

Role of *Mycobacterium simiae* in Pulmonary Infections

Nishmi Gunasingam*

Department of Gastroenterology, St Vincent's Hospital, Sydney, Australia

DESCRIPTION

In the vast world of microorganisms, *Mycobacterium simiae* stands out as an intriguing and lesser-known species. This bacterium belongs to the genus *Mycobacterium*, which also includes well-known pathogens such as *Mycobacterium tuberculosis* and *Mycobacterium leprae*. *Mycobacterium simiae* has been discovered in various environmental sources, including soil, water, and biofilms, and has been associated with human infections, particularly in individuals with compromised immune systems. Despite its significance, *Mycobacterium simiae* remains a relatively understudied microbe. In this article, we will explore the characteristics, epidemiology, clinical relevance, and diagnostic approaches related to *Mycobacterium simiae*.

Characteristics of *Mycobacterium simiae*

Mycobacterium simiae is a Non-Tuberculous *Mycobacterium* (NTM) species, meaning it is distinct from the *Mycobacterium tuberculosis* complex responsible for causing tuberculosis. It is an acid-fast bacillus with a unique cell wall structure, composed of complex lipids such as mycolic acids. These lipids contribute to the bacterium's resistance to environmental stresses, disinfectants, and antibiotics, making *Mycobacterium simiae* a formidable adversary.

Epidemiology and transmission

Mycobacterium simiae has been found worldwide, but its prevalence varies across different regions. It is commonly found in aquatic environments, including natural and man-made water sources. Occupational exposure, such as working in healthcare settings or laboratory research, has been associated with an increased risk of *Mycobacterium simiae* infections. It can also be acquired through inhalation of contaminated aerosols, ingestion of contaminated water, or direct contact with infected animals.

Clinical relevance

Mycobacterium simiae infections primarily affect individuals with weakened immune systems, such as those with HIV/AIDS, organ transplant recipients, or individuals undergoing

immunosuppressive therapy. Pulmonary infections are the most common manifestation, with symptoms resembling tuberculosis, including chronic cough, fever, night sweats, and weight loss. However, *Mycobacterium simiae* can also cause extra pulmonary infections, such as skin and soft tissue infections, lymphadenitis, and disseminated disease.

Diagnosis and treatment

Diagnosing *Mycobacterium simiae* infections can be challenging, as it requires specialized laboratory techniques. Microscopic examination, culture, and molecular testing, including Polymerase Chain Reaction (PCR), are essential for accurate identification. Antibiotic susceptibility testing is crucial to guide appropriate treatment, as *Mycobacterium simiae* exhibits variable resistance patterns. The treatment of *Mycobacterium simiae* infections often involves a multidrug approach, tailored to the specific susceptibility profile of the isolated strain. Antibiotics commonly used include macrolides, fluoroquinolones, and aminoglycosides, often in combination with other agents such as ethambutol or rifampicin. The duration of treatment is typically prolonged and may extend for several months or even years, depending on the site and severity of infection.

Prevention

Preventing *Mycobacterium simiae* infections primarily involves minimizing exposure to the bacterium, particularly for individuals at higher risk. Proper disinfection of medical equipment, adherence to infection control measures, and avoidance of contact with contaminated water sources are essential preventive measures.

CONCLUSION

Mycobacterium simiae, a lesser-known member of the *Mycobacterium* genus, presents a unique microbial enigma. Although it is primarily found in environmental sources, it has been associated with infections in individuals with compromised immune systems. The bacterium's distinctive characteristics, including its acid-fast nature and resistance to various stressors, contribute to its clinical significance and the challenges

Correspondence to: Nishmi Gunasingam, Department of Gastroenterology, St Vincent's Hospital, Sydney, Australia, E-mail: astoita@stvincents.com.au

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associated with diagnosis and treatment. Increased awareness among healthcare professionals, enhanced surveillance, and

improved diagnostic techniques are crucial for early detection and appropriate management of *Mycobacterium simiae* infections.