Hormones and the oestrus cycle

Hormones used to control the oestrous cycle have been developed from naturally occurring hormones produced by the cow. They provide the means by which farmers can take more control over reproduction in the dairy herd. Many of these products provide the opportunity to shorten calving-to-conception intervals and some provide the opportunity to increase conception rates. A greater awareness of these products and how they work may help farmers make better use of them. However, it is important to discuss the best way to use these products with your veterinarian and they should only be administered in conjunction with your vet.

Hormone products fall into these groups:

- Prostaglandins (e.g. Estrumate, Lutalyse, Prosolvin)
- Progesterones (e.g. CIDR, Crestar)
- Oestrogens (e.g. Cidirol, Oestradiol, ODB capsules)
- Gonadotrophin-releasing hormones (e.g. Cystorelin, Fertagyl)

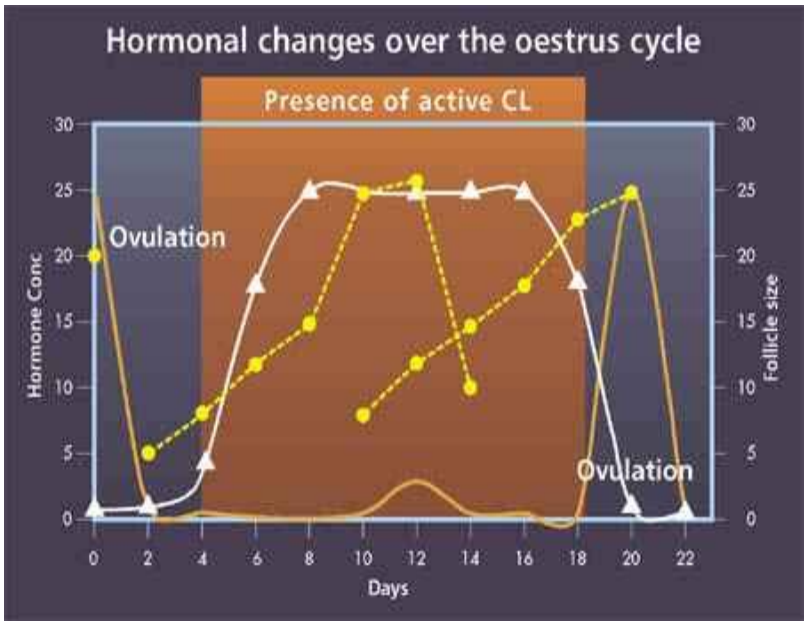
All these groups work in different ways to control the oestrous cycle.

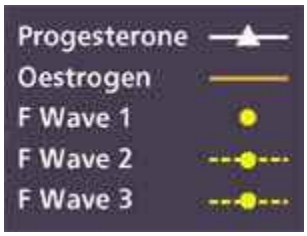
This brief overview of treatments is provided to alert farmers to the potential to improve production through control of the oestrous cycle.

These treatments can now be used to:

- get most anoestrus cows to cycle
- synchronise oestrus
- treat cows with ovarian cysts
- make cows more fertile.

Careful use of these products can enhance farm productivity.





The Oestrus Cycle (above)

The egg (oocyte) grows inside a follicle. Follicles grow in waves, and there are usually three waves during a 21-day cycle. Although 20-50 follicles begin growing, one follicle grows to a larger size, dominating the others which die off. In the third wave the dominant follicle goes on to release an egg (ovulation). Oestrogen is produced by the dominant follicle and causes the signs of heat. Following ovulation, a corpus luteum (CL) forms where the follicle was. The corpus luteum produces progesterone which primes the cow to display heat.

Prostaglandins

Prostaglandins are produced in the animal through an interaction between the ovary and the uterus. They are very powerful hormones that cause the corpus luteum (CL) to lyse (or be removed). Prostaglandins are used to remove the active CL and allow cows to come on heat. Prostaglandins only work to bring cows on to heat when a CL is present.

Prostaglandin products are used to:

- bring cows on to heat
- produce abortions in cows less than 5 months pregnant
- induce calving in the last few weeks of pregnancy
- treat some types of ovarian cysts.

Prostaglandins when used in programs can reduce the calving-to-conception interval by stimulating cycling cows to show oestrus and may help to slightly increase conception rates.

Progesterone

Progesterone is naturally produced by the CL of the ovary. The corpus luteum forms after the ovary releases an egg and develops over 5 days to the stage when it produces amounts of progesterone in sufficient amounts to control the cycle.

The Progesterones (CIDR and Crestar) act to mimic the action of the active corpus luteum in producing progesterone.

Progesterone is essential in the animal for:

- priming the cow to display heat?
- controlling the number of follicles that grow in the ovary
- maintaining a pregnancy.

Progesterone products are used in conjunction with oestrogens and prostaglandins:

- to control the oestrus cycle and bring cows into heat
- to treat non-cycling cows and induce them to cycle and be fertile
- to treat some forms of ovarian cysts.

Progesterones can be used to synchronise oestrus and can get non-cycling cows to cycle.

Oestrogens

Oestrogens are naturally produced at the time of oestrus, that is, when cows are on heat. They are produced by the dominant follicle. Many of the signs of heat result from the actions of oestrogens. There is a small increase in oestrogen concentrations on Day 12 of the cycle, coinciding with the second follicular wave reaching maturity. This small increase causes the corpus luteum to eventually lyse and consequently allows heat to occur on Day 21 of the cycle.

Oestrogens are essential in the animal:

- for cows to show heat
- to remove the corpus luteum.

Oestrogen products are used to:

- remove the corpus luteum
- remove a dominant follicle
- ovulate a mature follicle.

Oestrogens can be used in conjunction with progesterones and prostaglandins to more effectively control the oestrus cycle and to get non-cycling cows to cycle.

GnRH

Gonadotrophin releasing hormones are produced by the brain and act on a gland in the base of the brain called the pituitary gland. The effects of this hormone include a better development of the corpus luteum, a stimulus for the corpus luteum to produce progesterone and the ovulation of dominant or mature follicles.

GnRH products are used to treat:

- cystic ovarian disease
- repeat breeder cows (cows that fail to get pregnant after three or more breedings) and is the only proven treatment for them.

GnRH is used in conjunction with prostaglandins in fixed-time synchrony programs. It can decrease calving-to-conception intervals and increase the fertility of cows.

Ref: *Ian Lean, Bovine Research Australia*