

Development of ovulation synchronization and timed-AI in Japanese Black beef cows



Collaborative research between Osaka Prefecture University (Lab of Theriogenology) and Hyogo Prefecture Northern Center of Agricultural Technology

Background

Calving interval of Japanese Black beef cow is being extended

Cow number per farm is increasing

Aging of farmers

Lack of reproductive management (Heat detection is not well-done.)

Lowered conception rate

Method to do AI or ET without estrus detection?

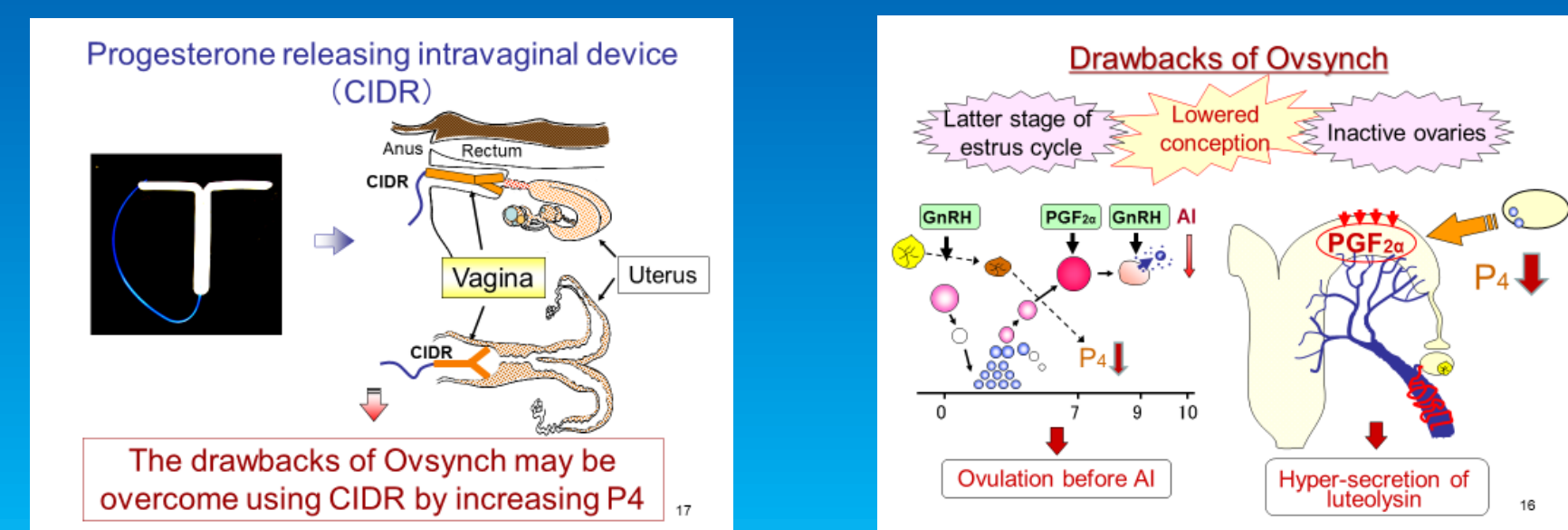


Background/Objective

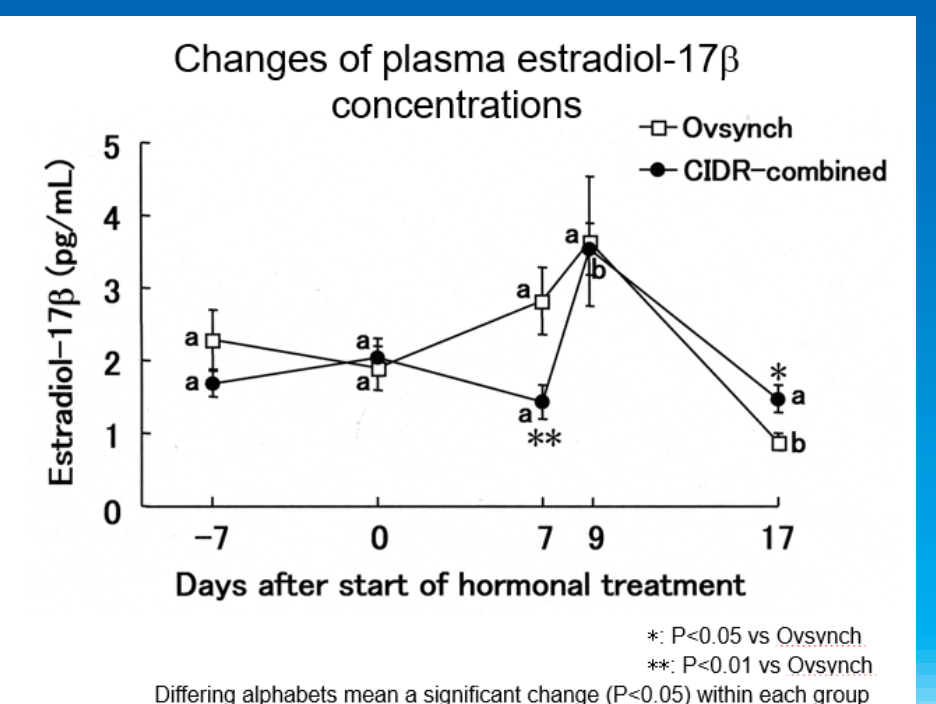
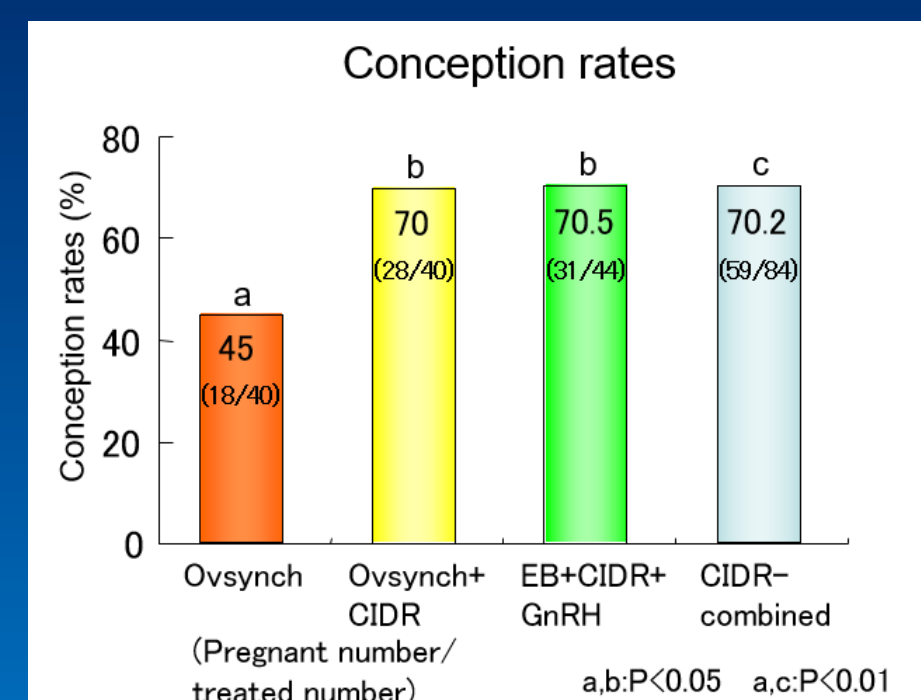
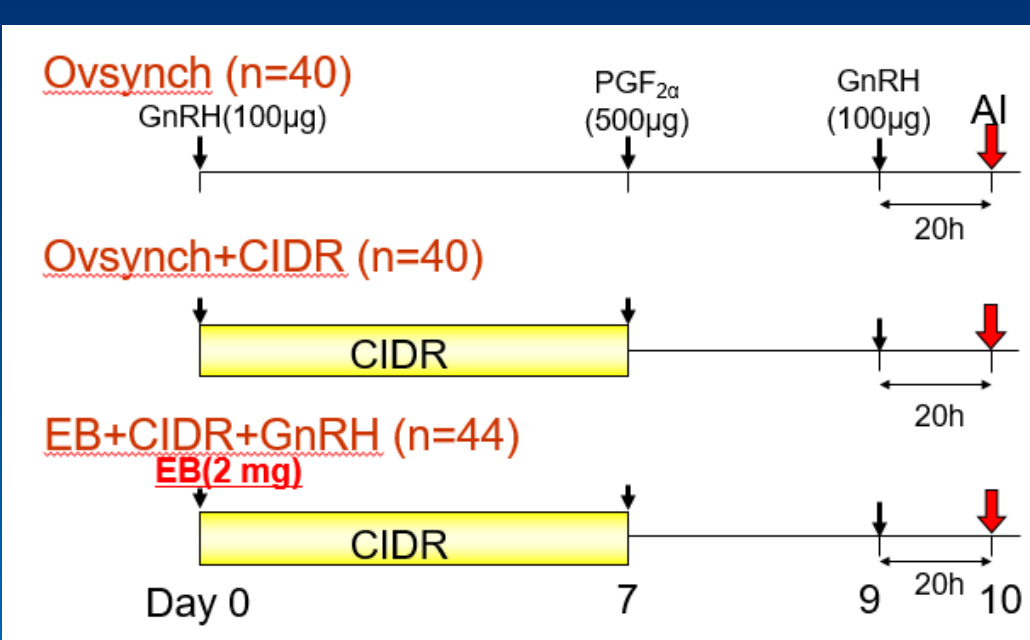
Ovulation synchronization + timed-AI (Ovsynch)

Lower conception rates occurred by Ovsynch in cases of latter stage of estrus cycle and ovarian quiescence

Can addition of progesterone releasing device (CIDR) improve conception rates by Ovsynch?

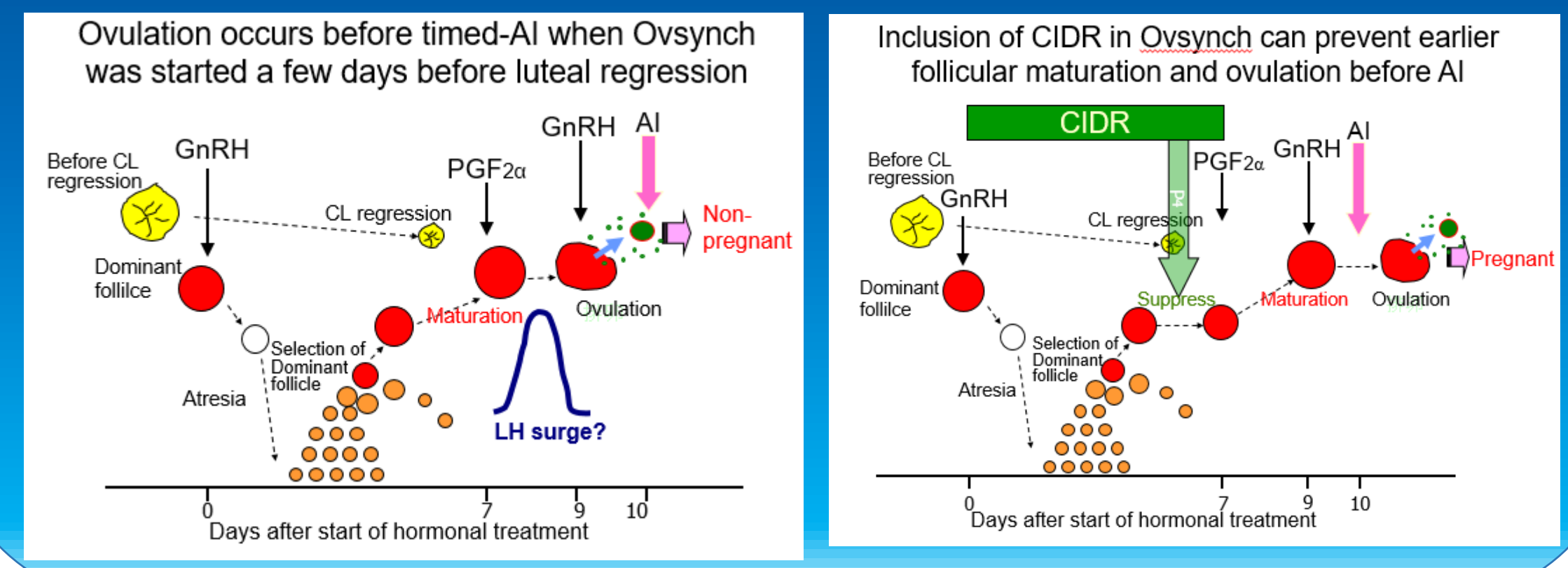
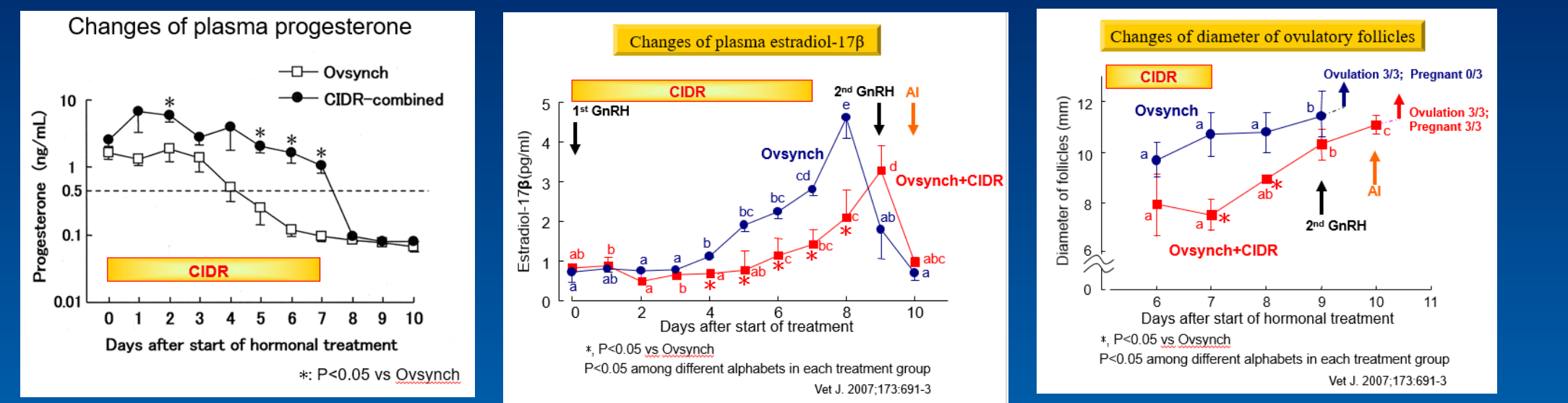


Timed-AI by Ovsynch+CIDR protocol

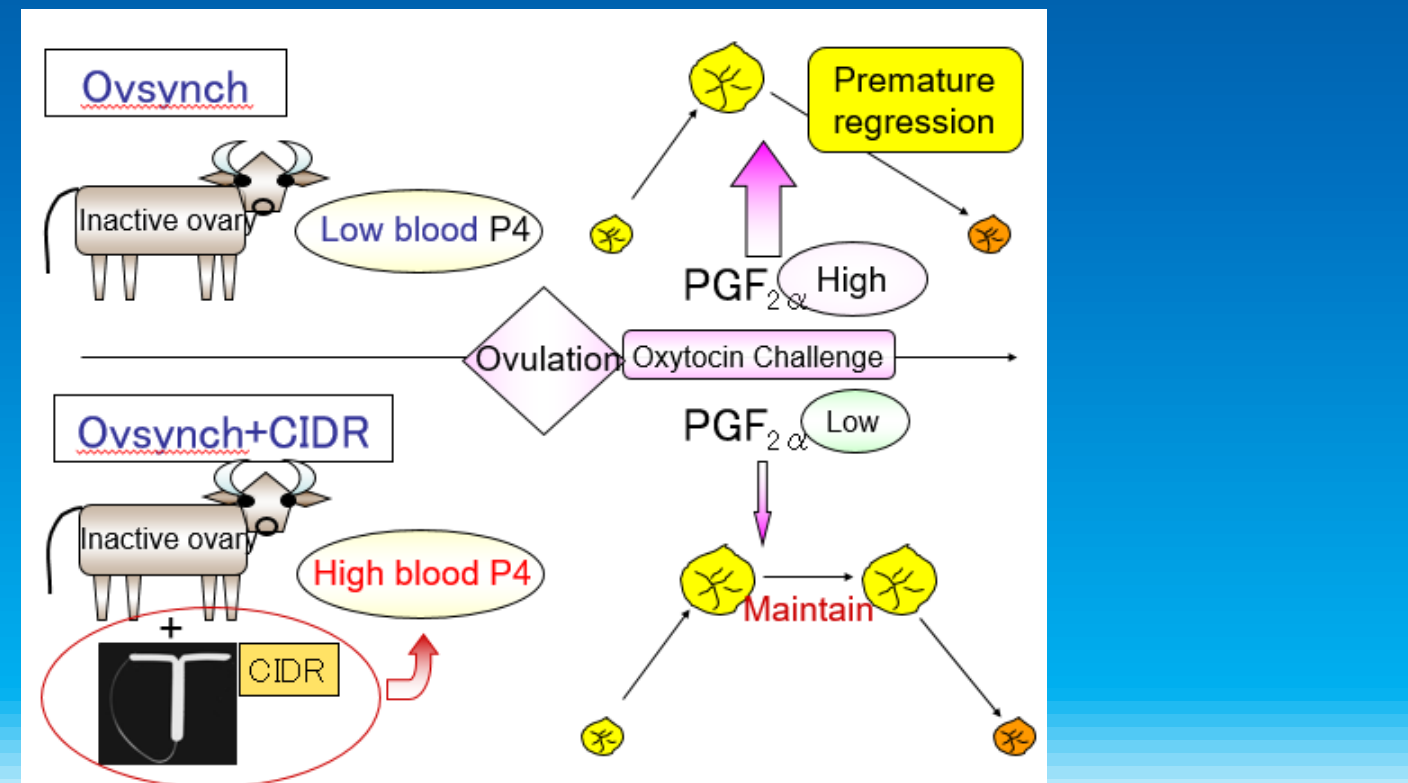
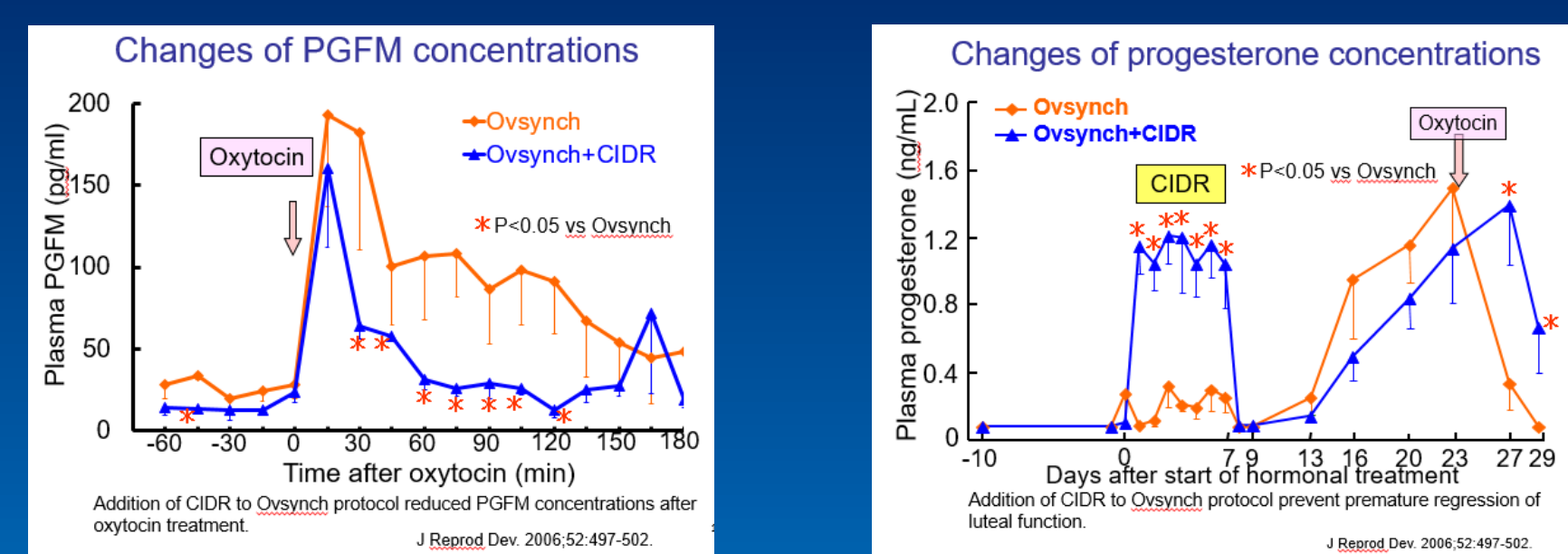


Treatment group	High E ₂	Low E ₂
Ovsynch	77.8% (7/9)	25.0 (7/12)
Ovsynch+CIDR	80.0 (12/15)	50.0 (3/7)
EB+CIDR+GnRH	86.7% (13/15)	28.6 (2/7)
Overall	82.1% (32/39)	30.8 (8/26)

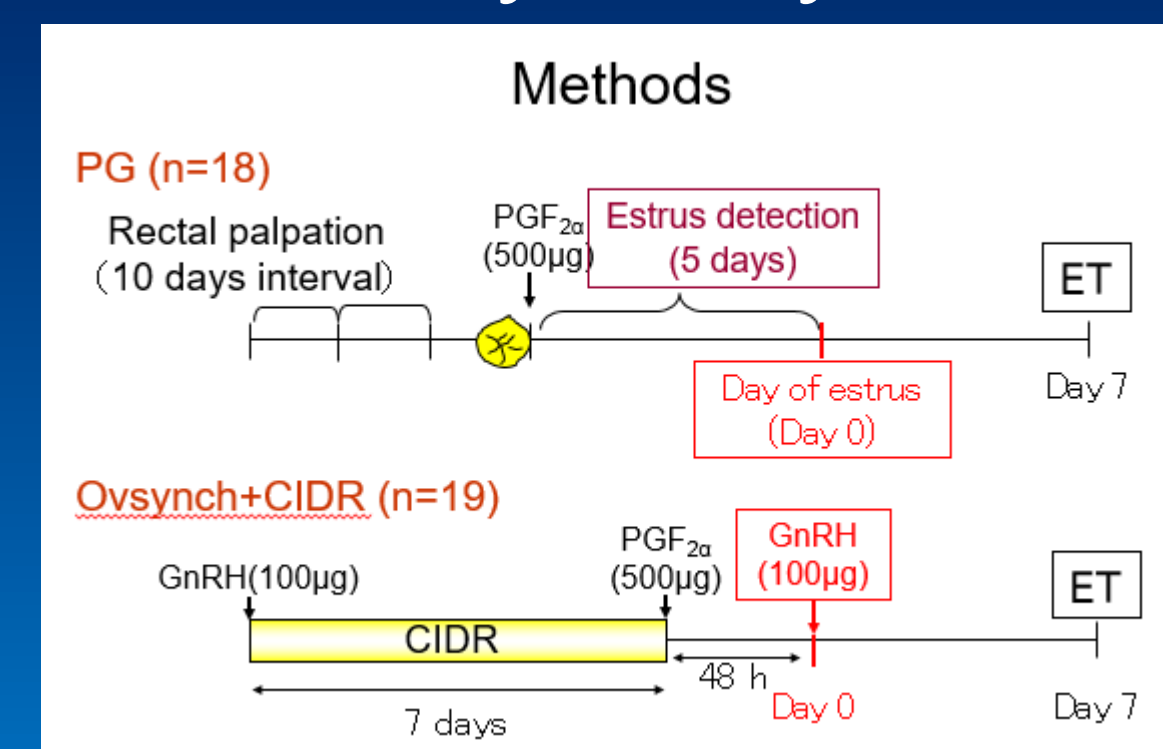
Effect of CIDR to prevent premature ovulation



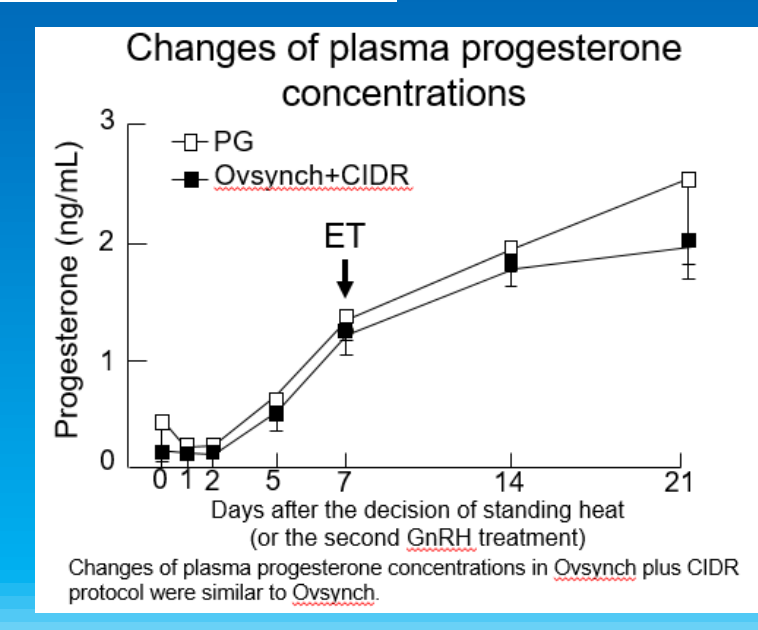
Effect of CIDR to inhibit PGF_{2α} hyper-secretion



Timed-ET by Ovsynch+CIDR



Treatment	Synchronized (Estrus or ovulation)	ET performed	Pregnancy
PG (n=18)	66.7% (12/18)	91.7 (11/12)	50.0 (9/18)
Ovsynch+CIDR (n=19)	100% (19/19)	100 (19/19)	57.9 (11/19)



Conclusions · Publications

Conclusions

- Ovulation synchronization / timed-AI protocols with CIDR improved conception rates of Japanese Black beef cows compared with those by Ovsynch alone.
- The protocols with CIDR inhibit premature ovulation occurred in non-pregnant cows by Ovsynch.
- Conception rates a day before timed-AI are higher for cows with higher plasma estradiol-17β concentrations.
- In case when the protocol begins at a few days before luteal regression the protocol with CIDR is able to prevent premature ovulation and optimize the timing of ovulation.
- The protocol can prevent a short-lived corpus luteum in early postpartum cows with quiescent ovaries by inhibiting PGF_{2α} secretion in the luteal phase after the synchronized ovulation.
- In the timed-ET by Ovsynch plus CIDR protocol, similar conception rates and luteal growth are achievable to those by conventional estrus synchronization with PGF_{2α} alone.

Publications in academic journals

- Kawase N, Uemasa K, Takahashi M, Inaba T, Yamada H. Comparison of plasma concentrations of estradiol-17β and progesterone, and conception in dairy cows with cyclic estrous disease between Ovsynch and Ovsynch plus CIDR timed AI protocols. J Reprod Dev. 2011;32(12):1487-92.
- Kawase N, Uemasa K, Takahashi M, Inaba T, Yamada H, Sawada T. Ovsynch plus CIDR protocol for timed embryo transfer in incised postpartum Japanese Black beef cows. J Reprod Dev. 2007;32(4):511-7.
- Kawase N, Nakagawa C, Fukushima M, Noda M, Takada K, Ueno S, Inaba T, Kida K, Yamada H, Sawada T. Inhibitory effects of CIDR-based ovulation synchronization protocols on uterine PGF_{2α} secretion at the following luteal phase in early postpartum non-cycling beef cows. J Reprod Dev. 2006;31(4):497-502.
- Kawase N, Nakagawa C, Fukushima M, Noda M, Takada K, Ueno S, Inaba T, Kida K, Yamada H, Sawada T. Prevention effects of CIDR-based protocols on premature ovulation before timed AI in Ovsynch in cycling beef cows. Vet J. 2007;162(3):491-3.
- Kawase N, Nakagawa C, Fukushima M, Noda M, Takada K, Ueno S, Inaba T, Kida K, Yamada H, Sawada T. Relation between plasma 17β-E₂ concentrations during treatment with CIDR-based or Ovsynch protocol for timed AI and conception in early postpartum Japanese Black beef cows. J Reprod Dev. 2006;31(4):491-6.
- Kawase N, Nakagawa C, Fukushima M, Noda M, Takada K, Ueno S, Inaba T, Yamada H, Sawada T. Effect of CIDR-based protocols for timed AI on the conception rate and uterine functions of Japanese Black beef cows in the early postpartum period. Theriogenology. 2006;64(12):1147-51.
- Kawase N, Inami T, Choshi T, Saito T, Wada T, Matsuzaki K, Uemasa K, Tanaka N, Yamada H, Inaba T, Yamada H, Inaba T, Sawada T. Improved conception in timed AI using estrus synchronization with progesterone-releasing intravaginal device and Ovsynch protocol in postpartum beef Japanese Black beef cows. Theriogenology. 2004;61(2-3):399-406.

Prevailing of Ovsynch+CIDR protocol and economic gain (NOSAI Hyogo Awaji Island)

