

## Alternatives to Tuberculosis Skin Testing

### The Problem:

Approximately one third of the world's population is infected with *Mycobacterium tuberculosis*, the causative organism of tuberculosis. In many of these cases the infection remains latent; patients do not develop full-blown disease and remain asymptomatic. However, about one in ten of these latent infections, if undiagnosed will eventually progress to active disease, which, if untreated is fatal in about 50 percent of these cases. Additionally, the developed world is facing an increase in the number of people infected with tuberculosis because their immune systems are compromised by factors such as immunosuppressive therapy, substance abuse, or AIDS.

### Skin Testing Limitations:

The skin test, or the Mantoux test is widely used to assess individuals with suspected tuberculosis; however, the test has a number of limitations:

1. False positive reactions in patients previously vaccinated with BCG
2. False positive reactions following exposure to nontuberculous mycobacteria
3. False negative reactions due to anergy in immunosuppressed patients
4. Multiple visits to test
5. Subjectivity of readout
6. Not quality controlled

### How Do Interferon Gamma Release Assays Address These Concerns?

The interferon gamma release assays (IGRA) measure the reactivity of patients' lymphocytes to *Mycobacterium tuberculosis* antigens. The advantages of these tests are:

1. Fewer false positives through use of *Mycobacterium tuberculosis* specific antigens
2. Highly sensitive, measures low response
3. *Single draw In vitro* blood test
4. Requires one patient visit

For guidance in selecting which of these tests to use on your patients, please see references:

- Pai, M et al. Systematic review: T-cell-based assays for the diagnosis of latent tuberculosis infection: an update. *Ann Intern Med.* 2008 Aug 5;149(3):177-84.
- William Check, PhD, "Tuberculosis testing is no longer skin deep" *CAP Today.* 2008 Nov; pg 1.

You may also contact:

**Ronald Harbeck, PhD, D (ABMLI), Medical Director**

phone: 303.398.1337 / email: HarbeckR@NJHealth.org

**Vijaya Nagabhushanam, MD, PhD, Assistant Medical Director**

phone: 303.398.1292 / email: NagabhushanamV@NJHealth.org

# QuantiFERON®-TB Gold

Shake vigorously!

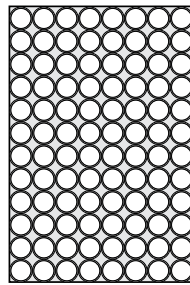
Incubate 24 hrs



1 ml blood per tube  
Grey = nil  
Red = TB antigens  
Purple = mitogen



Ship to lab  
within 16 hrs



Measure interferon  
gamma by ELISA

## Quantiferon Gold In-Tube

- Samples received Mon - Thurs. Thursday samples must be received by 4pm
- Blood Collection: 1 mL per each of 3 tubes. **Shake vigorously to induce frothing!** Store at ambient temperature
- Timing: Blood must reach the lab within 16 hours of collection

### Test information

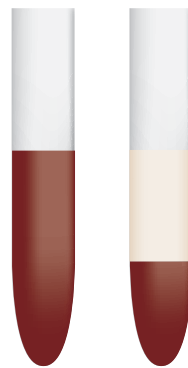
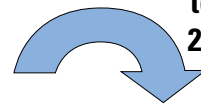
|                   |           |
|-------------------|-----------|
| Test code:        | QFT       |
| Reference range:  | By report |
| Turn around time: | 7 days    |
| CPT code:         | 86480     |

# T-SPOT®.TB

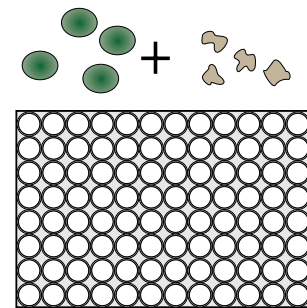
## T-SPOT.TB Method

- Samples received Mon - Thurs. Thursday samples must be received by 4pm
- Blood Collection: One 10mL lithium or sodium heparin, ambient temp (18-25°C)
- Timing: Blood must reach the lab within **24 hours** of collection

Courier specimen  
to ADx within  
24 hrs of draw



Separate peripheral blood  
mononuclear cells

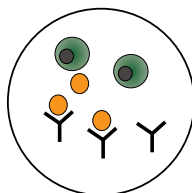


Add cells + TB antigens and  
incubate 24 hr

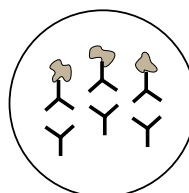
### Test information

|                   |           |
|-------------------|-----------|
| Test code:        | TSPOT     |
| Reference range:  | By report |
| Turn around time: | 2 days    |
| CPT code:         | 86480     |

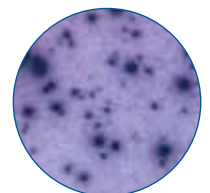
Anti-IFN $\gamma$  antibody  
binds IFN $\gamma$  secreted  
by T cells



Anti-IFN $\gamma$  antibody  
linked to enzyme  
binds IFN $\gamma$



Colorimetric reaction  
to visualize individual  
IFN $\gamma$  secreting cells as  
discrete spots



## About Our Laboratories

Advanced Diagnostic Laboratories (ADx) at National Jewish Health is internationally known for specialty diagnostic testing. Our experience and research capabilities enable us to offer the most advanced and accurate services. Our laboratories provide specialized testing in the areas of complement function, immunology/immune deficiency, flow cytometry, mycobacteriology, infectious disease pharmacokinetics, genetics and proteomics.