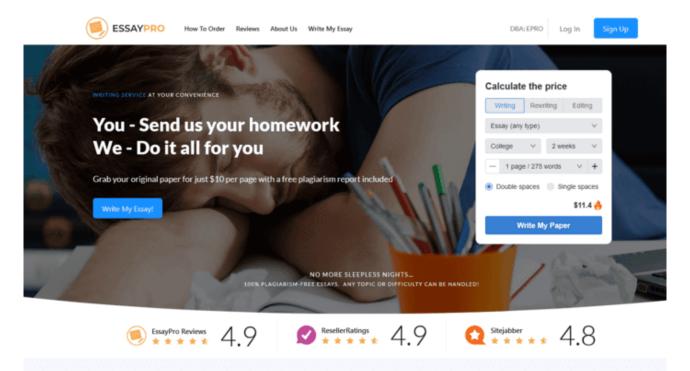
Mycobacterium tuberculosis



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Mycobacterium tuberculosis Introduction Mycobacterium tuberculosis has been present in the human population for thousands of years; fragments of the spinal column from Egyptian mummies from 2400 BCE show definite pathological signs of tubercular decay. Called "consumption," tuberculosis was recognized as the leading cause of mortality by 1650. Using a new staining technique, Robert Koch identified the bacterium responsible for causing consumption in 1882. While scientists finally had a target for fighting the disease, they did not have the means to treat

patients; the spread of infection was controlled only by attempting to isolate patients. At the turn of the twentieth century, more than 80% of the population in the United States was

infected before age 20, and tuberculosis was still the leading cause of death. The production of antibiotics in the 1940's allowed physicians to begin effectively treating patients, leading to huge drops in the death rate of the disease. Tuberculosis is still a major cause of mortality in young adults worldwide, but is less of a problem in developed

countries.

Microbiological characteristics

Mycobacterium tuberculosis is a nonmotile, acid-fast, obligate aerobe. The bacilli are 2-4 um in length and have a very slow generation time of between 15 and 20 hours. The cell wall of the mycobacterium is unique in that it is composed mainly of acidic waxes, specifically mycolic acids. M. tuberculosis is unusually <u>resistant</u> to drying and chemicals, contributing to the <u>ease</u> with which it is transmitted.

Encounter/Entry

Tuberculosis is transmitted by inhalation of aerosols containing the tubercle bacilli. The required inoculum size for infection is usually high, but easily occurs with exposure to a patient who is currently infected. The products of dried aerosols, droplet nuclei, are particularly infectious because they remain in the air for an extended time, and upon inhalation easily move to the alveoli. The severe damage related to infection is caused by the reaction of the host. The tuberculosis infection has two phases, primary and secondary.

Primary infection

Primary tuberculosis is the initial infection of the host, usually being mild and asymptomatic. A healthy person recently infected with the mycobacterium may exhibit flulike symptoms and has no reason to suspect tuberculosis. Left untreated, the bacilli infect and multiply within pulmonary alveolar macrophages, migrating to the hilar lymph nodes. An immune response is exhibited by the T-helper cells, and inflammation develops at multiple sites. A person may test positive in the tuberculin skin test at this point, and a chest x-ray may shows opacities in the lungs.

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