Detection of specific cell immunity
Skin test
IGRA

Skin tests, IGRA

- Latent tuberculosis is where a patient is infected with *Mycobacterium tuberculosis*, but does not have active tuberculosis disease.
- Patients with latent tuberculosis are not infectious—it is not possible to get TB from someone with latent tuberculosis.

Tests for latent tuberculosis

- two major classes of tests used to identify patients with latent tuberculosis: tuberculin skin tests and IFN-γ (Interferon-gamma) tests.
- The tuberculin skin tests in use include (but are not limited to)
- Mantoux test
- QuantiFERON-TB Gold
- QuantiFERON-TB Gold In-Tube

- **Mantoux** – in vivo detection of specific cell immunity after exposition to antigen

- - burden of patient by antigen
- - possible immunodeficiency of patients (anergy, risk of alergic reaction)
- - memory cell after BCG vaccination,
- - exposition to antigen = activation of M
- - interpretation,
- - booster dose of antigen,

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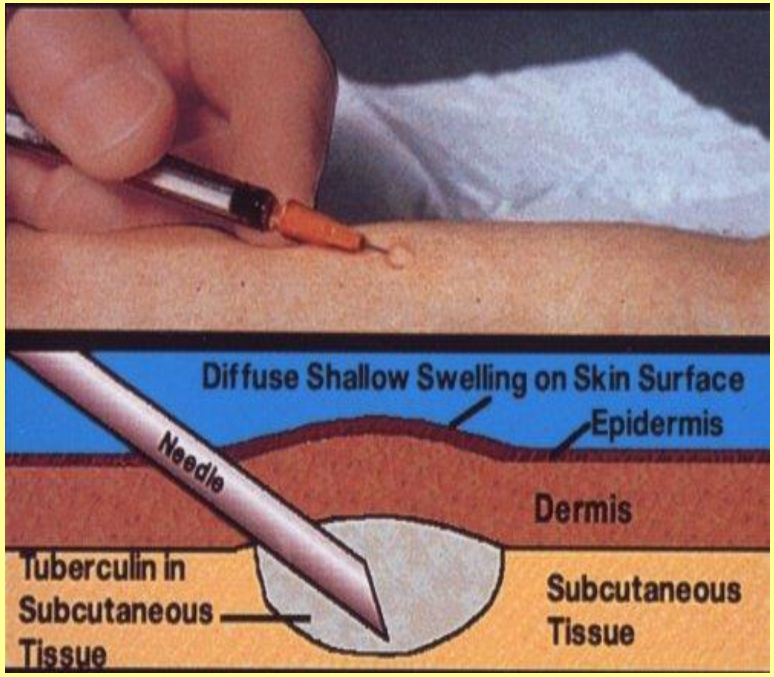
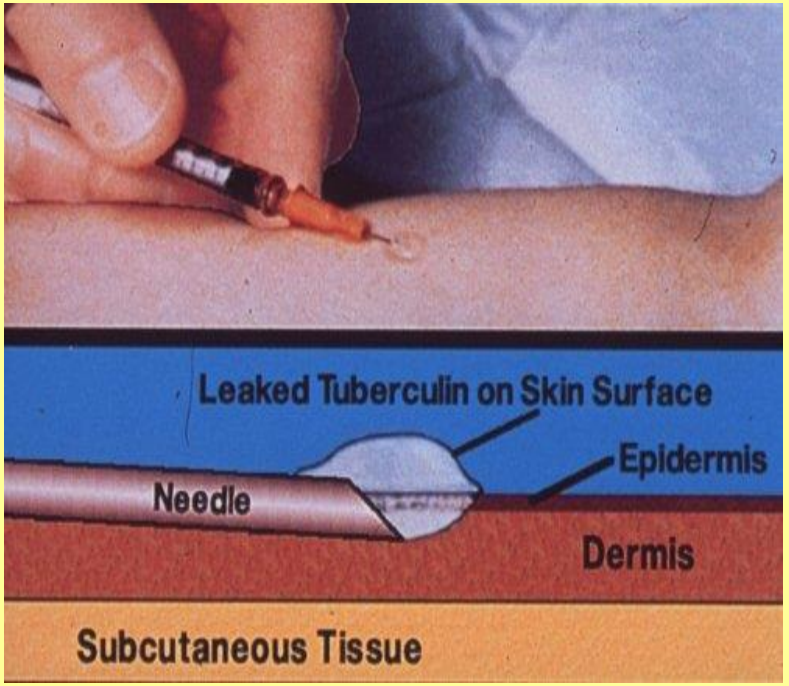
Mantoux test

- The Mantoux test is now standardised by the WHO. 0.1 ml of tuberculin (100 units/ml) is given by intradermal injection into the volar surface of the forearm (subcutaneous injection results in false negatives).

needle to deep



needle to shallow



Measurement of induration

- 0 – 15 mm – negative, not enough, vaccination, revaccination
- 15 mm – OK, positive (after vaccination ?)
- 15 and more – too much, possible activity

Interferon Gamma Release Assays (IGRA)

- measurement of *in vitro* levels of interferon gamma produced by sensitized T cells that have been stimulated by purified or synthesized TB antigens.
- In the first step, blood is collected and mixed with TB-specific antigens.
- The tubes are then incubated at 37°C for generally 16 to 24 hours. During this incubation period, antigen presenting cells process the purified TB antigens.

Interferon Gamma Release Assays (IGRA)

- in vitro detection of specific cell immunity after exposition to the antigen
- whole blood of patient - to 3 vials
- specific memory cells after disease are activated

  antigen is not given to patient in vivo

- no risk of exposition of immunocompromised patients

Interferon Gamma Release Assays (IGRA)

- Following the incubation period, the tubes are centrifuged to separate the plasma and cell layers.
- And finally, the tubes are sent to a clinical laboratory where the levels of interferon gamma are measured by an ELISA-based assay.

Interpretation:

comparison of concentration of IFγ in the vial with

-TB ag : negat.contr.

Negat control – exclude the nonspecific reaction

Posit.control – demonstrate capacity to react (negat. in imunocompromised or annergic

comparison

- **Mantoux: in vivo**
- reactivity of memory cells produced after vaccination (BCG) and after disease (M.tbc)
- application of i.d.
- memory cells migrate to the place of injection
- inflamation with induration

- **Quantiferon: in vitro**
- memory cells after M.tbc infection present in the blood in vial + M.tbc antigen = release of IFγ
- ELISA for detection