Babesia bovis as an Anti-Tick Live Vector Vaccine

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INTRODUCTION: *Rhipicephalus microplus* tick is a blood-feeding ectoparasite responsible for several losses in livestock. Current method for tick control relies in chemicals, however, selection of resistant parasites and meat/milk contamination lead to a search for new anti-tick methodologies. Immunologic control through vaccination is an alternative. Using a *B. bovis* transfection system we develop a *B. bovis* live vector vaccine, using the protozoan to express the tick protective antigen. **OBJECTIVE**: Hereby, we describe the construction and the *in vivo* testing of an attenuated *B. bovis* line able to express a GST from *Haemaphysalis longicornis* (HlGST), an antigen previously tested as recombinant protein vaccine to control tick infestation. **MATERIAL AND METHODS**: The transfection plasmid contain a bidirectional promoter of *B. bovis,* the coding regions for the selectable marker GFP-BSD and HlGST genes, and the 5' and 3' flanking regions for insertion into elongation factor locus by homologous recombination. Parasiter were transfected and a clonal population was obtained using a FACS-based sorting method. Expression of heterologous proteins was demonstrated by fluorescence microscopy, RT-PCR and Western blot. **RESULTS AND DISCUSSION**: Transfection resulted in parasites containing exogenous DNA stably integrated into ef-1 locus and expressing the GFP- BSD and HlGST proteins. Cattle were experimentally infected with the GSTHl expressing *B. bovis* clonal parasites All animals immunized with transgenic B. bovis developed mild acute babesiosis. The results showed that cattle immunized with with HlGST-expressing B. bovis were able to generate a partially protective humoral response to tick infestation challenge. The tick fed in immunized animals presented a reduction on engorged female individual weight. **CONCLUSION**: This study demonstrates the potential for the use of transgenic *B. bovis* as a live vaccine against parasites.

Financial support: Agriculture Research Service CRIS Project No. 5348-32000-028-00D, CNPq, CAPES, FAPERGS and INCT entomologia molecular.

Key words: *Rhipicephalus microplus*, *Babesia bovis*, live vector vaccine