Clinical Chemistry

June 2015 Audio Summary

This is the June 2015 issue of *Clinical Chemistry*, Volume 61, Issue 6.

On the cover this month: Malaria. Malaria control programs have achieved remarkable success during the past decade; 111 countries have eliminated malaria and 34 countries are advancing towards elimination. However, to achieve elimination and prevent resurgence, surveillance systems must be able to detect all possible malaria infections in a timely manner to effectively interrupt transmission. This challenge emphasizes the importance of technology innovation in malaria elimination, calling for screening methods with high throughput, low cost, and high sensitivity for detecting asymptomatic subpatent infections. This issue of *Clinical Chemistry* contains a description of a new technology, capture and ligation probe-PCR (CLIP-PCR), for molecular screening, along with its application to active malaria surveillance for elimination. An accompanying editorial covers the strengths and limitations of this new technology.

Capture and Ligation Probe-PCR (CLIP-PCR) for Molecular Screening, with Application to Active Malaria Surveillance for Elimination
By Zhibin Cheng, et al.

Sensitive and affordable methods for active screening of malaria parasites in low-transmission settings are urgently needed. Here the authors present a capture and ligation probe-PCR, named CLIP-PCR, to meet the need. In this assay, the 18S ribosomal RNA of the genus Plasmodium is released from blood, captured onto 96-well plates, and quantified by the amount of ligated probes that bind continuously to it. From 3,358 clinical samples, CLIP-PCR identified 14 infections including 4 asymptomatic ones, with fewer than 500 tests, and costing less than 0.6 dollars/sample. CLIP-PCR offers an alternative for sensitive, large-scale molecular screening of infectious diseases.

Noninvasive Prenatal Diagnosis of Duchenne Muscular Dystrophy: Comprehensive Genetic Diagnosis in Carrier, Proband, and Fetus
By Seong-Keun Yoo, et al.

In the present study, the authors demonstrate the feasibility of noninvasive prenatal diagnosis of Duchenne muscular dystrophy using massively parallel targeted sequencing. The uniqueness of the approach is targeting the entire Duchenne muscular dystrophy region with a tiling design and using one large haplotype block for dosage imbalance analysis. This approach is advantageous in that proband diagnosis, carrier detection and noninvasive prenatal diagnosis can be performed in a single platform.

Rapid Identification of Plasma DNA Samples with Increased ctDNA Levels by a Modified FAST-SeqS Approach
By Jelena Belic, et al.

Recent progress in the analysis of cell-free circulating tumor DNA allows monitoring of tumor genomes by noninvasive means. Owing to the highly variable allele frequencies of circulating tumor DNA and lack of sensitivity of genomewide methods, the authors of this study developed a prescreening method for an

untargeted assessment of tumor DNA content. To accomplish this they adapted the recently described FAST-SeqS method and were able to detect tumor-specific aneuploidy in circulating tumor DNA if present at at least 10%. The obtained results were highly concordant with copy number profiles obtained from plasma-Seq. Therefore, this approach appears promising as a prescreening tool to aid decisions on further diagnostic steps.

Controlled Cannabis Vaporizer Administration: Blood and Plasma Cannabinoids with and without Alcohol
By Rebecca Lynn Hartman, et al.

Increased marijuana legalization leads to more cannabis vaporization, and increased cannabis driving under the influence cases. Simultaneous cannabis and alcohol use is common. Here the authors present comprehensive blood and plasma vaporized cannabinoid dispositions, with and without alcohol. Healthy, adult occasional-to-moderate cannabis smokers drank placebo or low-dose alcohol and inhaled placebo, 2.9% or 6.7% THC vaporized cannabis. Blood collected 10 minutes to 8.3 hours post-cannabis administration contained 15.2-137 µg/L maximum observed THC among 19 individuals who completed the experiment for the 6.7% THC potency. Six additional 8.3 hour cannabinoid profiles are also presented. Vaporization was effective, producing similar concentration profiles to smoking. THC maximum concentration was significantly higher with alcohol. The results will help facilitate forensic interpretation and inform drugged-driving debates.

Impact on Patient Management and Outcome of Switching between 2 Contemporary Sensitive Cardiac Troponin Assays
By Craig B. Wilen, et al.

In this article the authors examined the clinical impact of switching troponin methods to one that had a lower 99th percentile cutoff and lower analytic sensitivity. Over 45,000 patient encounters were examined where at least one troponin result was obtained. The new method resulted in a 50% increase in the number of patients with abnormal values. Electronic medical records and hospital billing records were examined. The authors found that having an increased cardiac troponin I reported on the new assay that would not have been reported as such on the old correlated with increased inpatient mortality, length of stay, non-ST elevation myocardial infarction diagnoses, therapeutic heparin use, and percutaneous coronary interventions.

24,25-Dihydroxyvitamin D3 and Vitamin D Status of Community-Dwelling Black and White Americans
By Anders H. Berg, et al.

Black Americans frequently have low serum 25-hydroxyvitamin D concentrations as compared to whites, but without manifestations of vitamin D deficiency. The vitamin metabolite ratio of 24,25-dihydroxy to 25-hydroxyvitamin D represents an alternative biomarker for vitamin D sufficiency. Here the authors measured the vitamin metabolite ratio in black and white Americans to see if the values differed similarly to 25-hydroxyvitamin D. Black Americans had lower

concentrations of 25-hydroxyvitamin D3 than whites. However, the vitamin metabolite ratio values correlated with parathyroid hormone concentrations, and mean vitamin metabolite ratio values were similar in both races. These data provide further evidence that measurements of 25-hydroxyvitamin D in black Americans deserves reevaluation, and suggest that alternatives such as the vitamin metabolite ratio should be considered.