

Why COVID-19 Laboratory Personnel Should Be Tested Before Attending the Laboratory: *how even the most experienced personnel contaminate clinical samples*

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Dear Editor in Chief

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has resulted in a pandemic (1). Early diagnosis and testing of symptomatic individuals and asymptomatic carriers (2) remain essential since the latter group can transmit the virus (3,4). Current assays for SARS-CoV-2 detection are mostly based on quantitative real-time PCR (RT-qPCR)(5). However, cross-contamination remains a challenge in RT-qPCR assays. Here, we would like to share the most interesting route of sample contamination in SARS-CoV-2 molecular diagnosis laboratories and the necessity of personnel testing.

We set up our molecular diagnosis laboratory three months ago using RT-qPCR. We strictly adhered to biosafety guidelines to ensure personnel safety and avoid cross-contamination of samples. We use (i) two extraction negative controls (EXNC), (ii) one no template control for every 10 samples, and (iii) one negative control. Note that to minimize the probability of contamination, the positive control was prepared last, after each patient's sample was added to the corresponding tube.

After one month and a half, we noticed a slightly positive signal ($C_q = 38$) in one of the EXNC. Upon repeating the run, both EXNC showed a $C_q = 38$. We narrowed down the cause to the personnel. Thus, all the personnel were tested for SARS-CoV-2 by the reference laboratory of the Pasteur Institute of Iran.

We were astonished when we found that the person who was in charge of extractions tested positive for SARS-nCoV-2. This same person also handled the extraction kits. Thus, a SARS-CoV-2 PCR-negative technician was assigned to perform viral RNA extraction. The results were perfectly satisfactory.

How is it possible when the RNA extraction technologist used all necessary personal protective equipment and level 2 biosafety guidelines?

Since the SARS-CoV-2 PCR-positive person handled the extraction kits, she contaminated all the buffers and solutions probably by *inadvertent touching of her mask or face*.

What we observed is *the trickiest route of cross-contamination* in a molecular diagnostic laboratory even when the most experienced user is working. When molecular diagnostic laboratory personnel do not use shields, it is probable that they touch their masks or faces inadvertently. Especially when they work long hours, and the mask becomes wet because of the exhalation, the outer surface of the mask is certainly contaminated.

We strongly recommend that all the personnel working in SARS-CoV-2 molecular diagnostic laboratories have to be tested. In fact, personnel of every molecular diagnosis laboratory should be tested especially for respiratory diseases that can be transmitted through exhalation of infected individuals.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Conflict of Interest

Authors declared no conflict of interest.

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