

March 27, 2014

Dear prospective MMRRC and RRRC user:

On March 13, 2014 routine testing for rats from Room W113 of the Mutant Mouse Regional Resource Center (MMRRC) and Rat Resource and Research Center (RRRC) revealed one sentinel rat to be positive by fecal PCR for *Helicobacter ganmani* (testing performed by IDEXX BioResearch). Upon receipt of these results, shipping was suspended and all rat sentinels from the room were immediately removed from the room, tested for helicobacters and replaced. To further assess the status of the room, fecal pellets were collected from all 31 rat cages in that room and 60 randomly selected mouse cages and submitted for helicobacter testing at IDEXX BioResearch. All samples (from sentinels and room animals) were found to be negative for rodent helicobacters.

We interpret these results to indicate that the room remains helicobacter-free. The origin of the helicobacter contamination in the sentinel rat could not be determined. While this sentinel was obtained from a helicobacter-free facility, we suspect that it may have been contaminated on arrival. However, this contamination was contained through routine husbandry practices (ventilated rack housing, changing sentinel cages last, etc) and the inherent biology of the agent; spread of rodent helicobacters often requires direct contact and spread via dirty bedding is often limited.

For the coming 3 months, we are more than happy to test rats being shipped to your facility for helicobacter by fecal PCR. If you have questions or concerns, please contact:

Craig Franklin, DVM, PhD, dACLAM
(573) 882-6623; franklinc@missouri.edu
www.mmrrc.missouri.edu and www.rrrc.us

Thank you again for using the MMRRC and RRRC.



Craig Franklin, DVM, PhD, DACLAM
Professor, Department of Veterinary Pathobiology
Director, Mutant Mouse Regional Resource Center



Elizabeth Bryda, PhD
Professor, Department of Veterinary Pathobiology
Director, Rat Resource and Research Center

FINAL REPORT OF LABORATORY EXAMINATION

4011 Discovery Drive, Columbia, MO 65201

1-800-669-0825 1-573-499-5700

idx-radil@idexx.com

www.idexxbioresearch.com

IDEXX BioResearch Case # 8518-2014

Received: 3/3/2014
Completed: 3/13/2014

Submitted By

Sentinels
University of Missouri-RCA
Columbia, MO 65201

Phone: 573-884-7970
Email: franklinc@missouri.edu; bethunec@missouri.edu;
goerndta@missouri.edu; watermanjd@missouri.edu

Specimen Description

Species: rat
Description: Live Rat
Number of Specimens/Animals: 1
Building/Facility: W113

Client ID	Investigator	Room #	Strain	Sex	Age	Rack
1	Bryda	W113	CD	F	Adult	1

Services/Tests Performed: Rederivation Necropsy Profile - rat

Serologic evaluation for antibodies to: *Clostridium piliforme*, *Mycoplasma pulmonis*, CAR bacillus, H1, Hantaan, KRV, LCMV, MAD1, PVM, RCV/SDAV, REO3, RMV, RPV, RTV, Sendai

PCR evaluation for: *Helicobacter bilis*, *Helicobacter ganmani*, *Helicobacter hepaticus*, *Helicobacter mastomyrinus*, *Helicobacter rodentium*, *Helicobacter spp.*, *Helicobacter typhlonius*, *Mycoplasma pulmonis*, *Pneumocystis carinii*, *Streptobacillus moniliformis*

Parasitologic evaluation for: fur mites, mesostigmatid mites, lice, *Spironucleus muris*, *Giardia muris*, large intestinal flagellates and amoeba, pinworms and tapeworms

Microbiologic evaluation for: *Corynebacterium kutscheri*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Pasteurella multocida*, *Pasteurella pneumotropica*, *Salmonella enterica*, *Streptococcus pneumoniae*

General Comments: CB: Sentinel placed on 12/9/2013.

Summary: *Helicobacter ganmani* was isolated from feces from this animal. Please see the report for details.

NECROPSY

No gross lesions were detected in any of the body systems and organs examined.

SEROLOGY SUMMARY

	1
CAR bacillus	-
Hantaan	-
LCMV	-
<i>Mycoplasma pulmonis</i>	-
MAD1	-
RPV	-
RMV	-
KRV	-
H1	-
PVM	-
RCV/SDAV	-
REO3	-
RTV	-
Sendai	-
<i>Clostridium piliforme</i>	-
Rat IgG	N

Legend: + = positive - = negative blank = test not performed EQ = equivocal HE = hemolysis precluded testing I = insufficient W = weak positive WB = Western Blot confirmatory analysis pending NS = non-specific reactivity N = normal IgG L = less than normal IgG

PCR EVALUATION

feces	1
<i>Helicobacter</i> spp.	+
<i>Helicobacter bilis</i>	-
<i>Helicobacter ganmani</i>	+
<i>Helicobacter hepaticus</i>	-
<i>Helicobacter mastomyrinus</i>	-
<i>Helicobacter rodentium</i>	-
<i>Helicobacter typhlonius</i>	-

lung	1
<i>Pneumocystis carinii</i>	-

nasopharyngeal swab	1
<i>Mycoplasma pulmonis</i>	-

oral swab	1
<i>Streptobacillus moniliformis</i>	-

Legend: + = positive - = negative id:id = pooled sample range id+id+id = non-range pooled sample NT or blank = no test performed wps = weak positive

Comments: All samples are first tested by the *Helicobacter* spp. PCR assay; a generic *Helicobacter* PCR assay that detects all bacteria in the *Helicobacter* genus. Samples testing negative on this assay are reported negative for *Helicobacter* spp. and all species-specific helicobacters. Samples testing positive on the *Helicobacter* spp. assay are subsequently retested on the *Helicobacter* spp. assay and tested with PCR assays specific for *H. bilis*, *H. ganmani*, *H. hepaticus*, *H. rodentium* and *H. typhlonius* and positive results are reported.

PARASITOLOGY

	1
parasites	-

MICROBIOLOGY

cecum	1
<i>Klebsiella oxytoca</i>	-
<i>Klebsiella pneumoniae</i>	-
<i>Salmonella enterica</i>	-

nasopharynx	1
<i>Corynebacterium kutscheri</i>	-
<i>Pasteurella multocida</i>	-
<i>Pasteurella pneumotropica</i>	-
<i>Streptococcus pneumoniae</i>	-

Legend: + = agent recovered - = agent not recovered blank = test not performed n = no growth p = Proteus overgrowth, which may interfere with the identification of other bacteria

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Received: 3/3/2014

Completed: 3/13/2014

SEROLOGY DETAILS

	Baseline	1
CAR bacillus		
CAR bacillus purified bacteria	MFI > 3.750	-
Hantaan		
Hantaan purified virus	MFI > 1.250	-
LCMV		
LCMV purified virus	MFI > 1.100	-
Mycoplasma pulmonis		
<i>M. pulmonis</i> purified bacteria	MFI > 2.750	-
MAD1		
MAD1 purified virus	MFI > 2.550	-
RPV		
RPV purified virus	MFI > 1.450	-
NS1 ¹	MFI > 3.820	-
RMV		
RMV VP2 recombinant	MFI > 1.000	-
NS1 ¹	MFI > 3.820	-
KRV		
KRV purified virus	MFI > 2.250	-
NS1 ¹	MFI > 3.820	-
H1		
H1 purified virus	MFI > 1.200	-
NS1 ¹	MFI > 3.820	-
PVM		
PVM purified virus	MFI > 1.500	-
RCV/SDAV		
RCV/SDAV purified virus	MFI > 3.750	-
RCV/SDAV NC recombinant	MFI > 4.950	-
REO3		
REO3 purified virus	MFI > 4.900	-

	Baseline	1
RTV		
RTV purified virus	MFI > 1.100	-
TMEV purified virus	MFI > 1.500	-
Sendai		
Sendai purified virus	MFI > 3.000	-
<i>Clostridium piliforme</i>		
<i>Clostridium piliforme</i> purified bacteria	MFI > 4.950	-

NS1¹: NS1 protein is highly conserved among rodent parvoviruses and thus serves as a generic assay for parvovirus seroconversion.

Legend: + = positive - = negative blank = test not performed EQ = equivocal HE = hemolysis precluded testing I = insufficient W = weak positive WB = Western Blot confirmatory analysis pending NS = non-specific reactivity N = normal IgG L = less than normal IgG Positive MFI results are reported as "+" followed by a number from 1 to 33 in thousands rounded off to the nearest thousand.

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IDEXX BioResearch Case # 8519-2014

**Received: 3/3/2014
Completed: 3/11/2014**

Submitted By

Sentinels
University of Missouri-RCA
Columbia, MO 65201

Phone: 573-884-7970
Email: franklinc@missouri.edu; bethunec@missouri.edu;
goerndta@missouri.edu; watermanjd@missouri.edu

Specimen Description

Species: rat
Description: Live Rat
Number of Specimens/Animals: 6
Building/Facility: W112

Client ID	Investigator	Room #	Strain	Sex	Age	Rack
1	Bryda	W112	CD	F	Adult	1
2	Bryda	W112	CD	F	Adult	2
3	Bryda	W112	CD	F	Adult	3
4	Bryda	W112	CD	F	Adult	4
5	Bryda	W112	CD	F	Adult	5
6	Bryda	W112	CD	F	Adult	6

Services/Tests Performed: Rederivation Necropsy Profile - rat

Serologic evaluation for antibodies to: *Clostridium piliforme*, *Mycoplasma pulmonis*, CAR bacillus, H1, Hantaan, KRV, LCMV, MAD1, PVM, RCV/SDAV, REO3, RMV, RPV, RTV, Sendai

PCR evaluation for: *Helicobacter bilis*, *Helicobacter ganmani*, *Helicobacter hepaticus*, *Helicobacter mastomyrinus*, *Helicobacter rodentium*, *Helicobacter spp.*, *Helicobacter typhlonius*, *Mycoplasma pulmonis*, *Pneumocystis carinii*, *Streptobacillus moniliformis*

Parasitologic evaluation for: fur mites, mesostigmatid mites, lice, Spironucleus muris, Giardia muris, large intestinal flagellates and amoeba, pinworms and tapeworms

Microbiologic evaluation for: *Corynebacterium kutscheri*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Pasteurella multocida*, *Pasteurella pneumotropica*, *Salmonella enterica*, *Streptococcus pneumoniae*

General Comments: CB: Sentinels placed on 12/9/2013.

Summary: All test results were negative.

NECROPSY

No gross lesions were detected in any of the body systems and organs examined.

SEROLOGY SUMMARY

	1	2	3	4	5	6
CAR bacillus	-	-	-	-	-	-
Hantaan	-	-	-	-	-	-
LCMV	-	-	-	-	-	-
<i>Mycoplasma pulmonis</i>	-	-	-	-	-	-
MAD1	-	-	-	-	-	-
RPV	-	-	-	-	-	-
RMV	-	-	-	-	-	-
KRV	-	-	-	-	-	-
H1	-	-	-	-	-	-
PVM	-	-	-	-	-	-
RCV/SDAV	-	-	-	-	-	-
REO3	-	-	-	-	-	-
RTV	-	-	-	-	-	-
Sendai	-	-	-	-	-	-
<i>Clostridium piliforme</i>	-	-	-	-	-	-
Rat IgG	N	N	N	N	N	N

Legend: + = positive - = negative blank = test not performed EQ = equivocal HE = hemolysis precluded testing I = insufficient W = weak positive WB = Western Blot confirmatory analysis pending NS = non-specific reactivity N = normal IgG L = less than normal IgG

PCR EVALUATION

feces	1	2	3	4	5	6
<i>Helicobacter</i> spp.	-	-	-	-	-	-
<i>Helicobacter bilis</i>	-	-	-	-	-	-
<i>Helicobacter ganmani</i>	-	-	-	-	-	-
<i>Helicobacter hepaticus</i>	-	-	-	-	-	-
<i>Helicobacter mastomyrinus</i>	-	-	-	-	-	-
<i>Helicobacter rodentium</i>	-	-	-	-	-	-
<i>Helicobacter typhlonius</i>	-	-	-	-	-	-

lung	1	2	3	4	5	6
<i>Pneumocystis carinii</i>	-	-	-	-	-	-

nasopharyngeal swab	1	2	3	4	5	6
<i>Mycoplasma pulmonis</i>	-	-	-	-	-	-

oral swab	1	2	3	4	5	6
<i>Streptobacillus moniliformis</i>	-	-	-	-	-	-

Legend: + = positive - = negative id:id = pooled sample range id+id+id = non-range pooled sample NT or blank = no test performed wps = weak positive

Comments: All samples are first tested by the *Helicobacter* spp. PCR assay; a generic *Helicobacter* PCR assay that detects all bacteria in the *Helicobacter* genus. Samples testing negative on this assay are reported negative for *Helicobacter* spp. and all species-specific helicobacters. Samples testing positive on the *Helicobacter* spp. assay are subsequently retested on the *Helicobacter* spp. assay and tested with PCR assays specific for *H. bilis*, *H. ganmani*, *H. hepaticus*, *H. rodentium* and *H. typhlonius* and positive results are reported.

PARASITOLOGY

	1	2	3	4	5	6
parasites	-	-	-	-	-	-

MICROBIOLOGY

cecum	1	2	3	4	5	6
<i>Klebsiella oxytoca</i>	-	-	-	-	-	-
<i>Klebsiella pneumoniae</i>	-	-	-	-	-	-
<i>Salmonella enterica</i>	-	-	-	-	-	-

nasopharynx	1	2	3	4	5	6
<i>Corynebacterium kutscheri</i>	-	-	-	-	-	-
<i>Pasteurella multocida</i>	-	-	-	-	-	-
<i>Pasteurella pneumotropica</i>	-	-	-	-	-	-
<i>Streptococcus pneumoniae</i>	-	-	-	-	-	-

Legend: + = agent recovered - = agent not recovered blank = test not performed n = no growth p = Proteus overgrowth, which may interfere with the identification of other bacteria

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Completed: 3/11/2014

SEROLOGY DETAILS

	Baseline	1	2	3	4	5	6
CAR bacillus							
CAR bacillus purified bacteria	MFI > 3.750	-	-	-	-	-	-
Hantaan							
Hantaan purified virus	MFI > 1.250	-	-	-	-	-	-
LCMV							
LCMV purified virus	MFI > 1.100	-	-	-	-	-	-
Mycoplasma pulmonis							
<i>M. pulmonis</i> purified bacteria	MFI > 2.750	-	-	-	-	-	-
MAD1							
MAD1 purified virus	MFI > 2.550	-	-	-	-	-	-
RPV							
RPV purified virus	MFI > 1.450	-	-	-	-	-	-
NS1 ¹	MFI > 3.820	-	-	-	-	-	-
RMV							
RMV VP2 recombinant	MFI > 1.000	-	-	-	-	-	-
NS1 ¹	MFI > 3.820	-	-	-	-	-	-
KRV							
KRV purified virus	MFI > 2.250	-	-	-	-	-	-
NS1 ¹	MFI > 3.820	-	-	-	-	-	-
H1							
H1 purified virus	MFI > 1.200	-	-	-	-	-	-
NS1 ¹	MFI > 3.820	-	-	-	-	-	-
PVM							
PVM purified virus	MFI > 1.500	-	-	-	-	-	-
RCV/SDAV							
RCV/SDAV purified virus	MFI > 3.750	-	-	-	-	-	-
RCV/SDAV NC recombinant	MFI > 4.950	-	-	-	-	-	-
REO3							
REO3 purified virus	MFI > 4.900	-	-	-	-	-	-

If you have questions, please call our toll free number at 1-800-669-0825 or e-mail us at idx-radil@idexx.com.

	Baseline	1	2	3	4	5	6
RTV							
RTV purified virus	MFI > 1.100	-	-	-	-	-	-
TMEV purified virus	MFI > 1.500	-	-	-	-	-	-
Sendai							
Sendai purified virus	MFI > 3.000	-	-	-	-	-	-
<i>Clostridium piliforme</i>							
<i>Clostridium piliforme</i> purified bacteria	MFI > 4.950	-	-	-	-	-	-

NS1¹: NS1 protein is highly conserved among rodent parvoviruses and thus serves as a generic assay for parvovirus seroconversion.

Legend: + = positive - = negative blank = test not performed EQ = equivocal HE = hemolysis precluded testing I = insufficient W = weak positive WB = Western Blot confirmatory analysis pending NS = non-specific reactivity N = normal IgG L = less than normal IgG

Positive MFI results are reported as "+" followed by a number from 1 to 33 in thousands rounded off to the nearest thousand.

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IDEXX BioResearch Case # 8520-2014

**Received: 3/3/2014
Completed: 3/11/2014**

Submitted By

Sentinels
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Columbia, MO 65201

Phone: 573-884-7970
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goerndta@missouri.edu; watermanjd@missouri.edu

Specimen Description

Species: rat
Description: Live Rats
Number of Specimens/Animals: 2
Building/Facility: W114

Client ID	Investigator	Room #	Strain	Sex	Age	Rack
1	Bryda	W114	CD	F	Adult	1
2	Bryda	W114	CD	F	Adult	2

Services/Tests Performed: Rederivation Necropsy Profile - rat

Serologic evaluation for antibodies to: *Clostridium piliforme*, *Mycoplasma pulmonis*, CAR bacillus, H1, Hantaan, KRV, LCMV, MAD1, PVM, RCV/SDAV, REO3, RMV, RPV, RTV, Sendai

PCR evaluation for: *Helicobacter bilis*, *Helicobacter ganmani*, *Helicobacter hepaticus*, *Helicobacter mastomyrinus*, *Helicobacter rodentium*, *Helicobacter spp.*, *Helicobacter typhlonius*, *Mycoplasma pulmonis*, *Pneumocystis carinii*, *Streptobacillus moniliformis*

Parasitologic evaluation for: fur mites, mesostigmatid mites, lice, Spironucleus muris, Giardia muris, large intestinal flagellates and amoeba, pinworms and tapeworms

Microbiologic evaluation for: *Corynebacterium kutscheri*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Pasteurella multocida*, *Pasteurella pneumotropica*, *Salmonella enterica*, *Streptococcus pneumoniae*

General Comments: CB: Sentinels placed on 12/9/2013.

Summary: All test results were negative.

NECROPSY

No gross lesions were detected in any of the body systems and organs examined.

SEROLOGY SUMMARY

	1	2
CAR bacillus	-	-
Hantaan	-	-
LCMV	-	-
<i>Mycoplasma pulmonis</i>	-	-
MAD1	-	-
RPV	-	-
RMV	-	-
KRV	-	-
H1	-	-
PVM	-	-
RCV/SDAV	-	-
REO3	-	-
RTV	-	-
Sendai	-	-
<i>Clostridium piliforme</i>	-	-
Rat IgG	N	N

Legend: + = positive - = negative blank = test not performed EQ = equivocal HE = hemolysis precluded testing I = insufficient W = weak positive WB = Western Blot confirmatory analysis pending NS = non-specific reactivity N = normal IgG L = less than normal IgG

PCR EVALUATION

feces	1	2
<i>Helicobacter</i> spp.	-	-
<i>Helicobacter bilis</i>	-	-
<i>Helicobacter ganmani</i>	-	-
<i>Helicobacter hepaticus</i>	-	-
<i>Helicobacter mastomyrinus</i>	-	-
<i>Helicobacter rodentium</i>	-	-
<i>Helicobacter typhlonius</i>	-	-

lung	1	2
<i>Pneumocystis carinii</i>	-	-

nasopharyngeal swab	1	2
<i>Mycoplasma pulmonis</i>	-	-

oral swab	1	2
<i>Streptobacillus moniliformis</i>	-	-

Legend: + = positive - = negative id:id = pooled sample range id+id+id = non-range pooled sample NT or blank = no test performed wps = weak positive

Comments: All samples are first tested by the *Helicobacter* spp. PCR assay; a generic *Helicobacter* PCR assay that detects all bacteria in the *Helicobacter* genus. Samples testing negative on this assay are reported negative for *Helicobacter* spp. and all species-specific helicobacters. Samples testing positive on the *Helicobacter* spp. assay are subsequently retested on the *Helicobacter* spp. assay and tested with PCR assays specific for *H. bilis*, *H. ganmani*, *H. hepaticus*, *H. rodentium* and *H. typhlonius* and positive results are reported.

PARASITOLOGY

	1	2
parasites	-	-

MICROBIOLOGY

cecum	1	2
<i>Klebsiella oxytoca</i>	-	-
<i>Klebsiella pneumoniae</i>	-	-
<i>Salmonella enterica</i>	-	-

nasopharynx	1	2
<i>Corynebacterium kutscheri</i>	-	-
<i>Pasteurella multocida</i>	-	-
<i>Pasteurella pneumotropica</i>	-	-
<i>Streptococcus pneumoniae</i>	-	-

Legend: + = agent recovered - = agent not recovered blank = test not performed n = no growth p = Proteus overgrowth, which may interfere with the identification of other bacteria



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SEROLOGY DETAILS

	Baseline	1	2
CAR bacillus			
CAR bacillus purified bacteria	MFI > 3.750	-	-
Hantaan			
Hantaan purified virus	MFI > 1.250	-	-
LCMV			
LCMV purified virus	MFI > 1.100	-	-
Mycoplasma pulmonis			
<i>M. pulmonis</i> purified bacteria	MFI > 2.750	-	-
MAD1			
MAD1 purified virus	MFI > 2.550	-	-
RPV			
RPV purified virus	MFI > 1.450	-	-
NS1 ¹	MFI > 3.820	-	-
RMV			
RMV VP2 recombinant	MFI > 1.000	-	-
NS1 ¹	MFI > 3.820	-	-
KRV			
KRV purified virus	MFI > 2.250	-	-
NS1 ¹	MFI > 3.820	-	-
H1			
H1 purified virus	MFI > 1.200	-	-
NS1 ¹	MFI > 3.820	-	-
PVM			
PVM purified virus	MFI > 1.500	-	-
RCV/SDAV			
RCV/SDAV purified virus	MFI > 3.750	-	-
RCV/SDAV NC recombinant	MFI > 4.950	-	-
REO3			
REO3 purified virus	MFI > 4.900	-	-

If you have questions, please call our toll free number at 1-800-669-0825 or e-mail us at idexx-radil@idexx.com.

	Baseline	1	2
RTV			
RTV purified virus	MFI > 1.100	-	-
TMEV purified virus	MFI > 1.500	-	-
Sendai			
Sendai purified virus	MFI > 3.000	-	-
<i>Clostridium piliforme</i>			
<i>Clostridium piliforme</i> purified bacteria	MFI > 4.950	-	-

NS1¹: NS1 protein is highly conserved among rodent parvoviruses and thus serves as a generic assay for parvovirus seroconversion.

Legend: + = positive - = negative blank = test not performed EQ = equivocal HE = hemolysis precluded testing I = insufficient W = weak positive WB = Western Blot confirmatory analysis pending NS = non-specific reactivity N = normal IgG L = less than normal IgG Positive MFI results are reported as "+" followed by a number from 1 to 33 in thousands rounded off to the nearest thousand.