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Abstract (oral session)

Impact of hypoxic and anaerobic environments on multidrug-resistance of emerging species found in cystic fibrosis airways

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Objectives: It is well-known the establishment of steep oxygen gradients in cystic fibrosis (CF) airways mucus, giving rise to hypoxic or anaerobic zones in the deeper mucus layers, where traditional and atypical bacteria may accommodate and proliferate to biofilms. This study aimed to compare the influence of low-oxygen atmospheres on biofilm growth and susceptibility profiles of the CF-atypical species *Inquilinus limosus* and *Dolosigranulum pigrum* with the traditional *Pseudomonas aeruginosa*. **Methods:** Single biofilms encompassing each species were formed in vitro under aerobic, microaerophilic and anaerobic environments, and further evaluated in terms of biomass and respiratory activity. The antibiotic resistance propensity of planktonic and biofilm-cells was also analyzed by measuring the MICs and MBECs, respectively. **Results:** Both traditional and unusual species were proficient to develop biofilms under all oxygen environments, with the facultative anaerobe *D. pigrum* demonstrating the greatest facility to accumulate high amounts of biomass and respiratory activities. Regarding the resistance propensity, planktonic populations of *P. aeruginosa* and *D. pigrum* showed antibiotic tolerance under non oxygen-restricted environments, reducing their resistance under microaerophilic and anaerobic conditions. Independently of the oxygen availability, it was noticed a markedly decline of the antibiotic action against the pre-established biofilms, requiring higher doses to eliminate biofilm-encased cells. Although the resistance of *P. aeruginosa* biofilms has displayed the same tendency as the planktonic populations, the biofilm consortia involving *I. limosus* and *D. pigrum* became exceptionally more resistant to antibiotics when compared to those bacteria seeded from the biofilms, persevering this multidrug resistance under hypoxic and anaerobic atmospheres. **Conclusion:** This study highlights a potential prospect on the impact of non-conventional organisms on CF lung infections, showing their great capacity to easily adapt to biofilm mode of life under atmospheres with restricted oxygen, as it is believed to occur in CF airways, which may endanger the efficacy of current antibiotic regimens in CF. The financial support from IBB-CEB, FCT and FEDER, through Program COMPETE (project PTDC/SAUSAP/113196/2009/FCOMP-01-0124-FEDER-01601), and grant SFRH/BD/47613/2008 is acknowledged.