Cerberus Adelaide
Unit 3 49 Holland Street
Thebarton SA 5031
Telephone: +61 8 8234 8780
Facsimile: +61 8 8234 8712
Email: cerberus@cerberus.net.au

Cerberus Melbourne
Unit 2 7-11 Rocco Drive
Scoresby VIC 3179
Telephone: +61 3 9763 8290
Facsimile: +61 3 9763 8290
Email: cerberus@cerberus.net.au

Murine Astrovirus (MuAstV)

Family: *Astroviridae*

Prevalence

- MuAstV recently detected in commercial and noncommercial colonies
- Positives reported from breeding facilities, universities, and research institutes in USA, Japan, and Australia

Significance

- Unknown whether there is an effect on other infectious diseases, immunity, or research outcomes
- Virus replication may result in non-specific signs of lethargy and distress and may alter immunological reactions
- Preliminary data suggests MuAstV changes microbiome

Disease

- Infected mice generally do not present significant clinical symptoms
- Clinical signs:
    - Astroviruses infect a wide range of mammalian species – causing self-limiting enteritis and diarrhea or being subclinical
    - No inflammation detected histologically - infected NSG mice do not show histological changes
    - A trial using CD1 mice showed a lower average weight of infected mice compared to control animals

Transmission

- Faecal-oral route - cohousing resulted in transmission to naïve animals
- Humoral, cell-mediated, and innate immunity involved in controlling infection

Isolation and Diagnosis

- MuAstV can be tested by both PCR and serology
- Preferred – PCR of faeces
- Studies show:
    - MuAstV is restricted to the gastrointestinal tracts of wild-type mice
    - MuAstV shed at high levels in faeces of immunocompromised mice
    - MuAstV genomic RNA could be detected in numerous organs (e.g., spleen, liver, kidney, intestines, and MLN) in asymptomatic animals

Strains

- Infects immunocompetent and immunocompromised mice

Screening

- Effectively monitor colonies by PCR of faeces and EAD - quarantine imports and release only post screening

Duration

- Apparently mice exhibit low-level persistent infection, virus shed in faeces for extended periods (up to 53 days)

Durability

- Astrovirus particles are hardy, withstanding a pH of 3 and demonstrating resistance to detergents, lipid solvents, and chlorine solvents

Prevention and Control

- Standard viral prevention strategies should be followed - this is an emerging pathogen with questions still to be answered with regard to the control

Reading

- Susan Compton, Carmen Booth, and D. M. James. Lack of Effect of Murine Astrovirus Infection on Dextran Sulfate-induced Colitis in NLRP3-deficient Mice. Comparative Medicine, 2017, 67:400-406
- Susan Compton, Carmen Booth, and D. M. James. Murine Astrovirus Infection and Transmission in Neonatal CD1 Mice. JAALAS, 2017, 56:402-411
- Cydney Johnson, Virginia Hargest, Valerie Cortez, Victoria A Meliopoulos, and Stacey Schultz-Cherry. Astrovirus Pathogenesis. Viruses, 2017, 9(1):22
- Terry Fei Fan Ng, Nikola Kondov, Nobuhito Hayashimoto, Ritsuki Uchida, Yunhee Cha, Ashley Beyer, Walt Wong, Patricia Pesavento, Hiroshi Suemizu, Marcus Muench, and Eric Delwart. Identification of an Astrovirus Commonly Infecting Laboratory Mice in the US and Japan. PloS one, 2013, 8. e66937. 10.1371/journal.pone.0066937
- Cortez V, Sharp B, Yao J, Livingston B, Vogel P, Schultz-Cherry S. Characterizing a Murine Model for Astrovirus Using Viral Isolates from Persistently Infected Immunocompromised Mice. J Virol, 2019, 93(13):e00223-19