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Direct Characterization of Motion-Dependent Parameters of Sperm in a Microfluidic Device: Proof of Principle
By Yu-An Chen, et al.

Semen analysis is essential for evaluating infertility. However, rapid and complete assessment remains difficult. In this article the authors describe a microfluidic device with a long channel that allows quantification of sperm properties "on the fly" as the sperm swim through the channel. Sperm volume, swim velocity, and beat frequency were acquired through voltage time trace during sperm passage. The correlation between swim velocity from this channel approach and that from microscopic observation had a correlation of 0.94. The approach is an economical alternative for characterizing sperm motion compared with optical methods. This approach may also be useful for characterizing sperm morphology.

High Throughput Assay of 9 Lysosomal Enzymes for Newborn Screening
By Zdenek Spacil, et al.

In this study the authors extended a tandem mass spectrometry enzyme assay method to analyze 9 enzymes for newborn screening of 9 lysosomal storage diseases. The assay used a single dried blood spot punch in a single buffer. This was followed by a simple sample workup and liquid chromatography-tandem mass spectrometry. The assay distinguished healthy newborns from those that were affected by the lysosomal storage diseases. The goal is to pilot this new assay in newborn screening laboratories worldwide.

Epitope Specificity and IgG Subclass Distribution of Autoantibodies to Cardiac Troponin
By Tanja Savukoski, et al.

Cardiac troponin-specific autoantibodies can interfere with clinically important cardiac troponin I immunoassays. Because detailed data on the molecular characteristics of these autoantibodies are scarce, their IgG subclass distribution and cardiac troponin I binding sites were determined with sandwich-type immunoassays. IgG subclasses of 28 chest pain patients at admission and at 3-month follow-up confirm that cardiac troponin-specific autoantibody formation may be triggered or boosted in acute cardiac events. Additionally, the epitope specificity studies demonstrate that the whole cardiac troponin I molecule can suffer from anti-cardiac troponin autoantibody interferences. Therefore, the existing recommendation of using solely midfragment epitopes in clinical cardiac troponin I assays should be reevaluated.

Impact of Prolonged Cannabinoid Excretion in Chronic Daily Cannabis Smokers' Blood on Per Se Drugged Driving Laws
By Mateus M. Bergamaschi, et al.

Cannabis is the illicit drug most frequently reported with impaired driving and motor vehicle accidents. Some "per se" laws make it illegal to drive with any amount of drug in the body, while others establish specific blood concentration limits. In this study, the authors characterized the excretion of Δ^9-tetrahydrocannabinol, 11-hydroxy-Δ^9-tetrahydrocannabinol and 11-nor-9-carboxy-Δ^9-tetrahydrocannabinol in 30 chronic daily cannabis smokers' blood during sustained abstinence. Tetrahydrocannabinol was quantified in some participants for 30 days, albeit in low concentrations, due to the large cannabinoid body burden from extended exposure. This is consistent with the time course of persisting neurocognitive impairment reported in recent studies.

Diurnal Rhythm rather than Dietary Iron Mediates Daily Hepcidin Variations
By Charlotte C.M. Schaap, et al.

The iron-regulating hormone hepcidin is a promising biomarker in the diagnosis of iron disorders. Concentrations of hepcidin have been shown to increase during the day while following a regular diet. It is currently unknown whether these increases are determined by an innate rhythm or by other factors.
The authors of this study assessed the effect of dietary iron in healthy volunteers on circulating hepcidin concentrations during the day.
Their observations indicate that an innate rhythm, rather than diet, mediates daily hepcidin regulation. The findings of this study have importance for the optimization of sampling protocols and in facilitating interpretations of hepcidin as a novel biomarker in clinical practice.

Soluble ST2 Is Associated with All-Cause and Cardiovascular Mortality in a Population-Based Cohort: The Dallas Heart Study
By Lu Qi Chen, et al.

Soluble ST2 is a novel biomarker that is associated with adverse cardiac events in patients with heart failure or acute coronary syndromes. However, little is known about soluble ST2 as a cardiovascular biomarker in the general population. This report documents significant associations between ST2 and all-cause and cardiovascular mortality in the Dallas Heart Study, a low-risk population-based cohort. Interestingly, in contrast to other cardiovascular biomarkers, ST2 does not correlate strongly with traditional risk factors, but is remarkably higher in African Americans. This is the first report of such a race-specific association and the first large-scale investigation of ST2 as a cardiovascular biomarker in the general population.

Quantification of Globotriaosylsphingosine in Plasma and Urine of Fabry Patients by Stable Isotope Ultraperformance Liquid Chromatography-Tandem Mass Spectrometry
By Henrik Gold, et al.

Biochemical markers that accurately reflect the severity and progression of disease in patients with Fabry disease are urgently needed. Globotriaosylsphingosine, termed lysoGb3, is a promising candidate biomarker. The authors of this paper describe an assay for the measurement of lysoGb3 in plasma and urine using UPLC-tandem mass spectrometry. LysoGb3 and isotope-labeled lysoGb3 were synthesized. The lysoGb3 concentration in plasma and urine samples was measured after addition of isotope-labeled internal standard and quantification by UPLC-mass spectrometry. The assay provided accurate quantification of lysoGb3 and lyso-ene-Gb3 in plasma and urine samples obtained from normal subjects and from hemizygous male and heterozygous female Fabry patients.

Prospective Evaluation of B-type Natriuretic Peptide Concentrations and the Risk of Type 2 Diabetes in Women
By Brendan M. Everett, et al.

Data from animal studies suggest an important role for natriuretic peptides in metabolism, but human studies are scarce and inconsistent. Using a prospective case-cohort study of 491 women with incident type 2 diabetes, the authors observed that increasing concentrations of NT-proBNP were associated with a reduced risk of diabetes. In a sub-sample of 458 women, common genetic variants in the natriuretic peptide genes were associated with higher NT-proBNP concentrations. Those same variants were also associated with a reduced risk of incident type 2 diabetes among 22 607 women followed prospectively for the development of diabetes.