American College of Laboratory Animal Medicine
Committee for Evidence Based Performance Standards

Guidance Document on Adequate Rodent Cage Sanitation and Sterilization
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Effective sanitation of cage and cage components is an important aspect of an animal care and use program to control the possible spread of unwanted microorganisms. Specific guidelines on the sanitation, disinfection and sterilization of rodent caging are limited. Standards promulgated in the laboratory animal literature are generally extrapolated from guidelines developed for other industries, such as healthcare, for which extensive guidance is available.[1] The terminology used to describe sanitation, disinfection, and sterilization has not been consistently applied within the healthcare or laboratory animal fields and this laxity may contribute to confusion regarding appropriate practices within a reserch setting. Sanitation has been defined as a process of reducing bacterial contaminants to safe levels as judged by public health standards[2] as well as the more general process of "maintenance of conditions conducive to health" including changing of soiled bedding, cleaning and disinfection.[3] Disinfection is defined as the process of destroying pathogenic (i.e. disease causing) microorganisms, not including bacterial spores, and refers only to substances applied to inanimate objects. Sterilization is the act or process of destroying or eliminating all forms of life, particularly microorganisms.

The *Guide for the Care and Use of Laboratory Animals* states that "effective disinfection can be achieved with wash and rinse water at 143-180 ºF or more.[3] The Animal Welfare Regulations provide similar regulatory standards for the sanitation of primary enclosures for rodents (i.e. guinea pigs and hamsters) which states primary enclosures "shall be sanitized by washing them with hot water (180°F) and soap or detergent as in a mechanical cage washer, or by washing all soiled surfaces with a detergent solution followed by a safe and effective disinfectant, or by cleaning all soiled surfaces with live steam".[4] The engineering standard of cage disinfection and sanitation by exposure to180 °F water was apparently established in the 1950s as a National Sanitation Foundation standard for commercial dishwashers, as this temperature reliably ensures the destruction of vegetative microorganisms, for review see Wardrip (1994).[5]

Effective cage sanitation can be achieved in a variety of methods ranging from hand washing of cages with reliance on chemical disinfectants to the use of mechanized washing machinery such as cage and rack washers and tunnel washers. Regardless of method, successful sanitation and disinfection of cages is generally accomplished in a multi-step process. After gross particulate mater is removed by dumping of soiled bedding, residual organic and inorganic material (i.e. urine salts, feces, etc) can be removed by use of hot water alone, but the effectiveness of this process can be enhanced by use of a detergent solution. The final step in the disinfection process to destroy vegetative microorganisms is typically achieved by exposure to high temperature water, i.e. 180 °F rinse water (i.e. temperature of water exiting the sprayer jets within a mechanical cage washer). The use of high temperature rinse water has been shown to be

an effective method of disinfection in the laboratory animal environment.[5-7] This practice is recommended when sterilization of cages is not necessary.

The standard of relying on 180 °F temperature water for disinfection of animal cages was established prior to the availability and common use of microisolation (i.e. filter top) caging, the application of cage-level barrier practices, HEPA-filtered animal work stations, and high volume and efficient sterilization of rodent cages by autoclaving that have been shown effective in limiting cage-to-cage spread of rodent infectious agents. Today, many laboratory animal care programs employ microisolation caging systems with appropriate barrier exclusion practices that provide a high level of protection of rodents from such risks. And in many programs, these cages are routinely sterilized by autoclaving between washing and reuse to ensure the animal is provided a primary enclosure free of pathogens.

In an era of growing pressures to reduce both operating costs and energy consumption, it is appropriate to reconsider the redundancy of washing cages with high temperature water before such cages are sterilized prior to use. Such a program should be coupled with a quality control program of visual inspection and testing for organic material and microbial agents post-wash/pre-sterilization to confirm cages are sanitized prior to sterilization. In addition, a combination of mechanical, chemical and biological indicators should be utilized to monitor the effectiveness of the final sterilization process (autoclaving).

References

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