ABSTRACT

*Staphylococcus aureus* and *Staphylococcus epidermidis* are gram-positive commensal organisms that colonize host mucosal membranes and epithelial surfaces. They are opportunistic pathogens and are the leading cause of hospitalizations due to skin and soft tissue infections, sepsis, implant associated biofilm infections, endocarditis, pneumonia, septic arthritis and others. These common etiological agents, accountable for a plethora of nosocomial and community associated infections, are often refractory to antimicrobial therapy. With increasing incidence of antibiotic resistant infection, vaccine-based therapies are a promising alternative that can prevent the spread of these pathogens most effectively. However, no effective staphylococcal vaccine is available till date. In this study, we have screened major non-covalently surface associated proteins (NCSAPs) (eg., AM, LytM, LytN, LytR, GM, Aaa, SAV-1056 and SEM) of *S. aureus* and *S. epidermidis*; and identified major amidase (Atl-AM/AM) as a prime candidate for future vaccine design against these pathogens. AM is the major NCSAP that functions to separate staphylococcal cells after cell division, adhere to host extracellular matrix and involved in the formation of biofilms. AM is present on the surface of diverse *S. aureus* and *S. epidermidis* strains with greater than 75% interspecies homology. When used in combination with Freund’s adjuvant, AM generated a mixed Th1 and Th2 mediated immune response in Balb/c mice indicating balanced induction of both cell subsets. AM vaccinated mice sera showed increased production of opsonophagocytic IgG2a and IgG2b antibodies. Significant protective immune response was observed when vaccinated mice were challenged with *S. aureus* or *S. epidermidis*. Systemic dissemination of *S. aureus* and *S. epidermidis* was prevented as a result of vaccination with AM. Results demonstrate the remarkable efficacy of AM as a promising vaccine candidate against both *S. aureus* and *S. epidermidis*. 