Saint Luke's REGIONAL LABORATORIES

Clinical Laboratory News

January 2020

Novel Coronavirus 2019

A novel coronavirus was first reported to cause respiratory illness in Wuhan City, China in December 2019. Genetic sequencing has shown this new virus is different from other known human coronaviruses, including the one that caused Severe Acute Respiratory Syndrome (SARS) and Middle Eastern Respiratory Syndrom (MERS CoV). As of January 24, 2020, a few thousand cases of novel coronavirus (2019-nCoV) infection have been reported in China—along with a few cases in the United States, Australia, and other southeast Asian countries in travelers from Wuhan. To date, most cases have been epidemiologically linked to a large seafood and animal market in Wuhan City. There is no specific treatment for 2019-nCoV infection; care is supportive

The CDC advises that persons in the United States who meet specific epidemiologic and clinical criteria should be evaluated for 2019-nCoV infection. These criteria are updated regularly at the CDC website, www.cdc.gov. Persons who meet these criteria should be reported immediately to state and local health departments who will provide further testing guidance.

Diagnosis of 2019-nCoV can only be made through specific real-time PCR testing, currently available exclusively through CDC. Commercially available respiratory virus PCR panels, including Saint Luke's Microbiology's respiratory PCR, do not detect this virus. Submission of respiratory specimens for testing requires consultation with the CDC and state health laboratory. The latest information concerning this outbreak is available at the CDC website at www.cdc.gov.

EBV Panel Changes

Most cases of infectious mononucleosis caused by Epstein-Barr virus (EBV) can be diagnosed by Monospot testing. Monospot tests for heterophile antibodies that usually appear in the first 3 weeks of illness. However, some adult patients and most pediatric patients with EBV infections test negative by Monospot. Suspected cases of EBV mononucleosis that are monospot-negative can be further investigated by EBV-antibody profile testing.

EBV antibody profile testing consists of multiple components. Antibodies to viral capsid antigen (VCA) indicate recent infection (VCA IgM) or past infection (VCA IgG). IgG antibody to Epstein-Barr nuclear antigen (EBNA) is detectable 6-8 weeks following infection and generally persists for life. Most recent guidelines, including from CDC, conclude a combination of these three antibody tests are most useful diagnostically.

Beginning in February 2020, EBV antibody profiles available through LabCorp designated Acute Infection and Chronic Active Infection that included early antigen will no longer be offered. A single profile designated EBV Antibody Profile with VCA-IgM, VCA-igG, and EBNA IgG components will be offered. Early antigen IgG may still be ordered separately.

How Contaminated is Donated Blood

Liquid chromatography-mass spectrometry (LC-MS) and tandem mass spectrometry (MS/MS) play an essential role in drug discovery and development. One of the important steps in discovery is evaluation of safety of the drug, which includes investigating the potential for drug-drug

pharmacokinetic interactions. In recent years, with the growth of botanical dietary supplements, drug-botanical interactions are becoming increasingly important.

Enzymes involved in drug metabolism belong to the family of heme-containing proteins (CYP enzymes) that are highly concentrated in human liver. In most clinical studies, the alterations in CYP enzyme activity are measured by the differences in serum levels of probe substrates over time after consumption of the test drug or botanical dietary supplement. Because of speed, and sensitivity and specificity, LC-MS/MS has become standard for measuring serum or plasma levels of the probe substrate.

A recent study undertaken to determine drug-botanical dietary supplement interactions measured serum concentrations of caffeine, tolbutamide, dextromethorphan, and alprazolam in commercially available pooled human serum and serum from individual donors. None of these probe substrates are reported CYP inhibitors or inducers and all are recommended by the U.S. Food and Drug Administration (FDA) for clinical drug-drug interaction research. Of the 18 lots of pooled human serum tested, caffeine was detected in all lots, alprazolam was detected in 13 lots, dextromethorphan was detected in 8 lots, and tolbutamide was detected in 0 lots. The concentrations of these compounds determined in commercially available pooled serum were as high as 250 ng/mL for caffeine, 0.04 ng/mL for dextromethorphan, and 0.1 ng/mL for alprazolam.

These findings raise the possibility of issues in patients receiving blood products and for researchers using commercial pooled human plasma/serum for research. However, in most samples, the levels of the compounds tested were very low and considered unlikely to produce a noticeable pharmacological effect on the blood transfusion recipient.

Testing for Telomere Length

Telomeres are protective DNA-protein complexes at each end of chromosomes. The telomere length shortens with each cell division and at a certain point signals cells to stop dividing and become senescent. Telomeres vary in their length and regression between different organs. For example, telomeres shorten approximately 26-60 base pairs per year in liver, renal cortex, and spleen. In comparison, telomeres in myocardium and cerebral cortex do not shorten as much as other organs. Myocardium has the longest telomeres and liver and renal cortex have the shortest.

When genes responsible for telomere synthesis, trafficking, maintenance, and function are perturbed, accelerated telomere shortening occurs resulting in a group of genetic disorders, referred to as short telomere syndromes (STS). Short telomeres are etiologically associated with degenerative diseases including idiopathic pulmonary fibrosis and emphysema, bone marrow failure and myelodysplastic syndrome, and cryptogenic liver cirrhosis. In contrast, mutations that lengthen telomere are associated with high cancer risk especially glioma and familial melanoma.

Diagnosis of telomere disorders especially STS is challenging due to their broad clinical spectrum. While few a well-known laboratories such as Mayo Clinic are working towards establishing clinically reliable tools for measuring telomere length, direct-to-consumer (DTC) telomere testing touting to inform users how well their cells are aging are being offered. Some of the DTC testing suggests that lifestyle factors such as diet, exercise, and weight loss might modify telomere length and in addition offer supplements that “enhance” telomere length. Many prominent researchers of telomere biology have spoken out against DTC telomere testing.