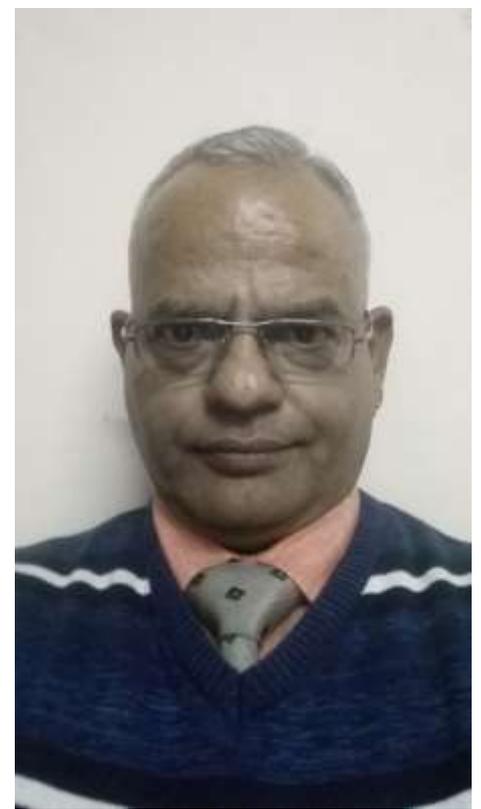


Prof G N Purohit



**Estrus synchronization in
domestic farm animals**

Benefits of Estrus Synchronization

- Bringing a large number of animals in estrus at nearly the same time is estrus synchronization
- Saving labor- Avoiding estrus detection
- Planned matings – Timed inseminations
- Planned calvings
- Shortened calving periods
- Uniformity of calves

Structures that regulate estrus

- Dominant Follicle
- Corpus luteum



Approaches

- Extending the luteal phase or terminating the luteal phase
Progestins or prostaglandins
- Controlling the CL
- Control the Dominant Follicle and initiation of new follicular wave

Optimum Management

- Cows should be well fed
- Regularly cyclic
- Grouping for estrus synchronization
 - » Heifers
 - » Post partum cows
 - » Anestrus non pregnant cows

Synchronization Methods

Method	Tradename	Utilization
Gonadotropins	Cystorelin Fertagyl Buserelin	Mature females
Prostaglandins	Estrumate Lutalyse Prostamate	Cycling females
Progestins	MGA CIDR	Pre-pubertal heifers Post-partum or Anestrous females

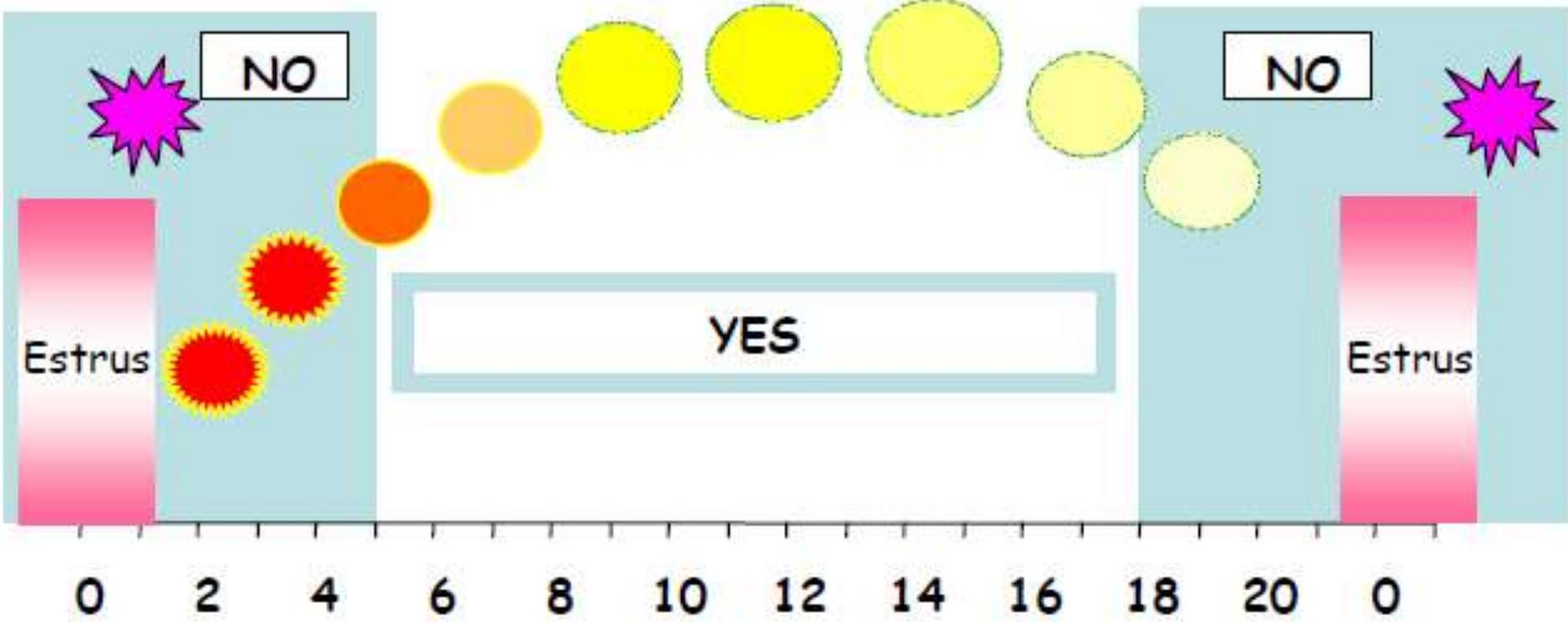
Prostaglandins

Prostaglandins

- Naturally occurring hormone that causes regression of the CL (luteolysis) and decreases progesterone secretion
- Can expect estrus within two days following injection

Principle of PGF_{2a} Use

- **Regress active corpus luteum**
 - » **Only effective on day 5 - 17 corpus luteum**
 - » **Not effective on days:**
 - ✓ **1 - 4 (CL not responsive)**
 - ✓ **18 - 21 (CL already regressed)**



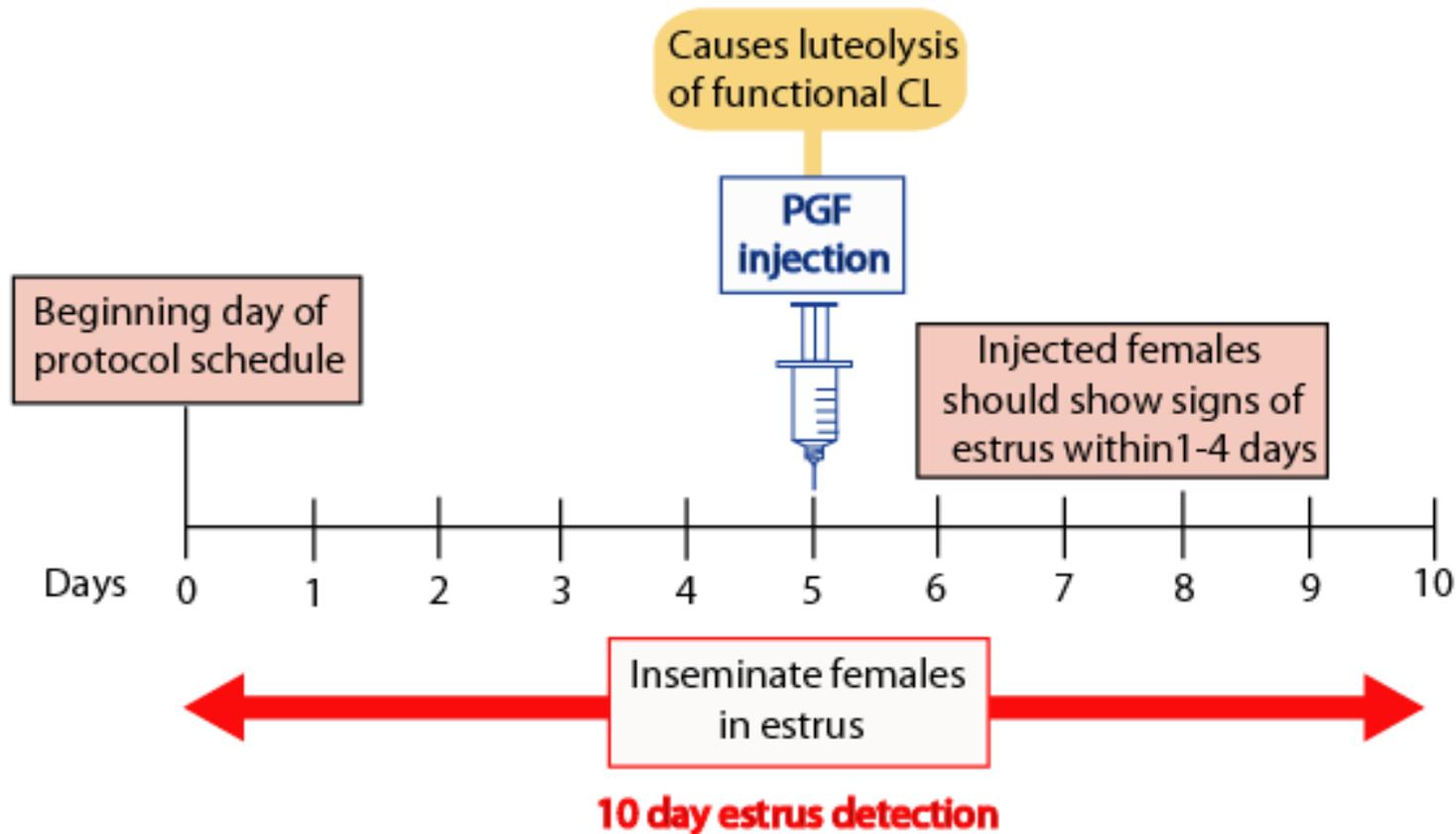
Prostaglandins: PGF2a

Lutalyse - Natural compound 25 mg dose I.M.

Estrumate - Analogue 500 µg dose I.M.

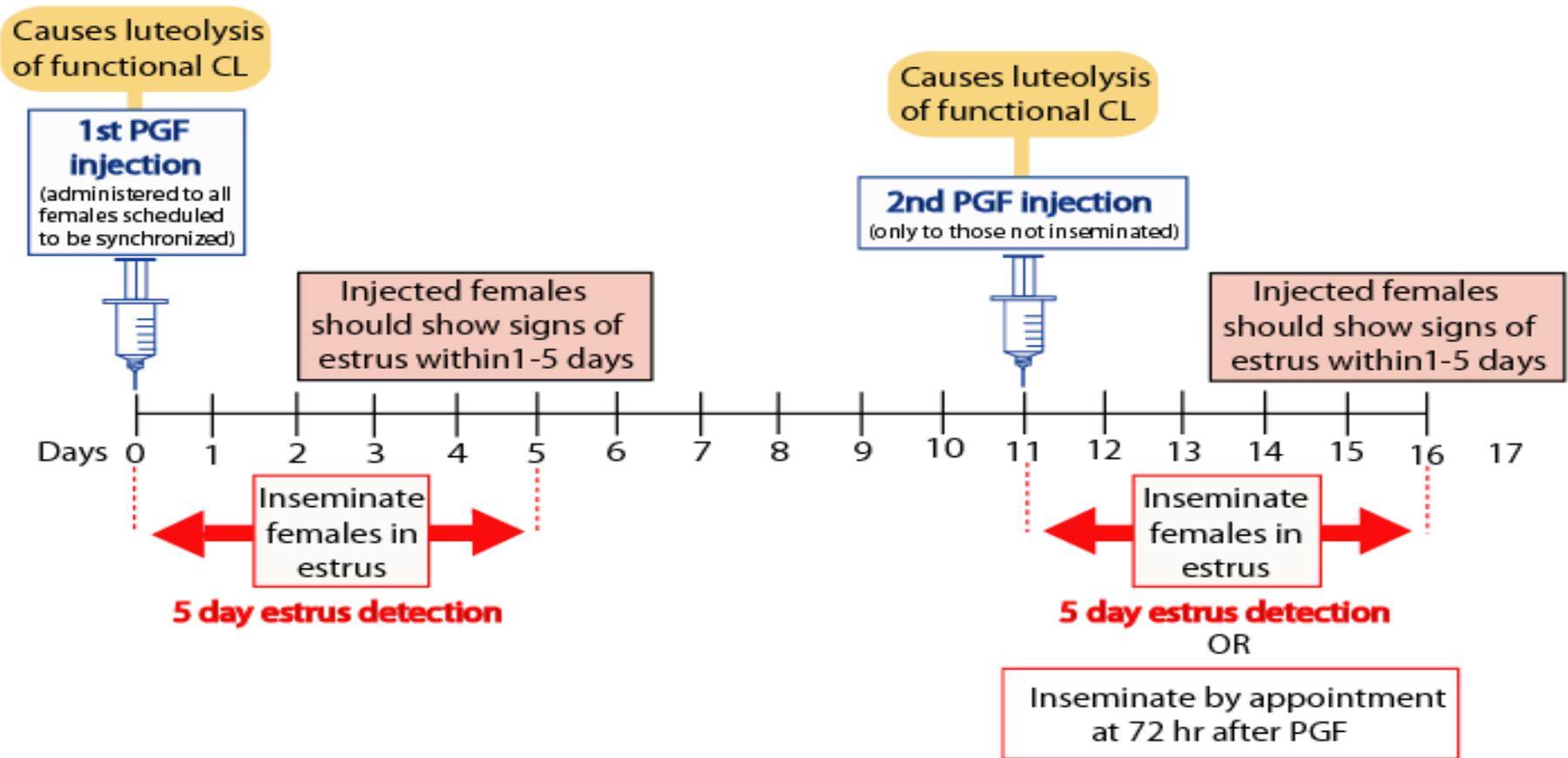
Lustin - Analogue 500 µg dose I.M.

Protocol for One Injection of Prostaglandin (PGF)



Females that have been inseminated prior to day 5 should not be administered PGF injection unless abortion is desired.

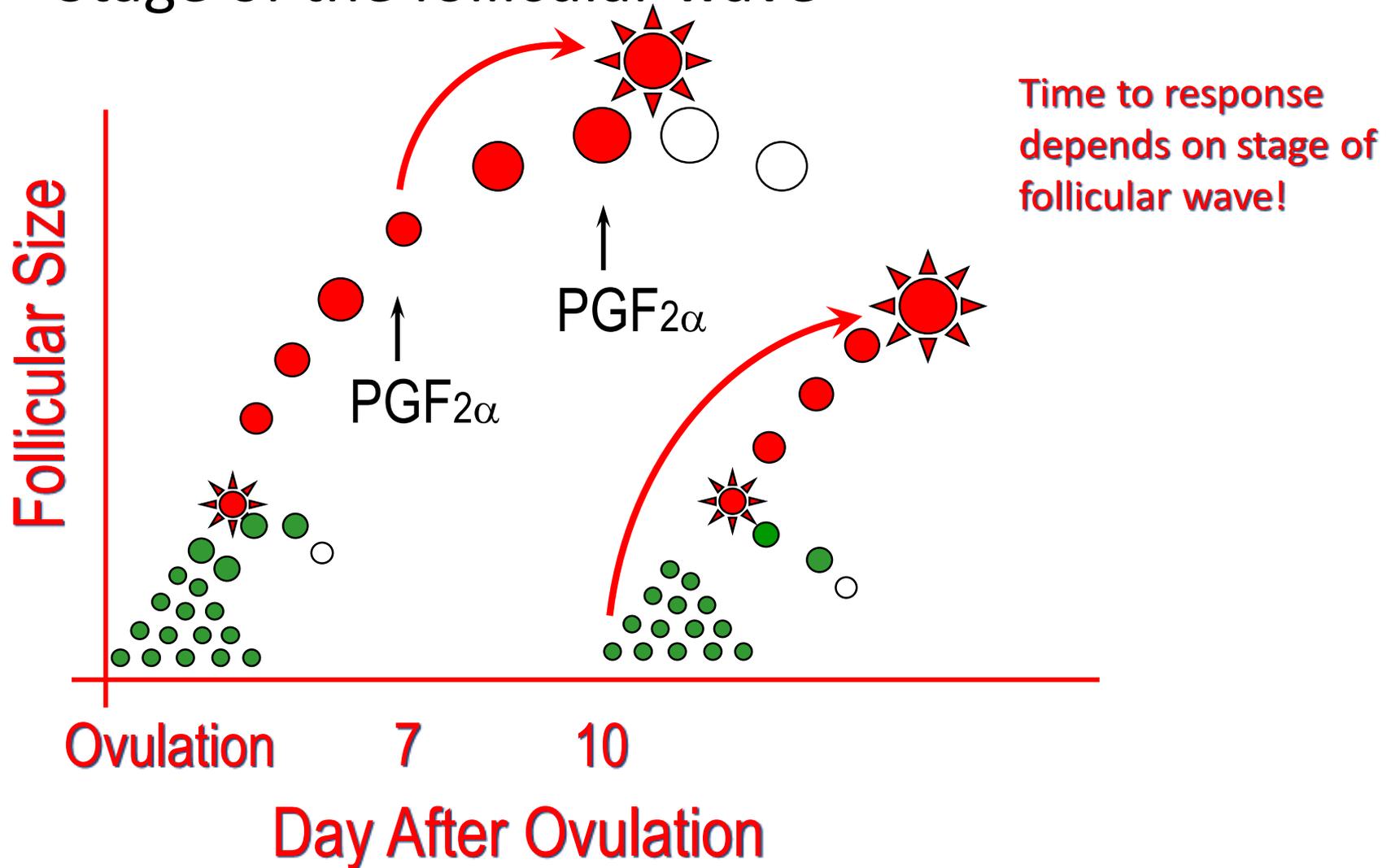
Protocol for Two Injections of Prostaglandin (PGF) with Split Insemination



Females that have been inseminated prior to day 11 should not be administered PGF injection unless abortion is desired.

Reasons for Variation in Response

- Stage of the follicular wave



- Heifers react faster than cows
 - Follicular growth is faster in heifers
- Animals may be pregnant
- No CL may be present – **Anestrus**

- Brahman cattle respond poorly to the two injection system of PGF2a

Management Considerations

- Have proper facilities to handle animals
- Good reproductive records
- Have enough A.I. technician help
 - One technician/100 cows will cause problems
 - Should be around 30-50 cows/technician
- Anestrus cows don't respond to PGF2 α
 - No CL!!!!!!
 - Be sure cows & heifers cycling
- Use good fertility semen

Breeding

Conception Rate

1. Breed 72-80 hours after
2nd injection (FTAI)

31 - 80%

2. Breed based on estrus
detection after PGF_{2a}

67%

Use of Progestogens

- Progestagens have been specially useful for estrus synchronization of
- Treatment of cycling heifers or cows with low levels of a progestin, following luteolysis, resulted in the formation of persistent follicles that had a large diameter, extended lifespan, and increased production of estradiol

Mechanisms of action of progestins

- Progesterone concentrations are maintained at a relatively constant level during the seven days the insert is in the vagina. Upon removal of the insert, progesterone concentrations are quickly eliminated.
- The progesterone treatment blocks ovulation of a DF and also suppresses its dominance. Thus a new follicular wave is initiated

- Suppresses LH surge and estrus behavior
Effective method for treating anestrus
- -increases DF development
- -primes estrus expression and LH surge

Administration:

Injection

Time Consuming

Feed

Mix in ration

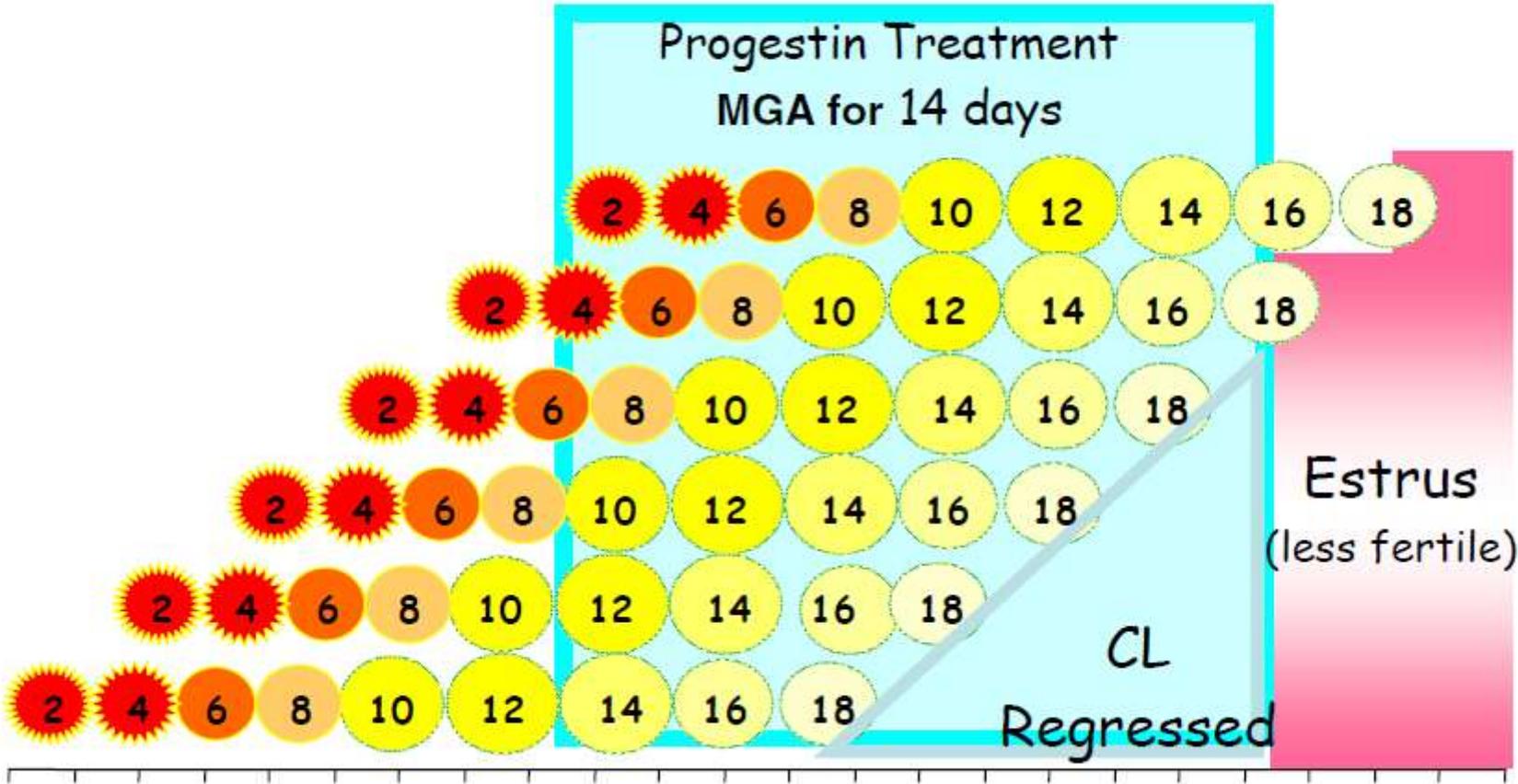
Ear Implant

Place in ear

**Vaginal Pessary or
Controlled Internal
(CIDR)**

**Placed in
Vagina
Drug Release**

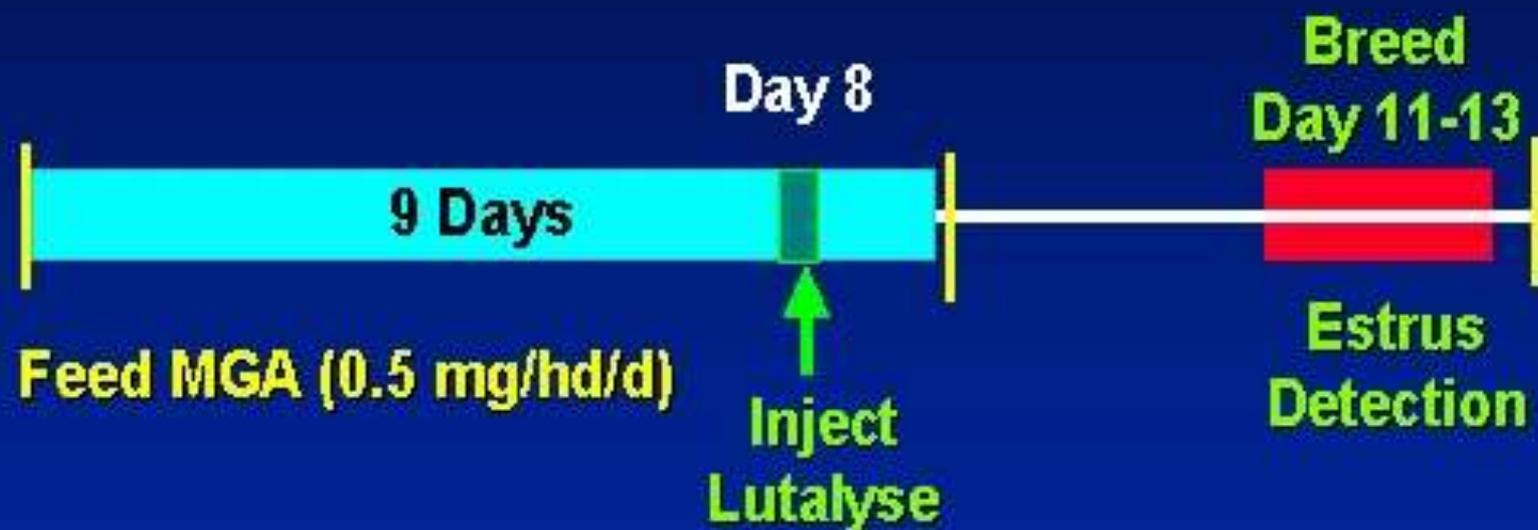
Oral feeding of melengesterol to heifers 14 days



Disadvantages of oral feeding for 14 days

- Persistent follicles

MGA + Lutalyse for Synchronization

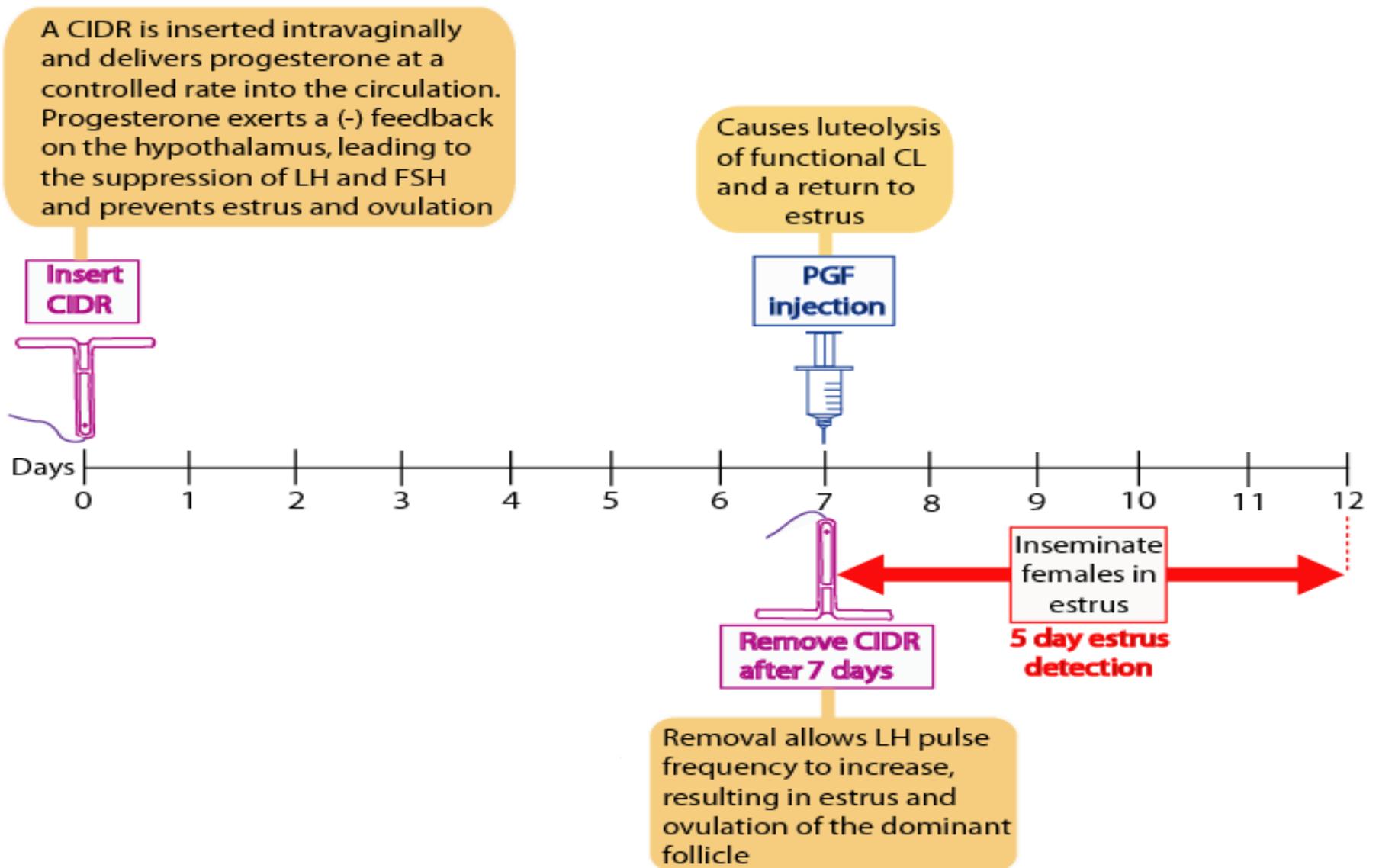


Advantage and Disadvantage: Must be feeding the animals grain!!

Progesterone Vaginal Implants

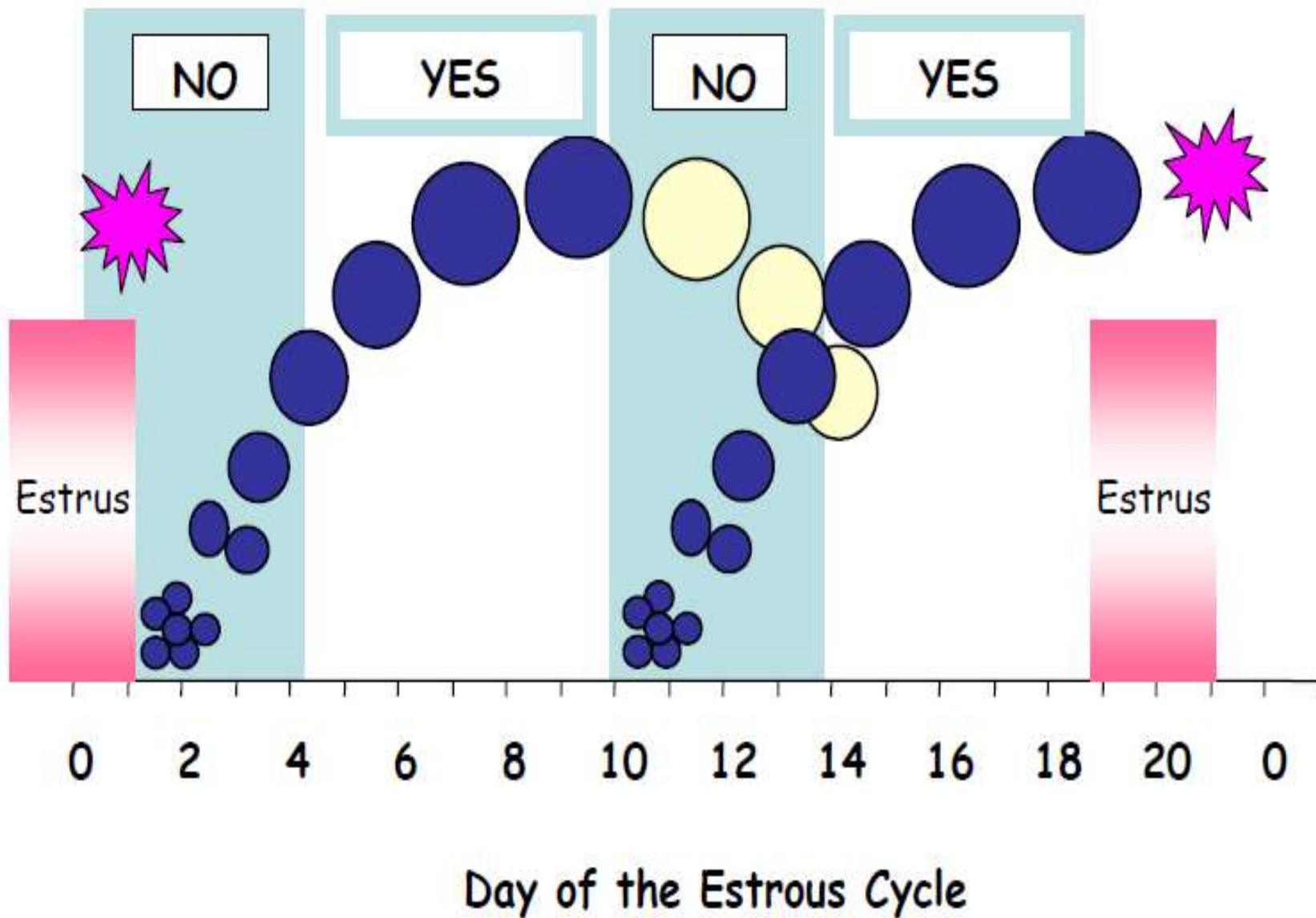
- CIDR-B
- TRIU-B
- PRID

Controlled Internal Drug Release (CIDR) Protocol for Estrus Synchronization



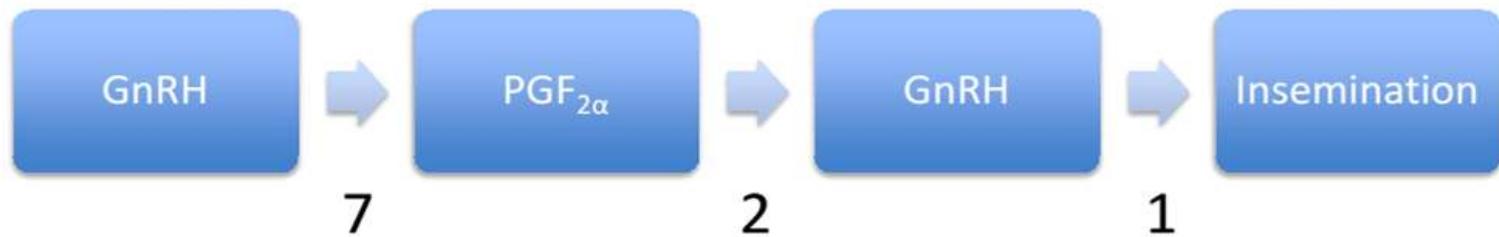
GnRH Based Protocols

- Principle:
- GnRH-induced LH release causes ovulation or
- luteinization of the physiologically mature DF
- –Loss of the DF leads to emergence of a new
- follicular wave
- Destruction or ovulation of a dominant follicle results in a transient rise in circulating concentrations of FSH and subsequent initiation of a new follicular wave. PG administered 7 days later induces estrus and a second GnRH 2 days later assures ovulation.



- OVSYNCH
- SELECT SYNCH
- CO SYNCH

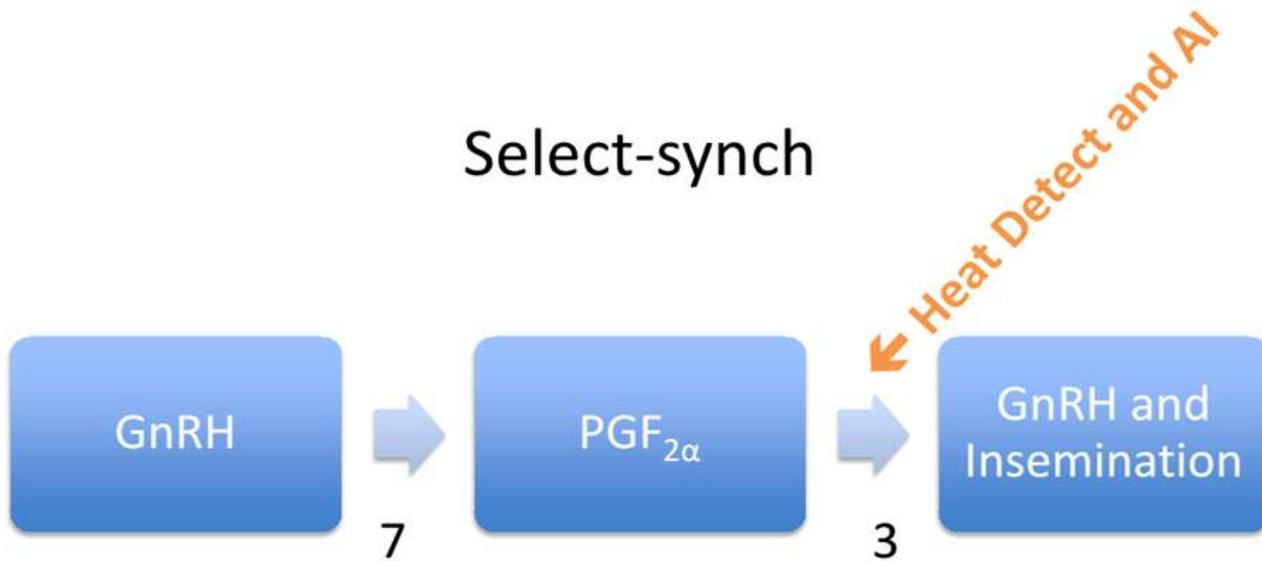
Ovsynch



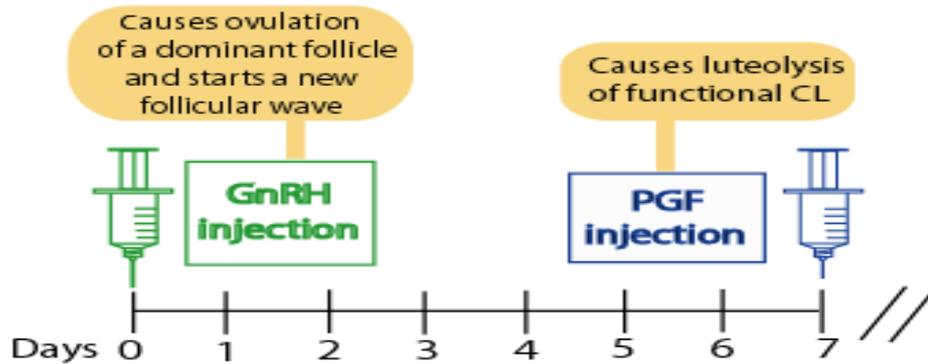
Cosynch



Select-synch

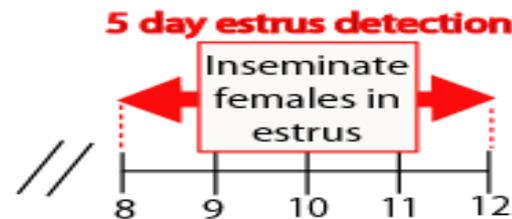


GnRH Synchronization Protocols

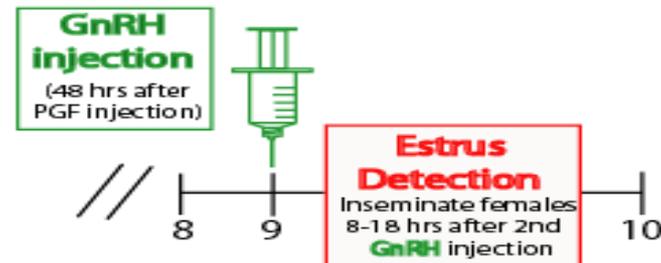


Basic **GnRH** synchronization protocols (*Select Synch, Ovsynch, Cosynch*) begin with the same format of an initial **GnRH** injection followed by a **PGF** injection 7 days later. Differences are derived from timing of insemination, estrus detection, parity, and hormone administration.

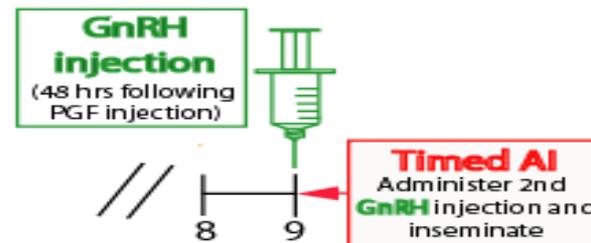
Select Synch



Ovsynch



Cosynch



Estrus synchronization for heifers

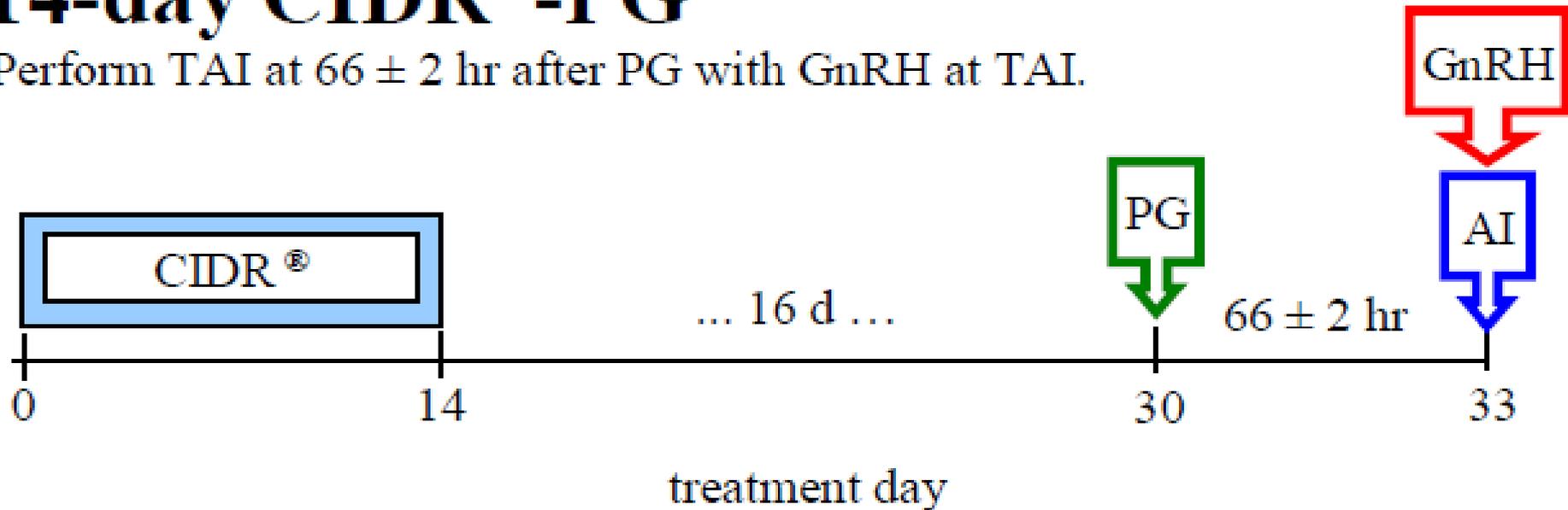
Synchronizing Heifers

- Ovsynch success low
 - 50-60% synch rate
- Progesterone + PGF_{2α}
 - Synchronization, but may not improve conception rate or pregnancy rate
- MGA + PGF_{2α}
 - Takes a long time, but good pregnancy rates, cheap, and little labor required

Estrus synchronization for heifers

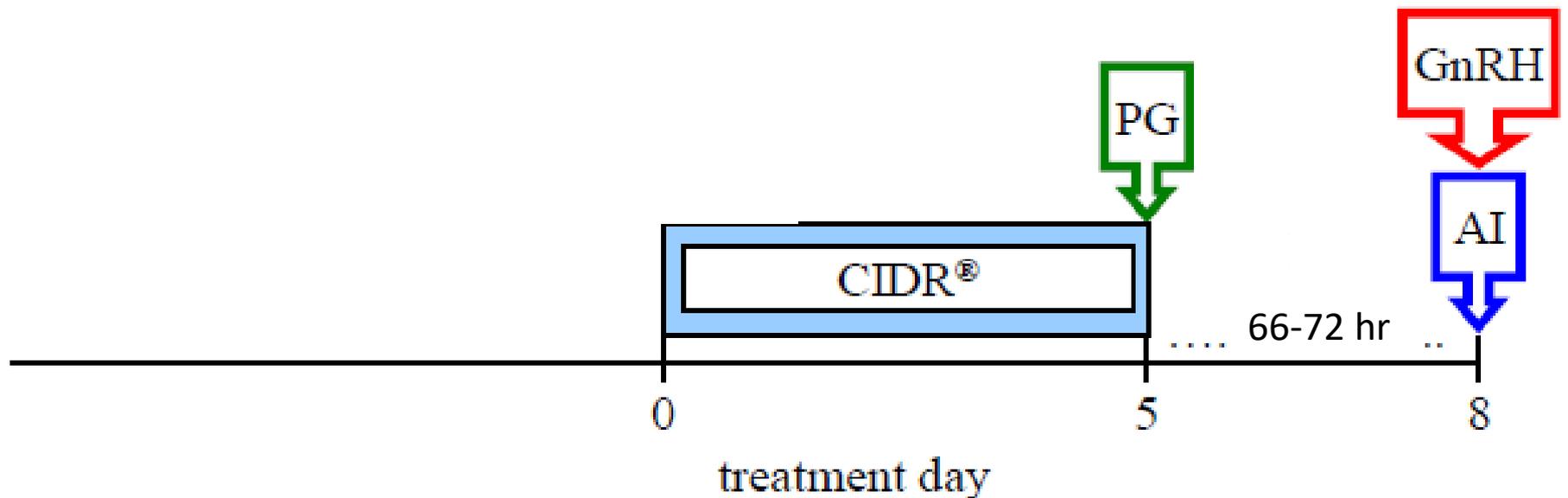
14-day CIDR[®]-PG

Perform TAI at 66 ± 2 hr after PG with GnRH at TAI.



5-day PG + CIDR

Perform TAI at 72 ± 2 hr after CIDR removal with GnRH at TAI.



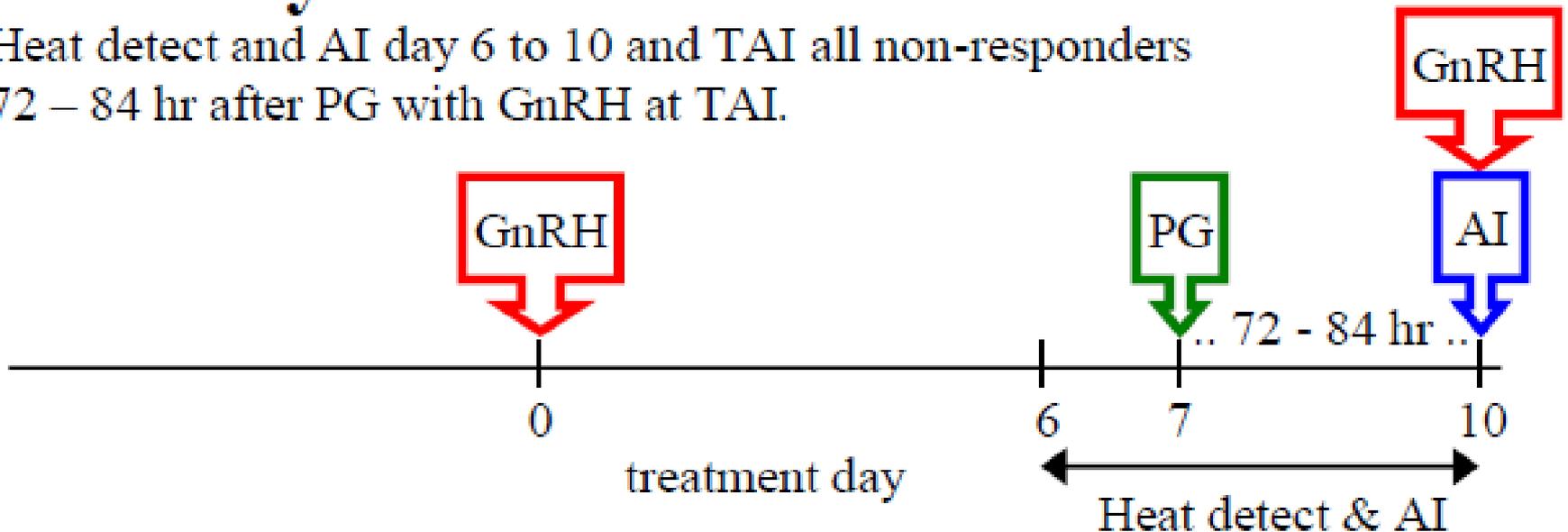
Cow Systems

With heat detection

If Most of the Cows are Cyclic....

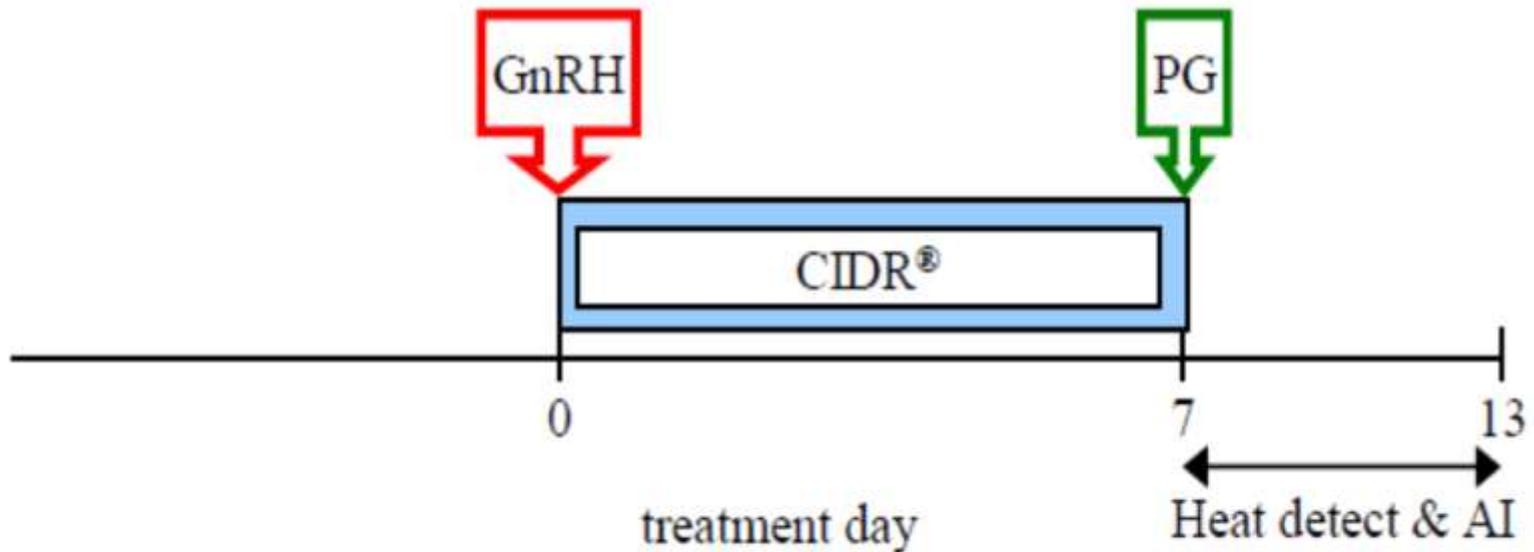
Select Synch & TAI

Heat detect and AI day 6 to 10 and TAI all non-responders
72 – 84 hr after PG with GnRH at TAI.



If Most of The Cows Are Anestrus...

Select Synch + CIDR[®]



- GPG + Progesterone

- Prevents premature estrus expression during 7 days between first GnRH and PGF_{2α}
- Benefits anovulatory and cystic cows
- Improves overall synchrony and pregnancy rate

Estrus synchronization in buffaloes

- PG and Ovsynch protocols useful in the breeding season only
- Progesterone treatments along with estradiol, eCG, PG and GnRH more useful during non-breeding seasons.
- Day 0----- Day 9 -----Day 11----- Day 12
- PRID/CIDR+E2 eCG + PG GnRH or hCG (AI)

Estrus synchronization in sheep and goats

- Non-breeding season
- Use progestagen/progesterone impregnated vaginal devices
- Use the ram effect
- Use melatonin Melovine/Regulin Implants

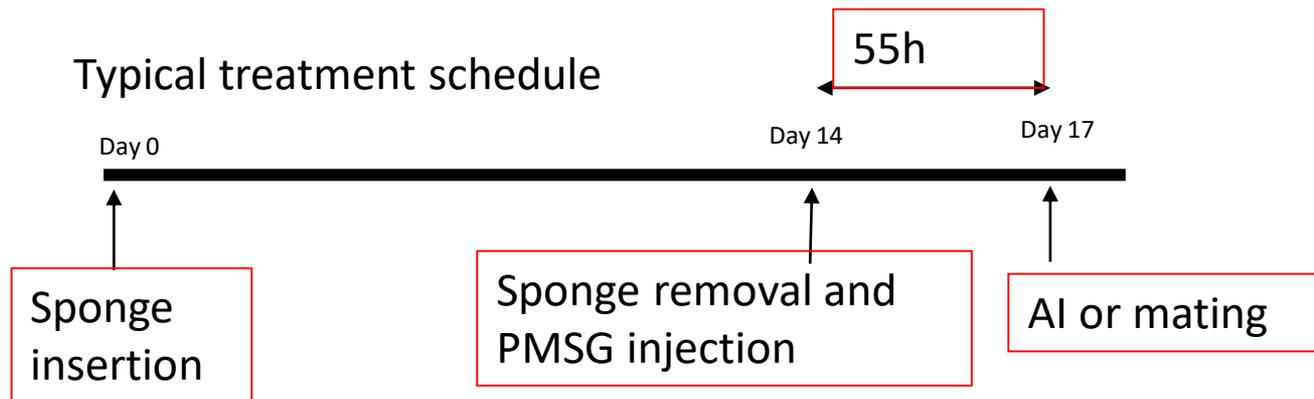
Use progestagen/progesterone impregnated vaginal devices

- Three types of devices are available: cronolone (20mg) impregnated sponges (Chronogest CR, MSD AH), Methyl Acetoxy Progesterone (60mg) impregnated sponges and CIDR(0.3g progesterone)

SHEEP

- ***Use progestagen/progesterone impregnated vaginal devices***

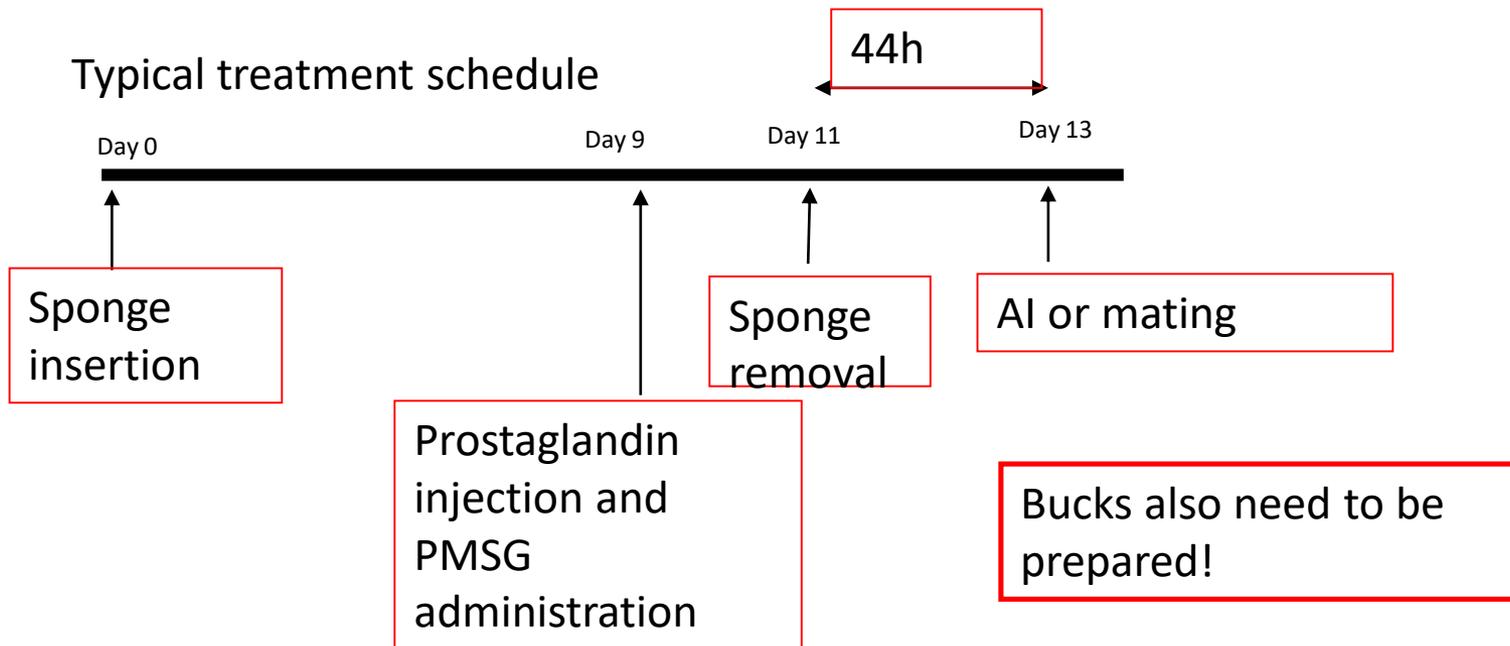
Three types of devices are available: cronolone (20mg) impregnated sponges (Chronogest CR, MSD AH), MAP (60mg) impregnated sponges and CIDR(0.3g progesterone)



If mating is used, preparation of the rams (flushing, light treatment or melatonin) and a suitable ewe to ram ratio are needed

GOAT

Three types of devices are available: cronolone (20mg) impregnated sponges (Chronogest CR, MSD AH), and CIDR



**Use PMSG at removal of
progestagen/progesterone impregnated vaginal
devices**

**Use Androvax, a vaccine against an ovarian
steroid**

Breeding season

Use of Ovsynch type protocols

Use of double prostaglandin protocols

Estrus synchronization in sows

- Gilts PG600 estrus within 5-8 d
- Oral Feeding of metallibure 19 d estrus in 5-8 d
- Allyl trenbolone (Regumate) 10-15 mg/gilt/day
Mixed in feed for 18 d
- Norgestomet ear implant
- Estradiol benzoate 5-15 d followed by PG

Estrus synchronization in mares

- Light treatment 60 W incandescent bulb for 1 month

Deslorelin 1.5 mg IM once

Domperidone 1.1 mg/kg PO SID for 10-14 days

Sulpiride 1.0 mg/kg IM SID or BID

Induction of ovulation – hCG effective only after follicle is 30 mm

Single GnRH ineffective

Termination of luteal phase (Use prostaglandins)

Estrus synchronization in camels

- PG effective during breeding season
- GnRH less effective
- Oral allyl trenbolone (Regumate)
- hCG is needed as ovulation is induced
- hCG followed by PG

- The above lectures are also explained in video lectures at my YouTube Channel Govind Narayan Purohit
- Kindly share the videos and subscribe to my channel if you like them
- Thanks