

# **Corynebacterium kutscheri**

## **Host species**

- mouse, rat, (guinea pig, hamster)

## **Organotropism**

- respiratory tract (other organs)
- middle ear
- superficial tissue
- generalization

## **Clinical disease and pathology**

- inapparent in most strains of immunocompetent mice und rats
- abscesses of superficial tissue with microabscessation of various internal organs
- pneumonia in some strains of rats

## **Morbidity and mortality**

- up to 100% of animals are infected
- 5-60% of susceptible strains show clinical signs (Amao, 1993)
- no age or sex prevalence are known

## **Zoonotic potential**

- *C.kutscheri* was isolated from umbilical cord and other surface in an infant (Fitter, 1979)

## **Interference with research**

Infection with this agent is usually subclinical in rats and mice and results in disease expressions only after severe immunosuppression, by exposure to experimental regimes, dietary deficiencies, or concurrent infection with other agents.

## Physiology

- Disease has been active in animals used in studies of dietary deficiency (Zucker, 1954), gamma irradiation (Schechmeister, 1953), cortisone administration (Takagaki, 1967), or by other infectious disease, for example infectious ectromelia (Lawrence, 1957)

## Immunology

- components of *C. kutscheri* may stimulate type -1 helper T cells to produce IL-2 and IFN-gamma and the enhance cytokine production could contribute to the non-specific resistance induced by this bacterium (Kita, 1992)

## Oncology

- a T- cell mitogen of *C. kutscheri* induced a tumorlytic factor in mice ( Kita, 1995)

## References

- Amao, H., T. Akimoto, K. W. Takahashi, M. Nakagawa and M. Saito. 1991. Isolation of *Corynebacterium kutscheri* from aged Syrian hamsters (*Mesocricetus auratus*). *Lab. Anim. Sci.* 41:265-268.
- Amao, H., Y. Komukai, M. Sugiyama, T. R. Saito, K. W. Takahashi and M. Saito. 1993. Difference in susceptibility of mice among various strains to oral infection with *Corynebacterium kutscheri*. *Jikken Dobutsu* 42:539-545.
- Amao, H., T. Kanamoto, Y. Komukai, K. W. Takahashi, T. Sawada, M. Saito and M. Sugiyama. 1995. Pathogenicity of *Corynebacterium kutscheri* in the Syrian hamster. *J. Vet. Med. Sci.* 57:715-719.
- Amao, H., Y. Komukai, M. Sugiyama, K. W. Takahashi, T. Sawada and M. Saito. 1995. Natural habitats of *Corynebacterium kutscheri* in subclinically infected ICGN and DBA/2 strains of mice. *Lab Anim Sci.* 45:6-10.
- Amao, H., Y. Komukai, T. Akimoto, M. Sugiyama, K. W. Takahashi, T. Sawada and M. Saito. 1995. Natural and subclinical *Corynebacterium kutscheri* infection in rats. *Lab. Anim. Sci.* 45:11-14.
- Antopol, W., H. Quittner and I. Saphira. 1959. "Spontaneous" infection after the administration of cortisone and ACTH. *Am. J. Pathol.* 29:599-600.
- Barrow, P. A. 1981. *Corynebacterium kutscheri* infection in wild voles (*Microtus agrestis*). *Br. Vet. J.* 137:67-70.
- Brownstein, D. G., S. W. Barthold, R. L. Adams, G. A. Terwilliger and J. G. Aftomis. 1985. Experimental *Corynebacterium kutscheri* infection in rats: bacteriology and serology. *Lab. Anim. Sci.* 35:135-138.
- Fauve, R. M., C. H. Pierce-Chase and R. Dubois. 1964. *Corynebacterium pseudotuberculosis* in mice. II. Active of natural and experimental latent infections. *J. Exp. Med.* 120:283-304.
- Fitter, W. F., D. J. de Sa and H. Richardson. 1979. Chorioamnionitis and funisitis due to *Corynebacterium kutscheri*. *Arch. Dis. Child.* 54:710-712.
- Fox, J. G., C. M. Beaucage and J. C. Murphy. 1979. *Corynebacterium kutscheri* pneumonia in rats on long term tobacco inhalation studies. Annual Session AALAS, abstract 104.
- Fox, J. G., S. M. Niemi, J. Ackerman and J. C. Murphy. 1987. Comparison of methods to diagnose an epizootic of *Corynebacterium kutscheri* pneumonia in rats. *Lab. Anim. Sci.* 37:72-75.

- Hirst, R. G. and R. J. Olds. 1978. *Corynebacterium kutscheri* and its alleged avirulent variant in mice. *J. Hyg. (Lond.)* 80:349-356.
- Hirst, R. G. and M. E. Wallace. 1976. Inherited resistance to *Corynebacterium kutscheri* in mice. *Infect. Immun.* 14:475-482.
- Kita, E., N. Matsui, M. Sawaki, K. Mikasa and N. Katsui. 1995. Murine tumorlytic factor, immunologically distinct from tumor necrosis factor alpha and -beta, induced in the serum of mice treated with a T-cell mitogen of *Corynebacterium kutscheri*. *Immunol. Lett.* 46:101-106.
- Kita, E., N. Kamikaidou, D. Oku, A. Nakano, N. Katsui and S. Kashiba. 1992. Nonspecific stimulation of host defense by *Corynebacterium kutscheri*. III. Enhanced cytokine induction by the active moiety of *C. kutscheri*. *Nat. Immun.* 11:46-55.
- Lawrence, J. J. 1957. Infection of laboratory mice with *Corynebacterium murium*. *Aust. J. Sci.* 20:147-150.
- Miyamae, T. 1982. *Corynebacterium kutscheri* invasiveness of the gastrointestinal tract in young mice. *Jikken Dobutsu* 31:189-194.
- Schechmeister, I. L. and F. L. Alder. 1953. Activation of pseudotuberculosis in mice exposed to sublethal total body radiation. *J. Inf. Dis.* 92:228-239.
- Suzuki, E., K. Mochida and M. Nakagawa. 1988. Naturally occurring subclinical *Corynebacterium kutscheri* infection in laboratory rats: strain and age related antibody response. *Lab. Anim. Sci.* 38:42-45.
- Takagaki, Y. M., M. Naiki and M. Ito. 1967. Checking of infections due to *Corynebacterium* and Tyzzer's organism among mouse breeding colonies by cortisone-injection. *Exp. Anim.* 16:12-19.
- Weisbroth, S. H. and S. Scher. 1968. *Corynebacterium kutscheri* infection in the mouse. I. Report of an outbreak, bacteriology, and pathology of spontaneous infections. *Lab. Anim. Care* 18:451-458.
- Weisbroth, S. H. and S. Scher. 1968. *Corynebacterium kutscheri* infection in the mouse. II. Diagnostic serology. *Lab. Anim. Care* 18:459-468.
- Zucker, T. F. and L. M. Zucker. 1954. Pantothenic acid deficiency and loss of natural resistance to a bacterial infection in the rat. *Proc. Soc. Exp. Biol. Med.* 85:517-521.

**Author: Herbert Meyer, University of Ulm, Germany**