



# **Estrous Cycle And Its Stages**

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- Rhythmic sexual behavior patterns develop in female animals on attainment of puberty.
  - This behavior change i.e. sexual receptivity is called **estrus**, a Greek term which means mad-desire.
  - The combination of physiological events which begin at one estrus period and end at the next is termed as **estrous cycle**.
  - Day of estrus is considered as day zero of the cycle.

# Estrous cycle

Follicular phase

Luteal phase

Proestrus

Estrus

Metestrus

Diestrus

# Proestrus

- Immediately precedes estrus phase.
- Characterized by follicular growth, regression of CL and increased production of estrogen.
- Estrogen increases blood supply of genital tract, thus, produces edema of genitalia.
- Uterus enlarges very slightly, endometrium becomes congested and oedematous, increased glandular secretory activity.

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- Vaginal mucosa becomes hyperaemic.
  - In bitches, number of cell layers in epithelium increase and superficial layers become cornified.
  - Also, vulval edema, hyperaemia and proestrual bleeding.

# Estrus

- Period of acceptance of male.
- Onset and end are defined and can be accurately measured, thus, used as reference points for determining the cycle length.
- The uterine, cervical and vaginal glands secrete increased amounts of mucus; the vaginal epithelium and endometrium become hyperaemic and congested; the cervix is relaxed.

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- Ovulation occurs in all species except in cows (12 hours after end of estrus).
  - Behavioural signs of estrus:
    - Restlessness
    - Loss of appetite
    - Bellowing
    - Frequent micturition
    - Mounting behaviour (Standing heat)
    - Decreased milk production
  - Mucus discharge (clear, stringy)

# Metestrus

- Follows cessation of estrus.
- Granulosa cells of ovulated follicle give rise to lutein cells.
- Formation of corpus luteum.
- Scanty discharge, blood tinged (Metestrual bleeding).
- If fertilization occurs, mucus secretion from uterine glands increases.

# Diestrus

- Phase of CL and progesterone dominance.
- Development of mammary gland and uterine myometrium.
- Uterine glands produce thick, viscid fluid (uterine milk) for nourishing zygote.
- CL regresses after 15-16 days, if fertilization fails.

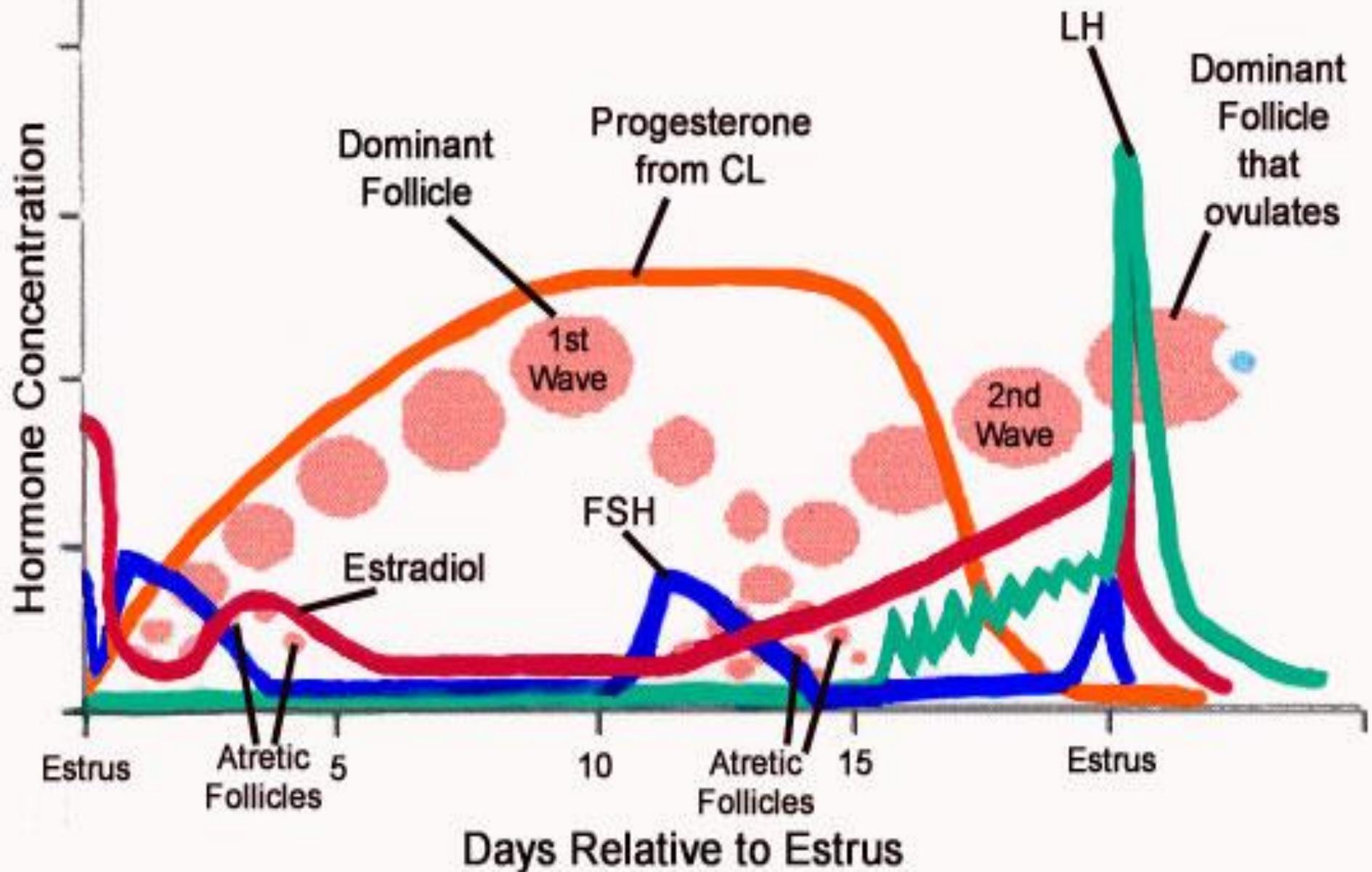
# Anestrus

- Prolonged period of sexual rest, genital tract quiescence.
- Minimal follicular development.
- CL regressed and non-functional.
- Scanty and tenacious secretions.
- Constricted cervix and pale vaginal mucosa.

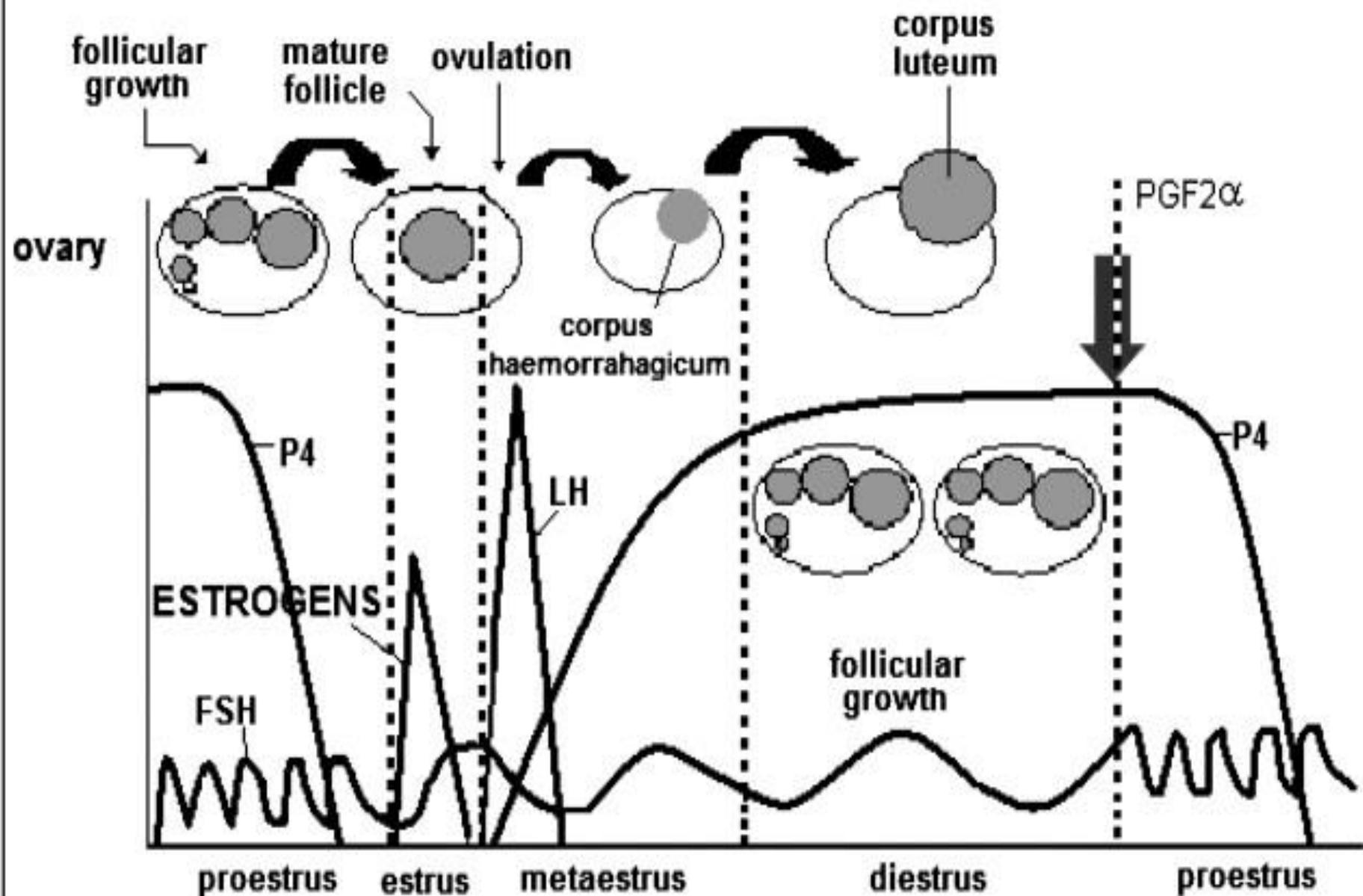
# Estrus- cycle, estrus and time of ovulation in some of the domestic animals

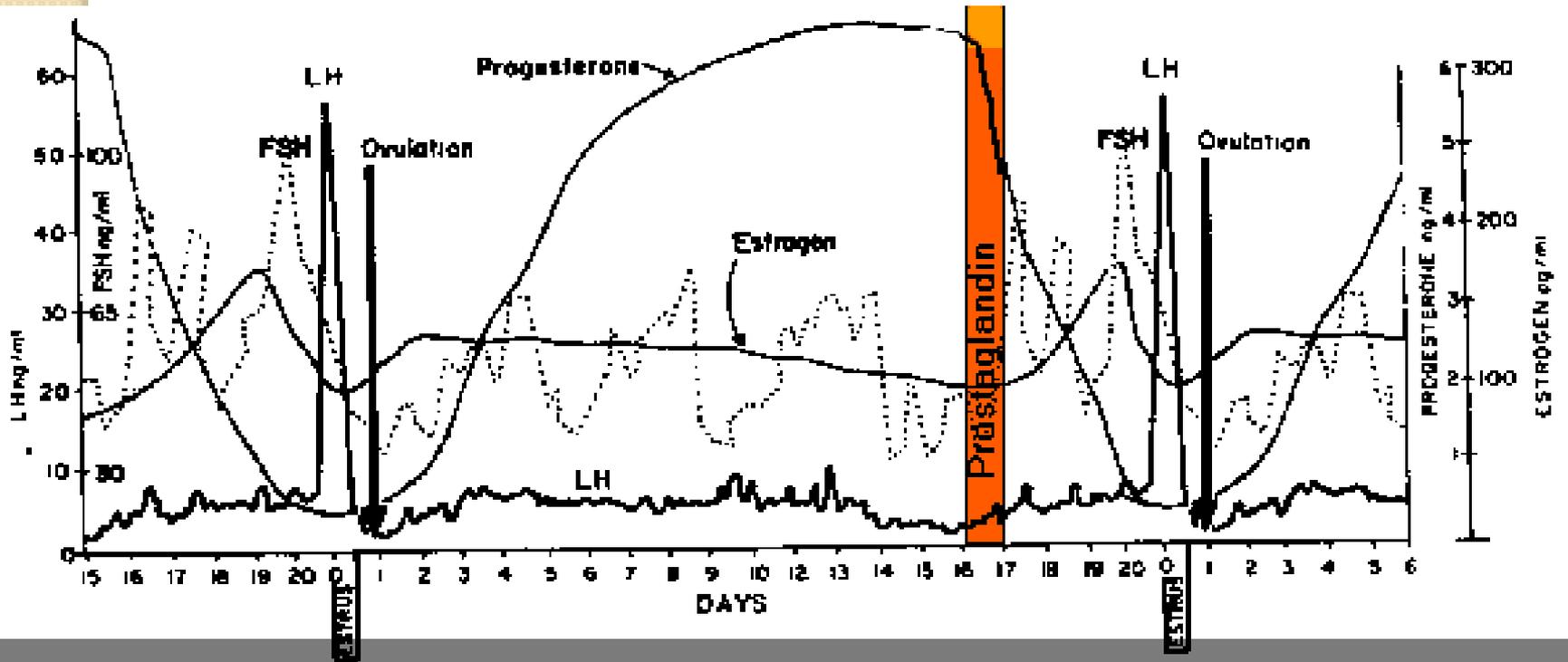
Species	Length of Estrous Cycle (days)	Duration of Estrus	Time of ovulation
<b>Cow</b>	21-22	18-19 hrs	10-11 hours after the end of estrus
<b>Mare</b>	19-25	4-8 hrs	1-2 days before the end of estrus
<b>Ewe</b>	16-17	24-36 hrs	24-30 hours from the beginning of estrus
<b>Goat</b>	21	32-40 hrs	30-36 hours from the beginning of estrus
<b>Sow</b>	19-20	48-72 hrs	35-45 hours from the beginning of estrus
<b>Bitch</b>	Size dependent	7-9 days	1-2 days after onset of estrus
<b>Queen</b>	16	5-6 days	Induced 14-36 hours after coitus

# The Estrous Cycle in Cattle



# Endocrine regulation of the bovine estrous cycle





**Thank  
You**

