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Diagnosis and understanding of chronic biofilm infections

Trine Rolighed Thomsen[1,2]
[1]Aalborg University, Denmark
[2]Danish Technological Institute, Denmark

Recent evidence suggests that the microbial community, its spatial distribution and activity play an important role in the prolongation of treatment and healing of chronic infections. Standard bacterial cultures often underestimate the microbial diversity present in chronic infections. This lack of growth is often due to a combination of inadequate growth conditions, prior usage of antibiotics and presence of slow-growing, fastidious, anaerobic or unculturable bacteria living in biofilms. Thus, diagnosis of chronic infections is challenged by lack of appropriate sampling strategies and by limitations in microbiological testing methods. The purpose of this study was to improve sampling and diagnosis of chronic infections, especially considering the biofilm issue. Systematic and optimized sampling of various specimen types was performed. Extended culture, optimized DNA extraction, quantitative PCR, cloning, next generation sequencing and PNA FISH were applied on different types of specimens for optimized diagnosis. For further investigation of the microbial pathogenesis, in situ transcriptomics and metabolomics were applied. Molecular techniques detected a larger diversity of microorganisms than culture methods in several patients and a heterogeneous distribution of bacteria in various specimens from the same patient was evident. Data from a 2-year prospective study on prosthetic joint infections including 164 patient cases will be presented. Transcriptomic and metabolomic analyses indicated the important virulence genes and nutrient acquisition mechanisms of *Staphylococcus aureus in situ.* Our studies show that diagnosis of chronic biofilm related infections required multiple specimen types, standardized sampling, extended culture and molecular analysis.

Biography

Trine Rolighed Thomsen has completed her PhD from Aalborg University and was appointed as an Associate Professor in Medical Microbiology in January 2012. She is affiliated to Aalborg University and the Danish Technological Institute and heads a research group. Her main interests and research grants are on diagnosis, prevention and treatment of human infections with a special focus on biofilm. She has published more than 40 peer-reviewed original papers and is an active Member of several Danish and international boards and scientific societies.

trt@bio.aau.dk

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