

Talk

Role of the outer membrane protein A (OmpA) in the interaction of *Acinetobacter baumannii* with host cells



Belén Cabello Vega (1), Irene Molina Panadero (1), Celia Atalaya Rey (1), Younes Smani (1,2)

1) Centro Andaluz de Biología del Desarrollo, Universidad Pablo de Olavide/Consejo Superior de Investigaciones Científicas/Junta de Andalucía, Sevilla, España. (2) Departamento de Biología Molecular e Ingeniería Bioquímica, Universidad Pablo de Olavide, Sevilla, España.

Tutor académico: Younes Smani

Keywords: Antimicrobial resistance; outer membrane protein A; therapeutic target

ABSTRACT

Background: In light of increasing antibiotic resistance the World Health Organization published a list of pathogens where *Acinetobacter baumannii* is considered as the most threatening Gram-negative bacteria (GNB). It is a GNB which is associated with hospital-acquired infections and its prevalence of multidrug-resistant strains is increasing. In addition, the identification of outer membrane protein A (OmpA) as a key bacterial virulence factor has been a major breakthrough (1). It is the most abundant and conserved porin associated with *A. baumannii* virulence and survival (1,2). In this regard, the aim of this study is understanding OmpA mechanism of action in host-pathogen interaction that could be relevant as a therapeutic target in the future.

Methods: To perform adhesion and invasion assays, HeLa cell line were infected with *A. baumannii* 17978 wild type strain and *A. baumannii* 17978 deficient in OmpA strain during 2 hours and incubated in CO₂ at 37°C. In invasion assay, gentamicin was added to kill extracellular bacteria. To observe autophagosome-lysosome machinery, labelling of lysosomes through immunoassay was made when HeLa cell line is infected with *A. baumannii* 17978 wild type and *A. baumannii* 17978 deficient in OmpA during 2 hours. To demonstrate whether OmpA is involved in switching acid pH into neutral one as mechanism of resistance to lysosome, a growth curve with *A. baumannii* 17978 wild type and *A. baumannii* 17978 deficient in OmpA at pH 4.8 and 7.1 was performed.

Results: A decrease in adhesion and invasive capacity of *A. baumannii* 17978 deficient in OmpA in HeLa cells was observed. Moreover, it was observed that a few number of lysosomes were activated when HeLa cells are infected with *A. baumannii* 17978 deficient in OmpA when compared with *A. baumannii* 17978 wild type strain. However, both *A. baumannii* 17978 and *A. baumannii* 17978 deficient in OmpA were able to switch acid pH into neutral one. Therefore, OmpA had no significant role in acid pH nos obtenidos. No tienen porqué aparecer todos los apartados (se puede prescindir de alguno de ellos, o todos). No más de 2500 caracteres el total del resumen. Incluir aparte (en el apartado de debajo) 1-3 referencias bibliográficas.

Conclusions: The results of the study show that OmpA is involved in bacterial adhesion and invasion with host cells. Moreover, it is the main factor involved in cell autophagosome-lysosome activation, which is one of the mechanism involved in the intracellular tr.

REFERENCES

1. Sánchez-Encinales V, Álvarez-Marín R, Pachón-Ibáñez ME, Fernández-Cuenca F, Pascual A, Garnacho-Montero J, Martínez-Martínez L, Vila J, Tomás M, Cisneros JM, Bou G, Rodríguez-Baño J, Pachón J, Smani Y. Overproduction of outer membrane protein A by *Acinetobacter baumannii* as a risk factor for nosocomial pneumonia, bacteremia, and mortality rate Increase. *Journal of Infectious Diseases* 2017; 215(6): 966–974, <https://doi.org/10.1093/infdis/jix010>
2. Smani Y, Fàbrega A, Roca I, Sánchez-Encinales V, Vila J, Pachón J. Role of OmpA in the multidrug resistance phenotype of *Acinetobacter baumannii*. *Antimicrob Agents Chemother.* 2014; 58(3): 1806-1808. doi: 10.1128/AAC.02101-13. Ep ..