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Is altering endogenous progesterone production from the corpus luteum the answer to improving and controlling reproduction in dairy cattle?

Tracy L. Davis

University of Idaho, USA

Abstract

Conception rates in dairy cattle in the United States have decreased to 25 – 35%, potentially a result of luteal insufficiency. Different methods have been tried to increase circulating progesterone (P4) concentrations to improve pregnancy rates. We developed a method that increases the size and P4 production of the primary corpus luteum (CL). Chronic administration of a gonadotropin releasing hormone (GnRH) agonist increases luteinizing hormone (LH) secretion, subsequent P4 production by the CL, and ovarian follicular dynamics. Chronic administration of a GnRHagonist during the early luteal phase increases luteal size, P4 circulating concentrations, and conception rates using a small number of lactating dairy cows of various parity. Ovarian follicular dynamics are different during the second ovarian follicular wave in first lactation heifers as compared to multiparous cattle. In all cattle, co-dominance of antral follicles occurs during the first ovarian follicular wave. Co-dominance of follicles is more prevalent on the ovary containing the CL than the contralateral ovary in cows administered treatment. It is unclear the difference between ovarian follicular dynamics between the ipsilateral and contralateral ovary, but is speculated that intraovarian communication is occurring that has yet to be determined. Furthermore, if the cows were not bred the GnRH treatment had no effect on the size of the ovulatory follicle or length of the estrous cycle following termination of treatment. The current model of chronic GnRH agonist treatment controlsluteal size, circulating P4 production, ovarian follicular dynamics, length of the estrous cycle, and conception rates in lactating dairy cows.

Biography

Tracy Davis completed her PhD in 2004 from The Ohio State University from the Department of Animal Sciences. She was a postdoctoral fellow at Colorado State University studying in the area of reproductive endocrinology at the Animal Reproduction and Biotechnology Laboratory. Dr. Davis is currently an Assistant Professor at the University of Idaho with a research focus on reproductive endocrinology and neuroendocrinology.