Evaluation of the immunogenicity and protective efficacy of an experimental *Streptococcus suis* autogenous vaccine formulated with six different adjuvants

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Background: *Streptococcus suis* is a swine pathogen responsible for economic losses to the swine industry worldwide. There are 29 serotypes described so far which creates additional difficulties in controlling disease outbreaks. There is no widely used commercial vaccine against *S. suis*. The use of autogenous vaccines (bacterins) to control *S. suis* outbreaks is a frequent preventive measure in the field, although scientific data on efficacy, immunogenicity, and reduction in mortality and morbidity are scarce. Furthermore, autogenous vaccines are made with different *S. suis* serotypes, adjuvants, and formulations which further complicates the evaluation of not only their efficacy in the field but also their cost-benefit for producers. Hence, the goal of our study is to experimentally evaluate the immunogenicity and protective efficacy in weaned piglets of a *S. suis* serotype 2 autogenous bacterin vaccine formulated with one of six different adjuvants.

Results and discussion: The same experimental formalin-killed bacterin was mixed with one of the following adjuvants: Alhydrogel™, Emulsigen D™, QuilA™, Montanide 206™, Montanide 61™ or Montanide 201™. Three-week-old piglets were assigned either to placebo (n=10) or vaccine group (n=10) for each autogenous vaccine formulation. The first dose of vaccine and corresponding placebo adjuvant was administered intramuscularly at three weeks of age and the second dose, two weeks later. The challenge with the $5x10^9$ homologous strain was performed intraperitoneally at 10 days after the second vaccine dose. Clinical signs were monitored three times per day for nine days, and blood sera were collected for ELISA analysis of antibody responses induced by the vaccine. Results revealed that animals vaccinated with the autogenous vaccine formulated with Montanide 61 presented 100% survival rate and significant improvement of clinical scores compared to placebo controls. The ELISA results indicated that this formulation induces significantly higher antibody titers than a placebo. The vaccine formulation with either Montanide 206 or Montanide 201 induced partial protection and clinical sign scores were slightly improved compared to the corresponding placebos. Although survival rates and clinical scores were similar between these two adjuvants, antibody titers were higher in piglets vaccinated with Montanide 206 than those vaccinated with Montanide 201. The other three vaccine formulations (Alhydrogel, Emulsigen D, or QuilA) did not show improvements in survival rates, clinical sign scores, or in antibody levels compared to the corresponding placebos.

Conclusion: There was a significant effect of the type of adjuvant on immunogenicity and protective efficacy of the experimental autogenous vaccine used. Our experimental results indicated that a bacterin formulated with Montanide 61 provides higher immunogenicity and protection of vaccinated piglets against a homologous challenge.

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