3.03 Anti-Pseudomonas aeruginosa biofilm activity of peptidyl-arginine deiminases

[1]Rory Baird, [1]Luke Forde, [1]Debananda Gogoi, [1]Emer Reeves
Royal College of Surgeons in Ireland, Dublin, Ireland

Background: *Pseudomonas aeruginosa* (PA) causes chronic lung infections in 80% of cystic fibrosis adults. PA biofilm encases bacteria in an intrinsically antibiotic resistant matrix, and with increasing incidence of antibiotic resistance, novel anti-biofilm anti-microbials are required. We previously demonstrated that peptidyl-arginine deiminases (PADs) participate in neutrophil intraphagosomal killing of PA. This study explores the anti-biofilm properties of exogenous PADs. **Methods:** Bactericidal, citrullination, and biofilm inhibition properties of active PAD2, PAD4 and control PAD6 (incapable of catalytic citrullination) against PA (PAO1) were assessed by CFU enumeration, western blot, crystal violet biofilm staining and RT-qPCR, respectively. **Results:** PAD2, PAD4, and PAD6 (2.5nM) reduced PA biofilm formation to 42.0±8.0%, 53.7±13.3%, and 55.9±14.0%, respectively (n=5, $p<0.0001$). PAD influence on quorum sensing genes (*lasR*, *lasl*, *rhlR*, *rhll*, and *mvfR*) was evaluated. In non-citrullination promoting conditions, PAD2, PAD4 (20nM) and PAD6 (100nM) reduced PA survival to 50.3±6.7% (n=3, $p=0.0006$), 43.4±2.0% ($p=0.0005$), and 34.5±5.9% ($p<0.0001$), respectively. **Conclusions:** PADs possess anti-biofilm/bactericidal properties against PA, independent of citrullination. This supports further research into the therapeutic use of PADs for PA infection in cystic fibrosis. **Keywords:** Pseudomonas aeruginosa*,* Peptidyl-arginine deiminases. **Disclosures: Conflict of Interest:** The authors declare they have no conflict of interest. **Funding:** IRC (GOIPG/2023/3100).