A novel 57-kDa merozoite protein of Babesia gibsoni is a prospective antigen for diagnosis and serosurvey of canine babesiosis by enzyme-linked immunosorbent assay

Aboge, Gabriel Oluga; Jia, Honglin; Goo, Younkyoung; Kuriki, Ken; Nishikawa, Yoshifumi; Igarashi, Ikuo; Suzuki, Hiroshi; Xuan, Xuenan
URI: http://erepository.uonbi.ac.ke:8080/xmlui/handle/123456789/11606
Date: 2007

Abstract

We isolated a novel single copy gene encoding a 57-kDa merozoite protein of Babesia gibsoni (BgP57). The nucleotide sequence of the cDNA was 2387 bp with an open reading frame (ORP) of 1644 bp encoding a 57-kDa predicted polypeptide having 547 amino acid residues. The recombinant BgP57 (rBgP57) without a predicted signal peptide was expressed in Escherichia coli as a soluble glutathione S-transferase (GST) fusion protein. Western blotting showed that the corresponding native protein was 57-kDa, consistent with molecular weight of predicted mature polypeptide. An indirect enzyme-linked immunosorbent assay (ELISA) using the rBgP57 detected specific antibodies in the sequential sera from a dog experimentally infected with B. gibsoni. Moreover, the antigen did not cross-react with antibodies to B. canis sub-species and closely related apicomplexan parasites indicating that the rBgP57 was a specific antigen for B. gibsoni antibodies. The diagnostic performance of ELISA based on rBgP57 using 107 sera from B. gibsoni-naturally infected dogs was the same as the previously identified rBgP32 but performed better than the previously studied rBgP50. Although, seminested peR detected higher proportions (82%) of positive samples than the ELISAs, the Mcnemar's chi-square test showed that there was no significant difference in relative effectiveness of rBgP57-ELISA and seminested peR ($x2 = 2.70$; $P = 0.1003$) in identifying positive samples. The rBgP57-ELISA when used in combination with rBgP32-ELISA and rBgP50-ELISA appeared to improve sensitivity of the rBgP57-ELISA for detection of B. gibsoni antibodies. Overall, the rBgP57-ELISA and seminested peR when used in combination, could improve epidemiological surveys and clinical diagnosis of B. gibsoni infection.