

## *The Life Story of Mycobacterium tuberculosis*

My name is *Mycobacterium tuberculosis*. My grandparents *M. Bovis* was causing Tuberculosis in the animal kingdom long before invading humans. However after the domestication of cattle between 8000-4000 BC, there is archaeological evidence of human infection by *M. Bovis* probably thorough to milk consumption. As rumors *Mycobacterium tuberculosis* come out after transformation of my grandparents in human body. We were so famous and spread around by 1000 BC in Western Europe and Eurasia. We first described on 24 March 1882 by Robert Koch, who subsequently received the Nobel Prize in physiology or medicine for this discovery in 1905; the bacterium is also known as "Koch's bacillus".

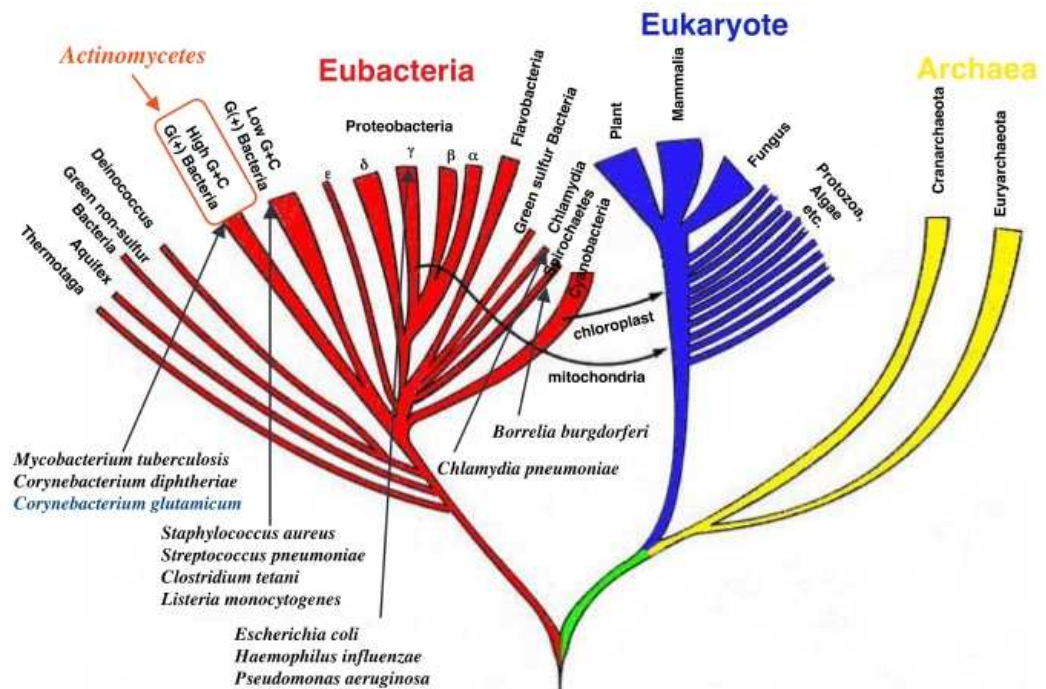
We are non-motile rod –shaped bacterium distantly related to the Actinomycetes. Our size about 2-4 micrometers in length and 0.2-0.5 um in width. Since our coat made very strong waxy material which is impermeable nature protect us most of the attack, we are resistant to many disinfectants and antibiotics humans call it magic bullet. Beside that we are growing very slow compare to the others likely about 12-24 hours due our cell wall prevent passage of nutrients into and excreted from the cell. Since humans improved their skills with technology they trying to diagnose us in early stage by some stain technics. *Mycobacterium tuberculosis* are not classified as either Gram-positive or Gram-negative because it does not have the chemical characteristics of either, although the bacteria do contain peptidoglycan (murein) in their cell wall. *Mycobacterium* species, along with members of a related genus *Nocardia*, are classified as **acid-fast bacteria** due to their impermeability by certain dyes and stains.

We love to leave rich oxygen environment and humans called us obligate **aerobes** that growing most successfully in tissue with high oxygen such as well-aerated upper lobes of the lungs. Some of our other members are abundant in soil and water. Several regulators have been found to respond to environmental distress, such as extreme cold or heat, iron starvation, and oxidative stress. Of course we developed our self to able to stay longer our host place and we learned to adapt to the environment by allowing or inhibiting transcription according to our surroundings.

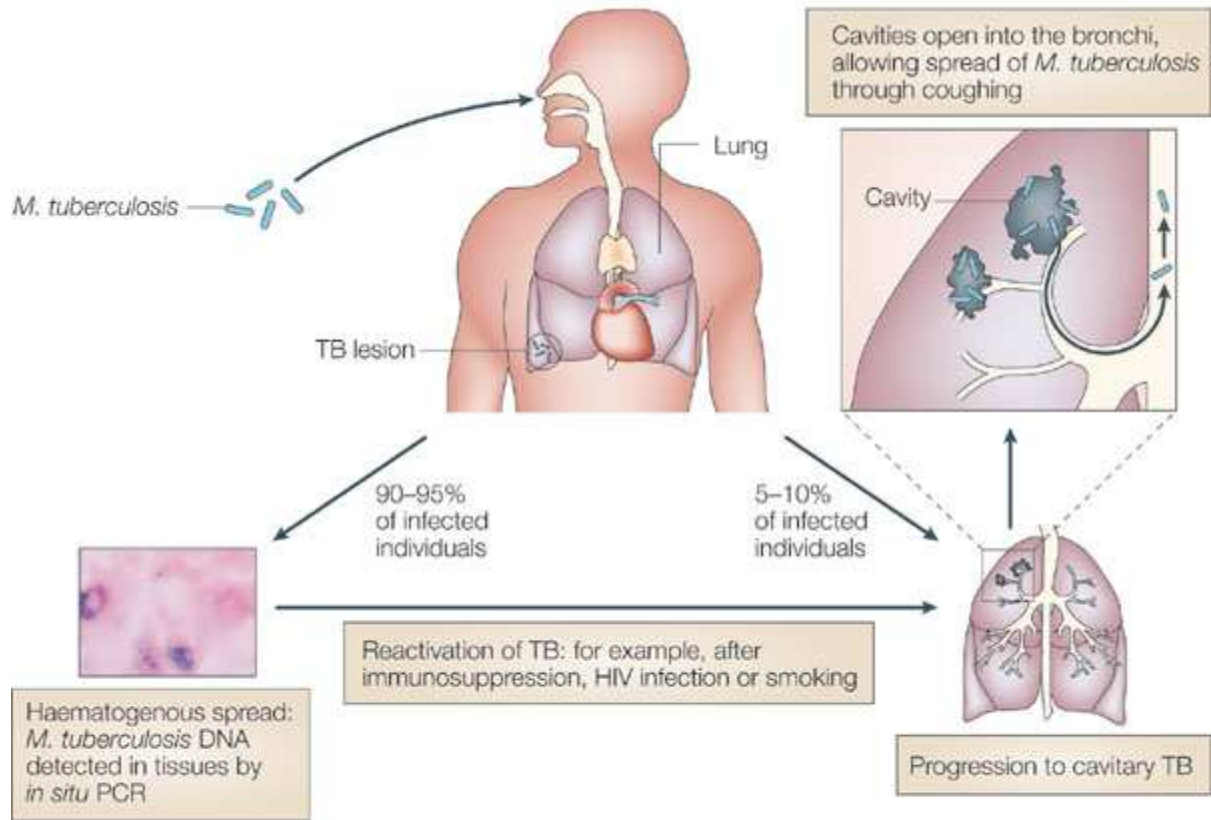
We are called by humans as complex pathogen microorganism because we like to live in host body but some. We travel mostly from close person to person contact by inhalation of aerosol. We only infect 10% of immunocompetent people and develop active disease in their life time, the rest of the 90% do not become ill and cannot transmit the organism. However, in some groups such as infants or the immunodeficient those with AIDS or malnutrition develop TB much higher. We are killing every year 3,000,000 people in the world more than AIDS, malaria, and other tropical diseases combined.

Plasmids in *Mycobacterium tuberculosis* are important in transferring virulence because genes on the plasmids are more easily transferred than genes located on the chromosome. Some general properties of *Mycobacterium tuberculosis* that contribute to its virulence:

- Special mechanisms for cell entry
- Intracellular growth
- Detoxification of oxygen radicals.
- Slow generation time
- High lipid concentration in cell wall
- Cord factor



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