orthoreovirus 1 ATCC VR-230, Reovirus type 2 ATCC VR-2310, and Reovirus 3 ATCC VR-824) should be handled according to good lab practices, with proper personal protective equipment, proper engineering controls and within the parameters of the purchaser’s safety program.

HEALTH HAZARDS: American Type Culture Collection (ATCC) recommends that all ATCC microbial cultures be handled by qualified microbiologists using appropriate safety procedures and precautions. Detailed discussions of laboratory safety procedures are provided e.g. in the U.S. Government Publication, Biosafety in Microbiological and Biomedical Laboratories. This

publication is available in its entirety in the Center for Disease Control and Prevention web site at <http://www.cdc.gov/biosafety/publications/bmb15/index.htm>.

FIRST AID MEASURES

Ingestion: If person is unconscious seek emergency medical attention; never give anything by mouth to an unconscious person. If the person is conscious wash mouth out with copious amounts of water and call a physician then administer three cupfuls of water. Do not induce vomiting unless directed to do so by a physician.

Inhalation: If person is unconscious seek emergency medical attention, if person is conscious remove to fresh air and call a physician.

Dermal exposure: Immediately wash skin with copious amounts of water followed by washing with soap and copious amounts of water. Remove all contaminated clothing.

Eye exposures: Flush eyes with copious amounts of water for at least 15 minutes with eyelids separated and call a physician.

ACCIDENTAL RELEASE MEASURES:

Procedure of Personal Precaution: At a minimum use the following PPE: Wear laboratory coat, gloves and eye protection. Avoid all contact.

Methods for Cleaning Up:

Patient/Victim: Wash with soap and water. Work clothes should be laundered separately. Launder contaminated clothing before re-use. Do not take clothing home.

Equipment/Environment: Allow aerosols to settle; wearing protective clothing, gently cover spill with paper towel and apply 1% sodium hypochlorite, starting at perimeter and working towards the center; allow sufficient contact time before clean-up (30 min).

Note: The use of additional PPE may be necessary for cleaning solutions.

EXPOSURE CONTROLS / PERSONAL PROTECTION

Use Personal Protective Equipment: Including eye protection, chemical resistant gloves, and appropriate clothing to prevent skin exposure. In addition, a Respiratory protection program that complies with Occupational Safety and Health Administration (OSHA) 29 CFR 1910.134 and American National Standards Institute (ANSI) Z88.2 requirements must be followed whenever workplace conditions warrant respirator use.

Engineering Controls: The use and storage of this material requires user to maintain and make available appropriate eyewash and safety shower facilities. Use fume hood or other appropriate ventilation method to keep airborne concentrations as low as possible.

Exposure Limits: No exposure limits for this material have been established by American Conference of Governmental Industrial Hygienists (ACGIH), National Institute for Occupational Safety and Health (NIOSH), or OSHA.

DISPOSAL CONSIDERATIONS

Decontaminate all wastes before disposal (steam sterilization, chemical disinfection, and/or incineration). Dispose of in accordance with applicable regulations.

REFERENCE

MSDS for Mammalian orthoreovirus 1 ATCC VR-230, Reovirus type 2 ATCC VR-2310, and Reovirus 3 ATCC VR-824 here referred as Pathogen Safety Data Sheets (PSDS) are modified from American Type Culture Collection information for these strains.

- 1) Picture from www.microbiologybytes.com
- 2) Picture: Micrograph prepared by [Dr Cornelia Büchen-Osmond](#)