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MATERIAL SAFETY DATA SHEET

SECTION I - INFECTIOUS AGENT

NAME: Respiratory syncytial virus

SYNONYM OR CROSS REFERENCE: RSV, Pneumovirus

CHARACTERISTICS: Respiratory syncytial virus (RSV) is classified as a member of the genus Pneumovirus in the family Paramyxoviridae. Virus particles are enveloped and pleomorphic, occurring as irregular spherical particles that are 100 to 350 nm in diameter, and as long filamentous fibres that are 60 to 200 nm in diameter and 10 mm in length. The virion consists of eight structural proteins. Three proteins are associated with the nucleocaspid and include nucleoprotein (N), phosphoprotein (P), and polymerase or large protein (L). The other five viral proteins are contained within the virus envelope and include nonglycosylated matrix protein (M), M2, fusion protein (F), glycoprotein (G), and short hydrophobic protein (SH). RSV lacks hemagglutinin and neuraminidase activity. The viral genome consists of a linear, single-stranded, negative-sense, nonsegmented RNA (~15.2 kb).

SECTION II - HAZARD IDENTIFICATION

PATHOGENICITY/TOXICITY: RSV primarily infects human epithelial cells within the nasopharynx; however, it can also infect other types of cells, including cell lines, but with much lower efficacy. Infection may lead to the formation of syncytia within the infected cell. Primary infection with RSV is generally exhibited as lower respiratory tract disease, pneumonia, bronchiolitis, tracheobronchitis, or upper respiratory tract illness. Common clinical symptoms include rhinorrhea, sneezing, cough, pharyngitis, bronchitis, headache, fatigue, and fever. In some cases, otitis media may occur. RSV infections usually begin with upper respiratory tract disease, which has the tendency to progress to lower respiratory tract disease (in ~50% cases). Severe infection (involving pneumonia) may develop among elderly patients with underlying respiratory conditions. Children and immunocompromised individuals are more susceptible to developing severe disease.

EPIDEMIOLOGY: RSV occurs worldwide and is the most common cause of bronchiolitis and pneumonia among infants and young children. Within USA, 100,000 hospitalizations and 4,500 deaths annually are attributed to RSV infections. RSV is also a major cause of nosocomial infections. Morbidity and mortality is highest among children with underlying illness and individuals with immunodeficiency or immunosuppression. Virtually all children are infected by age 2 to 3. Repeated infections are common,

particularly in young children with up to 5 or 6 infections per year. Although all individuals can be infected with RSV, those at high risk include premature infants, young children, elderly, immunocompromised, and children under age 2 with chronic lung conditions. Other factors that may predispose to RSV infection include: crowding (schools and day care centers), exposure to tobacco and smoke, low socioeconomic status, and family history of atopy and asthma. Infection among healthy and immunocompetent individuals tends to be less severe. RSV follows a seasonal pattern. Annual outbreaks occur during fall, winter, and early spring among urban centers. In the Northern hemisphere, epidemics peak in February and March, and may last up to 5 months. In tropical and subtropical regions, most outbreaks occur during the rainy season. RSV outbreaks involving lower respiratory illness have been reported in nursing homes and institutions.

HOST RANGE: Humans; however, various animal species can be experimentally infected with RSV including cotton rats, mice, ferrets, guinea pigs, hamsters, marmosets, lambs, and nonhuman primates.

INFECTIOUS DOSE: The infectious dose for RSV is > 160 - 640 viral units, administered through intranasal spray, as listed by the National Institutes of Health.

MODE OF TRANSMISSION: RSV is most likely transmitted through direct contact with infectious secretions (via fomites) and/or large-particle aerosols; however, close contact with infected individuals, or significant exposure of nasal or conjunctival mucosa with contaminated hands is required for transmission. Transmission via small-particle aerosols is less likely.

INCUBATION PERIOD: Incubation period for RSV infection ranges from 2 to 8 days.

COMMUNICABILITY: Communicable during the period of active disease. The disease is likely not readily transmitted from person-to-person, since significant and prolonged contact is required with infected individuals. Children are known to shed virus for long periods (up to weeks) even after clinical recovery.

SECTION III - DISSEMINATION

RESERVOIR: Humans.

ZOONOSIS: None.

VECTORS: None.

SECTION IV - STABILITY AND VIABILITY

DRUG SUSCEPTIBILITY: RSV has been shown to be susceptible to ribavirin, which has been used to treat severe RSV infections; however, recent studies suggest that its use produces no significant benefit.

SUSCEPTIBILITY TO DISINFECTANTS: RSV has been shown to be susceptible to ether, chloroform, and a variety of detergents, including 0.1% sodium deoxycholate, sodium dodecyl sulphate, and Triton X-100. It may also be sensitive to hypochlorites (1% sodium hypochlorite), formaldehyde (18.5 g/L; 5% formalin in water), 2% glutaraldehyde, and iodophores (1% iodine).

PHYSICAL INACTIVATION: RSV is sensitive to heating above 55 °C for 5 minutes (up to 90% decrease in infectivity). It is also sensitive to freezing and thawing (~90% loss in infectivity following each freeze-thaw cycle). It is also sensitive to acidic media (pH<7).

SURVIVAL OUTSIDE HOST: RSV is generally very vulnerable to environmental changes, particularly temperature and humidity. It is sensitive to high and low temperature, and to drying; i.e., low humidity levels. It loses up to 90% infectivity at room temperature after 48 hours and up to 99% at 1 °C after 7 days. The optimal pH is 7.5. It may survive for about 3 to 30 hours on nonporous surfaces at room temperature.

SECTION V - FIRST AID / MEDICAL

SURVEILLANCE: Monitor for symptoms. Other than monitoring for symptoms, there are four main techniques for diagnosing RSV, including virus cultures, serology, immunofluorescence and/or antigen detection, and nucleic acid based tests. Being labor- intensive and time consuming, the first two techniques are rarely employed for diagnostic purposes in epidemiological studies. Rapid diagnostic techniques for viral antigen detection, including immunofluorescent-antibody assay, optical immunoassay, enzyme immunoassay, and chromatographic immunoassay are preferred. Most are commercially available, easy to perform and produce rapid results. Nucleic acid tests (such as RT-PCR) are generally more sensitive.

Note: All diagnostic methods are not necessarily available in all countries.

FIRST AID/TREATMENT: Treatment is mainly supportive for infants with mild disease; however, children with severe disease, people with underlying illness, and/or immunocompromised individuals may require hospitalization. Aerosolized ribavirin may be administered to immunocompromised patients with severe illness; however, recent studies suggest that its use produces no significant benefit. Palivizumab prophylactic treatment, in combination with aerosolized ribavirin, may also be considered for high-risk children. Another approach is to consider the use of anti-inflammatory drugs; however, their efficacy is yet to be determined.

IMMUNISATION: None.

PROPHYLAXIS: Palivizumab prophylactic treatment has been shown to reduce the rate of hospitalization in children by up to 55%; however, convincing results on its therapeutic efficacy following an infection have not been observed. Palivizumab is a humanized monoclonal antibody that is administered as prophylaxis to high-risk infants for RSV infection. Other monoclonal antibodies are also available.

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: 1 case of a laboratory-acquired infection with RSV was reported up to 1976.

SOURCES/SPECIMENS: The main sources for RSV include nasal secretions, nasal swabs, nasopharyngeal swabs, and nasopharyngeal aspirates.

PRIMARY HAZARDS: Droplet or aerosol exposure of mucous membranes and accidental inoculation.

SPECIAL HAZARDS: None

SECTION VII - EXPOSURE CONTROLS / PERSONAL PROTECTION

RISK GROUP CLASSIFICATION: Risk Group 2.

CONTAINMENT REQUIREMENTS: Containment Level 2 facilities, equipment, and operational practices for work involving infected or potentially infected materials, animals, or cultures.

PROTECTIVE CLOTHING: Lab coat. Gloves when direct skin contact with infected materials or animals is unavoidable. Eye protection must be used where there is a known or potential risk of exposure to splashes.

OTHER PRECAUTIONS: All procedures that may produce aerosols, or involve high concentrations or large volumes should be conducted in a biological safety cabinet (BSC). The use of needles, syringes, and other sharp objects should be strictly limited. Additional precautions should be considered with work involving animals or large scale activities.

SECTION VIII - HANDLING AND STORAGE

SPILLS: Allow aerosols to settle. While wearing protective clothing, gently cover the spill with absorbent paper towel and apply appropriate disinfectant, starting at perimeter and working towards the centre. Allow sufficient contact time before clean up.

DISPOSAL: Decontaminate, either by steam sterilization, incineration, or chemical disinfection, before disposal.

STORAGE: The infectious agent should be stored in sealed containers that are appropriately labeled. Storage conditions for RSV can be improved by flash freezing in an alcohol and by addition of stabilizing agents (glycerine or sucrose).

SECTION IX - OTHER INFORMATION

The above information is believed to be accurate but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. ViraTree and its Affiliates shall not assume any liability whatsoever for the accuracy or completeness of the information contained herein. See www.viratree.com and packing slip for additional terms and conditions of sale.