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THE ROLE OF CAPSULAR POLYSACCHARIDES AND OUTER MEMBRANE VESICLES IN THE PATHOGENESIS OF OPPORTUNISTIC PATHOGEN ACINETOBACTER BAUMANNII

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Acinetobacter baumannii is considered one of the most crucial opportunistic pathogens, causing various medical-related infections worldwide. It commonly presents resistance to multiple antimicrobial agents, and hence, it is considered as a multidrug-resistant [1]. This opportunistic pathogen possesses multiple virulence factors, which contribute to the bacterial survival during the stress. *A. baumannii* ability to form biofilms on abiotic surfaces, such as catheters and endotracheal tubes, poses a great threat to the immunocompromised patients, therefore a better insight into *A. baumannii* pathogenesis could enhance the treatment of such individuals. Bacteria in biofilms can be 10–1,000 times less susceptible to various antimicrobial agents compared to planktonic bacteria [2]. The goal of this research is to investigate the impact of capsular polysaccharides and outer membrane vesicles produced by clinical *A. baumannii* isolates on biofilm formation and resistance under stress conditions, such as exposure to antimicrobial agents. The virulence properties of *A. baumannii* isolates and their Δ*galU* and Δ*ompA* mutants were assessed in this research. The deletion of *galU* gene provides capsule-less phenotype, whereas *ompA* knockout leads to a hyperproduction of outer membrane vesicles. Biofilm formation was evaluated by crystal violet staining, which revealed significant differences between mutant and wild-type isolates. The ability of various antimicrobial compounds to inhibit *A. baumannii* biofilms was tested. The results showed that the resistance of mutant isolates' biofilms was compromised in most cases compared to their wild-type isolates. Quantitative analysis demonstrated, that capsule production can alter the survival of *A. baumannii* in biofilms after exposure to antimicrobial agents.

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[2] Davies, D. (2003). Understanding biofilm resistance to antibacterial agents. Nature Reviews Drug Discovery 2, 114-122.