



# Pathogenic Corynebacterial Contamination of Biological Materials

## Etiology

Pathogenic cutaneous *Corynebacterium*, including *C. bovis* and an unspiciated Hyperkeratosis-Associated Coryneform bacterium 2 (HAC-2), infect primarily immunocompromised haired and nude rodents. These corynebacteria are small, Gram-positive bacilli that colonize layers of keratin on the skin. Infected rodents develop dermatitis and thickened skin with excessive skin flakes (transient hyperkeratosis). Bacteria-laden flakes easily exfoliate, contaminating the environment.

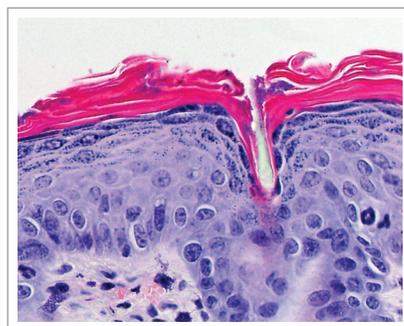
*Corynebacterium* species are environmentally hardy and can maintain infectivity in a dry environment for days to months. These bacteria are resistant to some disinfectants, especially ethanol, if there is inadequate contact time with bacteria before drying.

## Bacterial contamination of biological materials

Transmission of corynebacteria to biological materials occurs by direct contact with infected rodents, or indirectly by contact with contaminated fomites. Xenografts become contaminated by inadvertent contact with skin of infected rodents during surgical removal or with contaminated gloves, instruments, or work surfaces. For example, multiple reports describe *C. bovis* contamination of gloves of husbandry or research personnel, shared equipment and work surfaces such as biosafety cabinets used for experimental manipulations or cage changing. Once contaminated, xenografts subsequently serve as a source of bacteria when implanted back into naïve rodents. Outbreaks of *C. bovis* in mice have been documented to occur from implantation of cryopreserved contaminated xenografts.

## Effect on research

Immunocompromised rodents infected with *C. bovis* and HAC-2 can become dehydrated and lose body condition and are thus poor research subjects. Additionally, anecdotal reports describe poor growth of transplanted tumors in infected mice. Consequently, the use of infected mice or biological materials can introduce unwanted research variables, delays in research productivity, and lost investment in valuable resources.



## Detection

*Corynebacterium bovis* and HAC-2 can be detected in biological materials by submission of cryopreserved cells or tissue fragments to IDEXX BioAnalytics. Services include *C. bovis* and HAC-2 PCR testing alone or in combination with IMPACT profiles that screen for additional rodent pathogens. In addition to screening biological materials, swabs of equipment, work surfaces, or mouse skin can be tested for *C. bovis* and HAC-2 by PCR.

*Continued*



## Pathogenic Corynebacterial Contamination of Biological Materials, *continued*

### Prevention

All biological materials, including cell lines and tumors, should be regularly screened for *C. bovis* and HAC-2. Only negative biological materials should be used for transplantation. Instruments and equipment should be cleaned and autoclaved prior to use.

Oxidizing disinfectants for sanitizing work areas are reported to be effective against corynebacteria. Use of chlorhexidine solution as a skin antiseptic has been demonstrated to minimize transmission of *C. bovis* to xenografts during surgical removal. Along with good decontamination practices, regular monitoring by PCR or culture can be used to confirm a corynebacterium-free status.

### References

Crim MJ, Caraker S, Eckhoff D, Myles MH, Besch-Williford CL, Livingston RS, Bauer BA, Riley LK. A new *Corynebacterium* sp. that causes skin disease and dehydration in immunodeficient mice. Proceedings Annual Meeting of the American Association for Laboratory Animal Science; October 2017; Austin, Texas; J Am Assoc Lab Anim Sci, 2017 September; 56(5):574-694

Manuel CA, Pugazhenth U, Spiegel SP, Leszczynski JK. Detection and elimination of *Corynebacterium bovis* from barrier rooms by using an environmental sampling surveillance program. J Am Assoc Lab Anim Sci . 2017 March; 56(2): 202-209.

Manuel CA, Bagby SM, Reisinger JA, et al. Procedure for Horizontal Transfer of Patient-Derived Xenograft Tumors to Eliminate *Corynebacterium bovis*. J Am Assoc Lab Anim Sci . 2017;56(2):166-172.

Burr HN, Wolf FR, Lipman NS, *Corynebacterium bovis*: Epizootiologic features and environmental contamination in an enzootically infected rodent room, J Am Assoc Lab Anim Sci . 2012 March; 51(2): 189–198, published online March 2012.

Kramer A, Schwebke I, Kampf G. How long do nosocomial pathogens persist on inanimate surfaces? A systematic review. BMC Infect Dis. 2006 Aug; 6:130. doi:10.1186/1471-2334-6-130.

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