Cleaning and Disinfection of Hand-Washed Laboratory Equipment

BACKGROUND

AAALAC site visitors toured UCLA facilities in 2017, 2020, and again in 2023 and provided "suggestions for improvement" that focused on cleaning, disinfection, and accompanying documentation regarding hand-washed items (e.g. anesthesia boxes, behavior equipment) in research areas. In response to these suggestions, the following have been developed to ensure the effectiveness of sanitation for these items.

REQUIREMENTS

1. Identify reusable items in your lab that come into contact with animals. Examples include anesthesia induction boxes, behavioral testing apparatus, non-disposable enrichment objects, restraint devices, etc.
2. Review, and where possible adopt, the cleaning / disinfecting procedure options provided in this document.
3. If you choose to adopt alternative cleaning / disinfecting item(s) procedures:
    a. **Contact DLAM[1] for initial testing to verify cleaning**. The first test will be at no charge to the lab. Labs will be required to pay for follow-up testing, consultation, and ATP swabs (~$8–$10 each) if initial results indicate cleaning failure.
    b. If the cleaning process changes for any item, **repeat testing is required** UNLESS the change is to use a procedure described in one of the attached tables. Contact DLAM for advice and assessment.
4. On a random basis, labs will be requested to submit ATP swabs of hand-washed equipment to DLAM for periodic assessment of cleaning / disinfection. DLAM is currently using the AccuPoint ATP Advanced system. Here is some information on the system:

    How Does the AccuPoint ATP Monitoring System Work? - Quip Labs

Over the following pages, DLAM has assembled considerable information on cleaning and disinfection. We encourage all labs to reach out to DLAM for a consultation on the preferred cleaning and disinfection methods for their specific items or situation.

[1] Contact DLAM Associate Director Joanne Zahorsky-Reeves and the DLAM Training Team for questions and information.

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PURPOSE

To describe cleaning and decontamination procedures to prevent the spread of microbial agents that may cause sub-clinical and clinical animal diseases that could jeopardize the validity and reproducibility of research data, or complicate its interpretation, or cause zoonotic concerns. The tables below focus on direct animal contact areas.

RESPONSIBILITY

Space User(s) Responsibility:

Areas of Responsibility	Procedural Space Use
Animal Procedural Areas	It is the responsibility of the individual(s) using a common procedural area, core facility, or their own laboratory space to clean and disinfect all equipment and work surfaces that may come in direct contact with animals prior to each use as described below.
Core Facilities	
Equipment In Area	

GENERAL DECONTAMINATION PROCEDURES

Frequency: Each Use/Daily	
All devices or components of equipment that come in direct contact with animals (such as ultrasound probes and platforms; imaging and irradiator animal containment devices, behavioral testing apparatus; anesthetic induction boxes; restrainers)	Direct contact surfaces are: • Cleaned and disinfected using a one-step, single use wipe product (Purefexion Wipes, Peroxigard Wipes) or by using a cleaning and disinfecting product sprayed onto paper towels or a disposable, microfiber towel (Hexagiene or Sani-Plex 128m). Allow to air-dry. • Sanitized using: MB-10 Tablet Solution (non-corrosive CL02) (optional step). This is recommended if working with immuno-deficient animals, such as NSGs. The contact time is five (5) minutes for this product. After disinfection, use an alcohol rinse/wipe to remove surface residue after the required contact time (optional step). Be advised that that this rinse should be used on surfaces with the potential to corrode unless you use MB-10 Tablet Solution (non-corrosive CL02). • Do NOT use alcohol and/or products containing alcohol on Plexiglas® as these products may craze/damage this material (e.g., anesthetic chambers, rodent restrainers, etc.). • One time use objects like blue pads are discarded after use, they should not be left on surfaces when not in use
Frequency: Weekly to Monthly (depending on use)	
Deep cleaning of equipment that comes in direct frequent or high contact with animals	In addition to above spot-cleaning at each use, equipment where animals have high direct contact should be placed on a schedule for breakdown and thorough cleaning: • Hand-washing of caging / equipment in water that is approximately 110^{o} - 120^{o} F using appropriate detergent (Sani-Plex 128m, Iodex soap) and then rinsed using copious clean hot water (same temperature). Items are then set out to air-dry. (Items must not be placed on the floor.) • Once items have been cleaned, they must be stored covered and in a manner such that they are not contaminated prior to use with live animals. If items become dusty / dirty / soiled / contaminated, they must be washed and sanitized again prior to use.
Water Tanks/Maze	Water tanks used in behavioral testing (e.g., Morris water maze) are:

	• Drained • Cleaned with Sani-Plex 128m and rinsed after at least ten (10) minute contact time Sanitized, as indicated above, between studies of animal cohorts (e.g., animals from different cages, from different rooms, from different rack sides, or of different health status) at the discretion of the PI, but must be drained / cleaned and sanitized weekly to reduce the biofilm load in the tanks.

EXAMPLES OF EQUIPMENT DECONTAMINATION PROCEDURES

Equipment	Instructions
Irradiator Pies or Restraint Devices	• Any absorbent liners that come in contact with animal(s) are changed before and after each cage or animals are exposed. • Irradiator pies (if used) are cleaned and sanitized with one-step wipes before and after each cage of animals is irradiated. Pies are washed with soap and water on a weekly basis. • Consult with the manufacturer or UCLA Radiation Safety on any additional or alternate cleaning plans.
PET/SPECT/CT/MRI cradles	• Animal holder / cradle is sanitized with one-step wipes or MB-10 Tablet Solution (non-corrosive CL02) before and after each cage of animals is imaged. • Rectal probe, pneumatic respiration pillow sensor, and invasive blood transducer (if used) are sanitized with one-step wipes • Consult with the manufacturer on any additional or alternate cleaning plans, such as the use of alcohol.
Ultrasound / Echo Probe/ Stage	• Probe and stage area are sanitized with one-step wipes, followed by wiping with alcohol wipes after three (3) minutes after each cage of animals. • Consult with the manufacturer on any additional or alternate cleaning plans.
Anesthesia devices – Nose cones, induction boxes	• For rodents, anesthesia nose cone is cleaned with one-step wipes between animals. Replace the latex nose plenum when needed. Disassemble the nosecone for cleaning by washing in the sink with soap and water preferably at the end of each anesthetic day. • For induction boxes, before the start of each workday, the box is cleaned with one-step wipes or Sani-Plex 128m (no alcohol on Plexiglas®) allowing at least ten (10) minute contact time, or air dry • Paper towel liners that come in contact with animal(s) are changed after each cage of animals are anesthetized. • Box must be disassembled from anesthesia system and washed with detergent and water (see above instructions) on a regular schedule, depending on frequency of use.
Behavioral Apparatus / Restraint Device	• Behavioral apparatus and non-disposable restraint devices are cleaned with one-step wipes or Sani-Plex 128m between cages of animals or between individual animals if animals tested originate from different cages; or between cohorts / cages of animals from different investigators; and after use each day.

	• Behavioral apparatus may also be disinfected with MB-10 Tablet Solution (non-corrosive CL02), preferably after each animal is tested (since the scent of another animal may complicate the interpretation of data), but at least after every cage of animals tested. • If possible, apparatus is broken down and hand-washed with detergent in a sink (see detailed procedures above) on a regular schedule. Small items (such as Plexiglas® rodent restrainers) should be washed on a regular basis, preferably at the end of each day's use. **See "CLEANING OF BEHAVIORAL EQUIPMENT" on the Additional Information page.**
Microscope (live animal use)	Stage is wiped clean with one-step wipes then sanitized with MB-10 Tablet Solution (non-corrosive CL02 (optional step)). Paper liners that come in contact with animal(s) are changed before and after each cage of animals. • Micro Probe lenses that come in contact with animals should be cleaned/disinfected after each animal with alcohol only. • Objective lenses that happen to come in contact with animals should also be disinfected after each animal with alcohol only. • Consult with the manufacturer on any additional or alternate cleaning plans.
CODA non-invasive blood pressure system	• Occlusion cuffs can be gently rinsed with water and cleaned with Iodex soap and water before and after each cage of animals. Do not use solvents or alcohol to clean cuffs. • Cuffs can be sanitized with MB-10 Tablet Solution (non-corrosive CL02).

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Additional Information

SAFETY PROCEDURES

1. Always consult with Environmental Health and Safety (EH&S) when using any new chemical if you have questions on its potential hazards, required vs. recommended PPE, etc.
2. Wear appropriate personal protective equipment (PPE) when hand-washing equipment. PPE includes heavy rubber gloves, eye protection, waterproof apron, and rubber boots when appropriate.
3. Protective eyewear must be worn when working with caustic/corrosive chemicals. These chemicals must be added to your lab's chemical inventory, and an SOP for their use developed. Consult with UCLA Chemical Safety.

CLEANING OF BEHAVIORAL EQUIPMENT

A 2024/2025 study at UCLA, comparing two different cleaning / disinfecting agents (one was a peroxide-based agent, and the other a quaternary-ammonia based agent) vs. water, showed some significant aversion in mice and rats to the peroxide-based product (information available upon request).

It is therefore advised that a non-peroxide formulation (such as the Purefexion Wipes or Sani-Plex 128m) be used when cleaning behavioral testing equipment, and NOT Peroxigard wipes or Hexagiene, so that variables are not introduced into the studies.

TRAINING

A training module has been created in Worksafe for cleaning of various surfaces and items. The online module is entitled "DLAM WI 0212(D) General Surface Cleaning." It is directed more towards DLAM staff, but is still useful for PI lab staff as well, and we encourage everyone to complete it. (A note that Google Chrome is the best browser for the site.)

INFORMATION ON RECOMMENDED CLEANING / DISINFECTING PRODUCTS:

Note: If working with hazardous or biological agents, consult your approved Biological Use Authorization (BUA) or EH&S for help with disinfectant / cleaning product selection.

AGENT	DILUTION	CONTACT TIME	EXPIRES	COMMENTS / USES	REQUIRED PPE[2]
MB-10 Tablet Solution (non-corrosive, chlorine dioxide)[3]	200 ppm: 12.0 grams product per gallon	5 minutes	Lasts seven (7) days once mixed	Disinfectant / virucidal / tuberculocidal / oxidizing. For hard, non-porous surfaces, bio-safety hoods, sinks, tiles, cages, instruments and utensils.	Two pairs of gloves, one must be nitrile, eye protection, lab coat.

[2] Required PPE is based on review of chemical SDS and DLAM usage of these products. It is always recommended to consult with EH&S Chemical Safety before you start using any new chemical, or if you have any questions. When preparing chemicals please wear face shield and eye protection to reduce chemical splashes to face/ eyes.

[3] https://quiplabs.com/product/mb-10-tablets

AGENT	DILUTION	CONTACT TIME	EXPIRES	COMMENTS / USES	REQUIRED PPE[2]
Sani-Plex 128m (Quaternary Ammonia, liquid)[4]	1 oz in 1 gallon water	10 minutes	Three (3) months	A cleaner / disinfectant / fungicide / virucide / mildewstatic. Can be used on washable hard, non-porous surfaces (glass, laminants, metal, stainless steel, glazed porcelain, ceramic, sealed granite and marble, flooring, walls, countertops, painted surfaces, polystyrene and polypropylene plastics, other sealed stone [limestone, slate, terracotta, etc.], chrome, vinyl, Plexiglas®. Undiluted form can cause serious eye damage, skin corrosion, and is acutely toxic (oral).	Protective gloves, eye and face protection, lab coat.
Purefexion Wipes[5] (citric acid-based, compostable wipe)	N/A	5 minutes / Air dry	See packaging	Germicidal / Tuberculocidal / Fungicidal / Virucidal. Cleans, disinfects, deodorizes. Hard surface disinfecting and cleaning. No quaternary ammonia or bleach. Non-irritating. No residue.	None required, gloves (latex or nitrile) recommended.
Iodex Soap[6] (iodine-based liquid soap)	Undiluted	Undetermined	See packaging	One step sanitizing hand wash and mild detergent for lab items. Use Iodex only as part of a washing step, not as a contact disinfectant.	Lab coat, gloves. Eye protection if risk of splash while sink-washing.

[4] https://quiplabs.com/product/sani-plex-128m
[5] https://quiplabs.com/product/purefexion-wipes/
[6] https://quiplabs.com/wp-content/uploads/Iodex-Hand-Soap-Cut-Sheet-QL018.pdf

AGENT	DILUTION	CONTACT TIME	EXPIRES	COMMENTS / USES	REQUIRED PPE[2]
Peroxigard wipes[7] (peroxide-based wipe)	N/A	1 minute / Air dry	See packaging	One-step disinfectant cleaner and deodorizer. Bactericidal / virucidal (Parvovirus) / fungicidal / tuberculocidal. For hard, non-porous surfaces. Feeding and watering equipment, utensils, instruments, cages, etc. Life science laboratory surfaces, instruments, and equipment.	None required, gloves (latex or nitrile) recommended.
Hexagiene[8] (peroxide – based liquid)	N/A, ready to use	1 minute / Air dry	See packaging	One-step disinfectant and cleaner, deodorizer. Tuberculocidal, bactericidal, virucidal. For use on hard, non-porous, non-food surfaces. Causes skin irritation, eye irritation.	Protective gloves, eye and face protection, lab coat.

[7] https://peroxigard.com/product-information/wipes

[8] https://quiplabs.com/wp-content/uploads/Hexagiene-Quart-Bottle-Label-KD-12.06.23.pdf