Mycobacterium tuberculosis – cord formation and antibiotic resistance

For nearly 80 years, the snake-like cords formed by Mycobacterium tuberculosis (MTB), the notorious pathogen behind tuberculosis, have intrigued scientists. Recent research has described the biophysical mechanisms behind the formation of these cords, revealing their significant role in infection. A recent study has shown how generations of dividing MTB work together to form cords, which offer an advantage in resisting antibiotic treatment. Understanding cord formation can offer insights into TB pathogenesis, leading to more effective therapies and a deeper grasp of this respiratory infection.

This research has shown the role of cord formation in infection and underscores the importance of the highly organized architecture in pathogenesis. The researchers harnessed a unique combination of cutting-edge technologies to decipher MTB cord formation. The innovative lung-on-chip model allowed direct observation of the initial interaction between MTB and host cells in the lungs' air-liquid interface, emphasizing the prominence of cord formation during early infection. Further insights were gained through a mouse model, mirroring human tuberculosis pathology, and confocal imaging. It confirmed the early occurrence of cording *in vivo* during infection.

The study shed light on how these cords interact with and compress cell nuclei, influence the immune response, and alter connections between host cells and epithelial cells. Furthermore, it explored the impact of cord formation on the alveoli in the lungs, revealing their structural resilience and their role in bolstering tolerance to antibiotic therapy.

Antibiotic therapy remains the cornerstone of tuberculosis treatment. However, it is encumbered by complex, protracted regimens with the looming specter of drug resistance. The study underscores the necessity for host-directed therapies or interventions that target specific virulence mechanisms. By doing so, these therapies could shorten and enhance antibiotic treatment, offering a ray of hope in the battle against tuberculosis.

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