charles river

Summary

The standard practice for monitoring the health of animals housed in individually ventilated cages (IVCs) is the soiled-bedding sentinel method. While a standard practice, it is difficult to transmit several currently prevalent agents to sentinel animals via this method (Henderson et al., 2013).

360 DIAGNOSTICS

Limitations of Detection Using Soiled-Bedding Sentinels

Addressing the Limitations of Soiled-Bedding Sentinels

Sentinels animals monitor colony health in an indirect and delayed fashion. They are most commonly exposed to bedding contaminated with wastes from colony animals. To be effective, sentinels must be exposed to as much soiled bedding as possible to minimize the infection-preventing effects of diluting infectious material (Clifford and Henderson, 2014). Furthermore, this approach is dependent on the pathogen load that is present in the bedding during exposure and the ability of the agent to remain viable and infectious.

Compton et al. (2004) demonstrated that a filter could be used to collect dust on an IVC for PCR detection of rodent pathogens. However, the improved sensitivity and specificity of PCR methods, together with current high-density assay platforms, have made it a practical method for high-throughput routine screening for many different pathogens in dust samples. The number of agents readily detected by Exhaust Air Dust (EAD™) sampling has now greatly expanded to include not only the agents that sentinels can usually detect but also many commonly excluded agents that are not readily transmitted to bedding sentinels. The information in Table 1 is based on prevalence data compiled by Charles River, published reports on bedding transfer difficulties, and our own experience. Agents such as MNV, *Helicobacter*, and even pinworms will transmit to sentinels when the prevalence or infestation is high, but a low prevalence can go undetected by bedding sentinels because of the reduced load of infectious organisms.

Not all IVC racks are the same; variations in rack designs will influence the amount of exhaust air dust that can be effectively sampled. Therefore, it is important to identify and sample those locations on the IVC where dust accumulates, such as the end of a horizontal plenum or a filter. Through collaborative efforts with industry leaders, Charles River has qualified the combination of PCR testing and EAD™ sampling of rack plenums as a scientifically feasible health monitoring alternative to soiled-bedding sentinel testing. Our experts readily work with animal facilities to determine EAD™ compatibility as well as to develop customized EAD™-based health monitoring programs.

To request a consultation, please go to www.criver.com/360consultation.

EVERY STEP OF THE WAY

Table 1. Limitations of detection using soiled-bedding sentinels when prevalence is low

Agent	Test Method	Field Prevalence	Detected By Sentinels?
MPV, MVM	MFIA	~1%	Reliably detected
MHV	MFIA	0.40%	
EDIM	MFIA	0.30%	
Helicobacter	PRIA	31.13%	Unreliably or inconsistently detected
P. aeruginosa	PRIA	4.50%	
TMEV	MFIA	0.10%	
MNV	MFIA	40.00%	
Fur mites	PRIA	1.09%	
Pinworms	PRIA	1.46%	
Adenovirus	PRIA	0.15%	Poorly detected or undetected
M. pulmonis	PRIA	0.12%	
P. pneumotropica	Culture, PRIA	4.80%, > 0.25%	
Cryptosporidium	PRIA	0.13%	
Giardia	PRIA	0.04%	
Spironucleus	PRIA	1.56%	