

**Article:**

Daniel KW Chu, et al.

*Molecular Diagnosis of a Novel Coronavirus (2019-nCoV) Causing an Outbreak of Pneumonia.*Clin Chem 2020 <https://doi.org/10.1093/clinchem/hvaa029>**Guest:** Dr. Leo Poon from the School of Public Health, Li Ka Shing Faculty of Medicine at the University of Hong Kong.

Bob Barrett:

This is a podcast from *Clinical Chemistry*, sponsored by the Department of Laboratory Medicine at Boston Children's Hospital. I am Bob Barrett.

In December 2019, a cluster of atypical pneumonia patients epidemiologically linked to a wholesale market in Wuhan, China was detected. A novel betacoronavirus named as 2019-novel coronavirus (2019-nCoV) has been identified in some of these patients. Considerable attention has been given to this virus, that according to the World Health Organization, as of this recording at the end of January 2020, has so far thought to have sickened over 6,000 people and is responsible for at least 132 deaths.

Because of the potential for pandemic spread, there is a great need for a rapid and accurate test for the detection of this virus. We are fortunate to have with us today Dr. Leo Poon from the School of Public Health, Li Ka Shing Faculty of Medicine at the University of Hong Kong. He and his colleagues described a new molecular diagnostic assay that allows the detection and quantification of this new coronavirus. The paper is available online now and will appear in the April 2020 print edition of the journal *Clinical Chemistry*. So Dr. Poon, please tell us, what is the cause of the current atypical pneumonia outbreak in China?

Dr. Leo Poon:

Right. This is actually caused by a new human coronavirus. In fact, it is a completely new coronavirus in science. We've never known this before. The virus looks like it is coming from animals and it is genetically related to SARS coronavirus found in 2003.

Bob Barrett:

Where do you think this novel animal virus has come from?

Dr. Leo Poon:

We don't have direct evidence at the moment in the early phase of this outbreak. Some of these patients are actually epidemiologically linked to a seafood market which actually sells wild animal there. So, we believe that wild animal would be one of the possibilities. In 2003, we had the outbreak of SARS and then we found civet cats and raccoon dogs and these kind of wild animal were positive for SARS coronavirus. Eventually, it was found that these animals

were infected by a bat virus. So, I believe we have a similar situation here.

Maybe these wild animals in the seafood market actually may acquire this virus and then it spreads to humans. The origin of this novel coronavirus may be also coming from bats because it's genetically similar to other bat coronaviruses.

Bob Barrett: So, should we be concerned about this particular virus?

Dr. Leo Poon: Oh yes, we do [have concerns]. Because, at the time that I was preparing this test and working up the manuscript, it was only about 200 cases. Now, just after a week, and now we have 7,000 confirmed cases. And even worse, it's spreading to multiple countries.

In some of these counties, actually have their local cases, basically the patient flew to the country and spread the disease to another person. So, suggesting that maybe this virus can continue to spread to other countries, within the country, if they get to the territory. So, we have to be very cautious about this virus because it can be able to spread quite quickly.

Bob Barrett: You and your colleagues have developed, seemingly in record time, an assay for detecting this virus. Can you tell us something about the assay and how you and your team developed this laboratory test?

Dr. Leo Poon: Right. Basically, we've developed two assays. But at the time of preparing these assays, we only know one public sequence about these novel coronaviruses. So, what we did is actually tried to also analyze bat viruses which are genetically similar to this virus and then try to look for the conserved region so that we can be able to design some primer that can react with this clade of viruses. Since these are all animal viruses or SARS virus, if we found a patient with a positive in this test, they should be concerned, because they maybe acquired this virus or other bats like viruses. So, what we did is actually develop two assays. One assay for the ORF1b region and the other assay is for the N gene region. One for the screening test, one for confirmatory test.

Bob Barrett: So, how will having a laboratory test available help in the containment of the associated disease or in the treatment?

Dr. Leo Poon: Basically, we can be able to identify the patient early so that we can put them in prompt treatment and also try to quarantine these people. In addition, we can be able to do active contact tracing so that we can be able to identify those people who may have a close contact with these

patients so that again, we can monitor their health closely so that we can prevent further spreading of this disease in the community as well. This is what we did for SARS and also for MERS. So, I think prompt identification of these patients helps first of all, to reduce the further spreading of the disease in a community. Secondly, we may be able to provide some sufficient supportive treatment to these patients.

Bob Barrett: Do we have a cure or vaccine for this new coronavirus?

Dr. Leo Poon: There are several groups which are actively working on this. And of course, we have the experience from SARS and MERS so that we should be able to come up with some possible options much quicker than before. But it would take time, for example, we have to evaluate the efficacy of these vaccines. We have to develop better animal model to validate these vaccines. And also, we need to confirm it is safe to be used in humans. So, it would take time but I don't think we will be able to rely on these vaccines immediately. It would take time. For the cure, there are other people also trying to identify some drugs, which are able to control the disease process.

Again, that has to be evaluated by a good clinical trial. So, we have to wait and see. Right now, there may be some educated guess to identify some of the possible drugs for treating these patients. But then, we need further evidence to support that.

Bob Barrett: Well, finally, Dr. Poon, you've been a guest in the past on podcasts from *Clinical Chemistry* speaking about new viruses that have originated in the People's Republic of China, you mentioned now, SARS for example. What's unique about this type of virus and the country of origin that may contribute to this pattern?

Dr. Leo Poon: There are many coronaviruses in all walks of life. Basically, there are a lot of viruses like these in animals. I think the situation of SARS and now the current situation is because there is very close contact of human to wild animals. So, basically that facilitates the possibility of zoonotic transmissions. I think as long as there is such thing, we shouldn't allow people who can have a host close contact with wild animal. That is a problem. And then now, in China they also consume wild animals and they also trade a lot of our animals in the community. So, that may be the issue. I think, for the future not only China but also other countries, we have to consider how we can provide safe food to our public, so that we can prevent such zoonotic transmission in the community that may be leading to a major outbreak like now.

Bob Barrett:

Leo Poon is a professor in the School of Public Health in the University of Hong Kong. He is a molecular virologist and he researches on emerging viruses at animal human interface such as SARS, coronavirus, and animal influenza virus. He's been our guest in this podcast from *Clinical Chemistry* addressing a new coronavirus that originated in Wuhan, China at the end of 2019. Their paper is available online now and will appear in the April 2020 print edition of the journal *Clinical Chemistry*. I'm Bob Barrett. Thanks for listening.