1. Comprehensive Drug Screen For Clinical Toxicology.

The UCSF Toxicology Laboratory at San Francisco General Hospital and Trauma Center (UCSF Tox Lab at SFGHTC) participates in the weekly call conferences held at the Northern California Poison Control Center (PCC). This Center receives referrals from neighboring hospitals for critically ill patients who have signs and symptoms suggestive of ingestion of a poison, drug, or intoxicant. The PCC receives clinical history, physical examinations, and basic clinical laboratory data including a drug screen, and are asked to provide therapeutic consultations. For some cases, there is a need for a comprehensive drug test to identify drugs and substances that are not part of the routine panel. Information on the presence of drugs or substances or its rule out can be an important part of the management recommendations given by the PCC, but only if results are reported quickly.

Currently, testing is conducted in urine by either gas chromatography (GC) or liquid chromatography tandem mass spectrometry (LC/MS/MS). Identifications are based on knowledge of the substances’ chromatographic retention time and mass fragmentation patterns compared to previously tested samples or drug standards compiled in a mass spectral library. While this technology is definitive, the testing process is complex and requires considerable experience and expertise. Results are typically not available for 2-3 days, beyond the time necessary to make real-time therapeutic decisions. When urine is tested, results relate to exposure but not necessarily impairment by that substance. The UCSF Tox Lab at SFGHTC has evaluated a LC “time-of-flight” MS analyzer that has significant advantages over GC/MS or LC/MS/MS. This system produces the exact molecular weight of any potential drug or chemical and does not require comparison to known spectra. Serum is tested to better link drug presence with patient impairment. The library of compounds is virtually unlimited; in theory, any compound whose molecular formula is known can be detected. A list of stereo - or structural isomers are produced within 1 hour of testing and are reported as “presumptive.” Correlation of toxicological with clinical data will be necessary by PCC toxicologists, emergency department and critical care physicians in establishing the best diagnosis and management of poisoned patients at a time where such decision can still have an affect on clinical outcomes. Depending on when samples are received, results are available between 1 and 16 hours of receipt of samples. Testing requires availability of a serum sample collected on initial presentation of the patient.
2. Herbal medications.

Many herbal medications contain substances and adulterants that can produce side-effects even when used at therapeutic doses. As the quality of the commercial products is not regulated by the Food and Drug Administration (FDA), there is significant heterogeneity in the herbal medications from one lot to another. Moreover, in order to achieve the claimed therapeutic effect, some herbals illegally contain synthetic drugs or analogs to FDA-regulated medications. Using liquid chromatography time-of-flight mass spectrometry, the UCSF Tox Lab at SFGHTC can analyze herbal medications for illicit or unexpected compounds. The Laboratory can also correlate findings in herbal medications with urine samples submitted from subjects who are suspected to, or may be suffering from a toxic effect associated with use of herbals. We anticipate no therapeutic action to be taken to treat any toxic effect, but a recommendation to discontinue implicated herbal medications may result from such testing. Testing is conducted on the herbal medication itself and serum or random urine samples from affected individuals.

3. HLA-B-5701 Testing to Assess Risk for Abacavir Hypersensitivity.

Abacavir is a widely used antiretroviral drug to treat patients infected with human immunodeficiency virus (HIV). A minority of Caucasian patients develop Stevens Johnson Syndrome (SJS) or Toxic Epidermal Necrolysis (TEN) when this drug is repeatedly given. Studies have shown that patients who possess the HLA-B*5701 allele are at high risk for development of SJS. Using flow cytometry, The UCSF Clinical Chemistry Lab at SFGHTC have validated and released a screening test for HLA-B 57/58 allele. Results are available within 3-5 days. Patient who are negative for this test can be assumed to lack the presence of the specific 5701 allele. These patients have an extremely low likelihood of developing SJS/TEN, and abacavir can be used. As patients who are positive for the B57 allele may have other alleles besides 5701, confirmatory testing is necessary using the genetic test. This test is sent to a national reference laboratory and currently has a turnaround time of 4-6 weeks to result availability. As a consequence, use of this important drug for newly diagnosed patients with HIV may be significantly delayed. The flow cytometry screening test requires a whole blood sample collected into EDTA-preserved blood collection tubes.


A deficiency in the vitamin D concentrations in blood is linked to a variety of health problems including bone disorders, cardiovascular disease and cancer. Vitamin D is produced from dietary sources and exposure to ultraviolet light of the sun. Subjects who get an insufficient amount of sunlight, have dietary deficiencies or malabsorption will have low vitamin D levels. The UCSF Clinical Chemistry Lab at SFGHTC has developed a serum vitamin D assay based on liquid chromatography tandem mass spectrometry. This assay is more sensitive and accurate than currently available automated immunoassays. It also enables total vitamin D measurements or separate quantitation of vitamins D2 and D3 which allows assessment for adequate vitamin D replacement therapy, for example. Assay results are available with a turnaround time of 3-5 days. Results are standardized against the National Institute of Standards and Technology. Testing is conducted on serum samples.
5. Pharmacogenomic testing for KIF-6 to Assess Statin Drug Efficacy

Genome-wide association studies have identified a polymorphism in the gene for KIF-6, a molecular motor protein involved in the intracellular transport of organelles, protein complexes and mRNAs. Substitution of an arginine for a tryptophan at amino acid location 719 identifies the “carrier status.” Cardiac patients treated with statin medications for lowering total and LDL cholesterol who are KIF-6 carriers have better clinical outcomes than non-carriers. This is despite the fact that both KIF-6 carriers and non-carriers exhibit the same degree of decline in LDL cholesterol and C-reactive protein levels. The carrier status frequency for KIF-6 in various ethnic populations range from 55-60% among Caucasians, 40-60% in Chinese and Japanese, and 20-40% in Nigerians. Alternate drugs such as fibrates and niacin should be considered for patients who are non-carriers for KIF-6. The University of California has obtained a license for KIF-6 testing from Celera Corporation, the discoverers of the association between KIF-6 and statin efficacy. Assay results are available with a turnaround time of 1 week. Testing is conducted from whole blood collected into EDTA-preserved blood collection tubes.

FOR MORE INFORMATION, PLEASE CONTACT:

DR. ALAN WU @ 415-206-3540 – or –

DR. KARA LYNCH @ 415-206-5477 – or –

FOLLOW THE CONTACT INFORMATION AT THE TOP OF THE DOCUMENT