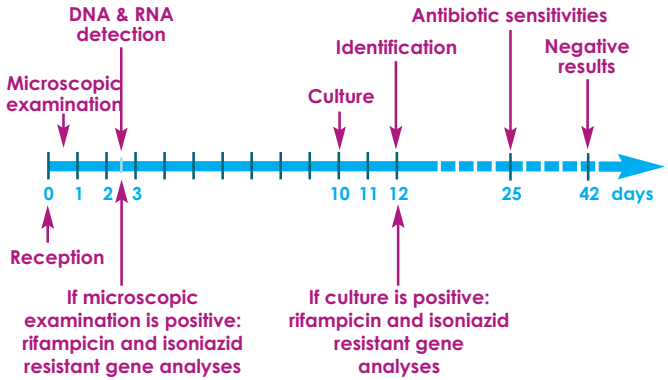

Average time to provide results for *Mycobacterium tuberculosis*

Interferon Gamma Release Assays

As tuberculin skin tests show poor specificity and are difficult to carry out, blood tests which avoid cross-reactivity with BCG were developed. According to National Health Authorities Interferon-γ Release Assays should be performed in the following circumstances:

- In contamination investigations at least 3 months after contact.
- Healthcare workers recruitment and for monitoring those within a high risk department.
- As a diagnostic aid for extra-pulmonary tuberculosis.
- Before initiating anti-TNFα treatment.

- The **QuantiFERON®-TB IT** test investigates the lymphocytes capability to release interferon-γ after stimulation by ESAT-6, CFP-10 and TB7.7 proteins from TB.

- Results are validated with one antigen-free negative control and one mitogen-positive control.

- Sampling must be performed using specific test tubes. Samples should be vigorously shaken before incubation for 24 hours at 37 °C, then centrifuged without decantation before shipping at + 4 °C.

Price

Please contact the International Team for pricing details.

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Focus on...

Mycobacterial infections diagnosis

APRIL 2008

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BIOLOGIE MÉDICALE SPÉCIALISÉE

Tuberculosis

More than one-third of the world's population (over 2 billion people) are infected by "Koch Bacillus" (latent infection with tuberculosis). Each year, 8 million people develop the tuberculosis disease and 2 million people die from it.

Tuberculosis is the primary cause of infectious mortality in the world. In developing countries, the AIDS epidemic contributes to the on going spread of the disease, whilst antibiotic multi-resistant bacilli continue to appear.
In contrast, the incidence in developed countries is steadily decreasing. For example in France, there are less than 10 cases/100 000 inhabitants and the multi-drug resistance rate is close to 1 %.

Mycobacteriosis (MOTT)

- Such infections are caused by non-tuberculosis (or atypical) Mycobacteria. More than a hundred of them have been described and most are ubiquitous germs that can be found in water or soil. Many prove to be opportunist organisms that may cause nosocomial infections in susceptible patients.

- They can take on different forms: pulmonary infections, lymphadenitis, cutaneous or sub-cutaneous infections and even general infections.

- Antituberculotic drugs are usually inefficient and antibiotic sensitivities may be performed in certain cases. However, surgery should be the choice procedure when possible.

- These infections are not contagious.

Microscopic examination

- After the sample has been decontaminated and concentrated, direct microscopic examination is performed using specific auramine staining for screening and Ziehl-Neelsen staining for confirmation.

- This test has a low sensitivity (<50 %), is non specific and shows only to the presence or absence of acid-fast bacilli.

- Should you expect the sample to be positive, results can be turned around within the same day of reception to allow patients to be isolated and initiate treatment.

Culture

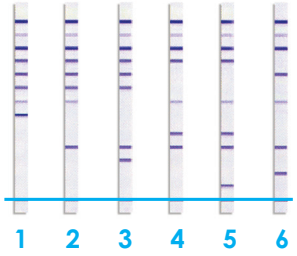
Previously cultures were grown on Löwenstein-Jensen or Coletsos medium. Today, both Middlebrook liquid media and agar gels are used, as some strains grow on one of these media only.
Automated incubators control the liquid based medium cultivation and as such provide results one week earlier than traditional mediums.

This test provides the highest sensitivity and is essential to the identification and antibiotics sensitivity processes.

Identification

- Biochemical methods tend to be replaced by amplification and reverse hybridisation that can identify 15 of the most common mycobacteria species in 2 days.

- Using a similar method, the GenoType® MTBC test (Hain Lifescience - Biocentric) can differentiate species within the tuberculosis complex (*M. tuberculosis, M. bovis, M. africanum, M. microti*, BCG).



- Sequencing of rare mycobacteria allows for identification by comparing the sequence profiles with those reported in a database.

- Molecular typing methods (MIRU-VNTR, spoligotyping, RFLP) are restricted to nosocomial or laboratory contamination studies and epidemiological monitoring.

Antibiotics Sensitivities

- *M. tuberculosis* sensitivity results are usually obtained within 10 days using the Bactec® MGIT system for: streptomycin, isoniazid, rifampicin, ethambutol and pyrazinamid.

- Atypical mycobacteria results are obtained through empirical methods as no validated test is available.

Rifampicin and isoniazid resistant gene analyses

Using molecular biology techniques, resistance to rifampicin (rpoB gene mutation responsible for 96 % of resistant cases) and to isoniazid (katG and inhA genes) can be determined. On positive cultures or positive microscopic examination results, the analyses are performed in 36 hours.

Mycobacterial DNA and RNA detection

- Two complexes are exploited: *tuberculosis* or *avium*.

- With real-time PCR and NASBA, results are provided in less than 2 days. **These tests should always be carried out in addition to culturing.**

- These detection methods show poor sensitivity (25 to 75 % when microscopic examination is negative), and can be influenced by inhibitors. Due to their specificity, they cannot be used for other mycobacterial species.