GV-SOLAS
Gesellschaft für Versuchstierkunde
Society for Laboratory Animal Science

Expert Information

from the Working Group on Hygiene

Implication of infectious agents on results of animal experiments

Filobacterium rodentium

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Contents

Filobacterium rodentium
(formerly CAR Bacillus, Cilia-associated Respiratory Bacillus)

Background

- A filamentous bacterium first was observed in wild and laboratory rats and preliminary named Cilia-Associated Respiratory Bacillus (CAR Bacillus).[1] Renamed as *Filobacterium rodentium* in 2016.[2]

Prevalence

- In 20 of 28 wild rats with Chronic Respiratory Disease (CRD) and in 3 of 8 healthy animals in North America CAR bacillus could be detected.[3]
- In seven conventionally reared rabbits in Italy the agent was detected between 30% to 100%.[4]
- Prevalence for red deer in northern Italy was 26% and for chamois 56%.[5]
- Prevalence in Laboratory animals in North America and Europe seems to be low, in 2015 for mice 0% and for rats 1.02%.[6]

Host species

- Wild and laboratory rats[1], laboratory mice, African white-tailed rat (*Mystromys albicaudatus*), rabbits, cattle, goats, swine, red deer and cats[3-5,7-16]

Properties

- CAR bacillus does not grow on cell-free media. Cultivation in cell lines and embryonated eggs is possible.[17]
- The organism withstands freezing and thawing.[17]
- CAR bacillus isolates of rat and rabbit origins differ in antigenic profile.[18]
- CAR bacillus isolates differ in virulence.[19]
- Filamentous bacteria adhere to the respiratory epithelium.[20]

Susceptibility

- Mice seem to be most sensitive, followed by Syrian hamsters, rabbits, and guinea pigs.[8]
- BALB/c seem to be more susceptible than C57BL/6 mice.[21,22]

Organotropism

- Respiratory tract[2,9,16,21,23]

Clinical disease

- Dyspnoea, respiratory signs (such as wheezing), decreased activity and ruffled fur[23], chronic respiratory disease[9,17]
- Bronchocentric lesions including lymphoid hyperplasia, ectasia of the major airways, mucopurulent exsudation[1]

Pathology

- Lesions associated with CAR bacillus may appear as mild peribronchiolar lymphoid infiltrate, later airways may become dilated and mucosal hyperplasia can be found and may progress to metaplasia.[24]
- Squamoid changes in the bronchi, atelectasis, emphysema and bronchiectasis; seldom death[11,17]
- Suppurative bronchopneumonia and necrotizing interstitial pneumonia and leukocytic infiltration in the lamina propria[20,25,26]
- Laryngeal, tracheal, and bronchial epithelia are slightly hypertrophic and hyperplastic, with areas of loss of cilia.[12,27]

Morbidity and mortality

- Usually asymptomatic infections; low mortality[8,11,17]
- Chronic disease[9,17]

Zoonotic potential

- No data

Interference with research

- 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.[28]

Oncology

- No data

Teratology

- No data

Infectiology

- *No data*

Immunology

- An infection causes an elevation of gamma interferon (IFN) and interleukins (IL-4 and IL-10). Interleukins are predominant in CAR bacillus-induced histologic lesions in mice, while IFN may have a role in resistance to disease.[24]
- An infection causes an increase in B cells and in double negative T cells but no change in the amount of natural killer cells. This increase may be responsible for the lesions associated with CAR bacillus infection.[29]

Interactions with other infectious agents

- *No data*

Toxicology

- No data

Physiology

- No data

Cell biology

- No data

Assisted reproductive technology

- No data

Special considerations

- No data

Actualized by Brunhilde Illgen-Wilcke, Reinach Schweiz, March 2019

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