

CAR Bacillus

Cilia-associated Respiratory Bacillus

Host species

- wild and laboratory rats (van Zwieten et al. 1980), laboratory mice, African white-tailed rat (*Mystromys albicaudatus*), rabbits, cattle, goats and swine (MacKenzie et al. 1981; Matsushita, 1986; Waggle et al. 1987; Shoji et al. 1988; Kurisu et al. 1990; Shoji-Darkye et al. 1991; Brogden et al. 1993; Hastie et al. 1993; Nietfeld et al., 1995; Fernández et al. 1996; Caniatti et al. 1998).

Properties

- the organism withstands freezing and thawing, and has been stored at -70°C and 23°C for short periods (Ganaway et al. 1985)

Susceptibility

- mice seem to be most sensitive, followed by hamsters, rabbits and guinea pigs. (Shoji-Darkye et al. 1991)

Organotropism

- respiratory tract

Clinical disease and pathology

- Dyspnoea (Cundiff et al. 1992); respiratory signs such as wheezing, decreased activity and ruffled fur (Matsushita and Joshima, 1989), chronic respiratory disease (Ganaway et al. 1985, Matsushita 1986)
- Bronchocentric lesions including lymphoid hyperplasia, ectasia of the major airways, mucopurulent exsudation (van Zwieten et al. 1980)
- Suppurative bronchopneumonia and necrotizing interstitial pneumonia and leukocytic infiltration in the lamina propria (Griffith et al. 1988; France 1994; Medina et al. 1994)
- Laryngeal, tracheal and bronchial epithelia are normally slightly hypertrophic and hyperplastic, with areas of loss of cilia (Kurisu et al. 1990; Matsushita 1991)
- Squamoid changes in the bronchi, atelectasis, emphysema and bronchiectasis; seldom death (Ganaway et al. 1985; Shoji et al. 1988)
- filamentous bacteria adhered to the respiratory epithelium (Griffith et al. 1988)

- Lesions associated with CAR bacillus may appear as mild peribronchiolar lymphoid infiltrate, later air ways may become dilated and mucosal hyperplasia could be found and may progress to metaplasia. (Kendall et al. 1999)

Notice

- CAR bacillus does not grow on cell-free media. Cultivation in cell lines and embryonated eggs is possible (Ganaway et al. 1985)
- Diagnosis is based on identification of the filamentous organism among the cilia of the respiratory tract by electron microscopy (MacKenzie et al. 1981), or by using stains such as Warthin-Starry, Grocott methenamine silver (Itoh et al. 1987; Griffith et al. 1988). Serological tests are available and include ELISA (Ganaway et al. 1985; Lukas et al. 1987; Shoji et al. 1988) and IFA test (Matsushita et al. 1987).

Morbidity and mortality

- usually inapparent and asymptomatic infections ; low mortality (Ganaway et al. 1985; Shoji et al. 1988; Shoji-Darkye et al. 1991)
- chronic disease
- susceptibility to infection seems to depend on host species (Shoji-Darkye et al. 1991)

Zoonotic potential

- unknown

Interference with research

- Effects on research are not documented. Infected rodents have abnormal tracheobronchial cellular morphology and an increased lung lymphocytic population, raising concerns about their suitability in respiratory, immunology, carcinogenicity and physiology studies. If ciliary function is altered through ciliastasis or loss of cilia, host respiratory response to pharmacologic or infectious agents might be impaired (Cundiff et al. 1992)
- An infection causes an elevation of gamma interferon (IFN γ) and interleukins (IL 4 and IL10). Interleukins are predominant in CAR bacillus induced histologic lesions in mice, while gamma interferon may have a role in resistance to disease (Kendall et al., 1999)

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