This study was done to elucidate antibiotic penetration through biofilms formed by Staphylococcus aureus, Staphylococcus epidermidis, Escherichia coli and Klebsiella pneumoniae, using an agar disk-diffusion assay" Singh et al (2016).

Abstract:

Bacterial biofilms are implicated in a wide range of implant-based and chronic infections. These infections are often associated with adverse therapeutic outcomes, owing to the decreased antibiotic susceptibility of biofilms compared with their planktonic counterparts. This altered biofilm susceptibility has been attributed to multiple factors, including a reduced antibiotic penetration.

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Although several studies have addressed the role of penetration barrier in biofilm-associated drug resistance, it remains inconclusive. This study was done to elucidate antibiotic penetration through biofilms formed by Staphylococcus aureus, Staphylococcus epidermidis, Escherichia coli and Klebsiella pneumoniae, using an agar disk-diffusion assay. Penetration capacity of six antimicrobial drugs from different classes (β-lactams, aminoglycosides, tetracyclines, phenicols, fluoroquinolones and glycopeptides) through biofilms formed by

standard strains and clinical isolates from catheter-related bloodstream infections (CRBSI) was elucidated by measuring their growth-inhibition zones in lawn cultures on Mueller-Hinton agar, following diffusion of an antibiotic from an overlying disk through their biofilm to the agar medium. Penetration of only select antimicrobials (vancomycin and chloramphenicol) was hindered through biofilms. There was considerable variation in biofilm-permeating capacity depending upon the genus, strain/CRBSI isolate and antibiotic tested. Furthermore, antibiotics failed to kill the biofilm cells independent of penetration, indicating that other factors contributed substantially to biofilm resistance.

Reference:

Singh, R., Sahore, S., Kaur, P., Rani, A. and Ray, P. (2016) Penetration barrier contributes to bacterial biofilm-associated resistance against only select antibiotics, and exhibits genus-, strain- and antibiotic-specific differences. Pathogens and Disease. July 7th. .

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