Topic: coronavirus in the laboratory and biosecurity

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1) What do you do when you have a patient with suspected coronavirus? How do you take the sample and how do you process it (biosecurity level BSL2? Can a sample be contagious?

Response: According to the latest guideline (7th edition) released by National Health Commission, if a patient is suspected of coronavirus, we will do have the following tests:

① Molecular diagnosis based on oral swabs or bronchoalveolar lavage fluid (BALF) was performed, quantative RT-PCR was performed to identify RNA of virus.

② Serological test was performed to identify anti-SARS-CoVID-2019 IgG and IgM in patients' blood.

The samples from patients suspected of COVID-2019 should be processed in biosafety level 2 (BSL2) labs. These samples are contagious and thus, we have to clearly separate samples of confirmed, suspected and common patients.

2) Are there rapid diagnostic tests? Or is there only PCR? Is it necessary to test influenza previously (A and B)? What is the algorithm for decision making and is it necessary to have a confirmation method? How do sensitivity and specificity methods work? (the same question for positive and negative predictive value)

Response: Currently PCR, serological test and NGS are considered as decision methods for the confirmation of SARS-COVID-2019 according to the latest guideline released by National Health Commission. It is necessary to differentiate between influenza A/B and SARS-COVID-2019 since the treatment is quite different.

3) Window period: how much time is expected between an infected patient and a positive test?

Response: Based on the current epidemiological survey， the incubation period is 1-14 days, mostly 3-7 days, but the virus is contagious when there are no typical symptoms during the incubation period.

4) When the patient shows symptoms, do you expect positive result? Or can result change with time?

Response: When symptoms occur, positive result of RT-PCR sometimes could not be obtained due to the following reasons.

Sample collection: RT-PCR is mainly performed on samples such as oral swabs, quality of such samples could be affected by collection methods, transportation and preservation.

Situation of patients: patients at early stage of disease or treated with various types of anti-virus drugs might generate negative results for RT-PCR. For example, results for the same patients could be negative for several times and turned into positive finally or first positive then negative and turn to positive again.

Quality of commercial kits for RT-PCR: Due to the tight epidemic situation, many manufacturers' reagents were put on the market as soon as they were developed. There were not enough performance verification experiments, and quality of different types of kits varies.

5) Does the laboratory give information to support patient discharge?

Response: Laboratory provides nuclear acids tests, which is considered as one of the standards for patient discharge.

According to the latest guideline, patients whose temperature recover to normal for at least 3 days, whose respiratory symptoms significantly improved, whose CT maging showed significant improvement in acute exudative lesions and whose RT-PCR results turn into negative for consecutive two times (the interval time between each detection should be over 24h).

6) Do you know what animal made species jump?

Response: still under research.

7) What recommendations would you give to laboratories and public health professionals from Latin America? (considering that with season change, the virus can potentially come to this region)

Response:

(1) Doctors should pay attention to those who have contacted with confirmed patients, who have come back from epidemic area or with family/office/school aggregation.
(2) Influenza A/B should be differentiated from SARS-COVID-2019.
(3) Laboratories in hospitals should prepare for biosafety related problems such as training colleagues how to perform detection, how to handle medical waste for biosafety protection in clinical laboratories.

8) What are your expectations as regards the epidemic's advance? Are we still in control phase?

Response: The possibility of a new crown virus turning into a long-term flu-like virus is entirely present, and we must be prepared for it. With the exception of the SARS virus, almost all other viruses have been around for a long time. After the virus has existed for a long time, the human immune system can recognize the virus, and it will appear to have immunity to prevent the virus from invading. If the population has acquired immunity to the virus, its size and intensity will not be as great as when it first came out when the virus re-emerges.
At present, full diagnosis and treatment are being performed, confirmed patients are treated, and close contacts are isolated and observed.

9) Are there population groups who are at higher risk of contracting the disease?

Response: When a new virus first appears, it is usually highly infectious and has a high lethality. Because the human immune system cannot yet recognize the new virus, since you cannot "know" it, there is no way to provide protection, so you will be "unprepared". The body does not have antibodies to the virus. At present, we are all susceptible to this new virus but people with low immunity are more susceptible such as elderly and children.