Tritrichomonas foetus is an obligate parasite of the bovine urogenital tract resulting in reproductive failure and considerable economic loss in areas of the world where natural breeding is used. The recorded prevalence of T. foetus in the United States has increased in the past few years and is now recognized as one of the most common infectious agents causing decreased reproductive efficiency in beef cattle. From 1984 to 1987 up to 44.1% of the Nevada ranches had at least one infected bull. Vaccination of heifers with vaccines containing T. foetus has been shown to induce elevated serological responses to many T. foetus antigens, decrease the rate and/or length of infection with T. foetus and decrease abortions caused by infection. Since T. foetus infections are usually limited to lumen and mucosal surfaces of the reproductive tract, it has been assumed that protection from infection and abortion is partially mediated by immunoglobulins in the uterus and vagina.

One objective of this study was to characterize the patterns of development of specific anti-trichomonal antibodies in serum and vaginal secretions of vaccinated and/or infected heifers. Total immunoglobulins and specific anti-trichomonal antibodies in serum and vaginal secretions of vaccinated and control heifers were analyzed utilizing Radial Immunodiffusion and ELISA procedures. Heifers were challenged by breeding to infected bulls and/or by intravaginal inoculation with $2 \times 10^7$ T. foetus organisms.

Vaccinated heifers remained infected for an average of 6.8 - 5.6 weeks less than unvaccinated control heifers. Total serum and vaginal mucus concentrations of IgM, IgA, IgG1 and IgG2 did not change significantly following vaccination or challenge. However, ELISA titers of total anti-trichomonal antibodies increased up to 1:10,000 in serum following vaccination and increased approximately 10 fold above background. In serum, the predominant anti-trichomonal antibody isotype was IgG1, although, anti-trichomonal IgG2 increased significantly and anti-trichomonal IgM increased soon after the initial immunization and decreased rapidly. The predominant anti-trichomonal antibody in vaginal mucus was IgA.

After challenge and infection of nonvaccinated control animals, the total anti-trichomonal antibody response increased to 1:50 and the vaginal mucus titer increased 3-5 fold following infection. In these animals, specific antibodies in serum were predominantly IgG1 and local vaginal antibodies were predominantly IgA.

The available vaccine is a whole-killed organism vaccine. Vaccination with whole organisms exposes the host to genetic material and possible immunosuppressive agents. A subunit vaccine, containing only antigen(s) that provide a protective immune response will eliminate antigenic competition with non-productive antigens as well as eliminate exposure to possible immunosuppressive agents. A second objective of this study was to isolate and characterize specific antigens of T. foetus to be used in a recombinant vaccine which will generate a protective immune response in cattle to trichomoniasis. Plasma membranes were isolated from T. foetus and the proteins extracted with detergent. Using polyclonal rabbit anti-trichomonal sera eluted from paraformaldehyde-fixed cells, surface proteins were identified. These proteins were found to have a high mannose content. Periodate oxidation indicates that the anti-trichomonal antibodies used in this study (rabbit anti-sera, bovine anti-sera and bovine cervicovaginal mucus antibodies) were directed against the peptide backbone and not the carbohydrate moieties. Western blot analysis indicates that these proteins are well conserved and excellent candidates for a recombinant vaccine.