

The Battle against tuberculosis: Advances and ongoing challenges.

Jing Ma*

Department of Molecular Immunology, Southern Medical University, China.

Introduction

Tuberculosis (TB), an ancient disease caused by the bacterium *Mycobacterium tuberculosis*, remains a significant public health challenge globally. Despite advancements in diagnosis, treatment, and prevention, TB continues to pose a considerable threat, particularly in low- and middle-income countries. This article explores the progress made in combating TB and highlights the ongoing challenges that need to be addressed to achieve the goal of TB elimination [1, 2].

TB has plagued humanity for millennia, with evidence of its presence in ancient Egyptian mummies. The disease became widely known as the "white plague" during the 19th century due to its high mortality rate in Europe and North America. In 1882, Robert Koch's discovery of the TB bacillus revolutionized our understanding and opened the door to developing diagnostic tools and treatments [3, 4].

Today, TB remains one of the top 10 causes of death worldwide. According to the World Health Organization (WHO), in 2021, there were an estimated 10 million new TB cases and 1.5 million TB-related deaths. The disease disproportionately affects vulnerable populations, including those with compromised immune systems, such as HIV patients, and those living in poverty with limited access to healthcare [5, 6].

Early and accurate diagnosis is critical for controlling TB. Traditional diagnostic methods, such as sputum smear microscopy, have limitations in sensitivity and specificity. However, recent advancements have significantly improved TB diagnostics. This molecular test can detect TB and rifampicin resistance (a key indicator of multidrug-resistant TB) in less than two hours with high accuracy. Its implementation in many high-burden countries has improved the rapid identification of TB cases and resistance patterns [7, 8].

These molecular tests can identify TB and its drug-resistant forms by detecting specific genetic mutations. LPAs provide quicker results compared to traditional culture methods, allowing for timely treatment adjustments. Used primarily for latent TB infection, IGRAs measure the immune response to TB antigens. While not suitable for active TB diagnosis, they help identify individuals at high risk of developing active disease [9, 10].

Conclusion

The battle against tuberculosis has seen significant advancements in diagnosis, treatment, and prevention. However, ongoing challenges such as drug resistance, inadequate healthcare infrastructure, and funding limitations hinder progress towards TB elimination. Addressing these challenges requires a concerted global effort, robust health systems, sustained funding, and innovative research. With continued commitment and collaboration, it is possible to turn the tide against TB and move closer to a world free of this ancient scourge.

References

1. Queval CJ, Brosch R, Simeone R. The macrophage: a disputed fortress in the battle against *Mycobacterium tuberculosis*. *Front Microbiol.* 2017;8:311458.
2. Dharmapalan D, Mane SS. Pediatric Drug-Resistant Tuberculosis: The Current and Future Prospects for Management and Prevention. *Pathogens.* 2023;12(11):1372.
3. Leowattana W, Leowattana P, Leowattana T. Tuberculosis of the spine. *World J Orthop.* 2023;14(5):275.
4. Michaleas SN, Protogerou AD, Sipsas NV, et al. The Anti-tuberculosis Battle in Greece in the 1800s and 1900s. *Cureus.* 2022;14(6).
5. Chauhan V, Thakur S. State of the Globe: The Global Battle for Survival against: *Mycobacterium tuberculosis*. *J Glob Infect Dis.* 2017;9(4):129-30.
6. Nesci S. Bacterial and mammalian F1FO-ATPase: Structural similarities and divergences to exploit in the battle against *Mycobacterium tuberculosis*. *Int Rev Cell Mol Biol.* 2023;377:45-63
7. Kant S, Tyagi R. The impact of COVID-19 on tuberculosis: challenges and opportunities. *Ther Adv Infect Dis.* 2021;8:20499361211016973.
8. Olaru ID, von Groote-Bidlingmaier F, Heyckendorf J, et al. Novel drugs against tuberculosis: a clinician's perspective. *Eur Respir J.* 2015 ;45(4):1119-31.
9. Raviglione M, Uplekar M, Vincent C, et al. Rebalancing the global battle against tuberculosis. *Lancet Glob Health.* 2014;2(2):e71-2.

*Correspondence to: Jing Ma, Department of Molecular Immunology, Southern Medical University, China. E-mail: majing23@smu.edu.cn

Received: 02-Nov-2023, Manuscript No. AAJIDMM-24-142935; Editor assigned: 06-Nov-2023, PreQC No. AAJIDMM-24-142935 (PQ); Reviewed: 20-Nov-2023, QCNo. AAJIDMM-24-142935; Revised: 23-Nov-2023, Manuscript No. AAJIDMM-24-142935 (R); Published: 28-Nov-2023, DOI:10.35841/ajidmm-7.6.175

10. Refrégier G, Genestet C. Mycobacterium tuberculosis Diversity Exploration: A Way to Serve the Three

Main Weapons against Epidemics, Hygiene, Vaccine Development and Chemotherapy. *Microorganisms*. 2022;10(8):1492.

Citation: Ma J. The Battle against tuberculosis: Advances and ongoing challenges. J Infect Dis Med Microbiol. 2023;7(6):175.