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Comparative secretomics reveals wound environment acidification-associated secretome and novel microbial virulence factors for group A *Streptococcus pyogenes* infection

Pao-Chi Liao
National Cheng Kung University, Taiwan

Streptococcus pyogenes is a human pathogen responsible for various diseases. To cause diseases, *S. pyogenes* must adapting adverse environments, such as acidic environment in the wound. The acid stimuli may trigger S. pyogenes invading from a mucosal to sub-epithelial tissue. However, how acid stimulates *S. pyogenes* to manipulate secretome for causing invasive infection is unclear. To investigate secretome change under acidic environment, a comparative secretomics by label-free LC-MS/MS was used to analyze the secretome from acidic and neutral conditions. The growth curves of *S. pyogenes* in acidic and neutral conditions are similar, which reveals that *S. pyogenes* can grow well during environmental acidification. The protein patterns on SDS-PAGE show prominent dissimilarity between the secretomes in acidic and neutral conditions. It demonstrates protein secretion is influenced by acid stress. The dynamic label-free LC-MS/MS profiling identified 172 proteins which are influenced by environmental acidification. Among these, 45 (28%) identified proteins are predicted secreted proteins. Interestingly, the predicted secreted proteins occupy about 90% of protein abundance of secretome in acidic condition at stationary phase. In contrast, only 30% shows in neutral condition. It exhibits that acid is crucial for secreted protein expression. There are 21 *pathogenesis related* secreted proteins effecting immune evasion, hemolysis, adhesion, tissue damage and nutrient acquisition. The 24 *non-pathogenesis related* secreted proteins could be potential virulence factors involved in invasive infection. Two known acid-induced proteins, SpeB and Pilin are also observed. Several novel candidates, such as streptococcal histidine triad protein, CAMP and biofilm regulatory protein A are of special interests. This investigation provided key information for elucidating the broad influences and underlying mechanisms related to acidified environment for group A streptococcal infection.

Biography

Pao-Chi Liao has completed his PhD in Analytical Chemistry from Michigan State University (MSU) in 1995 and Postdoctoral research in the Department of Biochemistry at MSU. He has joined as the Faculty at Department of Environmental and Occupational Health, National Cheng-Kung University, Taiwan in 1997, where he was promoted to full Professor in 2006 and named Distinguished Professor in 2011. His research interests and fields of specialty include analytical chemistry, mass spectrometry, proteomics, biomarker discovery, cancer biomarkers, lung cancer metastasis and environmental and occupational health.

liaopc@mail.ncku.edu.tw

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