

Goat Reproductive Hormones

Kiko Goat AI Conference
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Puberty in Does

- Bucks can reach puberty as early as 4 months of age
 - Age at which bucks start producing spermatozoa
- Doelings can reach puberty between 7 to 12 months of age
 - Age at which doelings exhibit first signs of estrus (this is not first estrous cycle!)
 - Can be influenced by genetics, body weight, level of feeding/nutrition, overall health status, etc.
 - Usually 60-75% of mature body weight

Vocabulary

- **ESTROUS**
 - Refers to the entire reproductive cycle
 - Follicular development
 - Luteal formation and regression
 - An adjective
 - "The length of the estrous cycle in the dairy goat is 21 days"
- **ESTRUS**
 - Period of "heat" or sexual receptivity
 - A noun
 - "The doe is displaying signs of estrus"

The Estrous Cycle

- Does are seasonally polyestrous
 - Short day breeders
 - Dwarf goats often nonseasonal
- Estrous cycle begins with the start of estrus and ends at subsequent estrus
 - The estrous cycle IS NOT the same thing as the human menstrual cycle!
- Describes both follicular and luteal events on the ovary

Important Ovarian Structures

- Dominant Antral (Graafian) Follicle
 - Secretes large amounts of estradiol
- Corpus Hemorrhagicum
 - "bloody body" that is like a blood clot
 - Transitional structure formed after ovulation with no real function
- Corpus Luteum (CL)
 - "Yellow body"
 - Secretes progesterone that maintains pregnancy
- Corpus Albicans
 - "white body" composed of scar tissue
 - Forms after luteolysis

Estrus

- Average estrus duration is 36 hr
- Can range from 24-48 hr depending on age, breed, season, and presence of a male
 - Breed-specific estrus duration has been reported for Mossi (20 hr), Angora (22 hr), Creole (27 hr), French Alpine (31 hr), Boer (37 hr), and Matou (58 hr) breeds
- Ovulation can occur anytime from 24-36 hr after the onset of estrus, typically toward the end of standing estrus.
 - Ovulation rate varies based on breed, season, and nutrition

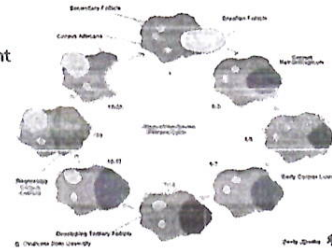
Estrus Detection

- Symptoms of does in heat are:
 - Does that are unusually aggressive, noisy, or active
 - Females that stand to be mounted by herd mates
 - Frequent urination
 - Wags tail rapidly
 - Decreased appetite
 - Decreased milk production
 - Swollen vulva with clear mucous discharge



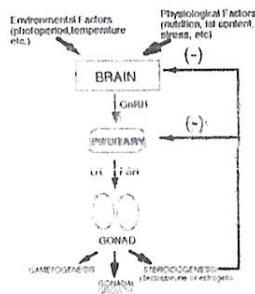
Estrous Cycle

- Follicular phase
 - Follicle development
 - Estrus
 - Ovulation
- Luteal phase
 - CL formation
 - Luteolysis



Important Hormones

- Gonadotropin Releasing Hormone (GnRH)
- Luteinizing Hormone (LH)
- Follicle Stimulation Hormone (FSH)
- Testosterone (T)
- Estradiol (E₂)
- Progesterone (P₄)
- Prostaglandin (PGF_{2α})
- Oxytocin (OT)
- Prolactin (PRL)



Hormone Function

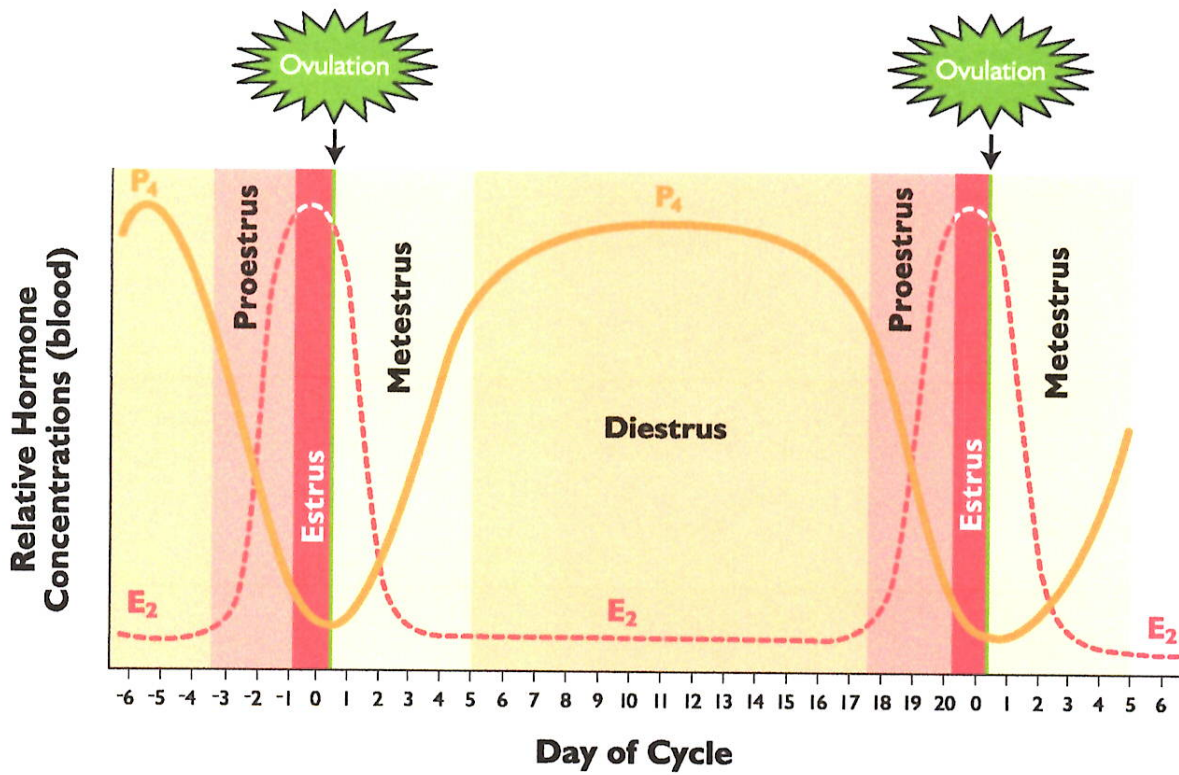
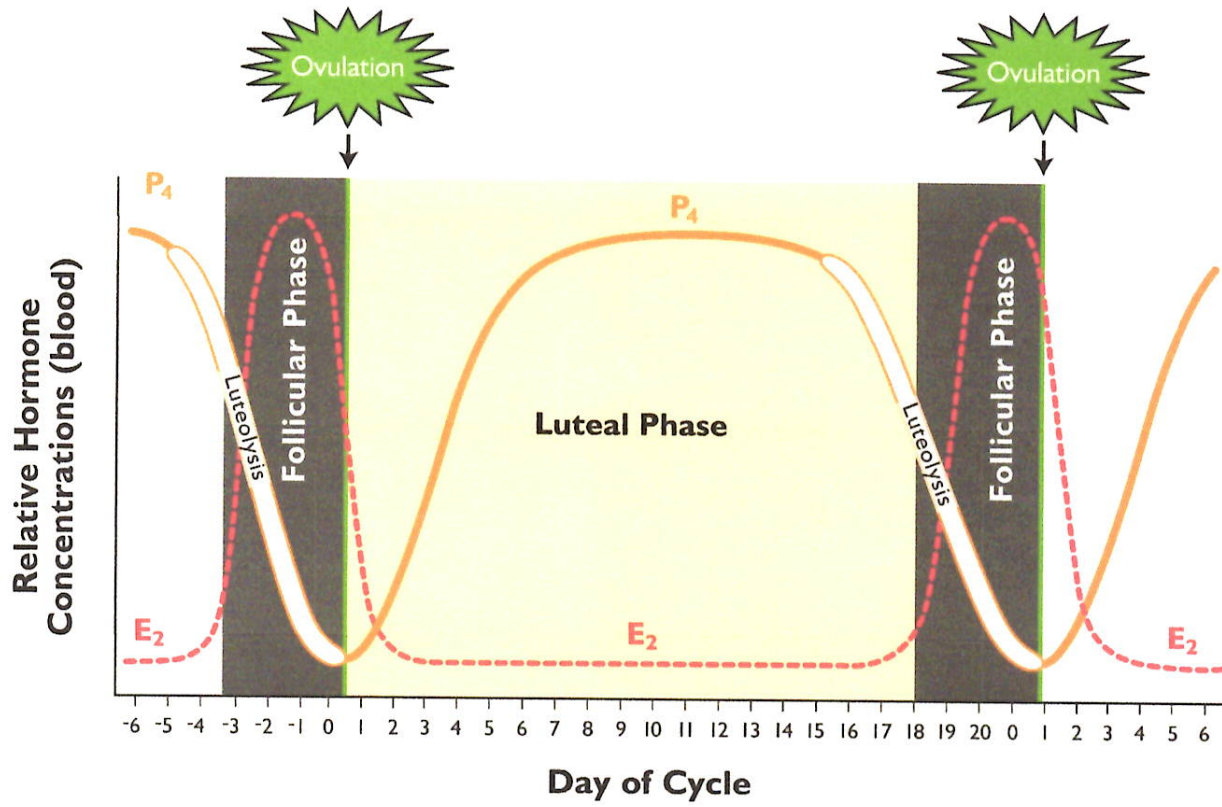
- Gonadotropin releasing hormone
 - Secreted by the hypothalamus in the brain
 - Controls hormone cyclicality in the doe
- Luteinizing Hormone
 - Secreted by the Anterior Pituitary
 - Causes ovulation in the doe
 - Stimulates the release of estradiol (ovary) or testosterone (testis)
- Follicle Stimulating Hormone
 - Secreted by the anterior pituitary
 - Causes follicular development (doe) and spermatogenesis (buck)

Hormone Function

- Testosterone
 - Produced by the Leydig cells in the testis
 - Causes secondary sex characteristics and sex drive in males
- Estradiol
 - Produced by the dominant (Graafian) follicles on the ovary
 - Causes estrus signs/behavior
- Progesterone
 - Produced by the corpus luteum (ovary)
 - Maintains pregnancy
- Prostaglandin
 - If does do not recognize pregnancy, the uterus secretes prostaglandin F_{2α}
 - Causes lysis of the CL (ovary)- resulting in a return to estrus, or spontaneous abortion

Hormone Function

- Oxytocin
 - Secreted by the posterior pituitary
 - Causes milk let down and uterine contractions (female) and epididymal contractions (male)
- Relaxin
 - Secreted by the CL (ovary) and the placenta
 - Widens the pelvis, softens the cervix, and relaxes the uterine musculature (doe)



(Figures from Senger, Pathways from Pregnancy to Parturition)