

Anything to do with microbiology



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of Microbiology Article Ahmad S. Clinical Dev Immunol [Internet]. December 27 [cited March 21]; 814943: Available from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3017943/?tool=pubmed> Since time immemorial, tuberculosis has affected mankind. The most common cause of tuberculosis in human beings all over the world is mycobacterium tuberculosis and through molecular genetic studies it is clear that the progenitor is about 3 million years old. The bacteria is member of the M. tuberculosis complex which comprises of six other species which are closely related. Disease caused by this bacteria, tuberculosis is a major public health challenge and is currently in an epidemic state in several parts of the world. According to the World Health Organisation, 139 per 100,000 population throughout the world suffer from tuberculosis. The highest number of cases are seen in Asia, followed by Africa. Two important contributing factors are human immunodeficiency virus and development of resistance of the bacteria to first line drugs. The main source of infection to the community are sputum positive pulmonary tuberculosis. Only 10 percent of individuals develop the clinical disease and the rest arrest the growth of the bacteria through adequate immune response. Some population-based studies have shown that some individuals are at increased risk of acquiring the infection when compared to others. Active transmission is mainly seen in crowded and household contacts. Acquisition is most common in young people. More than 85 percent of tuberculosis is pulmonary tuberculosis. Tuberculosis is communicable and patients with pulmonary tuberculosis are the most important source of infection. When the tuberculosis bacillus presents in the body, it is phagocytosed by antigen presenting cells in the alveoli of human lungs. This initiates a protective immune response by the host. The genome

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of the bacillus helps in establishing latent or progressive infection in the host. Multiple strategies adopted by the bacilli help in evading immune-mediated clearance, thus facilitating the formation of distinct granulomas. Several tuberculosis bacillus factors, mainly ManLAM and 19-kDa lipoprotein modulate antigen presentation pathways and either cause blunting of the microbicidal functions of the macrophages and also that of the other immune cells or prevent their maturation. Currently, there are 2 experimental strategies as to which factors promote persistence of the pathogen in immune cells including macrophages. One is the cloning of *M. tuberculosis* genes in nonpathogenic mycobacteria and studying their increased survival in macrophages or other mammalian cells. The other is the use of knockout mutants of *M. tuberculosis* for selected genes for persistence of the pathogen in macrophages and other immune cells. Dormant bacilli retain their ability to induce reactivation and also to cause active tuberculosis whenever disruption of immune response occurs. Active transmission of bacilli is the most significant contributor of active disease in countries with high tuberculosis burden. Latent tuberculosis infection is evident from positive tuberculin skin test. Recent studies have demonstrated specific T cell-based IGRAs as good indicators of latent tuberculosis infection. Application of this technology is useful in early detection of tuberculosis, especially in rich and advanced countries.