



PREVENT AND MANAGE AMPLICON CONTAMINATION IN YOUR LAB

WHAT IS AMPLICON CONTAMINATION?

When polymerase chain reaction (PCR) is used to amplify gene targets, large numbers of amplified nucleic acid molecules, or amplicons, are generated. Nucleic acid **amplicons are not infectious or hazardous to human health**. However, if not contained, amplicons can potentially contaminate surrounding surfaces and equipment, personnel and research experiments. Contamination is also possible when working with DNA and DNA products such as plasmid preparations.

If SARS-CoV-2 nucleic acid contamination reaches one's nasal passages via inhalation or touching of one's face with contaminated hands, COVID-19 nasal swab test results may be affected and return as positive or inconclusive, despite the individual not having an active SARS-CoV-2 infection at the time of testing. Such personnel may be asymptomatic with no known exposure to a COVID-19 positive individual.

Preventing and managing amplicon contamination is essential to focus public health guidance to those affected by active SARS-CoV-2 infections and to prevent unnecessary isolation or quarantine of those working with SARS-CoV-2 nucleic acids or their close contacts.

WORK FLOW MANAGEMENT

Ideally, work with amplified PCR product should be isolated from other work areas, such as in dedicated rooms. If separate rooms are not possible, physically isolate work areas or experiments as best possible and keep dedicated reagents and materials in each area. Have clean personal protective equipment (PPE) available at each work area. People, reagents, equipment and notebooks should not move from a dirty area back to a clean area.

USE ENGINEERING CONTROLS

Engineering controls can help contain potential amplicons at the source. Perform aerosol-generating activities such as unsealing plates, opening caps/lids after centrifuging and pipetting inside a biosafety cabinet, fume hood or other type of negatively-pressured ventilated enclosure. Do not use a laminar flow hood or PCR clean hood that blows air toward the user. Consult with EH&S if unsure about appropriate enclosures.

Implement these engineering controls as applicable:

- For pipetting: use filter tips and slow speeds.
- For centrifuging: use aerosol containment safety cups or sealed rotors, and unload inside a biosafety cabinet or fume hood. Place small centrifuges inside a biosafety cabinet or fume hood. At a minimum, wait 10 minutes to allow aerosols to settle before opening plates or tubes.
- For house vacuum lines: use liquid disinfectant traps with in-line HEPA filters.
- For shaking incubators: use flasks with vented caps to contain aerosols.

PPE AND LAB PRACTICES

Appropriate PPE and lab practices can reduce the potential for contamination on surfaces, clothing, skin and mucous membranes. Do not wear PPE outside the lab, and do not take PPE home for laundering.

- Wear disposable procedure masks for tasks involving amplicons. Dispose of masks when leaving the lab or moving to a different work area.
- A face shield can help reduce the touching of one's face or mask with contaminated hands.
- N95s can be worn as an extra layer of protection.
- Consult EH&S resources on [voluntary respirator use](#) for more information.

- Consider disposable lab coats with elastic wrist cuffs and/or the use of disposable sleeves. Remove and dispose of coats and sleeves before leaving the work area.
- Wear gloves for all tasks. Change gloves frequently, between tasks and if contaminated. Wash hands and put on clean gloves before moving to a new work area.
- Follow standard donning and doffing [procedures](#) for PPE, and wash hands before leaving the lab.
- Do not bring lab PPE, notebooks or pens home.



MONITOR, CLEAN AND DECONTAMINATE

Work with EH&S to conduct environmental sampling to detect the presence and spread of amplicon contamination. Clean and decontaminate throughout the day to continually remove amplicons from the lab. For chemical decontamination, dilutions of 10% bleach should be made fresh daily with a contact time of at least 10 minutes. Water or 70% ethanol can be used to remove bleach residue.

- Decontaminate potentially contaminated and high touch lab surfaces with 10% bleach daily and between work sessions.
- Consider DNAzap or DNA Away for degradation of nucleic acids in amplicon rich lab areas.
- Decontaminate pipettes, lab pens and other items daily and between users.
- Ethanol and isopropanol are not sufficient to remove nucleic acid residue.

Ultraviolet (UV) light can also be used to render DNA non-amplifiable, but the drawbacks to UV disinfection are that it cannot reach all surfaces due to shadowing, can degrade plastics, and does not work as well as the lamps age or get dirty. Most UV lamps are expected to

function for 10,000 hours or about one year. Thus, if UV lamps are not tested for efficacy, they can provide a false sense of security. The safest applications for UV decontamination are using lamps that are installed inside an enclosure, such as a biosafety cabinet or PCR clean hood. Consult with EH&S regarding the safety of any UV decontamination equipment prior to purchase or installation.

REDUCE CLUTTER AND PERSONAL ITEMS

- Limit clutter in the lab, and be aware that porous items such as notebooks and cardboard can be difficult to decontaminate.
- Do not handle personal items such as phones and headphones in the lab or near amplicon work areas.
- Consider that personal items such as watches or jewelry on wrists can become contaminated. Remove personal items or wear lab coats with wrist cuffs with gloves pulled up over the cuff.

COVID-19 TESTING MODIFICATIONS

Lab personnel should get tested for COVID-19 if:

- They have had a known close contact with a COVID-19 positive person and are not fully vaccinated; or
- They are experiencing any [COVID-19 symptoms](#) (even if fully vaccinated).

When testing for COVID-19, schedule the test in the morning before working in the lab or after washing hands, showering, and changing clothes after working in the lab.

- If you test positive or inconclusive for COVID-19, report this to UW EH&S (covidehc@uw.edu) and identify yourself to the UW EH&S contact tracer as a researcher that works with SARS-CoV-2 nucleic acid products.
- You may be advised by the EH&S contact tracer to get retested and isolate at home while EH&S confirms whether your results are related to an active infection or a nucleic acid contamination event.

Please contact EH&S Biological Safety at ehsbio@uw.edu or 206-2221-7770 for more information.