The Newly Discovered EclA Lectin: An Emerging player in Enterobacter cloacae Infections

Mario FARES [1], Stefanie WAGNER [1,3], Michael ZEMLIN [2,4], Markus BISCHOFF [2,4], Alexander TITZ [1-3]

[1] Helmholtz Institute for Pharmaceutical Research Saarland, GERMANY [2] Saarland University, GERMANY [3] German Center of Infection Research, [4] Saarland University Hospital, GERMANY

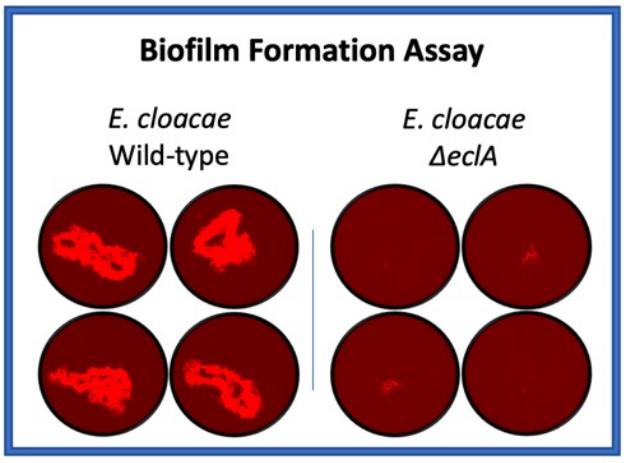
mariofares@outlook.com

Lectins are carbohydrate-binding proteins that exist in many pathogenic bacteria and are important for infection (Meiers *et al.*, 2019). These virulence factors can mediate cell attachment and biofilm formation, thereby decreasing the capacity of the host to clear the infection and the treatment options of the clinician. The inhibition of these lectins can disrupt the infection process and ultimately reduce pathogenesis without the risk of developing antimicrobial resistance (Leusmann *et al.*, 2023).

Recently, the fucophilic lectin EclA was discovered from the ESKAPE pathogen *Enterobacter cloacae* (Beshr *et al.*, unpublished). Interestingly, EclA is an orthologue of the galactophilic lectin LecA of *Pseudomonas aeruginosa* involved in biofilm formation (Gilboa-Garber *et al.*, 1982). Glycan specificity arrays demonstrated the affinity of EclA to the Lewis^a antigen present in most newborns and to the blood group antigen O (Beshr *et al.*, unpublished).

We hypothesize that *E. cloacae* utilizes EclA for cell attachment, biofilm formation, and pathogenesis. In this work, an *E. cloacae eclA* knockout mutant was generated by allelic exchange. The expression of EclA was studied by Western blot analyses and showed a prominent and constant expression, supporting its putative importance for the bacterium.

In vitro biofilm formation activity observed under fluorescence microscopy was greatly decreased in the *eclA* deletion mutant, validating the role EclA plays in biofilm formation. EclA showed hemagglutination potential in human red blood cells, further validating its role as a virulence factor. Lewis^a and blood group O-antigen adhesion assays are still to be performed to provide insights into whether EclA also mediates cell attachment, making it a strong therapeutic target for the treatment of *Enterobacter cloacae* infections.



The knockout of eclA in E. cloacae significantly reduces biofilm formation

Bibliographic references:

1) G. Beshr et al., (unpublished)
2) N. Gilboa-Garber (1982). Methods in Enzymology (83), 378-385.
3) S. Leusmann et al., (2023). Chemical Society Reviews, in press.
4) Meiers, J (2019). Current Opinion in Chemical Biology (53), 51-67.