Antigenic potential of a recombinant polyvalent DNA vaccine against pathogenic leptospiral infection

ABSTRACT

Leptospirosis is a serious epidemic disease caused by pathogenic Leptospira species. The disease is endemic in most tropical and sub-tropical regions of the world. Currently, there is no effective polyvalent vaccine for prevention against most of the circulating serovars. Moreover, development of an efficient leptospiral vaccine capable of stimulating cross-protective immune responses against a wide range of serovars remains a daunting challenge. This, in part, is associated with the extensive diversity and variation of leptospiral serovars from region to region. In this study, a multi-epitope DNA vaccine encoding highly immunogenic epitopes from LipL32 and LipL41 was designed using in-silico approach. The DNA encoding antigenic epitopes was constructed from conserved pathogenic Leptospira genes (LipL32 and LipL41). Immunization of golden Syrian hamsters with the multi-epitope chimeric DNA vaccine resulted in the production of both agglutinating and neutralizing antibodies as evidence by MAT and in-vitro growth inhibition tests respectively. The antibodies produced reacted against eight different serovars and significantly reduced renal colonization following in vivo challenge. The vaccine was also able to significantly reduce renal colonization which is a very important factor responsible for persistence of leptospires among susceptible and reservoir animal hosts. In conclusion, the leptospiral multi-epitope chimeric DNA vaccine can serve as a potentially effective and safe vaccine against infection with different pathogenic leptospiral serovars.

Keyword: Multi-epitope DNA vaccine; Leptospira infection; Immune response; Antigenic epitopes; Agglutinating and neutralizing antibodies