UC Health LABORATORY

Lab Update

May 2013 **Laboratory Phone: 585-LABS** Vol. 5 No. 5

In this issue:

LabUpdate is a periodic publication of the Clinical Laboratories of UC Health. By way of this publication, lab users are provided: 1) updated operational information relevant to the practice of laboratory medicine within UC Health facilities, and 2) didactic material generally applicable to laboratory medicine.

LAB UPDATE
University Hospital Clinical Laboratory

If you are interested in the on site availability of a particular test, please contact the Laboratory Client Services Department at 584-0696 or via email to Jenny Ford at jennifer.ford@uchealth.com.

Microbiology

Genital Culture (GENC) to be Discontinued

As of May 1, 2013, the Genital Culture will no longer be available on the EPIC test menu. Utilization of the test is very low. This is likely due to the non-specific nature of the genital culture and the availability of many more targeted tests with higher sensitivity and better turnaround time from the laboratory. Here is list of tests available in the UC Health Microbiology & Molecular Diagnostics Laboratory for genital specimens. Collection/transport devices may be ordered through Lawson or with the Outreach Client Supply Order Form.

BD Affirm (LAB3314) – This test is a nucleic acid hybridization test with good sensitivity to detect *Gardnerella vaginalis*, *Trichomonas*, and yeast. It requires a single swab; specimens must be collected in the BD VPIII ATTS (Ambient Temperature Transport System). The average turn-around time is 24 hours.

CT/NG (LAB3355 for swabs and LAB3356 for urine) – These are very sensitive and specific tests to detect the agents that cause gonorrhea and chlamydial infection. The tests can be performed on an endocervical swab (small swab placed in M4 Transport) or on a urine sample (first part of urine stream placed in a yellow-topped tube). The average turnaround time is 24 hours. CT/NG on rectal swabs (DNAP or LAB3363) must be collected in the Aptima collection kit. Turnaround time on these specimens averages 72 hours.

Group B Strep Screen (LAB3536, for Pen-allergic Patients LAB4913) – This test uses the most sensitive testing protocol available today to screen for Group B *Streptococcus*. Combined vaginal/rectal swab or swabs (eSwabs, Red-topped sponge swabs or Blue-topped gel swabs are acceptable) are cultured overnight in a selective medium; the following day the broth is tested for Group B *Streptococcus* using a nucleic acid amplification test. Positive screens on penicillin-allergic patients include a follow-up test for susceptibility to clindamycin. Average turnaround time is 24hours; 72 hours for the susceptibility results.

Yeast culture (LAB241) – This is a culture-based test; in cases of recurrent yeast infection, this test is recommended. Yeast culture includes a complete identification of yeasts isolated, which is valuable in directing therapy based on published patterns of response among *Candida* species. Vaginal specimens collected with eSwabs, Red-topped sponge swabs or Blue-topped gel swabs are acceptable. The average turnaround time of this test is 72 hours for positive cultures; negatives are held for 2 weeks.

Gonococcus Culture (GCC, LAB235) – This culture-based procedure is designed to isolate *Neisseria gonorrhoeae* from throat, rectal, or eye swabs (eSwabs or charcoal gel swabs are acceptable). Average turnaround time for this culture is 4 days.

If you have any questions, please call Microbiology at 584-3913 or Dr. Rhodes at 584-3923.

BK Virus PCR Assay

The Molecular Pathology (PCR) Lab at Cincinnati Children's will be converting their BK Virus PCR assay (qualitative and quantitative) to a new platform, effective Wednesday May 1, 2013. This change will mean that you will notice a shift in the results for patients whose viral load you have been monitoring recently. The transition to the new platform involved changing to a new quantitated standard material which will cause patient results to be consistently higher than

they were with the previous assay. Representative examples of the increased values are shown in the table below. The increase in the result (Copies/mL) from the old platform to the new platform can vary from <1 log higher to as much as 2 log higher, as the table below outlines. Once you have established a new baseline value for your patient's plasma and urine levels, we anticipate that the new assay will ultimately be even more consistent and reproducible, as the new standard material will provide identical set points from lot to lot. In addition, the lab will begin reporting extremely elevated values as ">500,000,000 Copies/mL" rather than as a discrete number. If you feel that it is important to know the exact value for an extremely elevated result you may call the lab to request further testing in order to determine the numeric value. Finally, both BK Virus Qualitative PCR and BK Virus Quantitative PCR will still be available as orderable tests in EPIC. Feel free to call the lab with any questions at 513-636-9820.

Venous Blood Gas (VBG)

What is "blood gas"?

The primary blood gases are oxygen (O_2) and carbon dioxide (CO_2). O_2 is found in the air we breathe in, and CO_2 is found in the air we exhale. Both O_2 and CO_2 are carried in blood. O_2 is found in hemoglobin, which is an iron containing protein in red blood cells. CO_2 is carried in the plasma, which is the liquid portion of the blood (that which does not contain red blood cells, white blood cells or platelets).

Normal values in arterial blood gas:

The pH of arterial blood is 7.35-7.45, the paO_2 is 89-100 mmHg and the $paCO_2$ is 35-45 mmHg.

Normal values in venous blood gas:

The pH of venous blood is 7.32-7.42, the pvO_2 is 25-40 mmHg and the $pvCO_2$ is 41-51 mmHg.

The pH of venous blood is slightly decreased due to the transfer of H^+ protons from the diffusion of CO_2 into the red blood cells. The pvO_2 is decreased due to the diffusion of O_2 to the tissues and the $pvCO_2$ is increased due to the diffusion of the waste product into the red blood cells.

Venipuncture draw

a. Collection:
Blood should be drawn using sodium or lithium heparin tubes (no gel tubes).
Specimen should be placed on ice and immediately transport to the lab (within 15 minutes after collection).

b. Ordering:
Horizon test code: VBG (Blood Gas, Venous)
EPIC test code: LAB79

c. Reference Range
Only pH reference range will be reported

Line draw

a. Collection:
Use heparin line draw procedure.
Specimen should be immediately transported to the lab (within 15 minutes after collection).

b. Ordering:
Horizon test code: LDVBG (Line Draw Blood Gas, Venous)
EPIC test code: LAB4912

c. Reference Range
Reference ranges will be reported for all analytes in the Line Draw Blood Gas.

Serum Protein Electrophoresis

Serum protein electrophoresis (SPE) is used to identify patients with multiple myeloma and other serum protein disorders. Electrophoresis separates proteins based on their physical properties, and the subsets of these proteins are used in interpreting the results (see Figure 1). Plasma protein levels display reasonably predictable changes in response to acute inflammation, malignancy, trauma, necrosis, infarction, burns, and chemical injury. A homogeneous spike-like peak in a focal region of the gamma-globulin zone indicates a monoclonal gammopathy. Monoclonal gammopathies are associated with a clonal process that is malignant or potentially malignant, including multiple myeloma, Waldenström's macroglobulinemia, solitary plasmacytoma, smoldering multiple myeloma, monoclonal gammopathy of undetermined significance, plasma cell leukemia, heavy chain disease, and amyloidosis. The quantity of M protein, the results of bone marrow biopsy, and other characteristics can help differentiate multiple myeloma from the other causes of monoclonal gammopathy (see Figure 2). In contrast, polyclonal gammopathies may be caused by any reactive or inflammatory process.

Serum protein electrophoresis may be ordered:

1. protein-losing condition
2. When a doctor is investigting symptoms that suggest multiple myeloma, such as bone pain, anemia, fatigue, unexplained fractures, or recurrent infections, to look for the presence of a characteristic band (monoclonal immunoglobulin) in the beta or gamma region; if a sharp band is seen, its identity as a monoclonal immunoglobulin is typically confirmed by immunofixation electrophoresis.
3. To monitor treatment of multiple myeloma to see if the monoclonal band is reduced in quantity or disappears completely with treatment
4. As a follow up to abnormal findings on other laboratory tests, such as total protein and/or albumin level, elevated urine protein levels, elevated calcium levels, or low white or red blood cell counts
5. When symptoms suggest an inflammatory condition, an autoimmune disease, an acute or chronic infection, a kidney or liver disorder, or a

Immunofixation electrophoresis may be ordered:

When an abnormal band suggestive of a monoclonal immunoglobulin is seen on either a serum or a urine electrophoresis pattern.

At UCMC Clinical Laboratory the protein electrophoresis are performed using the CAPILLARYS Sebia Electrophoresis system. The CAPILLARYS has been developed to provide complete automation of this testing with fast separation and good resolution. In many respects, the methodology can be considered as an intermediary type of technique between classical zone electrophoresis and liquid chromatography. The CAPILLARYS system uses the principle of capillary zone electrophoresis in free solution. With this technique, charged molecules are separated by their electrophoretic mobility in an alkaline buffer with a specific pH. Separation also occurs according to the electrolyte pH and electro osmotic flow. The CAPILLARYS system has 8 capillaries functioning in parallel allowing 8 simultaneous analyses. A sample dilution with buffer is prepared and injected by aspiration at the anodic end of the capillary. A high voltage protein separation is then performed and direct detection of the proteins is made at 200 nm at the cathodic end of the capillary. The capillaries are immediately washed with a Wash Solution and prepared for the next analysis with buffer. Proteins are detected in the following order: gamma globulins, beta-2 globulins, beta-1 globulins, alpha-2 globulins, alpha-1 globulins, and albumin with each zone containing one or more proteins.

How to order the tests?

LAB CODE	LAB #	TEST NAME EPIC
PE	LAB3207	Serum Protein Electrophoresis w/reflex
K/L	LAB3167	Kappa/Lambda free light chains,serum
IGQNT	LAB3434	Immunoglobulin Quantitation,serum

If you have questions please contact Cate Cronin, Hematology Tech Specialist (ext. 4-5027) or Dr. Vincent Ricchiuti, Director Clinical Chemistry and Toxicology (4-3837).

Figure 1

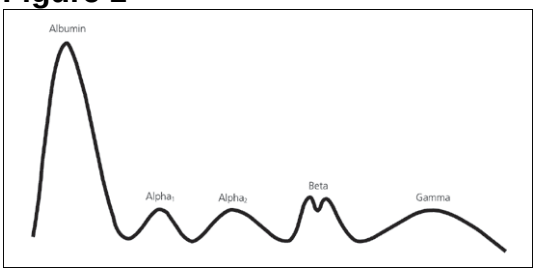

Figure 2

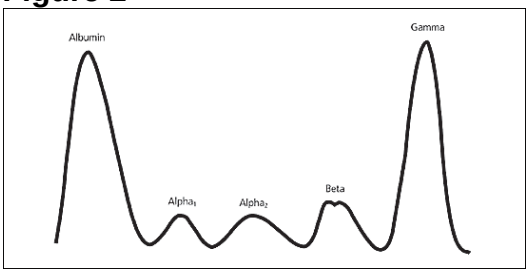

Figure1. Typical normal pattern for SPE.

Figure 2. Abnormal SPE pattern in a patient with multiple myeloma. Note the large spike in the gamma region.