In experiment 1, calves fed colostrum from HT cows in experiment 1 were not significantly different from calves fed colostrum from CL cows in the categories of birth weight, weaning weight, weight gain, weaning height and height gain. However, there was a tendency (P = 0.12-0.30) for calves fed HT colostrum to do better in these performance categories. In such a situation, having more calves per treatment than the 16-17 used in this study may have resulted in significant differences. This is a criticism of calf studies in general, not just this study (Kertz and Chester-Jones, 2004).

**Discussion**

For the HT cows, dry period length and gestation length were shorter, whereas rectal temperatures and respiration rates increased (Table). Cows were exposed to an ambient temperature humidity index of 78, which the evaporative cooling system ameliorated enough that CL cows exhibited less heat stress. There was no treatment effect on the colostrum quantity and quality.

Calves born to CL cows weighed more at birth and at weaning, were taller at birth and tended to gain more and get taller than HT cows. Calves did not differ by treatment for fecal score and health score but tended to have greater respiratory scores (P < 0.11) and rectal temperatures (P < 0.10) when dams had been heat stressed during their dry period.

In experiment 2, calves fed colostrum from HT cows in experiment 1 were not significantly different from calves fed colostrum from CL cows in the categories of birth weight, weaning weight, weight gain, weaning height and height gain. However, there was a tendency (P = 0.12-0.30) for calves fed HT colostrum to do better in these performance categories.

In such a situation, having more calves per treatment than the 16-17 used in this study may have resulted in significant differences. This is a criticism of calf studies in general, not just this study (Kertz and Chester-Jones, 2004).
In experiment 2, fecal and respiratory scores were similar between treatments, but rectal temperatures were greater ($P < 0.01$) for calves fed colostrum from HT cows.

Numerous blood samples were taken, especially in experiment 2, and analyzed by radial immunodiffusion for immunoglobulin G (IgG) blood levels that also enabled the calculation of apparent efficiency of absorption. Whole blood cell and cortisol analyses were also done. Colostral IgG concentrations and the amount of IgG fed did not differ between treatments in either experiment 1 or 2.

In general, there were no treatment differences in either experiment 1 or 2 for white blood cell components, whole blood cells, total plasma protein, serum IgG levels and efficiency of absorption. However, there were some significant interactions of treatment by time.

There were no cases in either experiment of failure of passive immune transfer, but calves exposed to heat stress in experiment 1 had a lower apparent efficiency of absorption than calves from CL dams in experiment 2.

Overall serum cortisol levels during the preweaning period were greater for calves born in experiment 2 from CL rather than HT cows. The researchers speculated that these calves may have been more sensitive to stress from routine management during their first two weeks of life.

**The Bottom Line**

There was evidence that calves born to cows exposed to heat stress during the later stage of pregnancy (i.e., most of the dry period) had compromised passive and cell-mediated immunity compared to cooled cows during the same period.

The calves born from heat-stressed dams had a shorter gestation length, lower birth weight and lower weaning weight and height.

Thus, this study provides more indications of the negative impact heat stress has on both dry cows in later pregnancy and on calves in utero and after birth.

**References**
