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Basic Science: Biofilm

Detection and characterisation of a quorum-sensing system in an ESBL-producing *Enterobacter asburiae* (*E. cloacae* complex) clinical isolate

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- Objectives: *Enterobacter cloacae* complex is a group of pathogens responsible for various infections associated with severe mortality, especially in multidrug-resistant (MDR) strains including extended-spectrum- β -lactamase (ESBL)-producing strains. Because of the importance of elucidating phenotypes regulated by quorum sensing in bacterial pathogens, the goal of this study was to evaluate the growth, quorum sensing (Q-S) production, and biofilm formation by an AHLs and TEM-12 beta-lactamase producing strain of *E. cloacae*.
- Methods: A nosocomial isolate of the *E. cloacae* complex was identified by conventional methods and MALDI-TOF as *E. asburiae*, and characterized for the presence of different types of QS signalling molecules using two bioreporter strains (CV026 and VIR24). Estimation of biofilm formation was performed in 96 and 24 well plates.
- Results: This strain did not form biofilms *in vitro*, and the results from our assays using both Q-S bioreporters suggested that the *E. cloacae* strain produces *N*-hexanoyl/heptanoyl-DL-homoserine lactones, but no other AHLs. Surprisingly, spent medium from cultures of this strain containing Q-S molecules can promote biofilm formation (>50-70% increase) in other *E. cloacae* clinical isolates *in vitro*.
- Conclusions: To our knowledge, this is the first study to demonstrate Q-S production in a clinical isolate of the *E. cloacae* complex. Moreover, given that biofilm formation is reported to enhance bacterial survival, colonisation and protection from antibiotics and host immune responses, the ability of *E. cloacae* strains to form biofilms in presence of heterologous AHLs may represent an important virulence mechanism in relation to its pathobiology.