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Mycobacterial Diseases

ISSN: 2161-1068

Short Communication

Unveiling *Mycobacteria bovis*: A Zoonotic Intruder with Global Implications

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DESCRIPTION

Mycobacteria bovis, a subspecies of the *Mycobacterium tuberculosis* complex, represents a significant zoonotic pathogen with far-reaching implications for both animal and human health. While primarily recognized as the causative agent of bovine tuberculosis, *Mycobacterium bovis* has demonstrated its ability to transcend species barriers, posing challenges to public health, agriculture, and wildlife conservation. This article delves into the intricacies of *Mycobacteria bovis*, exploring its characteristics, transmission dynamics, and the multifaceted impact it exerts on global health.

Characteristics of mycobacteria bovis

Mycobacteria bovis shares many characteristics with its human-adapted counterpart, *Mycobacterium tuberculosis*, including a robust cell wall structure rich in lipids, slow growth rate, and the ability to persist within the host [1]. However, *Mycobacteria bovis* has unique features that distinguish it as a distinct subspecies.

Host range

While its primary reservoir is cattle, *Mycobacteria bovis* can infect a broad range of mammalian hosts, including humans, domestic animals, and wildlife. This adaptability contributes to its capacity for interspecies transmission [2].

Zoonotic potential

Mycobacteria bovis is a zoonotic pathogen, meaning it can be transmitted from animals to humans. Human infections typically result from the consumption of contaminated animal products, inhalation of respiratory secretions, or direct contact with infected animals.

Persistence in the environment

Mycobacteria bovis is known for its environmental persistence. The bacterium can survive for extended periods in soil, water, and on fomites, complicating efforts to control its spread in both agricultural and natural settings [3].

Transmission dynamics

The transmission dynamics of *Mycobacteria bovis* are complex and multifaceted, involving various routes of transmission among animals, humans, and the environment [4-6].

Bovine-to-human transmission

The primary route of transmission to humans is through the consumption of unpasteurized milk or dairy products from infected cows. This direct zoonotic transmission underscores the importance of effective veterinary surveillance and control measures in the agricultural sector.

Wildlife reservoirs

Wildlife, particularly in regions with a high prevalence of bovine tuberculosis in cattle, can serve as reservoirs for *Mycobacteria bovis*. In such settings, transmission occurs through direct contact between domesticated and wild animals, creating a complex ecological challenge for disease control [7].

Human-to-human transmission

While less common, human-to-human transmission of *Mycobacteria bovis* can occur, particularly in crowded living conditions or healthcare settings. Respiratory transmission is the primary mode in these instances [8].

Impact on agriculture

Bovine tuberculosis caused by *Mycobacteria bovis* has substantial economic consequences for the agriculture industry. Infected cattle can experience reduced productivity, weight loss, and reproductive issues, leading to significant financial losses for farmers [9].

Trade restrictions

Countries with a high prevalence of bovine tuberculosis face trade restrictions due to concerns about the potential export of infected animals or animal products. This has implications for

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Received: 28-Nov-2023, Manuscript No. MDTL-23-28815; **Editor assigned:** 30-Nov-2023, Pre QC No. MDTL-23-28815 (PQ); **Reviewed:** 13-Dec-2023, QC No. MDTL-23-28815; **Revised:** 20-Dec-2023, Manuscript No. MDTL-23-28815 (R); **Published:** 26-Dec-2023, DOI: 10.35248/2161-1068.23.13.418

Citation: Kumari R (2023) Unveiling *Mycobacteria bovis*: A Zoonotic Intruder with Global Implications. Mycobact Dis. 13:418.

both domestic and international trade in livestock and livestock-derived products.

Controlling programs

Control measures often involve culling infected animals to prevent the spread of the disease within herds. However, the ethical considerations and the impact on farmers' livelihoods necessitate a delicate balance between disease control and sustainable agricultural practices.

Public health implications

Mycobacteria bovis infections in humans present unique challenges for public health systems, with implications for diagnosis, treatment, and prevention [10].

Diagnostic challenges

Diagnosing *Mycobacteria bovis* infections in humans poses challenges due to the similarity in clinical presentation with infections caused by *M. tuberculosis*. Specialized tests are required to differentiate between the two pathogens, impacting the accuracy and speed of diagnosis.

Antibiotic resistance

While treatment for *Mycobacteria bovis* infections typically involves standard anti-tuberculosis medications, the emergence of drug-resistant strains raises concerns about the effectiveness of current therapeutic regimens.

Prevention through pasteurization

The pasteurization of milk and dairy products is a crucial public health measure to prevent *Mycobacteria bovis* transmission from animals to humans. Educating communities about the importance of consuming only pasteurized products is paramount in regions where bovine tuberculosis is prevalent.

Conservation and wildlife concerns

The impact of *Mycobacteria bovis* extends beyond agricultural and human health domains, affecting wildlife populations and conservation efforts.

Wildlife health

In regions where bovine tuberculosis is endemic, wildlife species, such as deer and badgers, can suffer from the disease. This has implications for ecosystem health and biodiversity, particularly in areas where infected wildlife coexists with domesticated animals.

Interactions with livestock

The interplay between wildlife and domesticated animals creates challenges for disease control. Efforts to prevent transmission between species often involve the implementation of wildlife management strategies, such as culling or vaccination programs.

CONCLUSION

Mycobacteria bovis, with its ability to traverse species barriers, presents a complex challenge at the intersection of human health, agriculture, and wildlife conservation. Addressing the impact of bovine tuberculosis requires collaborative efforts between veterinary, public health, and environmental sectors. Sustainable solutions involve a holistic approach that considers the health of animals, humans, and ecosystems alike. As global efforts to combat zoonotic diseases intensify, understanding the intricacies of *Mycobacteria bovis* is crucial for developing effective strategies to mitigate its impact on diverse facets of our interconnected world.

REFERENCES

1. Pérez-Lago L, Navarro Y, García-de-Viedma D. Current knowledge and pending challenges in zoonosis caused by *Mycobacterium bovis*: A review. Res Vet Sci. 2014;97:S94-S100.
2. Cleaveland S, Laurenson MK, Taylor LH. Diseases of humans and their domestic mammals: Pathogen characteristics, host range and the risk of emergence. Philos Trans R Soc Lond B Biol Sci. 2001;356(1411):991-999.
3. Vlok M, Oxenham MF, Domett K, Tran Thi M, Nguyen Thi Mai H, Matsumura H, et al. Two probable cases of infection with *Treponema pallidum* during the Neolithic period in Northern Vietnam (2000-1500B.C.). Bioarchaeology International. 2020;4:15-36.
4. Crole MR, Soley JT, Clift SJ. Incidental Mycobacterium-induced granulomatous inflammation of the follicular pharyngeal tonsils in a South African farmed ostrich (*Struthio camelus*). Journal South African Veterinary Association. 2013;84(1):1-9.
5. Akther M, Akter SH, Sarker S, Aleri JW, Annandale H, Abraham S, et al. Global burden of lumpy skin disease, outbreaks, and future challenges. Viruses. 2023;15(9):1861.
6. Brüssow H. Europe, the bull and the Minotaur: The biological legacy of a Neolithic love story. Environ Microbiol. 2009;11(11):2778-2788.
7. O'Mahony DT. Badger (*Meles meles*) contact metrics in a medium-density population. Mammalian Biology. 2015;80(6): 484-90.
8. Szulc-Dąbrowska L, Bossowska-Nowicka M, Struzik J, Toka FN. Cathepsins in bacteria-macrophage interaction: Defenders or victims of circumstance?. Front Cell Infect Microbiol. 2020;10:601072.
9. Hudson D. Investigating the Epidemiology of Bovine Tuberculosis in the European Badger. University of Exeter (United Kingdom); 2021.
10. Duffy DC, Capece P. Biology and impacts of Pacific Island invasive species. 7. The domestic cat (*Felis catus*) 1. Pacific Science. 2012;66(2):173-212.