Targeting Biofilm-Based Bacterial Infections in Silicosis

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Objective:
To assess the efficacy of the anti-biofilm agents in treating pneumoconiosis bacterial infection.

Background:
There are no prior studies exploring if biofilms are involved in pneumoconiosis infection, resulting in recurrence of chronic infections and poor antibiotic response in patients. It is crucial to develop novel anti-biofilm agents to improve efficacy of antibiotics and eventually alleviate biofilm-mediated infections.

Methodology:
1. Establish the model of biofilm and silica treated macrophage infection involving silica polymorphs.
2. Evaluate the involvement of diguanylate cyclase (DGC) in biofilm formation during silicosis infection.
3. Determine biofilm matrix component in response to DGC during silicosis infection.

Impact:
The development of anti-biofilm agents in combination with antibiotics may help to alleviate biofilm mediated pneumoconiosis infections and improve the survival of patients.

Result and Conclusion:
The research institution successfully established the model of biofilm and silica treated macrophage infection and identified key biofilm regulator WspR, in which its main function was to promote c-di-GMP-dependent biofilm formation.
The finding showed that Psl exopolysaccharide was essential for biofilm integrity in the silicosis model, highlighting its potential as an anti-biofilm therapeutic strategy. Besides, the finding also suggested that anti-biofilm agents, in combination with antibiotics, could improve treatment outcomes.