



ComPath News



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> ANIMAL HEALTH MONITORING AND THE MICROBIOME

The intestinal microbiome (the bacteria, fungi and single-celled archaea that colonise the gut) has profound influence on mammalian physiology (Laukens D. et al, 2016), including affecting metabolic control, immune regulation, neurological development and behaviour, and disease susceptibility (Weldon L et al, 2015). Scientists are now discovering that differences in the microbiome associated with different facilities, genetic backgrounds, and even different cages, can have a major impact on experimental outcomes. This is causing stir in the research community, as it is increasingly demonstrated that an inability to replicate results in seemingly identical animals can often be explained by microbiological factors (Servick K, 2016).

The importance of taking steps to minimise factors that could cause microbiome variability, such as the co-housing of animals prior to experimentation, is increasingly well-recognised. In addition, monitoring the composition of the intestinal microbiome is increasingly viewed as an essential component of laboratory animal health monitoring. Often the responsibility for providing reassurance that animal models are fit for purpose and uniform will fall onto the shoulders of animal facilities. However, thanks to advances in DNA sequencing technology, characterisation of the complex intestinal microbiota is now rapid and relatively inexpensive.

ComPath are looking at providing a microbiome monitoring service, so watch this space! Please contact the lab at info@compath.com for more information.



Image taken from <https://www.emaze.com/@ACQTZIW/How-are-microbes-necessary-for-our-health?>

References

Laukens D., Brinkman B.M., Raes J., De Vos M., Vandenabeele P., Heterogeneity of the gut microbiome in mice: guidelines for optimizing experimental design, *FEMS Microbiology Reviews*, fuv036, 40, 2016, 117-132

Weldon L., Abolins S., Lenzi L., Bourne C., Riley E.M., Viney M., The Gut Microbiota of Wild Mice, *PLOSone*, DOI:10.1371/journal.pone.0134643, August 10, 2015

Servick K., Mouse Microbes May Make Scientific Studies Harder to Replicate, *Science AAAS*, DOI: 10.1126/science.aah7199, August 16, 2016

> EXHAUST AIR DUST FILTERS VS SOILED BEDDING SENTINELS

There has been huge progress made by Charles River Laboratories, in collaboration with Allentown Inc. in validating the use of exhaust air dust filters (EAD™) as an alternative health monitoring system to soiled bedding sentinel programs. So much so, that the figures are astounding. See table below.

Summary of agent groups detected by sentinel animals vs Sentinel®EAD™

Agent	Sentinel Animals	Sentinel EAD
Protozoa	10% Positive	100% Positive
Mites & Pinworms	6.3% Positive	100% Positive
Bacteria	21.4% Positive	85.7% Positive
Viruses	31.3% Positive	100% Positive
Average of All Agents	17.25% Positive	96.4% Positive

Note: Data represents 5% simulated prevalence.

Charles River test results were presented at the 2015 AALAS Tri-Branch Symposium

<http://www.allentowninc.com/sentinel/>

Not only has the technology specified better detection of pathogens, it also reduces the overall usage of live animals in research, which is in line with the 3 Rs and would provide considerable cost-savings to animal facilities in their health monitoring program. Sentinel®EAD™ samples and other similar products (e.g. Techniplast's Interceptor) work by accumulating pathogen derived DNA carried by aerosol and dust onto a filter located at the exhaust vent (e.g. from the room, cage or rack), which is then assayed by PCR. ComPath are moving in line with this method of animal health monitoring by actively pursuing validation studies and adopting the OpenArray Taqman® PCR technology, currently used by Charles River Laboratories. This sensitive,

higher density platform will allow ComPath to offer a superior method of exhaust air dust filter PCR testing to our customers at an economical price. Contact the lab for further information.

> PATHOGEN UNDER THE MICROSCOPE

Hantavirus

Hantavirus is an enveloped RNA virus and is part of the Bunyaviridae family (Watson et al., 2014). While Hantavirus infection is common in some wild populations, laboratory rodent populations are rarely infected. Infected rodents seldom show clinical signs. (Pritchett-Corning et al., 2009)

Although hantavirus is a zoonotic disease and is of concern throughout the world, particularly in Europe (e.g. Argentina, Brazil, Chile), Asia and America, thus far only serology positive rodents have been reported in Australia (Watson et al. 2014, 2002). Infection is believed to be passed on to humans through contact with rodent urine, saliva and faeces. In countries where zoonotic infection is documented, it can lead to Hantavirus Haemorrhagic Fever with Renal Syndrome and Hantavirus Pulmonary Syndrome also known as Hantavirus Cardiopulmonary Syndrome. Infection leads to flu like symptoms such as fever, cough, muscle pain, headache and lethargy in early stages. It is also characterised by sudden onset of shortness of breath with rapidly evolving pulmonary oedema. Currently, human infection leads to a fatality rate of 36% (Centres for Disease Control and Prevention, 2016).

All rodents entering a research facility should be shown to be free of Hantavirus. Diagnosis of Hantavirus infection is done by ELISA and/or IFA. If infection is diagnosed, all animals in the colony should be euthanized (Charles River Laboratories, 2011). Current Australian requirements for importation and

> PATHOGEN UNDER THE MICROSCOPE (CONTINUED)

release from biosecurity control of live laboratory rats and mice include pre or post-arrival testing for Hantavirus using a sample size sufficient to detect a 5% prevalence of infection at 99% confidence (Department of Agriculture and Water Resources, 2002). ComPath recommends to follow guidelines outlined by the Department when requesting Hantavirus testing for biosecurity release. Hantavirus testing is performed as part of our AQIS and quarantine panels.

Tips for when submitting samples for Hantavirus Testing:

- Only **5 microliters** of serum or **1 dried blood spot** per animal is required to test for Hantavirus by ELISA. Both sample types are accepted by the Department of Agriculture and Water Resources using this method.
- When entering your submission on CORA, select **M-AQIS** panel for mice, or **R-AQIS** panel for rats rather than individual HAN EIA. This will ensure we flag the sample as urgent, for immediate Hantavirus testing. We aim to deliver the report back to you the day after receiving the sample, as we understand the delicate and lengthy process involved when importing live laboratory animals into Australia.
- Include the **AIMS Entry number** and **sampling date** in your submission so that it can be included on the laboratory report. DAWR need to be able to cross-reference the laboratory report to the corresponding consignment/shipment.

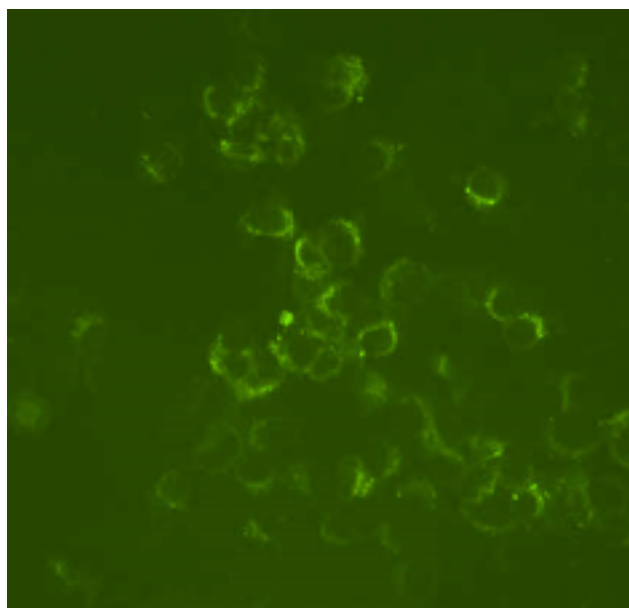


Image from ComPath, IFA Hantavirus positive control

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> COMPATH WORD SCRAMBLE

Unscramble the bacteria names:

1. petocustrcocs nepumeoian	_ _ r _ _ _ c _ _ _ _ p _ _ _ _ _
2. thacocpylosucs urause	_ _ _ _ _ y _ _ _ o _ _ _ _ _ u _ _ _ _
3. treepasulal emopicanuport	p _ _ _ _ _ _ _ _ _ _ _ _ m _ t _ _ _ _ _
4. baimoynerctercu stucherik	_ _ _ _ n _ b _ _ _ _ _ _ _ _ u _ _ _ _ _
5. mepasosudon earugsaino	_ _ _ _ d _ _ _ _ s _ _ _ _ u _ _ _ _ _
6. bsleieklal niumoaepne	_ l _ _ _ _ _ a _ _ _ _ m _ _ _ _ _
7. tropeus irmalbiis	_ _ _ t _ _ _ _ _ i _ _ _ _
8. ittercrobac drieuontm	_ _ _ o _ _ _ _ _ r _ _ _ _ _
9. brelalodet chepisbicronta	_ _ _ e _ _ _ a _ _ _ _ _ i _ _ _ _ _
10. chaesicerhi clio	_ _ c _ _ _ _ _ _ _ _ l _ _

> HAPPY HOLIDAYS FROM THE COMPATH TEAM

It's been another great year and we look forward to all the new and exciting things happening in 2017. We would love to hear your thoughts or concerns on microbiome composition analysis and exhaust air dust filter testing or any other matter, so please drop us an email anytime. Thank you all for your on-going support. Wishing everyone a safe, well-deserved and relaxing break.

Merry Christmas and Happy New Year!



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