Clinical Chemistry

July 2013 Audio Summary

This is the July 2013 issue of *Clinical Chemistry*: Volume 59, Issue 7.

On the cover this month: *American West Rodeo Cowboy Boots with Riding Spurs*. Images of traditional leather boots on old weathered wood planks have long been identified with Texas, whose largest city, Houston, is the site of this year's AACC Annual Meeting and Clinical Lab Expo. Houston's summers may be hot, and Houston may not be the first place you think of as being trendy or hip; yet *Forbes Magazine* recently named Houston as America's coolest city to live in. The downtown has been revitalized with an exquisite restaurant scene, professional sports facilities, musical entertainment, museums, theaters, and a modern convention center. And when you include the breadth of science that will be presented at the Annual Meeting, you will realize that the AACC and Houston have it all!

Cost-Effective and Scalable DNA Extraction Method from Dried Blood Spots
By Carlos A Saavedra-Matiz, et al.

In this article the authors report a low-cost and reliable method for genomic DNA extraction from dried blood spots that is adaptable to multiple-scaled settings. This method is important because molecular testing from screening and public health programs is increasing in demand. Sequential use of red cell lysis, detergent-alkaline, and acid-neutralizing buffers from whole blood and plant DNA extractions were validated. High quality DNA was extracted from multiple spots as demonstrated by mutation detection and copy quantification on different platforms. This method has been used by the New York State Newborn Screening Program for several years and should be applicable in small and large newborn screening programs.

Symmetric Snapback Primers for Scanning and Genotyping of the Cystic Fibrosis Transmembrane Conductance Regulator Gene
By Luming Zhou, et al.

Genetic analysis does not need to be detailed and complex. Rather than sequencing everything, an alternative approach is to identify only the sequence changes important to disease. Detecting DNA changes by melting, followed by genotyping common variants with special snapback primers, eliminates nearly all sequencing and minimizes effort with very little chance for error. Using the gene for cystic fibrosis as an example, 4 out of 5 patients were completely typed without any sequencing. This minimalistic approach contrasts against massively parallel sequencing with trade-offs of diagnostic sensitivity and specificity.

Molecular Detection of Human H7N9 Influenza A Virus Causing Outbreaks in China
By Chloe K.S. Wong, et al.

In this article the authors describe a new real-time reverse transcriptase PCR assay specific for the HA gene of the human H7N9 virus currently causing outbreaks in humans. The detection limit of the assay was approximately 0.04 median tissue culture infective dose per reaction. The assay specificity was high, and all negative control samples, including 8 H7 viruses not closely related to the human H7N9 virus, tested negative.

Factors Influencing the 99th Percentile of Cardiac Troponin I Evaluated In Community-Dwelling Individuals at 70 and 75 Years of Age
By Kai M Eggers, et al.

This study investigated the implications of cardiovascular disease, sex, and aging on the 99th percentile of cardiac troponin I concentrations, a benchmark used for decision-making in acute coronary syndrome. Troponin concentrations were measured using a high-sensitivity assay from Abbott in 814 community-dwellers at the ages of 70 and 75 years. Higher 99th percentile troponin concentrations were noted in men and in individuals with prevalent cardiovascular disease. Higher 99th percentile troponin concentrations were seen with increasing age across all subgroups. These findings should be taken into consideration when applying cardiac troponin I concentration decision-thresholds in clinical settings.

Gaps in the Traceability Chain of Human Growth Hormone Measurements
By Sébastien Boulo, et al.

The standardization of human growth hormone measurements is an ongoing process and also the subject of much debate. This study evaluated the recovery of human growth hormone in serum and commutability of calibrators prepared from the International Standard 98/574. The results of the study show first that harmonization is possible, but formal traceability to a common international standard is insufficient to achieve this goal, and, secondly, that the lack of a common reconstitution and spiking protocol and the lack of commutability of the prepared calibrators cause discrepancies. The authors investigated different solutions, such as LC-MS reference measurements. Equivalence of results might best be achieved using a pooled human serum reference material as a calibrator.

Time-Dependent Degradation Pattern of Cardiac Troponin T Following Myocardial Infarction
By Eline P.M. Cardinaels, et al.

To date it is still not clear which cardiac troponin T forms circulate in the serum of patients suffering from myocardial infarction and whether they affect the utility of measurements by the clinical assay for cardiac troponin T. Therefore, sera of myocardial infarction patients were examined by means of chromatography and a unique Western blotting technique, employing the capture and detector cardiac troponin T antibodies from the clinical assay to mimic the same measuring principle. This study reveals for the first time that the cardiac troponin T immunoassay detects intact and degraded cardiac troponin T forms in patient sera. Moreover, cardiac troponin T is shown to be degraded in a time-dependent pattern.

Change in Growth Differentiation Factor 15 Concentrations Over Time Independently Predicts Mortality in Community-Dwelling Elderly Individuals
By Kai M Eggers, et al.

Growth differentiation factor 15, abbreviated as GDF-15, is emerging as a powerful risk predictor in various cardiac diseases. This study investigated GDF-15 concentrations and their changes over 5 years time in 1004 community-dwelling individuals aged 70 years at baseline. The authors found that GDF-15 both alone and with increasing levels over time independently predicted both cardiovascular and noncardiovascular mortality. Cardiovascular risk factors, renal dysfunction, and estimates of inflammation and myocardial dysfunction were associated with changes in GDF-15 but explained only part of their variation. It appears thus that information on both cardiovascular and noncardiovascular biological processes closely related to longevity are reflected by GDF-15 concentrations.

Defining High-Sensitivity Cardiac Troponin Concentrations in the Community
By Paul M. McKie, et al.

The clinical use of high-sensitivity troponin assays depends on the development of proper reference values. The objective of this study was to define high-sensitivity troponin I reference values and their determinants in the general community. The authors studied a well-characterized community-based cohort of 1843 individuals from Olmsted County, Minnesota. The study findings suggest that age, male gender, systolic blood pressure, and left ventricular mass contribute to higher high-sensitivity troponin I values. Importantly, glomerular filtration rate and body mass index were not found to be independently associated with high-sensitivity troponin I values. The study reports age- and gender-specific upper reference limits that will be useful in the clinical interpretation of high-sensitivity troponin I results and the identification of disease.

In Vitro Stability of Free and Glucuronidated Cannabinoids in Blood and Plasma Following Controlled Smoked Cannabis
By Karl B. Scheidweiler, et al.

The stability of cannabinoids in authentic blood and/or plasma specimens after controlled smoked cannabis has not been systematically investigated. This study reports variable results for cannabinoid stability in fortified drug-free blood and plasma specimens. Storage at -20˚ Celsius provided optimal stability for all analytes. THC, THC-glucuronide, THC-carboxylic acid, THC-carboxylic acid-glucuronide, 11-hydroxy-THC, and cannabinol were stable in blood and plasma for at least 12 weeks at -20˚ Celsius. Cannabidiol was stable in plasma for 52 weeks at -20˚ Celsius, but blood concentrations did not exceed the assay limit of quantification and stability was inconclusive. The data from this study can be used to define the required storage conditions for accurate blood and plasma cannabinoids concentrations during cannabinoids testing.