

# Reverse vaccinology approach to develop an anti-tick vaccine

---

*André de Abreu Rangel Aguirre<sup>1</sup>, Marcos Valério Garcia<sup>2</sup>, Rodrigo Casquero Cunha<sup>1</sup>, Renato Andreotti<sup>2\*</sup>*

## Resumo

Tick infestation may cause several problems on animal health, reducing the production of meat and milk, among others. Ticks can become resistant to acaricide, because of this, started researches for alternative measures, such as vaccines against ticks. The commercially available vaccines aim of prejudicing the gut, so these vaccines are composed of gut antigens. On this basis, was developed a synthetic peptide from protein ATAQ, which is present in the intestines and Malpighi tubes of *Rhipicephalus (Boophilus) microplus*. The ATAQ protein has been isolated, characterized and sequenced from several species of the genus *Rhipicephalus*, and an in silicon analysis of this protein showed 93,6% of identity between these species. Based on this, an immunization trial was conducted on rabbits with this synthetic peptide, to check its effectiveness against the dog tick, *R. sanguineus*, specie from which this protein has not been studied. Each rabbit received three doses of vaccine. Each animal on vaccinated group received the 100 ug of peptide diluted in PBS and adjuvanted with Montanide. The control group

---

<sup>1</sup>Mestrando, Curso de Ciência Animal, Universidade Federal de Mato Grosso do Sul

<sup>2</sup>Pós-Doutorando, Bolsista CNPq, Laboratório de Sanidade Animal da Embrapa Gado de Corte, Campo Grande, MS

<sup>3</sup>Pesquisador da Embrapa Gado de Corte, Campo Grande, MS. \*renato.andreotti@embrapa.br

was vaccinated only with the adjuvant and PBS. After immunization, each rabbit was infested with the three life stages of *R. sanguineus*, in order to verify the effect of the immunization in all instars of this specie. The sera of the rabbits were collected and subjected to ELISA, to trace the total IgG antibody profile. All parameters of the life cycle of the ticks were evaluated. The partial results of this trial showed a curve of antibody production in only one rabbit. This result was consistent with the results of the evaluation of the life cycle of the tick, which yielded significant reduction in most of the evaluated reproductive parameters. Immunohistochemistry and histopathology of ticks will be done to detect ATAQ on the surface of the gut cells and to characterize damage on guts, respectively. These results conclude that there is damage in the life cycle of the tick, and that more researches should be conducted in order to develop an effective anti-tick vaccine.

**Keywords:** ATAQ, immunization, rabbits, *R. sanguineus*, synthetic peptide.

**Partners and Financial Support:** Embrapa Gado de Corte, Programa de Pós-Graduação em Ciência Animal da UFMS, Capes, CNPq e Fundect.