Table 1. Effect of treatment on mean (±SEM) circulating concentrations of progesterone (P4; ng/mL) and total luteal area (mm²) on different days (d) of the estrous cycle in Holstein recipient heifers

Treatment	Control (n=58)	hCGd5 (n=59)	hCGd0 (n=50)	hCGd0&5 (n=51)
Serum P4, ng/mL ±SEM				
d0	0.03 ±.01	0.03 ±.01	0.04 ±.01	0.04 ±.01
d5	1.92 ±.14[a]	1.88 ±.14[a]	2.35 ±.20[b]	2.44 ±.21[b]
d7	3.37 ±.17[a]	4.67 ±.27[b]	4.40 ±.28[b]	5.73 ±.40[c]
d12	4.39 ±.21[a]	9.19 ±.49[c]	5.30 ±.28[b]	8.53 ±.56[c]
Total luteal area (TLA), mm² ±SEM				
d5	249 ±13[a]	265 ±12[ab]	321 ±21[b]	**302** ±15[b]
d12	377 ±17[a]	812 ±39[b]	388 ±27[a]	901 ±65[b]

[a-c] Data with different superscripts within the same day differ with P < 0.05

Keywords: hCG, progesterone, recipient heifers

141 Effect of induction of an ipsilateral vs. contralateral accessory corpus luteum (CL) on pregnancy per AI and pregnancy loss in lactating dairy cows.

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Induction of accessory CL can increase circulating progesterone (P4) and potentially improve fertility; although, regression of accessory CL contralateral to the pregnancy can occur, potentially negating their benefit. In this study, primiparous (n = 377) and multiparous (n = 678) lactating Holstein cows (80.0 ± 3.3DIM, 43.2 ± 13.3 kg milk/d, and BCS = 2.85 ± 0.24) were enrolled in Presynch-Ovsynch (PGF-14d-PGF-12d-GnRH-7d-PGF-56h-GnRH-16h-AI) with AI at 81 ± 3 DIM. On d5 after AI, cows were randomly but unequally assigned as Control (n = 289) or GnRH (n = 641; 100 µg gonadorelin acetate). Blood samples were collected for P4 and ovaries evaluated by ultrasound on d5, d12, d19, d26, d33, d47, and d61. mRNA for ISGs (d19) and PSPB (d26) concentrations were evaluated and pregnancy diagnoses were done on d26, d33, d47 (also embryonic measurements), and d61. Statistical analyses were performed with PROC GLIMMIX of SAS 9.4. Ovulation to GnRH on d5 was 85.4% (577/676). Cows were designated as: Control (n = 289), Ipsilateral (n = 239), or Contralateral (n = 241). Overall P4 differed (P < 0.01) within groups (Control = 7.90 ± 0.35[c], Ipsilateral = 10.5 ± 0.34[a], and Contralateral = 9.55 ± 0.26[a]). Interestingly, 52.7% (78/148) of contralateral pregnant cows had accessory CL regression by d61 with decreases in P4 after contralateral CL regression (P < 0.001). There were no treatment differences for pregnant cows in ISG15 (P = 0.63) or Mx2 (P = 0.51) mRNA, circulating PSPB (P = 0.56), amniotic vesicle size (P = 0.89), or crown-rump length (P = 0.19) or in pregnancy/AI on d26 (P = 0.24), d33 (P = 0.67), d47 (P = 0.53), or d61 (P = 0.62; overall 50.3% [387/769]). Nevertheless, pregnancy losses between d26 and d61 were lower (P = 0.03) for ipsilateral (6.6 ± 2.3%) than contralateral (14.0 ± 3.0%) and from controls (P = 0.065; 13.7 ± 2.9%) With differences also from d26-33 (Control = 7.5 ± 2.1; Ipsilateral = 3.1 ± 1.5; Contralateral = 9.6 ± 2.5). Within contralateral group, early accessory CL regression was associated with greater pregnancy loss from d26-33 (P = 0.04) and d26-61 (P = 0.01). Thus, induction of accessory CL

increases P4 and may reduce pregnancy loss, although these advantages are reduced for contralateral accessory CL, because many of these CL regress during pregnancy.

Keywords: GnRH, conception rate, progesterone

150 Effects of managing mature beef bulls on divergent planes of nutrition on novel measures of bull fertility.

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Fifteen mature beef bulls (BW = 800.4 ± 17.4 kg) were used in a 112-d experiment to evaluate effects of divergent planes of nutrition on novel measures of bull fertility. Bulls were ranked by BW and randomly assigned to one of two treatments: 1) managed on a positive plane of nutrition (POS, n = 8), or 2) managed on a negative plane of nutrition (NEG, n = 7). Bulls were individually fed a common diet adjusted biweekly to achieve targeted weight loss or gain of 12.5% of original BW. On d 112, electroejaculation was used to collect 2 ejaculates from each bull, which were combined, extended, and frozen. The Guava easyCyte 8HT Flow Cytometer was used to analyze cell membrane and acrosome integrity, mitochondrial energy potential, and oxidation status of frozen-thawed semen. Data were analyzed for effects of treatment with bull as the experimental unit using the MIXED procedure of SAS. By design, bull BW diverged ($P < 0.0001$) with POS bulls gaining 1.27 ± 0.08 kg/d, whereas NEG bulls lost 0.91 ± 0.08 kg/d. Treatment did not influence cell membrane integrity ($P = 0.20$), or proportion of live sperm with intact acrosome ($P = 0.91$). A greater ($P = 0.04$) proportion of sperm from POS bulls (35.1 ± 3.47%) were alive and stained reactive oxygen species positive compared with sperm from NEG bulls (23.8 ± 3.71%) indicating sperm from POS bulls was more prepared to withstand oxidative stressors. However, NEG bulls (27.2 ± 5.22) had a greater ($P = 0.01$) proportion of sperm with polarized mitochondrial energy potential compared with POS bulls (6.1 ± 4.89%), indicating greater energy for sustained motility. We conclude that plane of nutrition during spermatogenesis may impact sperm's ability to withstand stressful environments encountered and to sustain motility in the female reproductive tract after cryopreservation.

Keywords: Bull Nutrition, Flow Cytometry, Semen Characteristics