
1. PURPOSE

The intent of this Standard Operating Procedure (SOP) is the harmonization of practices to facilitate movement of animals between McGill facilities to accommodate the needs of collaborative research while protecting resident colonies from infectious contamination.

- 1.1. The critical components covered by this harmonization are:
 - 1.1.1. Bioexclusion practices
 - 1.1.2. Quarantine procedures
 - 1.1.3. Health monitoring program
- 1.2. Bioexclusion practices and Quarantine procedures will be addressed in separate SOPs.

2. RESPONSIBILITY

Animal care staff, facility manager, veterinary care staff.

3. ENVIRONMENTAL SAMPLING PROCEDURES

- 3.1. Sample the Individually Ventilated Caging (IVC) system rack exhaust plenums – Exhaust Air Duct (EAD) samples:
 - 3.1.1. To avoid sample contamination, always wear gloves during the sample collection process and change gloves between samples. Wearing full personal protective equipment is recommended to limit exposure to rodent allergens.
 - 3.1.2. Use the adequate swab to collect dust from the areas on the IVC rack where dust tends to aggregate or is concentrated, e.g., the end of horizontal exhaust plenums.
 - 3.1.3. Clip the swab head and place in the collection vial/tube.
 - 3.1.4. Up to 10 swabs can be pooled and submitted in one vial as a single sample.
- 3.2. Alternatively you may submit filter material placed in the IVC system rack exhaust plenum or resident rodent cages:
 - 3.2.1. Submit a single filter section, 5.0 to 7.5 cm in size, of the dirtiest filter material; curl dirty side in and place in a 50mL conical tube.
 - 3.2.2. Up to 10 filters can be pooled and submitted in one vial as a single sample.
- 3.3. Swabs or filters from a maximum of three racks can be submitted in one vial as a single sample.
- 3.4. Include, in two additional vials and for each EAD sample, specimens from index animals:
 - 3.4.1. Select 10 random cages (preferably weanlings) per sample.
 - 3.4.2. Collect one fresh fecal pellet with no bedding material from one animal per cage selected.
 - 3.4.3. Collect fur/skin swab from at least two sites (head between ears, back/rump, inguinal area, perianal area) on one animal per cage selected.
- 3.5. Consider sampling Biological Safety Cabinets (BSCs) or other equipment used with live rodents, e.g., imaging or anesthetic equipment, in housing and procedure areas:
 - 3.5.1. Follow the directions outlined in 3.1 to collect dust from the dirtiest/dustiest areas of the equipment.

3.6. Sampling and agents to be monitored for mice:

	BIOEXCLUSION LEVEL 1 & 2	BIOEXCLUSION LEVEL 3	BIOEXCLUSION LEVEL 4
INTERMEDIATE TESTING	PCR Panel 1	PCR Panel 1	PCR Panel 1
YEARLY TESTING	PCR Panel 1	PCR Panel 2	PCR Panel 2

3.7. Agents monitored for mice:

PCR Panel 1	Mouse rotavirus (EDIM), Mouse coronavirus (MHV), Murine norovirus (MNV), Mouse parvoviruses (MPV1, MPV2, MPV5, MVM, NS-1), Mouse Theilovirus (TMEV, GDVII), <i>Helicobacter spp.</i> , <i>Pasteurella pneumotropica</i> , <i>Corynebacterium bovis</i> (immunodeficient mice), Fur mites, Pinworms
PCR Panel 2	Mouse rotavirus (EDIM), Mouse coronavirus (MHV), Murine norovirus (MNV), Mouse parvoviruses (MPV1, MPV2, MPV5, MVM, NS-1), Mouse Theilovirus (TMEV, GDVII) <i>CAR Bacillus</i> , <i>Clostridium piliforme</i> (Tyzzer's), Ectromelia (Mousepox), Lymphocytic Choriomeningitis Virus (LCMV), <i>Mycoplasma pulmonis</i> , Mouse Adenovirus (MAV-1 & MAV-2), Pneumonia Virus of Mice (PVM), Reovirus, Sendai virus, <i>Helicobacter spp.</i> , <i>Bordetella bronchiseptica</i> , <i>Citrobacter rodentium</i> , <i>Corynebacterium kutscheri</i> , <i>Klebsiella spp.</i> , <i>Pasteurella pneumotropica</i> , <i>Pseudomonas aeruginosa</i> , <i>Salmonella</i> , <i>Streptobacillus moniliformis</i> , <i>Streptococcus pneumonia</i> , Beta Hemolytic <i>Streptococcus</i> groups A,B,C,G, <i>Corynebacterium bovis</i> (immunodeficient mice), <i>Pneumocystis</i> (immunodeficient mice), Fur mites, Pinworms, <i>Spironucleus muris</i>

3.8. Frequency of monitoring, sampling and agents to be monitored for rats:

	BIOEXCLUSION LEVEL 1 & 2	BIOEXCLUSION LEVEL 3
INTERMEDIATE TESTING	PCR Panel 1	PCR Panel 1
YEARLY TESTING	PCR Panel 1	PCR Panel 2

3.9. Agents monitored for rats:

PCR Level 1	Rat parvoviruses (RPV, H-1, KRV, RMV), Sialodacryoadenitis virus/Rat coronavirus (SDAV/RCV), Theilovirus (RTV), Fur mites, Pinworms
PCR Level 2	Rat parvoviruses (RPV, NS-1, KRV, RMV), Sialodacryoadenitis virus/Rat coronavirus (SDAV/RCV), Theilovirus (RTV), Pneumonia virus of mice (PVM), Sendai virus, Lymphocytic Choriomeningitis Virus (LCMV), Hantavirus, Mouse Adenovirus (MAV-1 & MAV-2), Reoviruses, <i>CAR Bacillus</i> , <i>Clostridium piliforme</i> (Tyzzer's), <i>Mycoplasma pulmonis</i> , <i>Bordetella bronchiseptica</i> , <i>Citrobacter rodentium</i> , <i>Corynebacterium kutscheri</i> , <i>Klebsiella spp.</i> , <i>Pasteurella pneumotropica</i> , <i>Pseudomonas aeruginosa</i> , <i>Salmonella</i> , <i>Streptobacillus moniliformis</i> , <i>Streptococcus pneumonia</i> , Beta Hemolytic <i>Streptococcus</i> groups A,B,C,G, Fur mites, Pinworms, <i>Spironucleus muris</i>

4. SENTINEL ANIMAL PROCEDURES

- 4.1. Sentinel animals:
 - 4.1.1. Outbred females are used: CD-1, SW or ICR mice (4-6 weeks old) and SD or LE rats (4-6 weeks old).
 - 4.1.2. At the discretion of the facility veterinarian, immunodeficient mice can be used in addition. They are recommended in areas where animals are produced for redistribution (e.g. transgenic core facility).
 - 4.1.3. 3-5 sentinel mice are housed per cage. 2 sentinel rats are housed per cage.
 - 4.1.4. Ratio: 1 cage of sentinels per approximately 70 to 100 cages.
 - 4.1.5. Identify sentinel cages with a "SENTINEL" cage card.
- 4.2. Exposure:
 - 4.2.1. Dirty bedding transfer for mice:
 - 4.2.1.1. Transfer one plastic teaspoon (approximately 5mL) of dirty bedding from every cage monitored into a clean, empty cage (without bedding) during cage change. Total amount of dirty bedding should not exceed 500mL.
 - 4.2.2. Dirty bedding transfer for rats:
 - 4.2.2.2. Transfer one plastic teaspoon (approximately 5mL) of dirty bedding from every cage monitored into a clean cage during cage change.
 - 4.2.3. Refer to Sentinel Husbandry SOP.
 - 4.2.4. Sentinels must be exposed to all the 70 to 100 cages over a 2-week period.
- 4.3. Testing:
 - 4.3.1. Tests will be performed to monitor pathogens as established by the facility veterinarian, based on the Bioexclusion Level of the facility or room.
 - 4.3.2. For Bioexclusion Levels 1 and 2 collect samples for health monitoring twice per year.
 - 4.3.3. For Bioexclusion Level 3 collect samples for health monitoring three to four times per year.
 - 4.3.4. For Bioexclusion Level 4 collect samples for health monitoring three to four times per year but stagger sample collection as to have monthly results.
 - 4.3.5. Sentinel animals should not be kept for longer than 8 months.
- 4.4. Serology:
 - 4.4.1. A minimum of 2 sentinels per cage are tested per time point.
- 4.5. Parasitology:
 - 4.5.1. Parasitology testing is performed by PCR.
 - 4.5.2. Collect one fresh fecal pellet with no bedding material per animal. Up to 10 fecal pellets can be submitted in the same vial/tube as one single sample.
 - 4.5.3. Collect fur/skin swab by thoroughly swabbing each animal on the head between ears, back/rump, inguinal area and perianal area. One swab can be used to sample more than one mouse, e.g., all the mice in one cage. Clip the swab head and place in the vial/tube.
 - 4.5.4. Do not pool swabs and feces in the same vial/tube.
 - 4.5.5. Collecting samples from sentinel animals:
 - 4.5.5.1. Samples each sentinel animal.
 - 4.5.6. Collecting samples from index animals:
 - 4.5.6.1. Select 10 random cages (preferably weanlings) per housing room. Samples from the 10 selected cages will be pooled into one single sample for submission.
- 4.6. Helicobacter:
 - 4.6.1. Helicobacter testing is performed by PCR.
 - 4.6.2. Select 10 random cages (preferably weanlings) per housing room.

4.6.3. Collect one fresh fecal pellet with no bedding material from one animal per cage selected.

4.6.4. Fecal pellets can be submitted in the same vial/tube as one single sample.

4.7. Microbiology:

4.7.1. Microbiology testing is performed by PCR.

4.7.2. Consider collecting samples from sentinel animals and index animals (preferably weanlings), pooled as a single sample.

4.7.3. Collect one fresh fecal pellet with no bedding material from up to 10 animals.

4.7.4. Collect fur/skin swab from at least two sites (head between ears, back/rump, inguinal area, perianal area) from up to 10 animals.

4.7.5. Collect swabs of the oral cavity from up to 10 animals. Cut off the swab tip from the shaft and place into the collection vial/tube.

4.7.6. Separate vials/tubes must be submitted for fur/skin swabs, oral swabs and fecal pellets.

4.8. Sampling and agents to be monitored for mice:

	BIOEXCLUSION LEVEL 1 & 2	BIOEXCLUSION LEVEL 3	BIOEXCLUSION LEVEL 4
INTERMEDIATE TESTING	<ul style="list-style-type: none"> • Serology Panel 1 • Fur mites, pinworms (sentinels and index animals) 	<ul style="list-style-type: none"> • Serology Panel 1 • Fur mites, pinworms (sentinels and/or index animals) • C. bovis and Pneumocystis (immunodeficient animals) 	<ul style="list-style-type: none"> • Serology Level 1 • Fur mites, pinworms (sentinels and/or index animals) • Helicobacter • C. bovis and Pneumocystis (immunodeficient animals)
YEARLY TESTING	<ul style="list-style-type: none"> • Serology Panel 1 • Fur mites, pinworms (sentinels and index animals) 	<ul style="list-style-type: none"> • Serology Panel 1 or 2 • Fur mites, pinworms, Spironucleus (sentinels and/or index animals) • Helicobacter (optional if positive status known) • Microbiology • C. bovis and Pneumocystis (immunodeficient animals) 	<ul style="list-style-type: none"> • Serology Level 4 • Fur mites, pinworms, Spironucleus (sentinels and/or index animals) • Helicobacter • Microbiology • C. bovis and Pneumocystis (immunodeficient animals)

4.9. Agents monitored for mice:

Serology Panel 1	Mouse rotavirus (EDIM), Mouse coronavirus (MHV), Murine norovirus (MNV), Mouse parvoviruses (MPV1, MPV2, MPV5, MVM, NS-1), Mouse Theilovirus (TMEV, GDVII)
Serology Panel 2	Mouse rotavirus (EDIM), Mouse coronavirus (MHV), Murine norovirus (MNV), Mouse parvoviruses (MPV1, MPV2, MPV5, MVM, NS-1), Mouse Theilovirus (TMEV, GDVII) <i>CAR Bacillus</i> , <i>Clostridium piliforme</i> (Tyzzer's), Ectromelia (Mousepox), Lymphocytic Choriomeningitis Virus (LCMV), <i>Mycoplasma pulmonis</i> , Mouse Adenovirus (MAV-1 & MAV-2), Pneumonia Virus of Mice (PVM), Reovirus, Sendai
Parasitology	Fur mites, Pinworms <i>Spironucleus muris</i> , and <i>Pneumocystis</i> (immunodeficient mice)
Microbiology	<i>Helicobacter spp.</i> , <i>Bordetella bronchiseptica</i> , <i>Citrobacter rodentium</i> , <i>Corynebacterium kutscheri</i> , <i>Klebsiella spp.</i> , <i>Pasteurella pneumotropica</i> , <i>Pseudomonas aeruginosa</i> , <i>Salmonella</i> , <i>Streptobacillus moniliformis</i> , <i>Streptococcus pneumonia</i> , Beta Hemolytic <i>Streptococcus</i> groups A,B,C,G, <i>Corynebacterium bovis</i> (immunodeficient mice)

4.10. Testing schedule for rats:

	BIOEXCLUSION LEVEL 1 & 2	BIOEXCLUSION LEVEL 3
INTERMEDIATE TESTING	<ul style="list-style-type: none"> • Serology Panel 1 • Fur mites, pinworms (sentinels and index animals) 	<ul style="list-style-type: none"> • Serology Panel 1 • Fur mites, pinworms (sentinels and/or index animals)
YEARLY TESTING	<ul style="list-style-type: none"> • Serology Panel 1 • Fur mites, pinworms (sentinels and index animals) 	<ul style="list-style-type: none"> • Serology Panel 1 or 2 • Fur mites, pinworms, Spironucleus (sentinels and/or index animals) • Microbiology

4.1. Agents monitored for rats:

Serology Panel 1	Rat parvoviruses (RPV, NS-1, KRV, RMV), Sialodacryoadenitis virus/Rat coronavirus (SDAV/RCV), Theilovirus (RTV)
Serology Panel 2	Rat parvoviruses (RPV, NS-1, H-1, KRV, RMV), Sialodacryoadenitis virus/Rat coronavirus (SDAV/RCV), Theilovirus (RTV), Pneumonia virus of mice (PVM), Sendai virus, Lymphocytic Choriomeningitis Virus (LCMV), Hantavirus, Mouse Adenovirus (MAV-1 & MAV-2), Reoviruses, CAR <i>Bacillus</i> , <i>Clostridium piliforme</i> (Tyzzer's), <i>Mycoplasma pulmonis</i>
Parasitology	Fur mites, Pinworms, and <i>Spironucleus muris</i>
Microbiology	<i>Bordetella bronchiseptica</i> , <i>Citrobacter rodentium</i> , <i>Corynebacterium kutscheri</i> , <i>Klebsiella spp.</i> , <i>Pasteurella pneumotropica</i> , <i>Pseudomonas aeruginosa</i> , <i>Salmonella</i> , <i>Streptobacillus moniliformis</i> , <i>Streptococcus pneumonia</i> , Beta Hemolytic <i>Streptococcus</i> groups A,B,C,G

4.2. Testing schedule for hamsters:

	BIOEXCLUSION LEVEL 1 & 2
INTERMEDIATE TESTING	<ul style="list-style-type: none"> • Serology • Fur mites, pinworms (sentinels and index animals) • Replace sentinels
YEARLY TESTING	<ul style="list-style-type: none"> • Serology • Fur mites, pinworms, Spironucleus (sentinels and index animals) • Microbiology (optional) • Replace sentinels

4.3. Agents monitored for hamsters:

Serology	Lymphocytic Choriomeningitis Virus (LCMV), Sendai virus
Parasitology	Endoparasites, ectoparasites, and <i>Spironucleus muris</i>
Microbiology	<i>Pasteurella pneumotropica</i>

4.4. Testing schedule for guinea pigs:

	BIOEXCLUSION LEVEL 1 & 2
INTERMEDIATE TESTING	<ul style="list-style-type: none"> • Serology • Spironucleus (sentinels and index animals) • Replace sentinels
YEARLY TESTING	<ul style="list-style-type: none"> • Serology (2 sentinels) • Spironucleus (sentinels and index animals) • Replace sentinels

4.5. Agents monitored for guinea pigs:

Serology	Guinea pig Adenovirus, Guinea pig PIV 3, Sendai, <i>Bordetella bronchiseptica</i> , <i>Corynebacterium kutscheri</i> , <i>Streptococcus pneumoniae</i> , Beta Hemolytic <i>Streptococcus</i> groups A,B,C,G
Parasitology	<i>Spironucleus muris</i>

5. HEALTH STATUS REPORTS

- 5.1. The facility veterinarian reviews all sentinel reports.
- 5.2. If there are any health status problems, the veterinarian will contact the facility manager and investigators concerned.
- 5.3. Results must be within the last 4 months to allow transfer of animals (for facility-specific restricted pathogens).

SOP REVISION HISTORY

DATE	PREVIOUS VERSION	NEW VERSION
2017.03.31	n/a	List of monitored agents matched to SOP 611 Excluded Pathogens- Rodent Facilities
2017.03.31	3. (NO TEXT)	3. Environmental sampling procedures (whole section)
2017.03.31	4.1.3. 3-5 sentinel mice are housed per cage.	4.1.3. 3-5 sentinel mice are housed per cage. 2 sentinel rats are housed per cage.

DATE	PREVIOUS VERSION	NEW VERSION
2017.03.31	<p>3.6 Parasitology:</p> <p>3.6.1 Sentinels (survival):</p> <p>3.6.1.1. Pooled feces for flotation or PCR per sentinel cage.</p> <p>3.6.1.2. Perianal acetate tape impression from each sentinel animal (not necessary if PCR testing is used).</p> <p>3.6.1.3. Fur pluck or sticky PRC swab sample from at least two sites (head between ears and back/rump) from each sentinel animal.</p> <p>3.6.2. Sentinels (terminal):</p> <p>3.6.2.1. Pooled feces and caecal contents for flotation and direct observation per sentinel cage, or PCR testing.</p> <p>3.6.2.2. Perianal acetate tape impression from each sentinel animal (not necessary if PCR testing is used).</p> <p>3.6.2.3. Skin scraping or sticky PCR swab sample from at least two sites (head between ears and back/rump) from each sentinel animal.</p> <p>3.6.3. Index animals:</p> <p>3.6.3.1. Select a random cage (preferably weanlings) per rack.</p> <p>3.6.3.2. Perianal acetate tape impression (not necessary if PCR testing is used) and fur pluck or sticky PCR swab sample from at least two sites (head between ears and back/rump) on 2 to 4 animals.</p> <p>3.6.3.3. Pooled feces for flotation or PCR testing from index weanlings per rack.</p> <p>3.6.4. PCR testing:</p> <p>3.6.4.1. Select a random cage (preferably weanlings) per room.</p> <p>3.6.4.2. Samples from up to 10 cages can be pooled together in to one sample by sampling one mouse per cage.</p> <p>3.6.4.3. For endoparasite testing: collect fresh fecal pellets with no bedding material from one mouse per cage.</p> <p>3.6.4.4. For ectoparasite testing: swab fur using one swab per mouse, one mouse per cage.</p>	<p>3.6.1 Sentinels (survival):</p> <p>3.6.1.1. Pooled feces for flotation or PCR per sentinel cage.</p> <p>3.6.1.2. Perianal acetate tape impression from each sentinel animal (not necessary if PCR testing is used).</p> <p>3.6.1.3. Fur pluck or sticky PRC swab sample from at least two sites (head between ears and back/rump) from each sentinel animal.</p> <p>3.6.2. Sentinels (terminal):</p> <p>3.6.2.1. Pooled feces and caecal contents for flotation and direct observation per sentinel cage, or PCR testing.</p> <p>3.6.2.2. Perianal acetate tape impression from each sentinel animal (not necessary if PCR testing is used).</p> <p>3.6.2.3. Skin scraping or sticky PCR swab sample from at least two sites (head between ears and back/rump) from each sentinel animal.</p> <p>3.6.3. Index animals:</p> <p>3.6.3.1. Select a random cage (preferably weanlings) per rack.</p> <p>3.6.3.2. Perianal acetate tape impression (not necessary if PCR testing is used) and fur pluck or sticky PCR swab sample from at least two sites (head between ears and back/rump) on 2 to 4 animals.</p> <p>3.6.3.3. Pooled feces for flotation or PCR testing from index weanlings per rack.</p> <p>3.6.4. PCR testing:</p> <p>3.6.4.1. Select a random cage (preferably weanlings) per room.</p> <p>3.6.4.2. Samples from up to 10 cages can be pooled together in to one sample by sampling one mouse per cage.</p> <p>3.6.4.3. For endoparasite testing: collect fresh fecal pellets with no bedding material from one mouse per cage.</p> <p>3.6.4.4. For ectoparasite testing: swab fur using one swab per mouse, one mouse per cage.</p> <p>4.5. Parasitology:</p> <p>4.5.1. Parasitology testing is performed by PCR.</p> <p>4.5.2. Collect one fresh fecal pellet with no bedding material per animal. Up to 10 fecal pellets can be submitted in the same vial/tube as one single sample.</p> <p>4.5.3. Collect fur/skin swab by thoroughly swabbing each animal on the head between ears, back/rump, inguinal area and perianal area. One swab can be used to sample more than one mouse, e.g., all the mice in one cage. Clip the swab head and place in the vial/tube.</p> <p>4.5.4. Do not pool swabs and feces in the same vial/tube.</p> <p>4.5.5. Collecting samples from sentinel animals:</p> <p>4.5.5.1. Samples each sentinel animal.</p> <p>4.5.6. Collecting samples from index animals:</p> <p>4.5.6.1. Select 10 random cages (preferably weanlings) per housing room. Samples from the 10 selected cages will be pooled into one single sample for submission.</p>
2017.03.31	<p>3.3.2 At 3 and 9 months, samples are collected by survival methods.</p> <p>3.3.3. Sentinels will be euthanized and replaced at 6 and 12 months.</p>	<p>3.3.2 At 3 and 9 months, samples are collected by survival methods.</p> <p>3.3.3. Sentinels will be euthanized and replaced at 6 and 12 months.</p> <p>4.3.2. For Bioexclusion Levels 1 and 2 collect samples for health monitoring twice per year.</p> <p>4.3.3. For Bioexclusion Level 3 collect samples for health monitoring three to four times per year.</p> <p>4.3.4. For Bioexclusion Level 4 collect samples for health monitoring three to four times per year but stagger sample collection as to have monthly results.</p> <p>4.3.5. Sentinel animals should not be kept for longer than 8 months.</p>
2017.03.31	<p>3.7 Helicobacter:</p> <p>3.7.1. Pooled samples (10 fecal pellets/sample) from each independent index strains or group of stains (minimum of 1 pellet per strain).</p>	<p>3.7 Helicobacter:</p> <p>3.7.1. Pooled samples (10 fecal pellets/sample) from each independent index strains or group of stains (minimum of 1 pellet per strain).</p> <p>4.6 Helicobacter:</p> <p>4.6.1. Helicobacter testing is performed by PCR.</p> <p>4.6.2. Select 10 random cages (preferably weanlings) per housing room.</p> <p>4.6.3. Collect one fresh fecal pellet with no bedding material from one animal per cage selected.</p> <p>4.6.4. Fecal pellets can be submitted in the same vial/tube as one single sample.</p>
2017.03.31	<p>4.7 (NO TEXT)</p>	<p>4.7 Microbiology:</p> <p>4.7.1 Microbiology testing is performed by PCR.</p> <p>4.7.2 Consider collecting samples from sentinel animals and index animals (preferably weanlings), pooled as a single sample.</p> <p>4.7.3 Collect one fresh fecal pellet with no bedding material from up to 10 animals.</p> <p>4.7.4 Collect fur/skin swab from at least two sites (head between ears, back/rump, inguinal area, perianal area) from up to 10 animals.</p> <p>4.7.5 Collect swabs of the oral cavity from up to 10 animals. Cut off the swab tip from the shaft and place into the collection vial/tube.</p> <p>4.7.6 Separate vials/tubes must be submitted for fur/skin swabs, oral swabs and fecal pellets.</p>