Alberta Beef Producers

Research

Improving Immune Response in Newborn Calves

"Characterization of Fcγ (gamma) receptor II (CD32) on B lymphocytes and its role in modulation of antibody responses in neonates"

Project No. 0007-110

Research Institution: University of Guelph

Lead Researcher: Dr. Patricia Shewen

Objectives: To determine whether:

- Immune responses in young calves are age dependent;
- Immune responses in young calves can be modified;
- There are agents which can enhance antibody responses in young calves;
- These agents can be used to develop vaccines that will work in young calves that still have maternal antibodies from colostrums.

Background: Newborn calves are susceptible to many microorganisms that can cause respiratory and gut diseases. Antibodies from the cow's colostrum help provide protection from these diseases during the first few weeks of life. This is known as passive immunity because it comes from the cow rather than the calf's own immune response. Vaccination may not be very effective during the first few weeks because antibodies from the colostrum may bind the vaccine antigens. Vaccination will not work very well until the passive immune protection from the maternal antibodies declines, and the calf begins to develop its own active immunity. Between the time when the passive (maternal) immunity declines and the calf's (active) immunity develops the calf may be particularly susceptible to disease. As a result, industry would benefit from vaccines that could produce early, active immunity in calves before the maternal antibodies drop off. This would provide continuous immune protection to calfhood diseases.

These researchers are studying whether the expression of receptors on immune cells (B cells) is age dependent, and whether signals that suppress immune response early in life can be manipulated so that calves can be vaccinated while maternal antibodies are still circulating. Promising substances will be tested as vaccine additives in young calves having maternal antibodies. This project is scheduled to be completed in 2010.

Implications of the Research: Developing vaccines that can be used early in life will help to reduce early calf losses due to diseases such as pneumonia.