Hormone Balance

Successful breeding program begins with understanding hormones and how they affect the estrous cycle.

*Story & photo by **Troy Smith,** field editor*

The dictionary defines the term "hormonal" as being of, relating to or affected by hormones. The reproductive cycle definitely is hormonal. Specific hormones induce the physiologic changes necessary for the establishment of pregnancy in the mammalian female. According to reproductive physiologist Mike Smith, an understanding of hormonal changes occurring in the bovine female can make estrus synchronization and artificial insemination (AI) programs for beef breeding herds more successful.

The University of Missouri professor's review of the bovine estrous cycle set the stage for subsequent speakers at the Applied Reproductive Strategies in Beef Cattle (ARSBC) conference Aug. 17-18 in Davis, Calif.

Smith said the estrous cycle consists of three stages — the follicular phase, estrus and the luteal phase. These phases are regulated by the following hormones:

- gonadotropin-releasing hormone (GnRH) secreted by the hypothalamus;
- follicle-stimulating hormone (FSH) and luteinizing hormone (LH) secreted by the anterior pituitary gland;
- estradiol and progesterone secreted by the ovary; and
- prostaglandin secreted by the uterus.

"These hormones serve as chemical messengers that travel in the blood to specific target tissues, which contain receptors, and regulate the phases of the estrous cycle," explained Smith. He elaborated on the specific hormonal changes that must occur during a cow's estrous cycle for pregnancy to be established.

►"It's critically important that synchronization products be administered at the correct time and at the correct dosage," Michael Smith, University of Missouri reproductive physiologist. "Attention to detail is essential."

"Estrus synchronization protocols have been designed to mimic the physiological changes controlled by these [naturally occurring] hormones," he continued.

Smith said commercially available progestin products used to manage the luteal phase include melangestrol acetate (MGA), which is administered orally, and the controlled internal drug release (CIDR®) device. Prostaglandin and GnRH are administered by injection. Numerous synchronization protocols that prescribe the timing of product administration and insemination have been developed for heifers and cows (see pages 121 and 122).

According to Smith, it is not uncommon to hear producers blame a particular synchronization product or protocol for poor results. He reminded the audience that all of the commercially available products have been proven effective when properly stored and administered.

Unsatisfactory pregnancy rates can most often be attributed to cows or heifers being unsuitable candidates for synchronization, poor choice of synchronization protocol or noncompliance with the chosen protocol.

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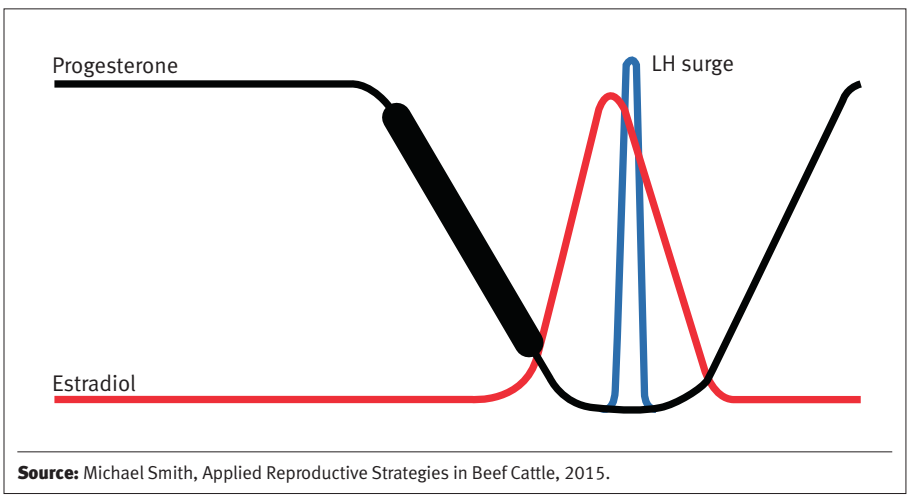
"It's critically important that synchronization products be administered at the correct time and at the correct dosage," emphasized Smith. "Attention to detail is essential."

Smith spoke during Monday's ARSBC session focused on the basics of reproduction. Visit the Newsroom at *www.appliedreprostrategies.com* to view his PowerPoint, read the proceedings or listen to his presentation. Smith suggested cattlemen also access three education modules found in the University of Missouri's Cattle Learning Center that focus on reproduction and management fundamentals for beef cattle (*http://animalsciences.missouri.edu/extension/beef/estrous_synch/course_1/*).

Fig. 1: Hormonal changes required for pregnancy



Source: Michael Smith, Applied Reproductive Strategies in Beef Cattle, 2015.

Editor's Note: *Troy Smith is a freelance writer and cattleman from Sargent, Neb. Comprehensive coverage of the ARSBC symposium is available online at* www.appliedreprostrategies.com. *Compiled by the* Angus Journal *editorial team, the site is made possible through sponsorship by the Beef Reproduction Task Force.*