On 3/2/2015, the Immunology Laboratory will begin offering the Cellestis QuantiFERON-TB Gold assay.

The QuantiFERON-TB Gold assay (QFT) is an in vitro diagnostic test using a peptide cocktail simulating ESAT-6, CFP-10 and TB7.7 (p4) proteins to stimulate cells in heparinized whole blood. Detection of interferon-\(\gamma\) (IFN-\(\gamma\)) by Enzyme-Linked Immunosorbent Assay (ELISA) is used to identify in vitro responses to these peptide antigens that are associated with *Mycobacterium tuberculosis* infection.

QFT is an indirect test for *M. tuberculosis* infection (including disease) and is intended for use in conjunction with risk assessment, radiography and other medical and diagnostic evaluations.

The QFT test is a test for Cell Mediated Immune (CMI) responses to peptide antigens that simulate mycobacterial proteins. These proteins, ESAT-6, CFP-10 and TB7.7 (p4), are absent from all BCG strains and from most non-tuberculous mycobacteria with the exception of *M. kansasii*, *M. szulagai*, and *M. marinum*. Individuals infected with *M. tuberculosis* complex organisms (*M. tuberculosis*, *M. bovis*, *M. africanum*, *M. microti*, *M. canetti*) usually have lymphocytes in their blood that recognize these and other mycobacterial antigens. This recognition process involves the generation and secretion of the cytokine, IFN-\(\gamma\). The detection and subsequent quantification of IFN-\(\gamma\) forms the basis of this test.

Tuberculosis is a communicable disease caused by infection with *M. tuberculosis* complex organisms, which typically spreads to new hosts via airborne droplet nuclei from patients with respiratory tuberculosis disease. A newly infected individual can become ill from tuberculosis within weeks to months, or can remain latently infected for years. Latent tuberculosis infection (LTBI), a non-communicable asymptomatic condition, persists in some, who might develop tuberculosis disease months or years later. The main purpose of diagnosing LTBI is to consider medical treatment for preventing tuberculosis disease. Until recently the tuberculin skin test (TST) was the only available method for diagnosing LTBI. Cutaneous sensitivity to tuberculin develops from 2 to 10 days after infection. However, some infected individuals, including those with a wide range of conditions hindering immune functions, but also others without these conditions, do not respond to tuberculin. Conversely, some individuals
who are unlikely to have *M. tuberculosis* infection exhibit sensitivity to tuberculin and have positive TST results after vaccination with bacilli Calmette-Guerin (BCG), infection with mycobacteria other than *M. tuberculosis* complex, or undetermined other factors.

The tuberculin skin test and QFT are helpful but insufficient for diagnosing *M. tuberculosis* complex infection in sick patients: a positive result can support the diagnosis of tuberculosis disease; however, infections by other mycobacteria (e.g., *M. kansasii*) could also cause positive results. Other medical and diagnostic evaluations are necessary to confirm or exclude tuberculosis disease.

Latent tuberculosis infection must be distinguished from tuberculosis disease, a reportable condition which usually involves the lungs and lower respiratory tract, although other organ systems may be affected. Tuberculosis disease is diagnosed from historical, physical, radiological, histological, and mycobacteriological culture findings.

Numerous studies have demonstrated that the peptide antigens used in QFT stimulate IFN-Y responses in T-cells from individuals infected with *M. tuberculosis* but generally not from uninfected or BCG vaccinated persons without disease or risk for LTBI. However, medical treatments or conditions that impair immune functionality can potentially reduce IFN-Y responses. Patients with certain other mycobacterial infections might also be responsive to ESAT-6, CFP-10 and TB7.7 (p4) as the genes encoding these proteins are present in *M. kansasii*, *M. szulgai* and *M. marinum*.

Risk factors for *M. tuberculosis* infection include historical, medical, or epidemiological predictors for tuberculosis disease or exposure to tuberculosis. Refer to the most recent CDC guidance (Mazurek et al. MMWR Recomm Rep. 2010, 59 (RR-5): 1-15) for detailed recommendations about diagnosing *M. tuberculosis* infection (including disease) and selecting persons for testing.

Reference values will change from those used at Mayo Medical Laboratories and are listed below. If you have any questions about this test please contact Dr. Greg Sharp in the Chemistry Laboratory, Phone: 847—5115 Email: gregory.sharp@uvmhealth.org.

---

**Specimen Collection:** QuantiFeron–TB Gold Testing must be scheduled in advance by contacting Laboratory Customer Service at 847-5121 or 1-800-991-2799. Patients samples are collected at the UVM Medical Center Campus Monday through Friday only.

<table>
<thead>
<tr>
<th>Test Name</th>
<th>TB by Quantiferon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Code</td>
<td>QFTBA</td>
</tr>
<tr>
<td>CPT</td>
<td>86480</td>
</tr>
<tr>
<td>Division</td>
<td>Immunology</td>
</tr>
<tr>
<td>Method</td>
<td>QuantiFERON-TB Gold (ELISA)</td>
</tr>
<tr>
<td>Reference Range</td>
<td>Negative</td>
</tr>
<tr>
<td>Days Performed</td>
<td>Tuesday and Thursday, run starts at 8:00 am</td>
</tr>
<tr>
<td>Analytical Time</td>
<td>Same day</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>Dynex DSX</td>
</tr>
</tbody>
</table>

**Reference:** QuantiFERON-TB Gold Product Insert, Cellestis Inc., 28358 Constellation Road, Unit 698, Valencia, CA, 91355, March 2013.