

### Positive Tuberculosis Test Video Script

Video Link: <https://www.youtube.com/watch?v=I0rBGE94rEE>

**0:00:** I am going to explain the reaction occurring when a client has a positive tuberculosis test:

**0:15:** First, the client is injected into the forearm intradermally with 0.1 ml of a TB protein derivative. The PPD (purified protein derivative) reaction exploits the delayed-type hypersensitivity reaction of a patient previously infected with TB.

**0:31:** If an individual has previously been exposed to TB, the T cell will recognize the TB protein. Dendritic cells in the dermis layer recognize the PPD antigen and phagocytose it, then present it via MHCII and travel to the lymph node.

**0:46:** The TB protein is then picked up by the macrophage and presents to the T cell. MHC molecules travel to the lymph system and then into local mediastinal lymph nodes, where they will activate T-helper cells.

**0:59:** Hypersensitivity IV reactions are cell mediated and occur through either T cytotoxic, or T helper cells. However, since the protein is injected into the dermis there is no cytotoxic response.

**1:10:** Subsequently, T helper cells produce cytokines that recruit more phagocytic cells. Th1 and Th17 cells produce cytokines (such as GM-CSF, TNF- $\beta$  and INF-gamma) that recruit macrophages through specific receptors such as INF- $\gamma$  receptors.

**1:28:** The GM-CSF cytokine activates macrophages to inhibit the intracellular growth of TB. Gamma interferon (INF- $\gamma$ ) which is a key cytokine that leads to inhibition and killing of TB. TNF- $\beta$  is a pro-inflammatory cytokine.

**1:44:** The T helper cells continue to recruit macrophages and produce cytokines. This results in an increase in cells within the dermis.

**1:53:** The intradermal layer begins to swell up with immune cells.

**1:57:** A firm bubble will form on the surface of the forearm; this is referred to as induration, caused by the pro-inflammatory cytokines: IFN-gamma + TNF- $\beta$

**2:07:** For patients who have not been previously exposed to TB, after injection, within the first 48 hours, the bubble will flatten.

## References:

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