27th ECCMID Vienna, Austria 22 – 25 April 2017
The congress of ESCMID

Session: EP071 Staphylococcal virulence

Category: 9a. Microbial pathogenesis & virulence

23 April 2017, 12:48 - 12:53
EP0368

Effects of Staphylococcus aureus foldase PrsA on protein A secretion

Chiao-Wen Lu[1], Mei-Hui Lin*[1]

[1]*Chang-Gung University; Department of Medical Biotechnology and Laboratory Science*

Background: *Staphylococcus aureus* secrets many surface proteins and virulence factors that cause a variety of diseases. PrsA is a membrane-anchored lipoprotein, which is found in many Gram-positive bacteria including *S. aureus.* This protein functions as a foldase to assist post-translocational folding and enhance the stability of exported proteins in the microenvironment of the membrane–cell wall interface. However, the role of PrsA in *S. aureus* is unclear. In a mice infection model, we found that PrsA is involved in virulence and pathogenesis of *S. aureus* infections. Additionally, proteomic analysis revealed that PrsA is required for secretion of protein A, a major virulent factor for immune evasion. The objective of this study is to investigate how PrsA influences protein A secretion.

Material/methods: This study extracted cell wall-associated proteins and exoproteins of *S. aureus* HG001 and HG001Δ*prsA* to examine the expression of protein A during different growth phases. The synchronized degradation of protein A on cell surface was used for calculating the half-life of protein A to analyze the stability of protein A. Cross-linking assay was used to demonstrate PrsA forming dimers and oligomers. Interaction between PrsA and protein A were demonstrated by pull down assay. Analysis of PrsA deletion mutant was performed to identified the region of PrsA involved in the interaction with protein A.

Results: We found that in comparison with wild-type strain HG001, the *prsA*-deletion mutant HG001Δ*prsA* secreted much less protein A throughout all growth phases. PrsA did not influence protein A expression transcriptionally. Deletion in *prsA* decreases the stability of exported protein A. We also demonstrated that PrsA is a dimeric or oligomeric protein. Furthermore, pull down assay demonstrated that PrsA interacts with protein A *in vitro* and *in vivo*. The domain mapping assay showed that both N- and C-terminal domain of PrsA are required for binding of protein A.

Conclusions: This study reveals that secretion of protein A is PrsA-dependent. Protein A is also the first identified folding substrate of *S. aureus* PrsA. In conclusion, the information derived from this study provides new insights into the protein export pathways that are crucial to pathogenesis of *S. aureus*.