P-044 - DECIPHERING THE ROLE OF STAPHYLOCOCCUS AUREUS IN PSEUDOMONAS AERUGINOSA ADAPTATION TO CYSTIC FIBROSIS LUNGS: BYSTANDER OR PLAYMATE?

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Background

Pseudomonas aeruginosa is the major responsible for the high mortality rate of cystic fibrosis (CF) patients due to the development of chronic infections. To long persist, *P. aeruginosa* uses sophisticated mechanisms to achieve full-adaptation, mainly triggered by the harsh environmental conditions of CF lungs. The influence of *Staphylococcus aureus*, a primary colonizer of CF lungs, in increasing *P. aeruginosa* pathogenicity has also been reported. The main objective of this study was to decipher the impact of *S. aureus* on *P. aeruginosa* pathogenicity using *in vitro* conditions mimicking CF lungs.

Method

Antibiotic sensitive and resistant strains of *S. aureus* and *P. aeruginosa* were grown in artificial CF sputum medium and cultured at different timings to simulate a typical colonization of patient lungs. *S. aureus* was first cultured for 3 days, and then *P. aeruginosa* was co-cultured for another 4 days. In the last 4 days the co-cultures were exposed to aggressive ciprofloxacin treatment. Samples were collected every 24 h to analyze bacterial growth kinetics and phenotypic diversity.

Results & Conclusions

Results showed that growth kinetics of *P. aeruginosa* and its phenotypic diversity was not affected by the presence of *S. aureus*. Interestingly, the presence of *S. aureus* seemed to inhibit the emergence of *P. aeruginosa* small colony variants (SCV) that have emerged when the resistant strain was cultured alone. Likewise, *S. aureus* seemed not provide any resistant advantage to *P. aeruginosa* when facing ciprofloxacin treatments. These results do not substantiate the role of *S. aureus* on *P. aeruginosa* persistence pointed out by some studies that reported *S. aureus* extracellular factors increased *P. aeruginosa* growth activity and resistance towards antibiotics by inducing the emergence of SCV. Discrepancies may be explained by the different *in vitro* conditions used. The majority of the studies used standard laboratory medium that does not fully mimic the chemical and nutritional complex environment found in CF lungs. Furthermore, this study mimics a typical lung colonization timeline. In effect, *S. aureus* was cultured prior to *P. aeruginosa*, as happen *in vivo*, to allow its adaptation to CF environment. *P. aeruginosa* co-cultured with CF-adapted *S. aureus* may produce these different, but more reliable, outcomes. In conclusion, the development of *P. aeruginosa* chronic infections seems not to be driven by *S. aureus*.

References & Acknowledgments

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