Luteinizing hormone (LH) profiles after either porcine LH or GnRH treatment in Holstein cows with or without FSH-stimulation

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Background

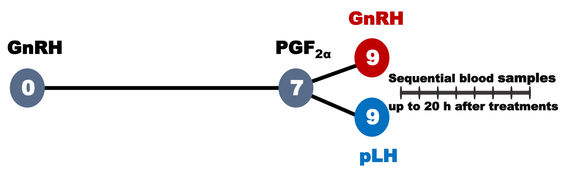
- Replacing the second GnRH injection with 25 mg porcine luteinizing hormone (pLH) in "Ovsynch" protocol:
  1) Increased pregnancy rate in dairy cattle [1].
  2) Altered the expression of intra-follicular proteins associated with improved oocyte competence [2].
- The wide variability in superovulatory responses and embryo yield in FSH-stimulated cows might be potentially reduced using pLH if the altered LH profile attained in non-stimulated cows could be established in superovulated cows.

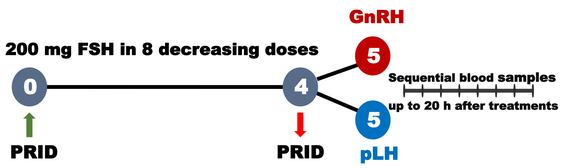
Objective

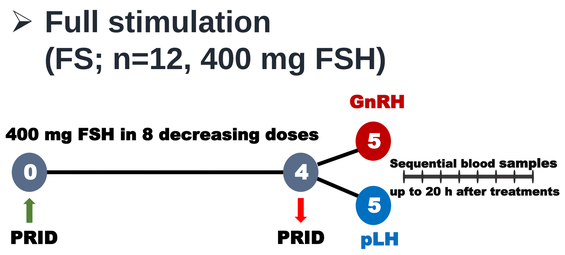
To characterize LH profiles after giving pLH or GnRH in non-lactating Holstein cows subjected to different levels of FSH stimulation.

Methodology & Results

- No FSH stimulation (NS; n=13, 0 mg FSH)
- Partial stimulation (PS; n=8, 200 mg FSH)
- Full stimulation (FS; n=12, 400 mg FSH)

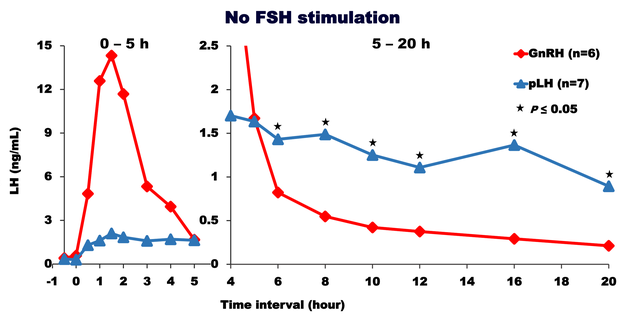


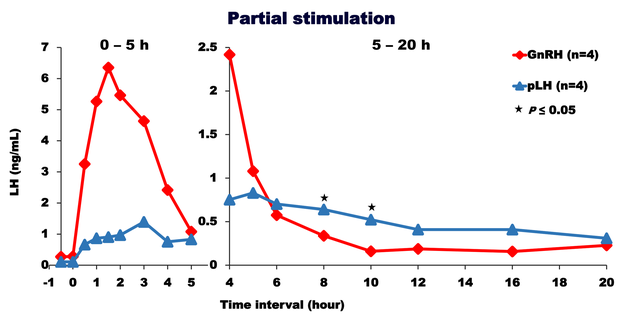


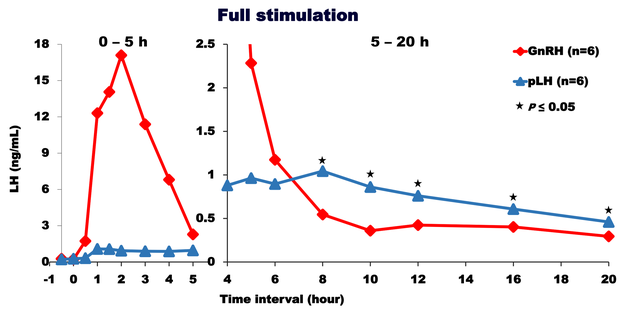


- Radioimmunoassay: by using an anti-bovine LH monoclonal antibody

Least-square means for plasma LH concentrations







- Plasma LH remained elevated from 0.5 h to 4 h after GnRH treatment ($P \leq 0.01$) returning to baseline (≤ 0.5 ng/mL) by 8 h after treatment in all three groups.
- Plasma LH peaked at 1.5 h and remained above basal concentrations ($P < 0.0001$) up to 20 h after treatment in pLH-treated NS and FS cows.
- In pLH-treated PS cows, LH concentrations peaked at 3 h and only remained above baseline for to 10 h post-treatment ($P < 0.01$).

Conclusion

- Plasma LH concentrations in cows given 25 mg pLH remained elevated for a longer period than in cows given 100 µg GnRH.
- Whether giving pLH to superovulated cows will reduce variability in ovarian response and improve embryo quality remains to be seen.

Abbreviations

FSH: Follicle stimulating hormone

GnRH: Gonadotropin releasing hormone

LH: Luteinizing hormone

$PGF_{2\alpha}$: Prostaglandin $F_{2\alpha}$

pLH: Porcine luteinizing hormone

PRID: Progesterone-releasing intravaginal device

Acknowledgment

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References

[1]. Colazo et al., 2009; Theriogenology 72:262-270

[2]. Behrouzi, 2014; MSc thesis University of Alberta