BIOFILM PRODUCTION USING DISTINCT MEDIA AND ANTIMICROBIAL SUSCEPTIBILITY PROFILE BETWEEN PSEUDOMONAS AERUGINOSA BIOFILM-PRODUCING FROM CYSTIC FIBROSIS AND NON-CYSTIC FIBROSIS PATIENTS

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Introduction: *Pseudomonas aeruginosa* is one of the leading cause of nosocomial infections and it has a crucial role as pathogen in cystic fibrosis (CF) being responsible for high level of mortality and morbidity.[1, 2] The CF lung is characterized through high mucus production, which blocks the clearance mechanisms. *P. aeruginosa* occurs in CF lung as microcolonies and presents a biofilm mode of growth. Biofilm production is an important mechanism for bacterial survival and its occurrence together with antimicrobial resistance represents a challenge for the clinical therapeutic.[1]

Objectives: Here, we evaluated the ability for biofilm production among *P. aeruginosa* isolates from patients with (PCF+) or without (PCF-) cystic fibrosis (CF) diagnosis in front of two distinct media (Tryptic Soy Broth used as reference medium and cystic fibrosis sputum used as alternative medium) and we determined the antimicrobial susceptibility profile of these isolates for eight antimicrobial agents.

Material and Methods: A total of 124 *P. aeruginosa* isolates, 52 from PCF+ and 72 from PCF- patients, recovered form sputum and endotracheal aspirates were evaluated. Quantitative determination of biofilm was made using a microtitre plate assay in accordance with O'Toole et al (1999) with few modifications.[3] A reference biofilm-producing strain of *Pseudomonas aeruginosa* PAO1 and a non-producing strain of *Pseudomonas aeruginosa* ATCC 27853 were used as controls. Susceptibility profile to amikacin (AN), aztreonam (AZM), cefepime (FEP), ceftazidime (TAZ), ciprofloxacin (CIP), gentamicin (GM), imipenem (IMI), meropenem (MEM) and piperacillin-tazobactam (TZP) was assessed by the VITEK® automated system (bioMérieux, Marcy l'Etoile, France) using GNS-655 cards (bioMérieux, Marcy l'Etoile, France) in accordance with manufacturer's instructions and breakpoints established by Clinical and Laboratory Standards Institute documents.[4]

Results and Discussion: The ability for biofilm production was higher when used Tryptic Soy Broth (reference medium) than cystic fibrosis sputum (alternative medium) (p=0.0198). We are aware to the fact that CF sputum medium used here is not entirely representative of CF lung environment because others active compounds and growth conditions, including anaerobic atmosphere, may be also present. However, in this study, *P. aeruginosa* isolates from CF have demonstrated similar performance for biofilm production, independently of the medium used. Besides, among the biofilm-producing isolates, those that recovered from CF were more resistant to the carbapenems (meropenem and imipenem) agents than those non-CF isolates.

Conclusion: Biofilm production and antimicrobial resistance are among the main bacterial defense apparatus during an infection process and both together representing actually a great challenge to the therapeutic practice. Here, our results have demonstrated that *P. aeruginosa* can display similar performances to produce biofilm in distinct media and among those biofilm-producing a characteristic profile of resistance could be related.

References:

1) J.W. Costerton *et al.*, Science **284**: 1318–22 (1999).
2) M.R. Kosorok *et al.*, *Pediatr Pulmonol* **32**: 277–87 (2001).
3) G.A. O'Toole *et al.*, *Methods Enzymol* **310**: 91–109 (1999).
4) Clinical and Laboratory Standards Institute - CLSI. Performance standards for antimicrobial susceptibility testing. 19th informational supplement M100-S19. Wayne, PA: CLSI/(NCCLS) (2009).

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