

# Do Heifers at Different Stages of the Estrous Cycle Respond Differently to Gonadotropin Releasing Hormone Treatment?\*

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The Ovsynch protocol helps synchronize ovulation in cattle, allowing timed insemination (TAI) without estrus detection. The protocol calls for two injections of gonadotropin-releasing hormone (GnRH) given 9 d apart, and a single injection of prostaglandin given 7 d after the 1st GnRH treatment, and TAI 16-24 h after the 2nd GnRH treatment. The 1st GnRH synchronizes new follicular development and the 2nd GnRH synchronizes ovulation. Luteinizing hormone (LH) released in response to GnRH is essential for ovulation to occur. Many studies have reported a poor ovulation rate in response to the 1st GnRH treatment. The chances of giving the 1st GnRH injection when progesterone is elevated are high in cyclic cattle; is it possible that GnRH-induced LH-release differs at different stages of the estrous cycle? Our objective, therefore, was to determine if GnRH-induced LH-release in Holstein heifers differed between the diestrous (when progesterone concentration was high) and proestrous (when progesterone concentration was low) stages of the estrous cycle. Six heifers were administered GnRH during the diestrous and proestrous phases of their estrous cycles, and plasma LH measured frequently for up to 8 h following each treatment. Ovulation was determined by transrectal ultrasonography. A smaller proportion of heifers ovulated in response to GnRH during the diestrous phase (40%) than during the proestrous phase (80%). However, the mean concentrations of LH did not differ between diestrous (2.2 ng/mL) and proestrous (3.6 ng/mL) treatments. The peak LH concentration, and time taken to reach the peak also did not differ. The duration for which LH remained above 1 ng/mL during diestrous and proestrous phases was 2.9 h and 4.5 h, respectively ( $P=0.09$ ). In this study, GnRH-induced LH release in Holstein heifers did not differ between the diestrous and proestrous phases of the estrous cycle. However, LH concentrations tended to remain elevated for a longer duration in proestrous-phase heifers.

**Take Home Message:** The lower ovulatory response to GnRH treatment in the diestrous stage of the estrous cycle was not readily attributable to a lack of LH release. Repeating this study with a larger number of heifers is necessary.

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