MYCOPLASMA PULMONIS

CLASSIFICATION

Division: Tenericutes
Class: Mollicutes
Order: *Mycoplasmatales*
Family: *Mycoplasmataceae*
Genera: *Mycoplasma*

- Motile, pleomorphic
- No cell wall, gram-negative bacteria
- 600-1400 kbp genome
- 0.3-.8µm in diameter
- Obligate parasites requiring nutrients from host
- Adaptable to environment and able to resist host defences through chromosomal gene rearrangements

PREVALENCE

Not as common as previously. Mice and rats are the primary hosts, but has also been isolated from rabbits, guinea pigs, Syrian hamsters and horses. Several other mycoplasmas are known to infect mice however these are not known to cause natural disease. *M. pulmonis* is more commonly found in rats than mice.

DIAGNOSIS

ELISA, IFA, PCR, Histopathology (upper respiratory mucosa, lung, auditory tube)
Note: ELISA seropositivity may occur only sporadically

DISEASE/CLINICAL SIGNS

Variable - can possibly be absent, but the following can be observed:
Weight loss; Lethargy; Ruffled coat; Dyspnea; Chronic respiratory infection; Acute bronchopneumonia; Sneezing; Conjunctivitis; Otitis media; Genital tract infections (salpingitis, endometriotis, oophoritis) with reduction in fertility (observed in rats) in naturally occurring disease; Experimental genital tract infections result in foetal infection, death and resorption; Lesions (rhinitis) in both mice and rats

Naturally arthritis not reported, but experimental inoculations resulting in arthritis have been reported

Clinical symptoms can be exacerbated by over-crowding (increased ammonia levels) and potentially by concurrent infections.

STRAINS

Many strains have been reported (more than 18). *M. pulmonis* strains differ in infectivity and virulence for both mice and rats, and some strains infect both species. The bacterium tends to disseminate to other organs from the respiratory tract. C3H mice appear to be more susceptible than other strains of mice.

TRANSMISSION

Natural infection transmissibility has been reported via:

- Aerosols
- Transplacental transmission

Infections have been known to occur when contaminated cell lines/cultures have been used in injections for mice and rats in experiments.

INTERFERENCE WITH RESEARCH

Effects are many and include but are not limited to:

- Alteration of innate mucosal defences
- Changes in mucosal vascular architecture (proportions of capillaries and venules, diameter of mucosal vessels)
- Degenerative loss of nerve fibres in the peribronchial area (rats)
- Respiratory tract damage
- Leukocytosis (increase in lymphocyte numbers observed)
- Activates mitogenic activity of B and T lymphotcytes in rats
- Modification of gene expression of various cytokines in the respiratory tract (mice)
- Suppression of interferon induction

DURABILITY

Resistant to:

- Antibiotics targeting cell wall synthesis (penicillins, cephalosporins)
- Freeze-drying and storage at -70ºC

Susceptible to:

- Survival outside of host
- Antibiotics inhibiting DNA function or protein synthesis (erythromycin)
- Drying; Lysis by surfactants and lipolytic agents; Heat

CONTROL

Maintain good husbandry practice and regular health monitoring of supplier sub-populations and strict protocols for barrier colonies. Use of filter-top cages. Care to be taken by screening cell lines before use. Exclude wild rats and mice from facility.

POST INFECTION

Embryo transfer or hysterectomy derivation methods can be used, but care should be taken as *M. pulmonis* can be transmitted vertically.

BIBLIOGRAPHY

Fox, J.G., Barthold, S.W., Davisson, M.T., Newcomer, C.E., Quimby, F.W., Smith, A.L. 2007. The Mouse in Biomedical Research, Second Edition, Volume Two, pp. 438-453

National Research Council. 1991. Infectious Diseases of Mice and Rats, pp 42-48

Nicklas, W et al (GV-SOLAS Working Group on Hygiene). 1999. Laboratory Animals. 33 (Suppl.1) S1:72-73

Waggie K. et al, Manual of Microbiologic Monitoring of Laboratory Animals, Second Edition, 1994, pp139-144