

General Guidance for Personal Protection and Decontamination



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General Guidance for Personal Protection and Decontamination

SECTION I Governing Principles

We are all in this together and have a duty to protect, help and encourage one another. We do this by consistently obeying good laboratory practices and safety rules and by ensuring good practices are followed by everyone around us. If you have concerns about your own safety or safety of others, contact your supervisor.

If you have any symptoms of any condition, stay at home.

Maintain physical distancing and clean hands, and wear appropriate PPE at all times.

The following are guidelines for safe operation in laboratory spaces to assist you in making your own laboratory and group plan according to your circumstances. They are complementary to the directives outlined by the Neuro and McGill:

Neuro directives at <https://www.mcgill.ca/neuro/about/staff/covid-19> and the McGill [directives for ramping up Research and directives for preventing the spread at COVID-19](#).

Personal Decontamination and PPE

Hand washing (before and after touching any surfaces), physical distancing, and keeping hands away from your head are the best means of protecting yourself. Wash your hands thoroughly with soap and water for at least 20 seconds before commencing work, at frequent intervals during work and when you are finished working with a piece of equipment or a lab bench. This includes when going from one room to another when your touch-area changes, including the washroom. Keep a container of hand sanitizer with you for intermittent sanitization when soap and water are not available.

A clean lab coat/gown must ALWAYS be worn in the lab. Wearing of safety glasses is encouraged whenever reasonably possible in addition to their normal safety requirements for specific activities. Do not take your lab coat into a seating area.

Masks: Wear a mask according to the policy stipulated by the institution, *e.g.*, when you are not alone in the lab/office or when moving through more public spaces. A mask can reduce transmission by reducing air flow from you to others, but does not prevent SARS-CoV-2 transmission and is not a substitute for physical distancing. If you use a reusable cloth mask, keep it clean – sterilize by thorough washing in soap and water or boiling each day.

Be aware: Touch as little as possible. Be cognizant of ALL the surfaces you touch (door knobs, drawers, equipment, pipettes, phones, computers, taps, faucets, *etc.*). You must sanitize these surfaces when you are finished your work or between users. After washing and drying hands, use the paper towel to shut off taps (and open the washroom door). Use other covered parts of your body to move doors, *etc.* when feasible.

Gloves: Gloves are only protective if you use them properly and understand the limitations. Clean gloves must be used at only one work station and then discarded. Do not cross contaminate surfaces and working areas – when you move from one area to another, wash your hands. Don gloves when you begin using a piece of equipment and doff and discard them before you leave that work station. Under some circumstances it might be appropriate to apply disinfectant to gloved hands when switching to an adjacent area, but be mindful to thoroughly cover all areas including folds. If wearing gloves is impractical (*e.g.*, at light sheet microscope – risk of contaminating the microscope with DBE), or you can work aseptically without them,

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please wash your hands for at least 20 seconds with water and soap before using the equipment, and after.

Decontaminating Laboratory Surfaces and Equipment

Common disinfectants and contact time are listed below. The disinfectant to use depends on the surface. Very important is to follow manufacturer's instructions on the container, including the contact time required to kill pathogens. Commercial disinfectants (e.g., Lysol or Clorox wipes), Conflikt or 70% alcohol solution are effective applied appropriately. The table in Table 1 documents persistence of SARS-coV-2 on various surfaces.

Disinfection efficiency depends on the agent used, concentration, and contact time.

Commonly Available Disinfectants

The following are excerpts from the McGill Biosafety Manual:

https://www.mcgill.ca/ehs/files/ehs/biosafety_manual_ehs-sman-001_v1.pdf Appendix G Chemical Disinfectants, and Health Canada and Center for Disease Control websites.

For lists of approved disinfecting agents and instructions see the Health Canada and Center for Disease Control websites:

- <https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19/list.html>
- <https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/cleaning-disinfection.html>

For persistence of SARS-CoV-2 on different surfaces see literature review by Fiorillo L et al. (2020) COVID-19 Surface Persistence: A Recent Data Summary and Its Importance for Medical and Dental Settings Int J Environ Res Public Health 17 doi:10.3390/ijerph17093132. <https://www.ncbi.nlm.nih.gov/pubmed/32365891>

and Chin A W H, Chu J T S, Perera M R A, et al. Stability of SARS-CoV-2 in different environmental conditions. Lancet Microbe 2020; published online April 2. [https://doi.org/10.1016/S2666-5247\(20\)30003-3](https://doi.org/10.1016/S2666-5247(20)30003-3) (see Table 1)

Sodium hypochlorite solution (liquid bleach)

Effective concentrations: 100-10,000 ppm (.01-1%) free chlorine, (3,000 ppm for broad spectrum). a 1/10 dilution of 5.25% bleach provides 5,250 ppm available chlorine.

Contact time: 10-60 min (see notes below)

Advantages: Broad spectrum; inexpensive; widely available; bactericidal at low temperature

Disadvantages: Toxic, corrosive to skin and metals; efficacy decreases as pH increases; inactivated by organic matter; deteriorates under light and heat: shelf life of dilutions is less than 1 week

Some uses: General disinfectant; waste liquids; surface decontamination; emergency spill clean-up; instrument disinfection (but could be harmful to sensitive equipment)

From the CDC website: "Follow manufacturer's instructions for application, ensuring a contact time of at least 1 minute, and allowing proper ventilation during and after application. Check to ensure the product is not past its expiration date. Never mix household bleach with ammonia or any other cleanser. Unexpired household bleach will be effective against coronaviruses when properly diluted."

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Alcohols

70-80% ethanol; 60-95% isopropanol

Contact Time: 10-30 min (see below)

Advantages: Low toxicity; rapid action; low residue; non-corrosive

Disadvantages: Rapid evaporation limits contact time; flammable, eye irritant; may damage rubber, plastic, shellac; ineffective against bacterial spores

Some uses: Skin disinfectant (antiseptic); surface decontamination; benchtop, cabinet wipe down.

NOTE: Alcohol is better at killing bacteria than viruses. Be aware that a quick squirt or wipe may not be sufficient; however, a study by Chin *et al.*, found that no detectable SARS-CoV-2 after 5 min exposure to 70% ethanol. [Chin A W H, Chu J T S, Perera M R A, et al. Stability of SARS-CoV-2 in different environmental conditions. *Lancet Microbe* 2020; published online April 2. [https://doi.org/10.1016/S2666-5247\(20\)30003-3](https://doi.org/10.1016/S2666-5247(20)30003-3)].

Hydrogen Peroxide

Solutions and contact times: Aqueous solution 3-30% for 10-60 min 6% for 30 min may kill spores *Advantages:* Rapid action; no residue; low toxicity; environmentally safe.

Disadvantages: Limited sporicidal activity; corrosive to some metals; potentially explosive at high concentrations; stock solutions irritating to skin and eyes.

Some uses: Surface decontamination; instruments and equipment

Other effective Commercial Products

Disinfectant wipes (Lysol and Clorox) contain quaternary ammonium compounds (Alkyl dimethyl benzyl ammonium chloride) and alcohols as active ingredients (not bleach).

There are also specialized cleaning products sold by equipment manufacturers (*e.g.*, microscopes and computers).

Decon™ Conflikt® Ready-to-use Disinfectant Spray (Fisher Scientific) is a quaternary (quat) disinfectant that can be used to clean and disinfect hard surfaces in labs, hospitals or anywhere thorough disinfection efficacy is required. Available from Fisher Scientific.

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Table 1 :

Chin A W H, Chu J T S, Perera M R A, et al. Stability of SARS-CoV-2 in different environmental conditions. Lancet Microbe 2020; published online April 2. [https://doi.org/10.1016/S2666-5247\(20\)30003-3](https://doi.org/10.1016/S2666-5247(20)30003-3)

Table. Stability of SARS-CoV-2 at different environmental conditions.

A) Temperature*

Time	Virus titre (Log TCID ₅₀ /mL)									
	4°C		22°C		37°C		56°C		70°C	
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD
1 min	N.D.	N.D.	6.51	0.27	N.D.	N.D.	6.65	0.1	5.34	0.17
5 mins	N.D.	N.D.	6.7	0.15	N.D.	N.D.	4.62	0.44	U	-
10 mins	N.D.	N.D.	6.63	0.07	N.D.	N.D.	3.84	0.32	U	-
30 mins	6.51	0.27	6.52	0.28	6.57	0.17	U	-	U	-
1 hr	6.57	0.32	6.33	0.21	6.76	0.05	U	-	U	-
3 hrs	6.66	0.16	6.68	0.46	6.36	0.19	U	-	U	-
6 hrs	6.67	0.04	6.54	0.32	5.99	0.26	U	-	U	-
12 hrs	6.58	0.21	6.23	0.05	5.28	0.23	U	-	U	-
1 day	6.72	0.13	6.26	0.05	3.23	0.05	U	-	U	-
2 days	6.42	0.37	5.83	0.28	U	-	U	-	U	-
4 days	6.32	0.27	4.99	0.18	U	-	U	-	U	-
7 days	6.65	0.05	3.48	0.24	U	-	U	-	U	-
14 days	6.04	0.18	U	-	U	-	U	-	U	-

B) Surfaces*

Time	Virus titre (Log TCID ₅₀ /mL)									
	Paper		Tissue paper		Wood		Cloth		Glass	
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD
0 min	4.76	0.10	5.48	0.10	5.66	0.39	4.84	0.17	5.83	0.04
30 mins	2.18	0.05	2.19	0.17	3.84	0.39	2.84	0.24	5.81	0.27
3 hrs	U	-	U	-	3.41	0.26	2.21 [#]	-	5.14	0.05
6 hrs	U	-	U	-	2.47	0.23	2.25	0.08	5.06	0.31
1 day	U	-	U	-	2.07 [#]	-	2.07 [#]	-	3.48	0.37
2 days	U	-	U	-	U	-	U	-	2.44	0.19
4 days	U	-	U	-	U	-	U	-	U	-
7 days	U	-	U	-	U	-	U	-	U	-

Time	Virus titre (Log TCID ₅₀ /mL)									
	Banknote		Stainless steel		Plastic		Mask, inner layer		Mask, outer layer	
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD
0 min	6.05	0.34	5.80	0.02	5.81	0.03	5.88	0.69	5.78	0.10
30 mins	5.83	0.29	5.23	0.05	5.83	0.04	5.84	0.18	5.75	0.08
3 hrs	4.77	0.07	5.09	0.04	5.33	0.22	5.24	0.08	5.11	0.29
6 hrs	4.04	0.29	5.24	0.08	4.68	0.10	5.01	0.50	4.97	0.51
1 day	3.29	0.60	4.85	0.20	3.89	0.33	4.21	0.08	4.73	0.05
2 days	2.47	0.23	4.44	0.20	2.76	0.10	3.16	0.07	4.20	0.07
4 days	U	-	3.26	0.10	2.27	0.09	2.47	0.28	3.71	0.50
7 days	U	-	U	-	U	-	U	-	2.79	0.46

C) Disinfectants*

Disinfectant (Working concentration)	Virus titre (Log TCID ₅₀ /mL)		
	5 mins	15 mins	30 mins
	Household bleach (1:49)	U	U
Household bleach (1:99)	U	U	U
Hand soap solution (1:49)	3.6 [#]	U	U
Ethanol (70%)	U	U	U
Povidone-iodine (7.5%)	U	U	U
Chloroxylenol (0.05%)	U	U	U
Chlorhexidine (0.05%)	U	U	U
Benzalkonium chloride (0.1%)	U	U	U

D) pH*

pH (60 mins)	Virus titre (Log TCID ₅₀ /mL)	
	Mean	±SD
	3	5.55
4	5.67	0.36
5	5.73	0.04
6	5.75	0.08
7	5.58	0.22
8	5.70	0.14
9	5.54	0.44
10	5.51	0.11

* All the virus titres were titrated using Vero-E6 cells. All experimental studies were done in three independent triplicates. Detection limit of a typical TCID₅₀ assay is 100 TCID₅₀/mL, except reactions containing hand soap/chloroxylenol (detection limit: 10³ TCID₅₀/mL) or reactions containing povidone-iodine/chlorhexidine/benzalkonium chloride; detection limit: 10⁴ TCID₅₀/mL because of their cytotoxic effects. N.D.: not done, U: undetectable.
[#] Only one of the triplicate reactions was positive in the TCID₅₀ assay.

Use and Decontamination of Specialized and Sensitive Equipment

SECTION II: SPECIALIZED AND SENSITIVE EQUIPMENT

On specialized equipment, the procedure for its use and decontamination should be posted.

Computer Equipment and Accessories

To ease the disinfection of touchable surfaces such as computer keyboards, mice, touchpads, *etc.* you can cover them wherever possible with plastic wrap, which can be exchanged or disinfected. Consider operating touchpads with appropriate pens, the rubber end of pencils, *etc.*

Decontaminating Keyboards, Computer mouse

Unplug the keyboard or turn it off if it is wireless. Clean with Clorox/Lysol disinfecting wipes (squeezed to remove any excess liquid) or 70% isopropyl alcohol or ethanol (commercial wipes or solution sprayed onto a microfibre cloth or cotton pad/swab). Be aware that products might damage the surface. Avoid bleach (note Clorox wipes do not contain bleach). Do not spray any cleaning solutions directly onto your equipment.

Decontaminating Screens, Touchpads

You can use 70% alcohol sprayed onto a clean pad or cloth or commercial product recommended for your equipment.

Personal Devices

Routinely disinfect your cell phone/tablet *etc.* (at least daily). Do not touch when you are working with lab equipment without decontaminating to avoid cross-contamination.

Sensitive Equipment

Please consult the manufacturer for effective procedures that will not damage the equipment. The protocol for microscopes is presented here since they are commonly found in labs.

Cleaning and Disinfecting Microscopes

- Please carefully and thoroughly disinfect the keyboards and other surfaces you touch such as power switches, focus knobs, joy-sticks, eye piece guards, *etc.* using 70% ethanol **before and after** each use.
- Use is limited to one person at a time – share computer images, not real time observation.
- Be sure to **clean the eye pieces as well, before and after use**, using lens paper (NOT Kimwipes).
- It is strongly encouraged to wear glasses for further protection of your eyes against virus.
- Wash your hands again when leaving the work station and rooms.

Links:

https://www.leica-microsystems.com/science-lab/how-to-sanitize-a-microscope/?nlc=20160425-DEWE-A9CGTV&utm_source=LinkedIn&utm_medium=SocialMedia&utm_campaign=GL-WID-SCL-150420
https://miap.eu/fileadmin/primary/Public/user_uploads/Files/Ressources/Zeiss_Quick_Guide_Cleaning_and_Disinfecting_the_Microscope_and_its_Optical_Components_en01_003.pdf

Notes:

Studies are showing that alcohol, although not the most efficient disinfectant for viruses, is effective against SARS-CoV-2 with sufficient contact time (see below). A cursory wipe is not sufficient. Other agents can be damaging to sensitive components of equipment.

Avoid liquid pooling on electronic devices.

Never spray disinfectant directly on sensitive equipment.

SECTION III: PROCEDURES FOR OPERATION AND MAINTENANCE OF TISSUE CULTURE (TC) ROOMS, BSCS AND INCUBATORS

TRAINING REQUIREMENTS

BIOHAZARD TRAINING, BIOSAFETY CABINETS, WHMIS

FOLLOW DIRECTIONS IN SOP. OTHER WISE ASK LAB MANAGER FOR ADVICE AND TRAINING.

PPE: LAB COAT/GOWN; GLOVES OR EXTENSIVELY WASHED HANDS WHILE OPERATING BSC

SPECIAL COVID-19 MEASURES:

- Ensure a lab manager is in charge of and carries out routine maintenance, ordering of gas cylinders and operation of the facility in a safe manner
- Users: Book use of the room as directed by lab manager
- Work with sterile technique
- Disinfect all surfaces touched with 70% alcohol (ethanol or isopropanol), disinfectant wipes or sprays (e.g., Conflikt), including both internal and external surfaces of the BSC, chairs, counters, taps, cupboard doors, etc.
- Disinfect sensitive equipment including microscopes, incubator doors, touched edges of incubator trays and other sensitive areas with 70% ethanol
- Avoid touching your face
- Maintain physical distancing of at least 2 metres at all times. Wear a mask if another user is in the room and there is a risk of being closer than 2 metres
- Avoid use of personal electronic devices (or if necessary, disinfect hands and device immediately)
- Handle cultures according to sterile procedures described for use of BSC.

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GENERAL TISSUE CULTURE AREA MAINTENANCE (see additional COVID-19 special procedures above)

- Spray down counters, cupboards, door handles, etc. with Conflikt or other spray disinfectant, daily as needed and weekly as maintenance
- Clean microscope stages, phones and other equipment with Conflikt or 70% ethanol (depending on the surface), sprayed onto a clean cloth.
- Flush EYE WASH Station every week and sign the card located above sink with your initials
- Record regular maintenance in the SOP record book

EACH USER UPON COMPLETION OF USE

- Check to see if service (vacuum) lines are turned off. (gas lines are no longer used)
- Check incubator settings to make sure they are at 5% CO₂ and 37°C or other required settings

SOP Use of Biosafety Cabinet, Incubators and General Tissue Culture

- Check that the CO₂ tanks are in good order and there is a spare
- Make sure microscopes, power supplies and other equipment not in use are turned off
- Make sure BSCs are off, empty of clutter and clean for the day
- Check refrigerator doors, faucets to make sure they are properly closed
- Close lights and door

USE OF BSC

- All users must put on gloves or wash hands thoroughly (>20 seconds with soap and water, or with hand sanitizer) when commencing work in the TC room and operating in the BSC. Wear gloves when working with any hazardous agent or if this is the lab's policy
- If using a Bactincinerator, make sure to turn unit on 10 minutes before use
- Work within the workspace without blocking vents
- To sterilize forceps and Pasteur pipettes, leave in the Bactincinerator for at least 5 seconds and don't touch any other surface before using on sterile cultures
- Wipe off any media spills on surface or dishes before returning to the incubator (with alcohol wipe)
- Dispose of sharps and biohazardous materials in their proper bins. Do not fill bins to overflowing
- All clean plastic bags and bottles (no animal or human tissue contact) may be placed in the plastic recycling bag
- Wipe down BSC with disinfectant (70% alcohol or Conflikt) after each use, including all touched external surfaces. Add bleach to the vacuum bottle and tubing after each use.
- Make sure ALL valves are closed and units are off at the end of the day

FOR SPILLS:

- If minor, please clean surfaces with either Conflikt or 70% ethanol. If liquids spill under the grill, stop work, and clean immediately. Please notify lab manager in charge so that the BSC may be disassembled properly. **DO NOT LEAVE SPILLS TO DRY AS THEY ARE THE MAIN SOURCE OF CULTURE CONTAMINATION.**
- If it is a serious spill, advise lab manager in charge and your supervisor.

SPILL KIT AVAILABLE IN (SPECIFY LOCATION).

IX. SHARPS USE AND DISPOSAL, PPE, STORAGE, EMERGENCY RESPONSE PROCEDURES AND TRAINING

As per the Laboratory Safety Rules

<http://www.mcgill.ca/ehs/laboratory/lab-safety-manual>

MAINTENANCE REQUIREMENTS (EVERY 3 MONTHS)

- Wear lab coat, nitrile gloves, safety glasses and mask
- Make sure unit is OFF. Empty unit of all items. Remove the top tray and spray the under chamber with 70% Ethanol. Wipe down. You can equally pour enough volume of 70% ethanol to cover the whole surface and let sit for 20 minutes. Then pour from the open valve. Replace top. Wipe counters with 70% Ethanol. Throw waste in biohazard box.

SOP Use of Biosafety Cabinet, Incubators and General Tissue Culture

- Let the BSC run for 10 minutes
- Every year units need to be certified to be compliant. This is organized by the Institute (Sandra Minotti provides supervision)

USE OF INCUBATORS

Clean the Incubators (every 2 weeks)

- Incubators are cleaned with Conflikt (Fisher), followed by a 70% ethanol spray on monthly basis. The pan is washed with Conflikt and then 70% ethanol. The water is replaced every week using filtered (0.2 μ M filter) distilled water.

Verify status of CO₂ cylinders and ensure back up cylinders(s) are available

- Reorder/exchange according to your laboratory procedure

Check the CO₂ percentage of the Incubators (every month) (CO₂ meter or Fyrite kit)

Maintenance and Cleaning of Countertop Centrifuge

SECTION IV: COUNTERTOP CENTRIFUGE

Standard Maintenance

- Centrifuge is washed with Conflikt every month. Bleach immediately any tube holders that contain any spilled contents.
- Occasionally oil the bucket holders with grease (located in the drawer below) to make sure they swing properly in a run
- Make sure that the rotors are installed properly before each use
- Turn the power off when not in use
- After use, make sure the lid is opened and the rotor cover is off to prevent trapping of humidity

Conflikt ® Ready-to-use Disinfectant Spray is a quaternary (quat) disinfectant that can be used to clean and disinfect hard surfaces in labs, hospitals or anywhere thorough disinfection efficacy is required.

COVID-19 Extra Precautions

- Arrange/Book usage with lab manager in charge
- Restrict movements within the lab, respecting general infection control procedures including physical distancing
- Wear clean gloves when operating and dispose upon completion
- Disinfect all touched surfaces including lab bench when finished (Conflikt or 70% alcohol), using the general procedures recommended (spray onto a cloth and wipe thoroughly – do not spray directly on sensitive component)
- Inspect carefully for any spills and clean as required

SOP Water Bath Maintenance and Disinfection

SECTION IV: WATER BATHS

STANDARD MAINTENANCE

- Water baths are drained and washed with Conflikt every 2 weeks. The distilled water is replaced and 0.1% Aquawater disinfectant is added to it (4 ml/4L)
- Every other week, 1 L of distilled water is added and an additional 1 ml of Aquawater disinfectant is added
- Make sure to check temperature with separate thermometer before actually doing a temperature controlled experiment (e.g., Heat shock)
- Check weekly to make sure water level is at least ½ filled

COVID PRECAUTIONS

- All lab members monitor water level in water baths and temperature
- Lab Manager ensures routine maintenance is carried out and external surfaces are routinely disinfected
- All users disinfect surfaces with Conflikt or 70% alcohol after use (including surrounding lab bench and floating devices)