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20th European Congress of Clinical Microbiology and Infectious Diseases
Vienna, Austria, 10 - 13 April 2010

Type Search Term
Author Name Go

Author Index
Abstract Index
Search
Journal Homepage
ECSMID Homepage
List of Issues
ECCMID 21
ECCMID 20
ECCMID 19
ECCMID 18
ECCMID 17
ECCMID 16
ECCMID 15
ECCMID 14
ECCMID 13
ECCMID 12
ECCMID 11
ECCMID 10
Privacy Policy

Back

Response of Staphylococcus epidermidis biofilms cells to the effect of farnesol

Abstract number: P1894

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Objective:*Staphylococcus epidermidis* is a leading cause of medical-device-related infections, especially in immunocompromised patients. The treatment of these infections is further complicated by the emergence of multiresistant strains. The ability of *S. epidermidis* to form biofilms on biotic and abiotic surfaces is believed to contribute significantly to the pathogenesis of these infections. Biofilms are notoriously difficult to eradicate and are often resistant to systemic antibiotic therapy. Recently, farnesol has been described as having antimicrobial properties, and therefore a possible action on the prevention of *S. epidermidis* related infections. In previous studies it was shown that 300 microM farnesol was effective against *S. epidermidis* planktonic cells but having only a slight effect on biofilm cells. So, the goal of this study was to assess the antimicrobial activity of higher farnesol concentrations (1 and 100 mM) against biofilm cells of *S. epidermidis*.

Methods: Two *S. epidermidis* strains biofilm-producing (9142 and 1457) were used in this study. Farnesol (0, 1 mM, 100 mM) was added to 24 h biofilm cells. Biofilm formation was assessed through crystal violet (CV) staining that measure total biomass of biofilm and cellular viability through XTT and colony-forming units (CFU/ml).

Results: The results didn't show a significant effect of both farnesol concentrations on biofilm biomass and activity. In fact, biofilm cell reduction was less than 2 Log, similarly to most antibiotics (e.g. tetracycline and vancomycin).

Conclusion: Although the reduction promoted by farnesol was less than 3 Log as requested for an antibiotic agent, its efficacy is similar to vancomycin. On account of that we are now testing the combined effect of farnesol with agents that disrupt the biofilm matrix.

Session Details

Date:	10/04/2010
Time:	00:00-00:00
Session name:	Abstracts 20th European Congress of Clinical Microbiology and Infectious Diseases
Subject:	
Location:	Vienna, Austria, 10 - 13 April 2010
Presentation type:	

Back to top

Author Index | Abstract Index | Search | Journal Homepage | ECSMID Homepage | List of Issues | ECCMID 21 | ECCMID 20 | ECCMID 19 | ECCMID 18 | ECCMID 17 | ECCMID 16 | ECCMID 15 | ECCMID 14 | ECCMID 13 - 10 | Privacy Policy