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Imipenem treatment induces expression of important pili genes and phenotypes in a resistant *Acinetobacter baumannii* isolate

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Background: *Acinetobacter baumannii* has emerged as a notorious multidrug-resistant pathogen; it is now one of the most important organisms implicated in hospital nosocomial infections with very limited therapeutic options. Given the dwindling pipeline of new antimicrobials against these pathogens, novel therapeutic strategies are desperately needed. Understanding the factors that play a role in bacterial survival upon exposure to an environmental stress such as suboptimal chemotherapy may contribute to the identification of novel therapeutic targets. Pili are essential for *A. baumannii* adherence to biofilm formation on abiotic surfaces as well as virulence. In this study, we investigated the effect of a sub inhibitory concentration of imipenem on the biological activities of an imipenem-resistant (Impr) *A. baumannii* strain.

Methods & Results: Using phenotypic and genotypic assays, we found that biofilm formation was significantly induced in an imipenem-resistant (Impr) strain treated with a sub inhibitory concentration of the antibiotic compared to that in an untreated control and an imipenem-susceptible (Imps) isolate. Microarray and quantitative PCR analyses showed that several genes responsible for the synthesis of type IV pili were significantly upregulated in the Impr but not in the Imps isolate upon treatment with a sub inhibitory concentration of imipenem. Notably, this finding is corroborated by an increase in the twitching motility of the Impr strain using twitching motility assay. Our results suggest that the ability to overproduce colonization factors in response to imipenem treatment confers biological advantage to *A. baumannii* and may contribute to clinical success.

Conclusion: The pilus biosynthetic machinery could be an amenable target for the development of novel therapeutic strategies to control *A. baumannii.*

Speaker Biography

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