MILK SUPPLEMENTED WITH IMMUNE COLOSTRUM: PROTECTION AGAINST ROTAVIRUS DIARRHEA AND MODULATORY EFFECT ON THE SYSTEMIC AND MUCOSAL ANTIBODY RESPONSES IN CALVES EXPERIMENTALLY CHALLENGED WITH BOVINE ROTAVIRUS

Gisela Marcoppido¹, Viviana Parreño², Celina Vega², Linda Saif³, Fernando Fernandez²

¹Pathobiology Institute, ²Virology Institute, INTA, Castelar, Argentina, ³Ohio State University, Columbus, OH, USA

Bovine rotavirus (BRV) is a major cause of diarrhea in neonatal calves worldwide. It is postulated that continues levels of passive and active antibodies (Abs) in the intestinal lumen provide efficient protection against infection and illness. The present study evaluated protection and immunomodulation in BRV-inoculated calves given milk supplemented with immune frozen cow colostrums.

All calves received control colostrum (CC; VN = 65,536; IgG1 = 16,384) prior to gut closure followed by the milk supplemented with immune colostrum (VN = 1,048,576; IgG1=262144) twice a day, for 14 days.

Calves received milk supplemented with 0.8% immune colostrum [(Gp 1) VN = 16,384; IgG1 = 4096] or supplemented with 0.4% immune colostrum [(Gp 2) VN = 1024; IgG1 = 1024]. Calves fed colostrum followed by milk without Abs or colostrum deprived calves were used as controls (gp 3 and gp 4, respectively). Calves were orally inoculated with virulent BRV IND, at 2 days of age (0 post-inoculation day (dpi) and re-challenged at 21dpi.

After BRV inoculation, all control calves (Gp 3 and 4) became infected and suffered severe diarrhea while all gp 2 (CC + milk 1024) calves were infected, but only 62.5% (5/8) developed diarrhea. Group 4 calves (milk IgG1 4096) showed 80% protection against BRV diarrhea and significantly reduced virus shedding with a significant delay in the onset of both variables.

At 21 post-inoculation days (PID), the antibody- secreting cell (ASC) responses of Gp 1 calves were limited mainly to duodenal and jejunal lamina propria (LP) with limited or no responses in systemic sites (spleen and PBL) and mesenteric lymph nodes. The profile of the Ab and ASC responses was modulated toward higher titers of IgA Ab in serum and feces and a greater number of IgA ASC in the proximal intestine, reflecting positive modulation by colostrum toward this isotype.

After challenge, at PID 21, all calves in Gp 1 and 2 were fully protected against diarrhea and only 1 of 5 calves in Gp 1 shed virus asymptomatically, indicating that the passive Ab treatment for 14 days was effective in protecting most of the animals after a first and a second virus exposure. The final outcome was a high protection rate against diarrhea during the entire period of susceptibility to RV infection and a positive modulation of the mucosal immune responses during the period of peak susceptibility to BRV infection.