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Determination of the immunogenicity conferred in cattle by inoculation of *Babesia bigemina* recombinant antigens

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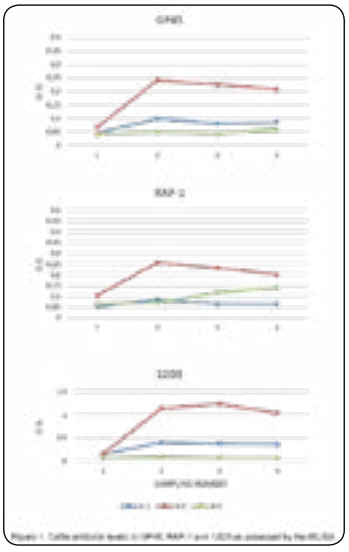
The development of a subunit vaccine against *Babesia bigemina* probably requires the inclusion of multiple immunogenic peptides of several proteins. Some of the antigens proposed as candidates are: RAP-1, a 58-kDa rhoptry associated protein; GP45, a 45 kDa merozoite surface glycoprotein; and 12D3, a 42 kDa apical complex protein. Previous studies performed individually with RAP-1 or Gp45 from *B. bigemina* and 12D3 from *B. bovis* have shown the induction of partial protection to challenge with a homologous strain. However, the immunoprotective potential of these antigens has not been tested in a combined form as a cocktail. To determine the immunogenicity in cattle inoculated with a cocktail of RAP-1, GP45 and 12D3 recombinant proteins, eighteen 9-10 months old, *Bostaurus* steers, serologically negative to *Babesia sp*, and from a ranch free of *Rhipicephalus microplus* ticks were used. Cattle were divided at random into 3 groups of 6 animals each. Group I was inoculated on day 0 with 1 ml of PBS emulsified in Montanide 75 adjuvant. Group II received 100 µg of each recombinant protein plus adjuvant, for 2 occasions with a difference of 15 days. Group III cattle were vaccinated with 1x108 infected frozen erythrocytes containing an attenuated strain of *B. bigemina*. Cattle immunized with the recombinant proteins cocktail seroconverted after the second immunization, presenting with relatively high levels of antibodies to 12D3 as measured by an indirect ELISA with the recombinant proteins as antigen. Immunized animals seroconverted specifically and recognized the authentic antigens of *B. bigemina*, as evidenced by an immunofluorescence assay using infected erythrocytes as antigen. Cattle will be challenged with a virulent strain of *B. bigemina* to verify whether the immunogen tested as a cocktail of recombinant proteins confers any protection in the immunized cattle.



Recent Publications

1. Brown W C, Norimine J, Goff W L, Suarez C E and Mc Elwain T F (2006) Prospects for recombinant vaccines against *Babesia bovis* and related parasites. Parasite Immunology 28: 315-27.
2. de Waal D T and Combrink M P (2006) Live vaccines against bovine babesiosis. Veterinary Parasitology 138:88-96.
3. Hope M, Riding G, Menzies M, Colditz I, Reverter A and Willadsen P (2005) Potential for recombinant *Babesia bovis* antigens to protect against a highly virulent isolate. Parasite Immunology 27:439-445.

4. Florin C M, Suarez C E, Rodriguez A E, Flores D A and Schnittger L (2014) Vaccines against bovine babesiosis: where we are now and possible roads ahead. Veterinary Parasitology 149(12):1563–1592.
5. Gimenez A M, Françoso K S, Ersching J, Icimoto MY, Oliveira V, Anabel, Rodriguez A E, Schnittger L, Florin C M, Rodrigues M M and Soares I S (2016) A recombinant multi-antigen vaccine formulation containing *Babesia bovis* merozoite surface antigens MSA-2a1, MSA-2b and MSA-2c elicits invasion-inhibitory antibodies and IFN-γ producing cells. Parasites & Vectors 9(1):577.

Biography

Julio V Figueroa is currently working as a Researcher and Head of the National Research Center for Veterinary Parasitology, INIFAP, in Jiutepec, Morelos, Mexico. He obtained his Veterinary Medicine degree from the State of Mexico Autonomous University in Toluca, Mexico, and MSc and PhD degrees in Veterinary Pathology and Microbiology at the University of Columbia-Missouri, in Columbia, MO, USA. He has conducted research on tick borne diseases of cattle during the past 30 years and has published over 70 research papers in peer reviewed international journals.

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