

International Conference on
**Infectious Diseases, Diagnostic Microbiology &
Dermatologists Summit on Skin Infections**

October 03-05, 2016 Vancouver, Canada

In silico design of a hexavalent protein, a potential candidate vaccine against *Staphylococcus aureus* biofilm-related infection

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Staphylococcus aureus possessing a pool of virulence factors is responsible for the significant and increasing number of hospital and community-acquired infections worldwide. Developing a potential vaccine to prevent these life-threatening and drug-resistant infections would have many advantageous impacts on global healthiness. In this study, considering the biofilm mode of growth and polymicrobial nature of *S. aureus* and *Candida albicans* co-infections, a multivalent protein vaccine was designed. In the first phase, the prediction of putative antigenic targets of *S. aureus* and *C. albicans* was conducted based on data mining and bioinformatic characterization of their proteins. Various properties of the proteins were evaluated such as subcellular localization, hydrophilicity, repeat containing modules, beta turns, surface accessibility and number of antigenic determinants. Eventually, 6 proteins Als, ClfA, FtmB, SdrE, Spa and Bap were selected. The second phase included various immunoinformatics analyses on their sequences leading to design of a novel sub-unit hexavalent candidate vaccine. Several potential T cell and B cell epitopes are present in this synthetic construct and it is expected to strongly induce IFN-gamma production. In conclusion, the amino acid sequence introduced here is expected to enhance T cell-mediated and humoral responses against *S. aureus* biofilm-related infections to clear biofilm communities of *S. aureus* and intracellular colonies of pathogen as well as planktonic cells and thus reducing colonization and persistence.

Biography

Maryam Shahbazi has completed her PhD program in Bacteriology from Shiraz University in 2016 with the thesis entitled "Design and Synthesis of a Protein Candidate Vaccine against *S. aureus* Biofilm Related Infections". She is a Researcher and has published 6 articles in peer reviewed journals.

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