

Evaluation of a New Antigen for Vaccination against *Staphylococcus Aureus* Causing Bovine Mastitis

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Staphylococcus aureus (*S. aureus*) is one of the most important pathogens that cause bovine mastitis. These infections are difficult to cure with antibiotics and cause great economic losses for the dairy producer and the dairy industry. Development of an effective treatment is needed to protect animals against this pathogen. However, to date, no vaccine is available that protects cattle against staphylococcal bovine mastitis. Research on new antigens for such a vaccine is highly warranted.

Milk contains very little iron medium and thus *S. aureus* possesses highly efficient iron acquisition systems that allow its survival and growth. In previous studies performed in our group, various genes were identified that were more expressed in an iron poor medium *in vitro* and were also higher expressed *in vivo* in a mouse model. These selected genes (*sirA*, *srtB*, *isdH* and *fhuD2*) were cloned and their recombinant proteins were produced. Antibodies against each protein were obtained by immunization of rabbits using TiterMax®Gold as adjuvant. Each protein induced an immune response in rabbits. However, among the potential candidates, IsdH appeared to be the most promising since it is located at the bacterial surface and induces a strong immune response (antibody titre higher than 1/1 000 000 by ELISA).

Following up on these results, 2 heifers were immunized with recombinant IsdH protein. A high immune response was also observed in these heifers (titres of 1/204800 and 1/102400). The majority of the antibodies were of the IgG2 isotype. This antibody class is important for the immune system since it is involved in opsonisation and it helps kill the bacteria by phagocytosis. Moreover, immunization leads to the multiplication of the population of the CD4 positive lymphocytes which are very important for antibody production by B lymphocytes.

Implications: Together, these positive results (high stimulation of the bovine immune system) allow us to go on with the analysis of this protein as a vaccine candidate against staphylococcal bovine mastitis. Such a vaccine should be of great help for increasing bovine udder health and so reduce economic losses for the dairy producers and the dairy industry.