B AND T LYMPHOCYTE ACTIVITY IN PERINATAL DAIRY COWS

Hideyuki YAMANAKA

Department of Veterinary Internal Medicine
Faculty of Veterinary Medicine
Hokkaido University, Sapporo 060, Japan

Depression of humoral immune function is one of the important causes of various infectious diseases occurring at high frequency during the perinatal period in dairy cows. This study was designed to analyze the mechanisms of the cellular immunoresponse to such immunodepression in perinatal cows. Peripheral blood lymphocytes were obtained from four perinatal dairy cows and a nonpregnant dairy cow. The ability of IgG production of these cells was determined by the protein A plaque assay, using pokeweed mitogen stimulated culture.

Non-B (T rich) lymphocyte fractions were isolated from peripheral blood by employing both the panning method and E-rosette sedimentation containing less than 1% of surface IgG bearing cells.

The ability of IgG production of peripheral lymphocytes from a nonpregnant cow was increased 1.8 fold by coculture with autologous or allogenic non-B cells.

The ability of IgG production of lymphocytes from perinatal cows decreased to the lowest level within 10 days after calving, and thereafter, within 40 days, the level recovered to that of 20 days before calving. Complete recovery of the IgG production ability was seen at 60 days after calving.

When lymphocytes from perinatal cows were cocultured with non-B cells from a nonpregnant cow, the IgG production ability of the cells decreased within 10 days after calving. These non-B cells scarcely increased the IgG production with lymphocytes from perinatal cows within 30 days after calving.

The non-B cells from perinatal cows within 40 days after calving had little ability to increase the IgG production with lymphocytes derived from a nonpregnant cow when the non-B cells were cocultured with them.

These results suggested that the ability of IgG production in perinatal dairy cows was decreased due to functional depression of both B and non-B cells.