Influence of length of p-FSH treatment prior to ovum pick-up on ovarian response and *in vitro* embryo production in Holstein heifers

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INTRODUCTION

- Ovarian follicle stimulation with exogenous FSH prior to ovum pick-up (OPU) in *Bos taurus* females is a common practice to increase *in vitro* embryo production (IVP).
- The optimal stimulatory period length for OPU-IVP, however, has not been definitively ascertained.

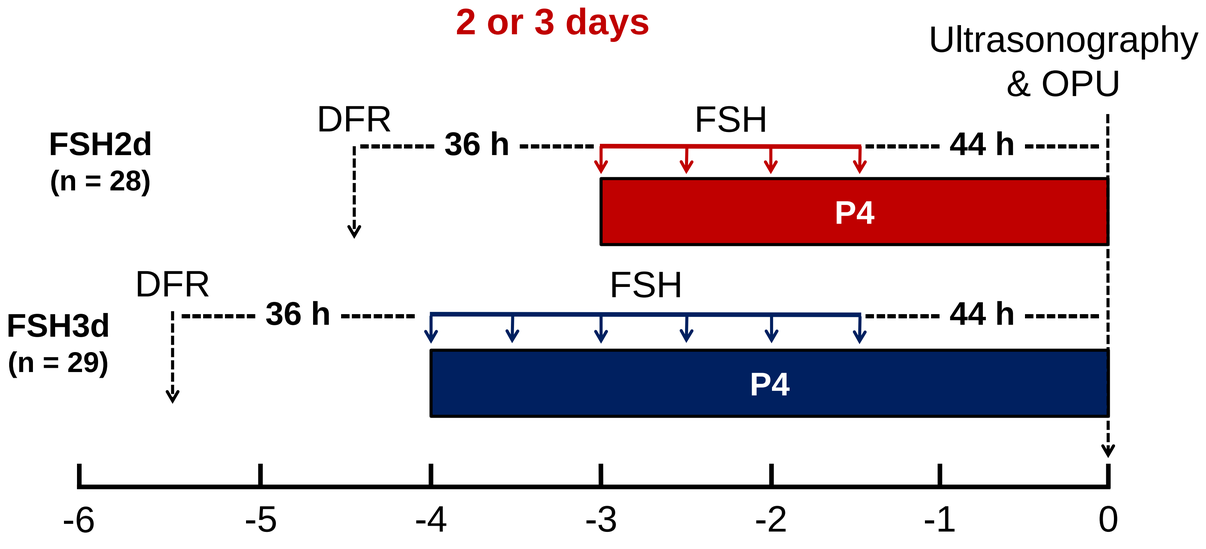
OBJECTIVE

The objective of the present study, was to determine the effect of length of the superstimulatory treatment period prior to OPU on ovarian response and IVP in Holstein heifers.

METHODS

- Non-pregnant heifers (n = 57) 13.8 ± 0.2 months of age with a body condition score of 3.0 ± 0.1 (scale 1 to 5) were assigned in a completely randomized design to one of the following experimental groups (Figure 1):
  - **FSH2d** – 200 mg of p-FSH (Folltropin-V®, Vetoquinol) distributed in four injections (60, 60, 40, and 40 mg) of FSH 12 h apart
  - **FSH3d** – 200 mg of p-FSH distributed in six injections (40, 40, 40, 40, 20 and 20 mg) of FSH 12 h apart
- Superstimulatory treatments were initiated 36 h after dominant follicle removal
- An intravaginal progesterone (P4) implant (1.38 g P4 CIDR®, Zoetis) was inserted at the time of the first p-FSH injection and removed at the time of OPU
- OPU was performed in all heifers 44 h after the last p-FSH injection
- Follicle numbers were determined at OPU and classified as **small** (< 6 mm), **medium** (6-10 mm) or **large** (> 10 mm)
- Oocytes from different size follicles were pooled by heifer at OPU and then classified and subjected to IVP procedures
- Differences between treatment groups were evaluated using generalized linear mixed models (SAS 9.4)

Figure 1. Treatment schedule for heifers superstimulated during 2 or 3 days



RESULTS

Table 1. Follicle numbers by size category in heifers superstimulated during 2 or 3 days with 200 mg of p-FSH

	FSH2d (n = 28)	FSH3d (n = 29)	P-value
Small Follicles (< 6 mm)	5.9 ± 0.6	5.7 ± 0.8	0.83
Medium Follicles (6-10 mm)	17.0 ± 2.4	12.9 ± 1.6	0.18
Large Follicles (> 10 mm)	2.5 ± 0.5^{A}	4.5 ± 0.6^{B}	0.01
Total Follicles	25.4 ± 2.6	23.1 ± 1.8	0.60

^{A,B}Means within a row with different superscripts differ ($P < 0.05$).

RESULTS

Figure 2. Proportion of small (<6 mm), medium (6–10 mm), and large (>10 mm) follicles at OPU

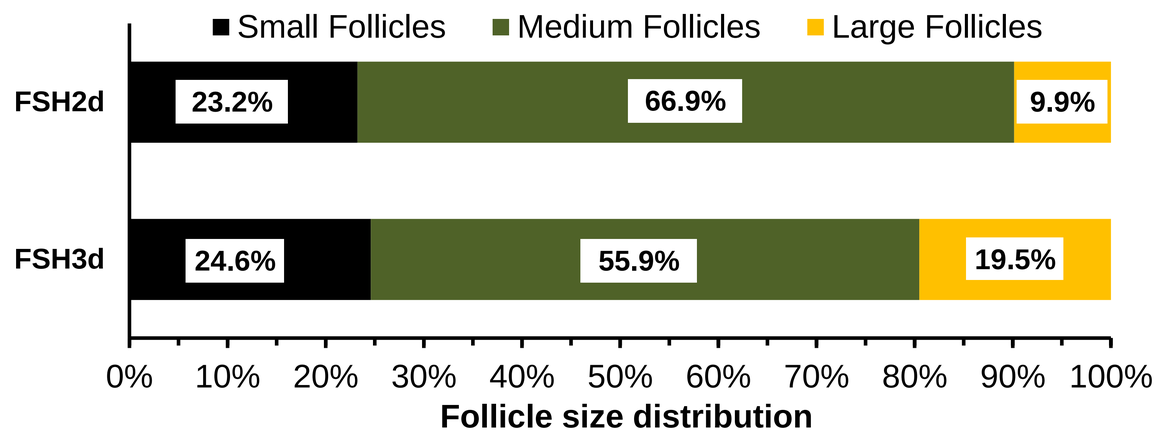


Figure 3. Oocyte production in heifers superstimulated during 2 or 3 days with 200 mg of p-FSH

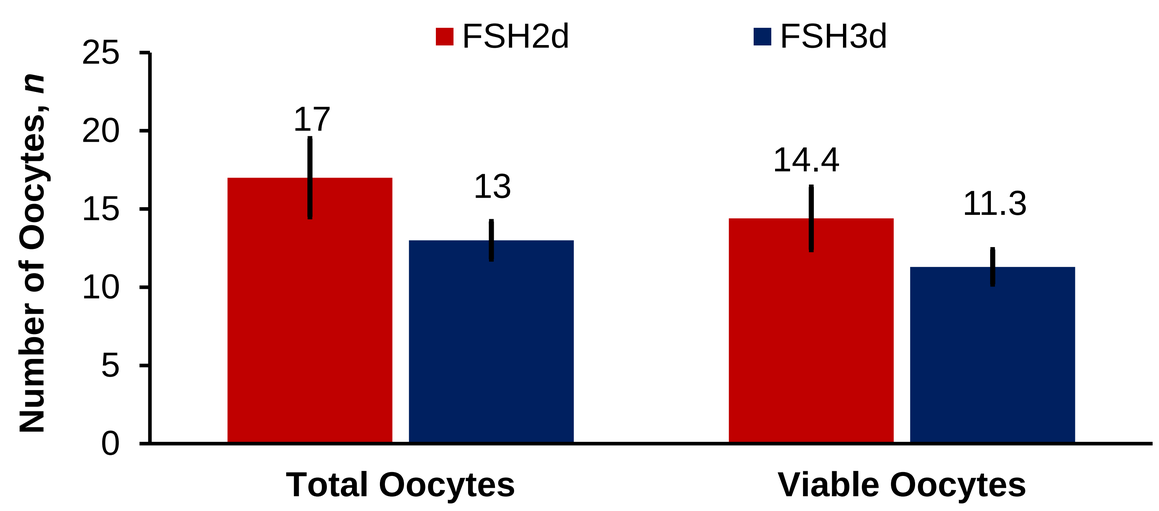
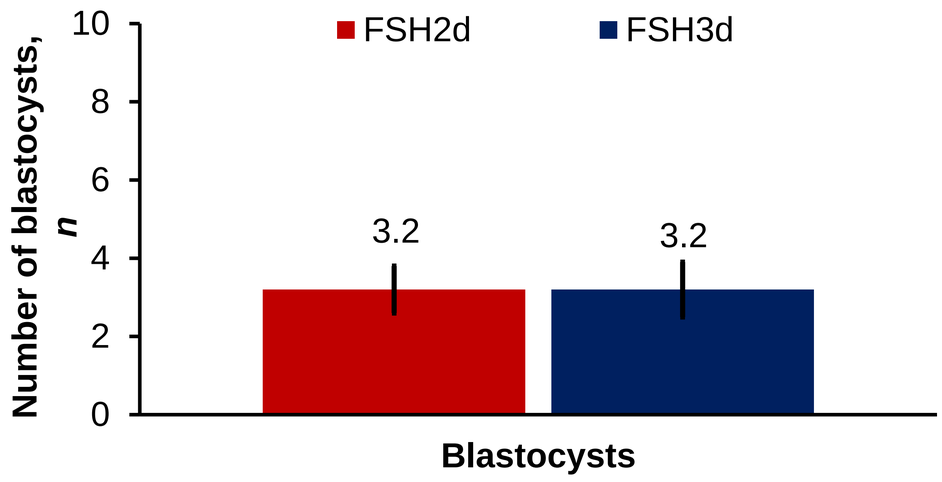


Table 2. Oocyte recovery rate, percent viable oocytes, cleavage and blastocyst rate in heifers superstimulated during 2 vs. 3 days

	FSH2d (n = 28)	FSH3d (n = 29)	P-value
Recovery rate (%)	62.6 ± 3.7	56.9 ± 3.1	0.26
Viable Oocytes (%)	85.0 ± 2.4	88.0 ± 3.0	0.31
Cleavage rate (%)	54.7 ± 5.7	54.1 ± 5.7	0.98
Blastocyst rate (%)	20.6 ± 4.0	22.4 ± 3.7	0.97

Figure 4. Blastocyst number in heifers superstimulated during 2 or 3 days with 200 mg of p-FSH



DISCUSSION

In conclusion, lengthening the period of FSH treatment by 1 d increases the number of large follicles (> 10 mm) at OPU, however, does not improve overall ovarian response, oocyte recovery nor embryo production

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ACKNOWLEDGEMENTS

We extend our gratitude to the staff at The Ohio Heifer Center farm for their assistance.