

The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The main title is centered in the upper half of the slide.

# **REPRODUCTION IN THE CANINE AND FELINE**

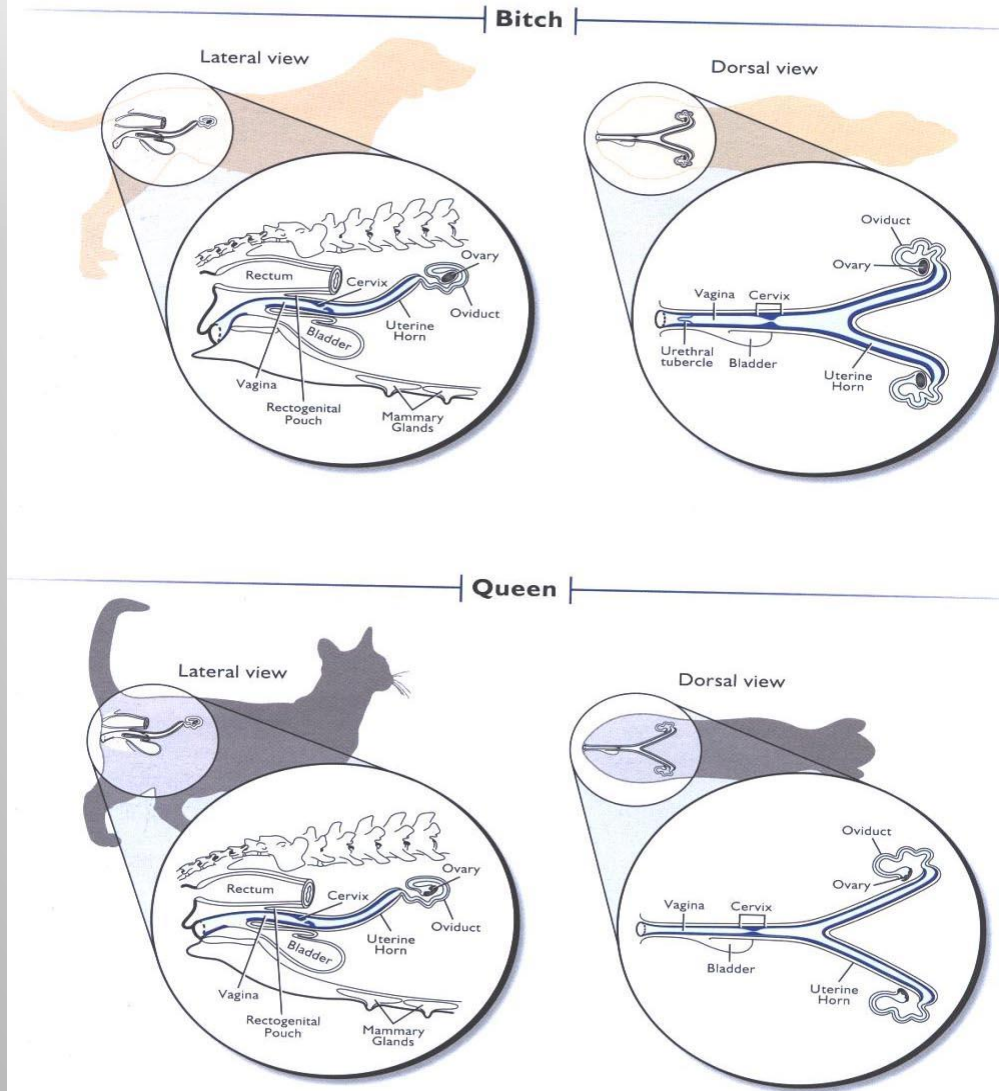
*A.K.GOUDARZI, D.V.M. PH.D*  
*DEPARTMENT OF BASIC SCIENCES*  
*I.A. UNIVERSITY*

# CANINE REPRODUCTION

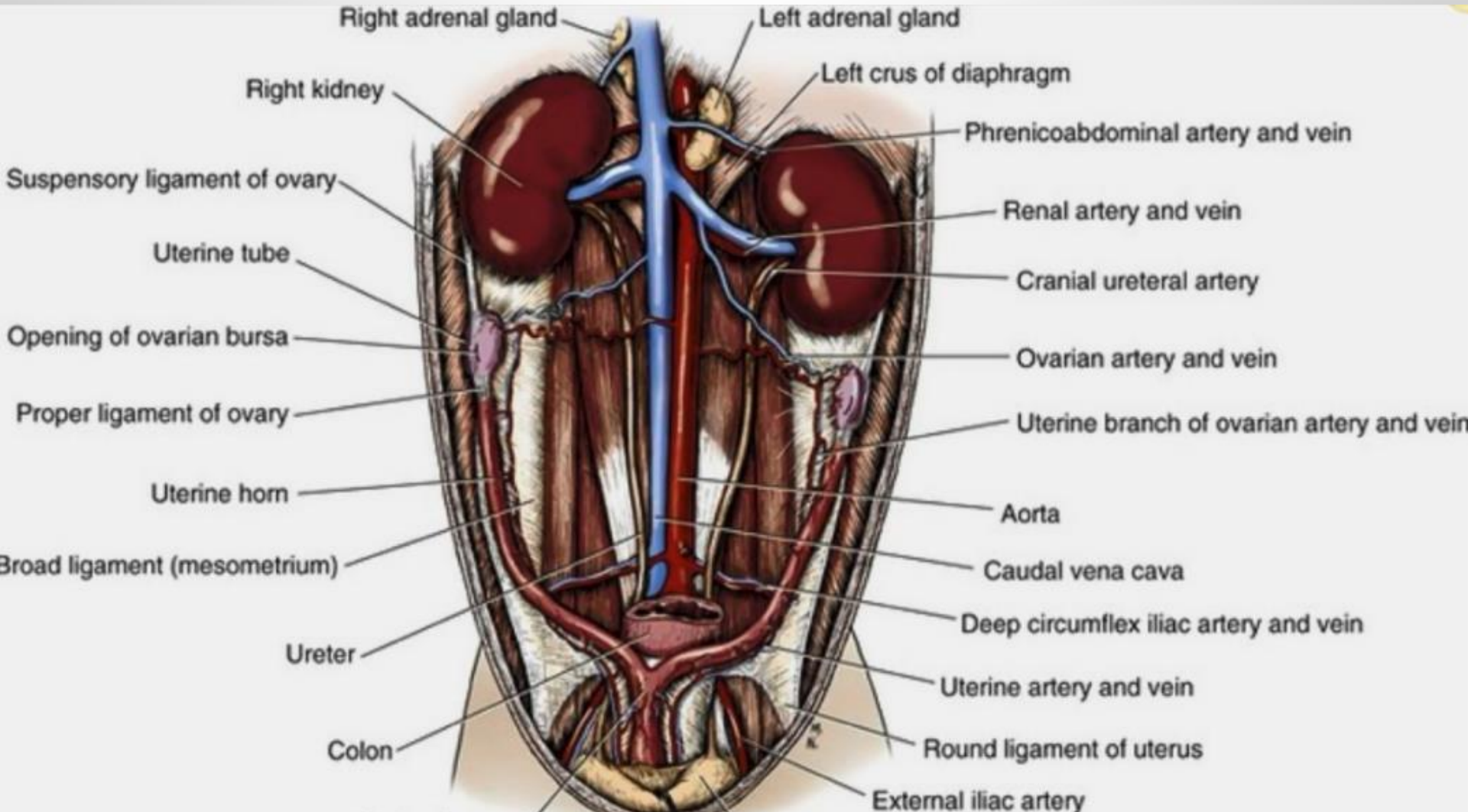


# ANATOMY

Figure 2-8 Lateral/Dorsal View of Bitch and Queen

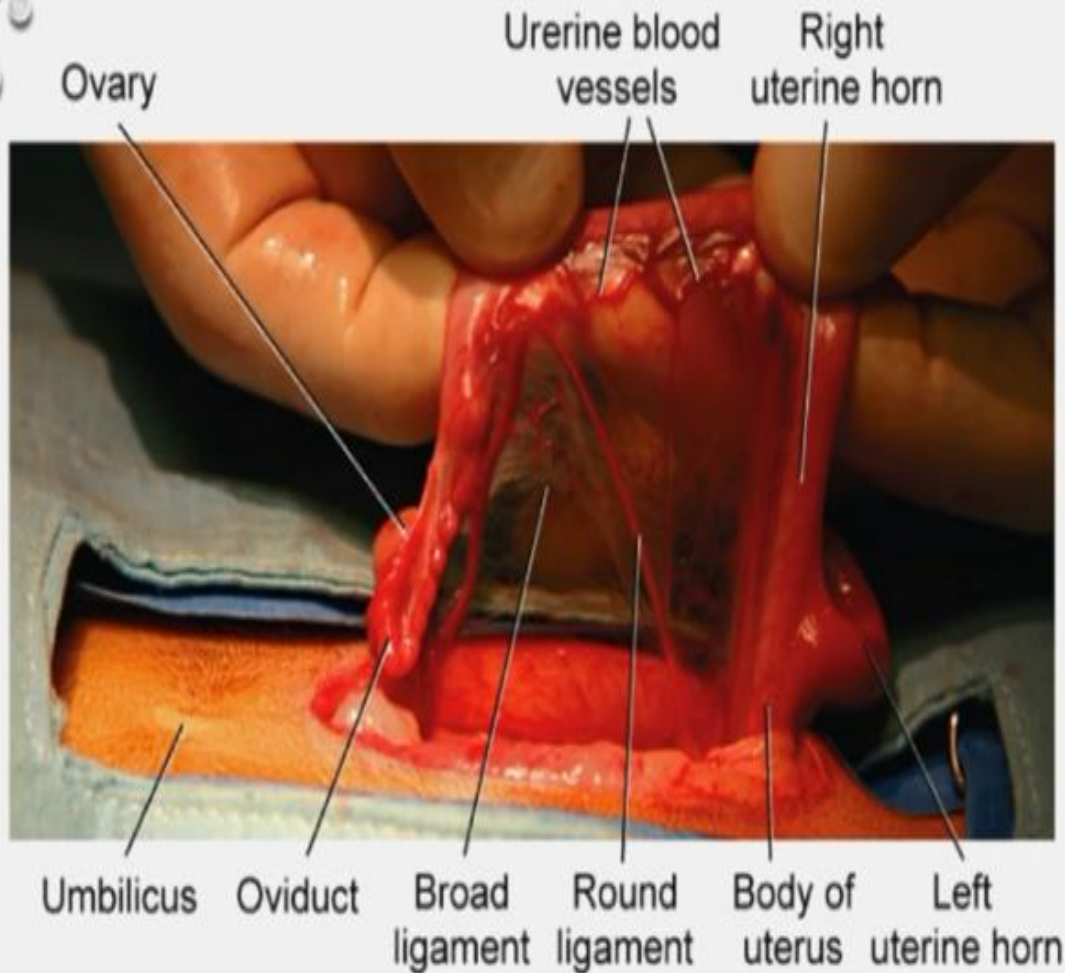


# ANATOMY - BITCH



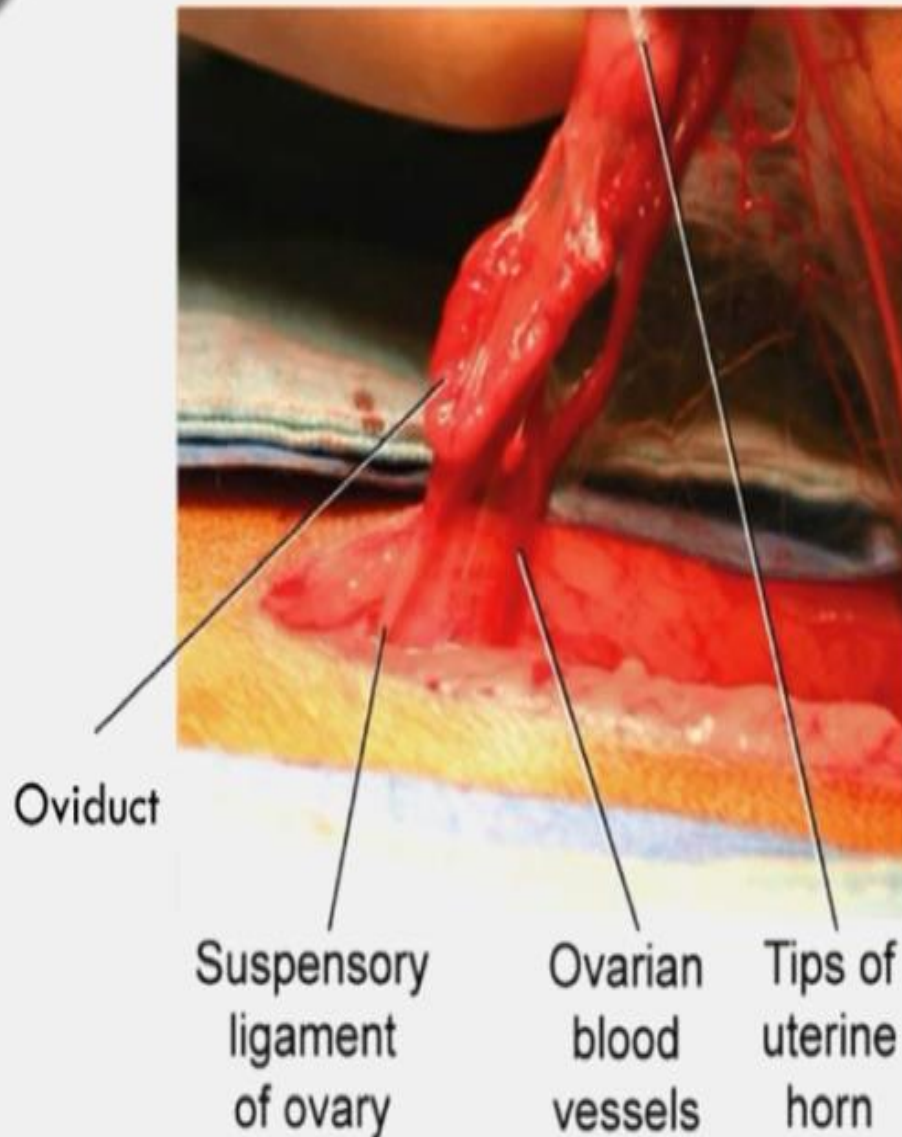
# LIGAMENTS

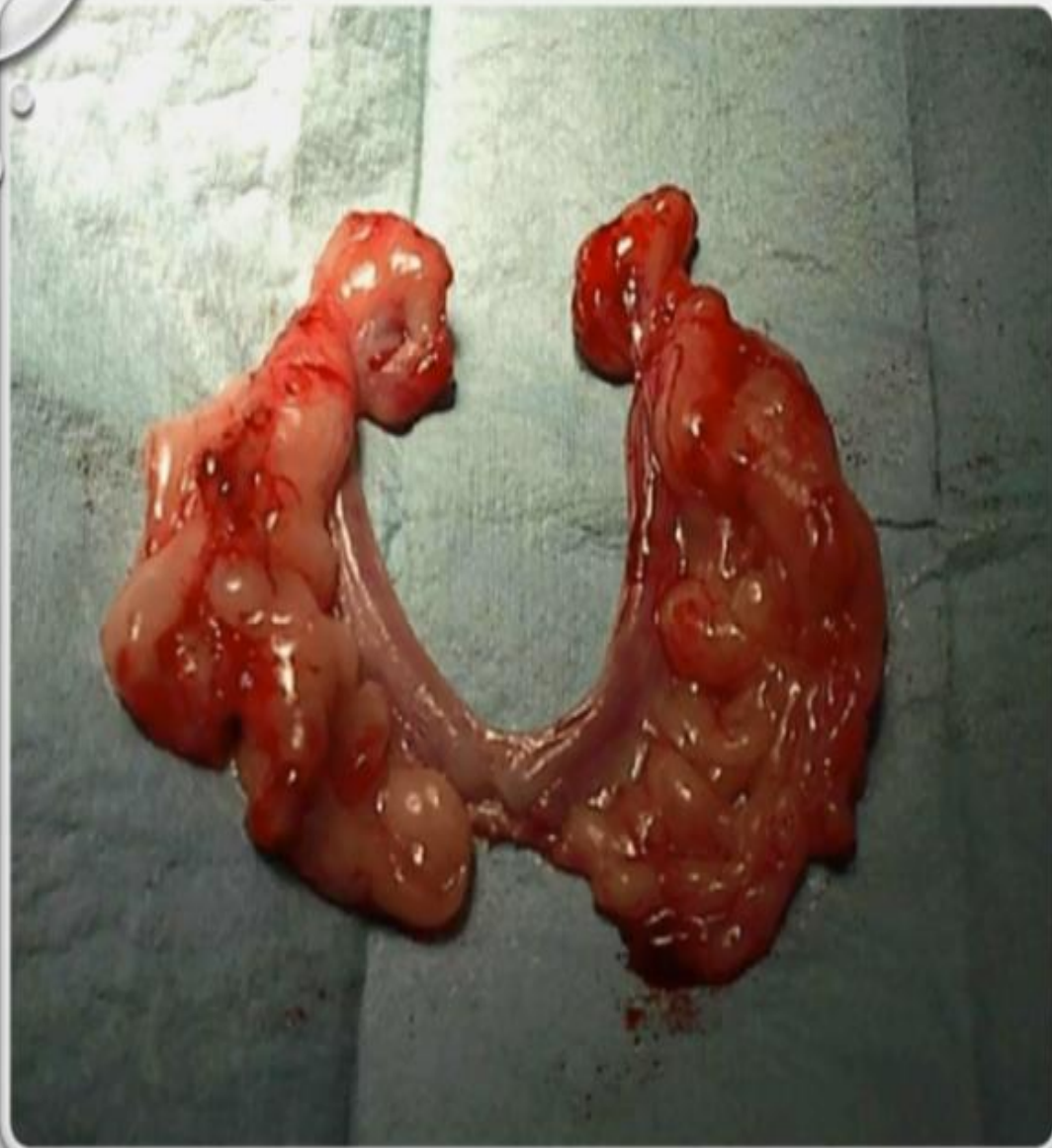
- BROAD LIGAMENTS: SHEETS OF PERITONEUM
- SUSPEND OVARIES, OVIDUCTS, AND UTERUS
- CONTAIN BLOOD VESSELS AND NERVES
- \*DROPPED PEDICLE!



# LIGAMENTS

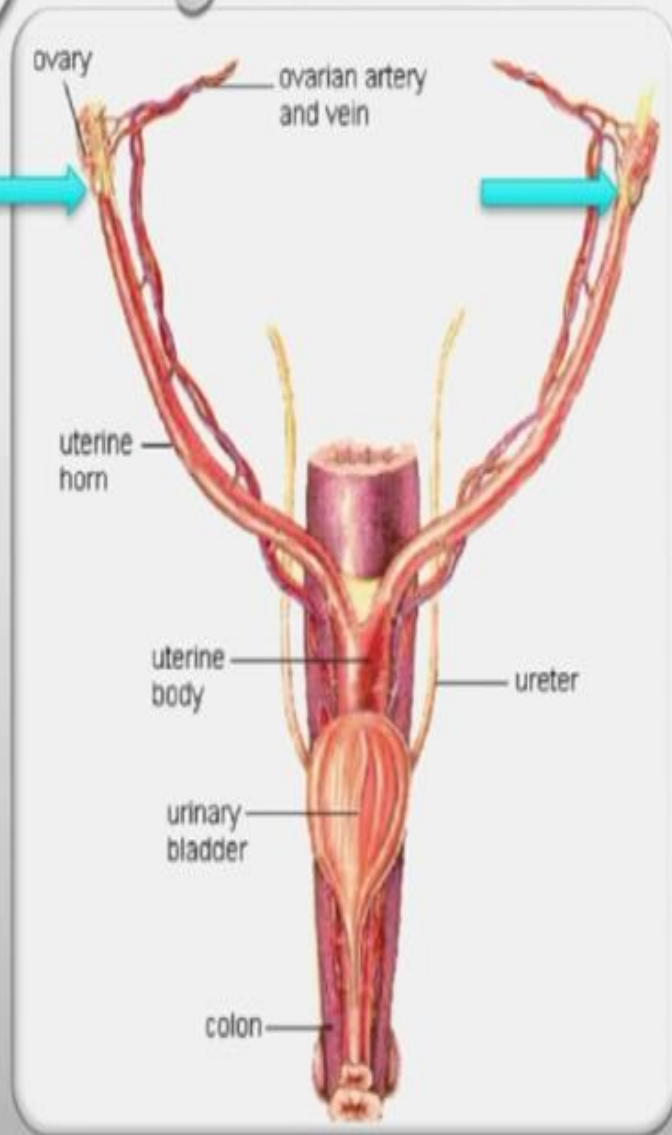
- SUSPENSORY LIGAMENT OF THE OVARY
  - OVARIAN END OF BROAD LIGAMENT ATTACHED TO BODY WALL IN AREA OF LAST RIB
- ROUND LIGAMENT OF THE UTERUS
  - FIBROUS TISSUE AND SMOOTH MUSCLE IN LATERAL FOLD OF THE BROAD LIGAMENT ON EACH SIDE





# OVARIES

- IN DORSAL ABDOMEN NEAR KIDNEYS
- SPECIES VARIATION IN APPEARANCE
- SITE OF OOGENESIS
- PRODUCTION OF ESTROGENS AND PROGESTINS



# OVIDUCTS

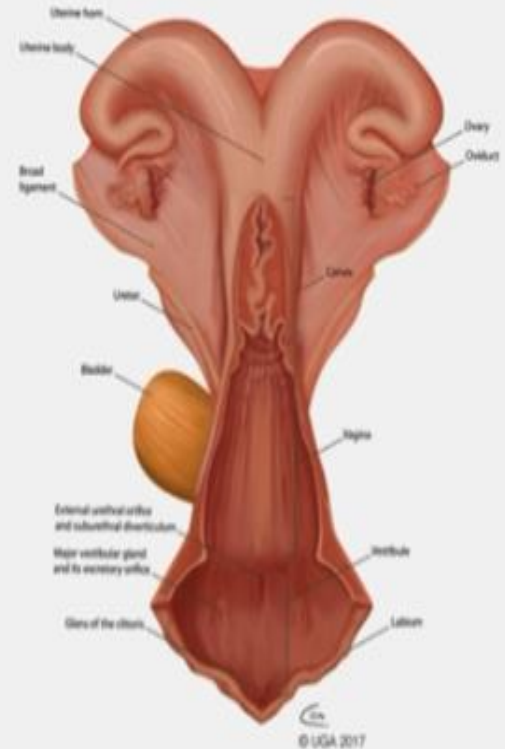
- FALLOPIAN TUBES: MORE OF A HUMAN TERM
- EXTEND FROM THE TIPS OF THE UTERINE HORNS
- INFUNDIBULUM: ENLARGED OPENING AT THE OVARIAN END OF EACH OVIDUCT
- VISCERAL SMOOTH MUSCLE FIBERS IN WALLS
- CILIATED CELLS IN LINING
- MUSCLE CONTRACTIONS AND CILIA MOVEMENTS GUIDE OVUM TOWARD THE UTERUS
- USUAL SITE OF FERTILIZATION

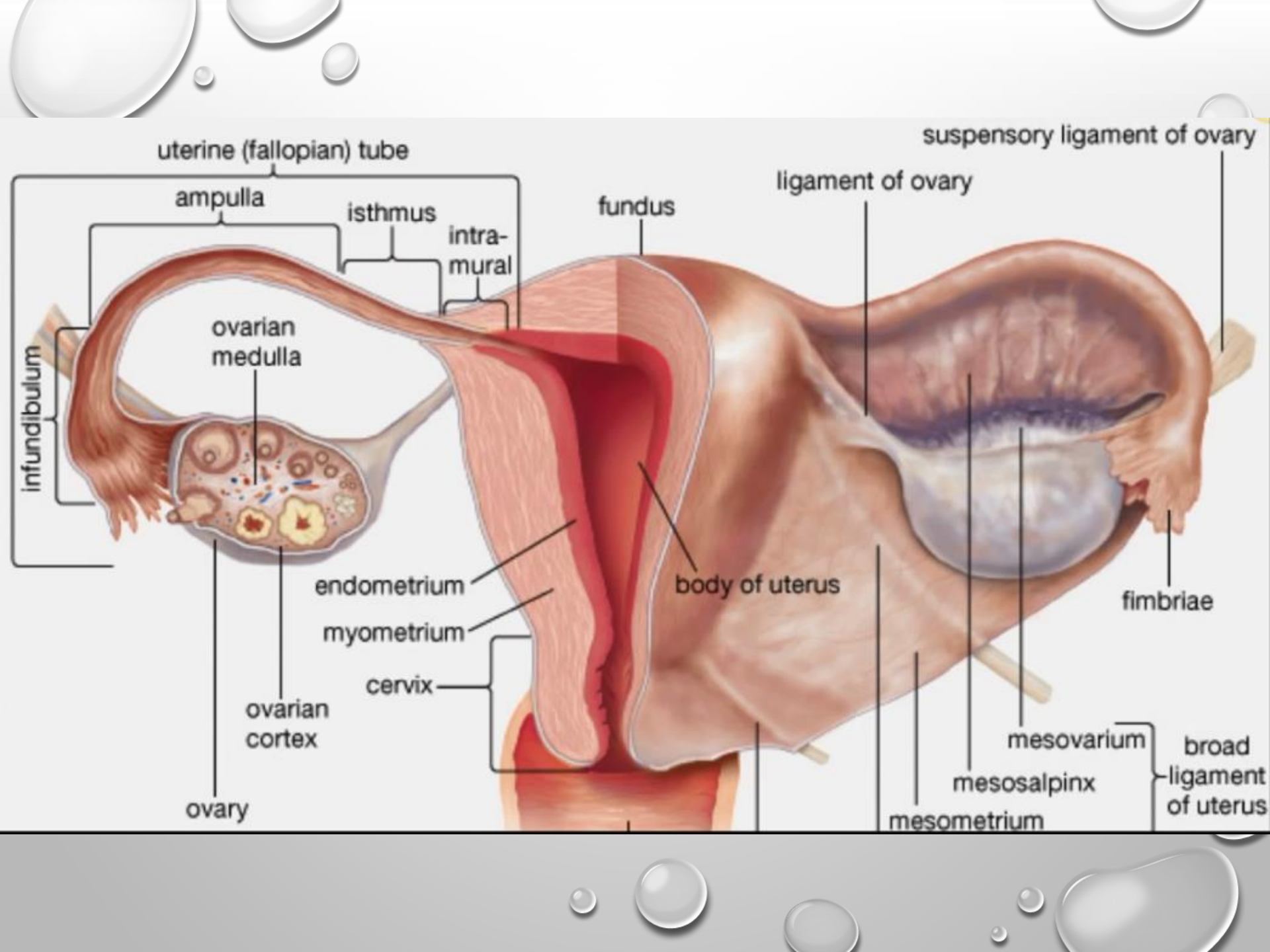


# UTERUS

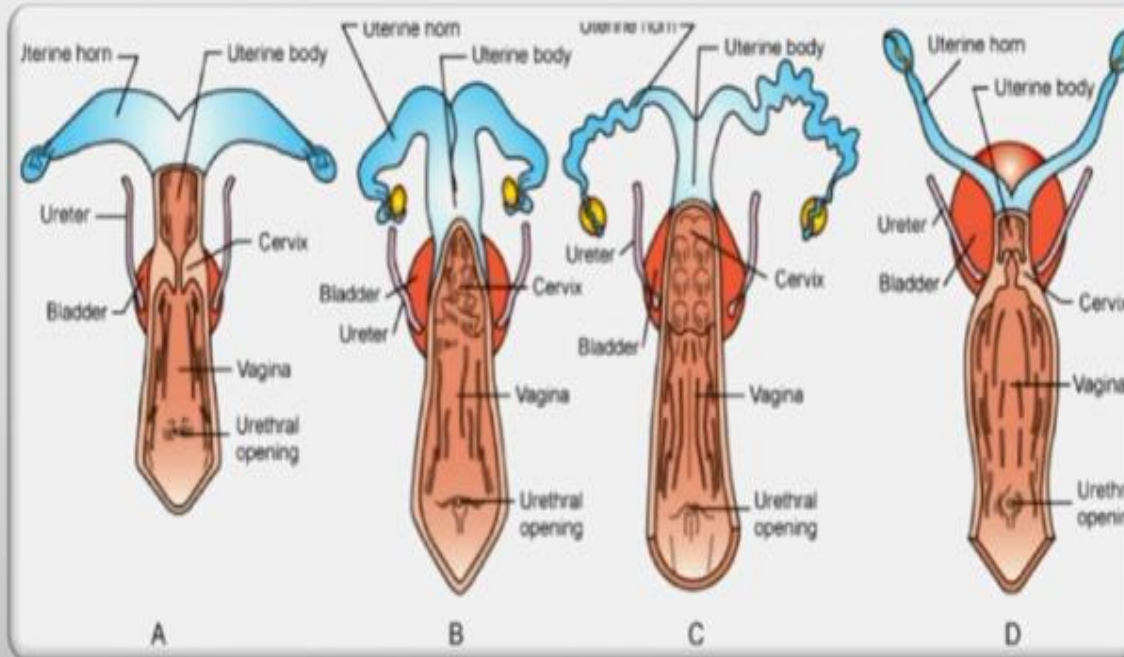
- UTERINE WALL LAYERS:
- ENDOMETRIUM: LINING COMPOSED OF SIMPLE COLUMNAR EPITHELIUM AND SIMPLE TUBULAR GLANDS
  - SECRETE MUCUS AND OTHER SUBSTANCES
- MYOMETRIUM: THICK LAYERS OF SMOOTH MUSCLE
- PERIMETRIUM: OUTERMOST LAYER COVERED BY THE VISCERAL LAYER OF PERITONEUM

Dorsal view of the different components of the cow reproductive tract





# CERVIX



- SMOOTH MUSCLE SPHINCTER BETWEEN THE BODY OF THE UTERUS AND THE VAGINA
  - CONTROLS ACCESS TO THE LUMEN OF THE UTERUS FROM THE VAGINA
- NORMALLY TIGHTLY CLOSED, EXCEPT DURING ESTRUS AND PARTURITION

# VAGINA AND VULVA

- VAGINA:
- MUSCULAR TUBE EXTENDS CAUDALLY FROM THE CERVIX AND CONNECTS IT WITH THE VULVA
- VULVA:
- COMPOSED OF THE VESTIBULE, CLITORIS, AND LABIA
  - URETHRA OPENS ON THE FLOOR OF THE VESTIBULE



# ESTROUS CYCLE INTERVALS

- POLYESTROUS: ANIMALS THAT CYCLE CONTINUOUSLY THROUGHOUT THE YEAR IF THEY ARE NOT PREGNANT (CATTLE AND SWINE)
- SEASONALLY POLYESTROUS: ANIMALS WITH SEASONAL VARIATIONS IN ESTROUS CYCLES (HORSE, SHEEP, CAT)
- DIESTROUS: ANIMALS WITH TWO CYCLES PER YEAR, USUALLY SPRING AND FALL (DOG)
- MONOESTROUS: ANIMALS WITH ONE CYCLE PER YEAR (FOX AND MINK)

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**Table 6-1. Average Ages (Range) of Puberty in the Male and Female of Various Species**

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<b><u>Species</u></b>	<b><u>Male</u></b>	<b><u>Female</u></b>
<b>Alpaca<sup>2</sup></b>	2-3 yrs	1 yr
<b>Bovine</b>	11 mo (7-18)	11 mo (9-24)
<b>Camel<sup>2</sup></b>	3-5 yrs	3 yrs
<b>Canine<sup>1</sup></b>	9 mo (5-12)	12 mo (6-24)
<b>Equine</b>	14 mo (10-24)	18 mo (12-19)
<b>Feline</b>	9 mo (8-10)	8 mo (4-12)
<b>Llama<sup>2</sup></b>	2-3 yrs	6-12 mo
<b>Ovine</b>	7 mo (6-9)	7 mo (4-14)
<b>Porcine</b>	7 mo (5-8)	6 mo (5-7)

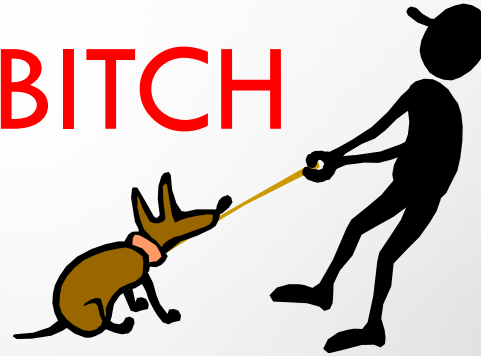
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<sup>1</sup> Very breed dependent - See Johnston *et al.* in **Key References.**

<sup>2</sup> See Tibary and Anouassi in **Key References.**

---

# THE BITCH



- PUBERTY – 6-12 MO.
- **MONOESTRUS**
  - ONE ESTRUS DURING BREEDING SEASON
- **ESTROUS CYCLE**
  - PROESTRUS
  - ESTRUS **Heat**
  - METESTRUS OR DIESTRUS
  - ANESTRUS

# ESTROUS CYCLE (NON-PREGNANT)

- **PROESTRUS (9 DAYS)**
  - VULVA SWOLLEN
  - BLOODY DISCHARGE
  - ATTRACTED TO MALE BUT DOES NOT MATE
- **ESTRUS (9 DAYS, OVULATION DAY 2)**
  - ACCEPTS MALE
  - STRAW-COLORED DISCHARGE
- **METESTRUS OR DIESTRUS (90 DAYS)**
  - FALSE PREGNANCY
- **ANESTRUS (5 MONTHS)**
  - SEXUAL INACTIVITY



# Canine Estrous Cycle



## PROESTRUS

- 9 days
- Increase estrogen
- Males show interest, female not yet reciprocating
- Vulvar edema, Bloody discharge
- Endometrium starts to develop thanks to the estrogen release

## ESTRUS

- 9 days
- LH (luteinizing hormone) surge
- Estrogen decrease, Progesterone increase
- Accepts male
- Decreased vulvar edema, Discharge more clear or straw coloured
- +/- lordosis

# Canine Estrous Cycle



## **DIESTRUS**

- 60 days
- Progesterone increase
- no longer accepts males
- Little discharge, clear, Little to no edema
- +/- pseudopregnancy
- (note: unlike humans, animals do not shed their uterine lining)

## **ANESTRUS**

- min. 4.5 months
- Sharp decrease in progesterone
- No outward signs
- Extremely little to no secretions.

# Canine Estrous Cycle



## PREGNANT

Proestrus- 9 days

Estrus- 9 days, ovulation day 2

Pregnant/diestrus- 50-60 days

- *Parturition 63 days from  
ovulation*

Anestrus- 5 months



# Changes During Estrus of Bitch

Vulva Swollen and Enlarged

Bloody discharge  
from vulva

Copulation

Aggressive  
towards Male

Passive

Provides sexual posturing  
to male for copulation

Proestrus

Estrus

-8

-4

0

+4

+8

+12

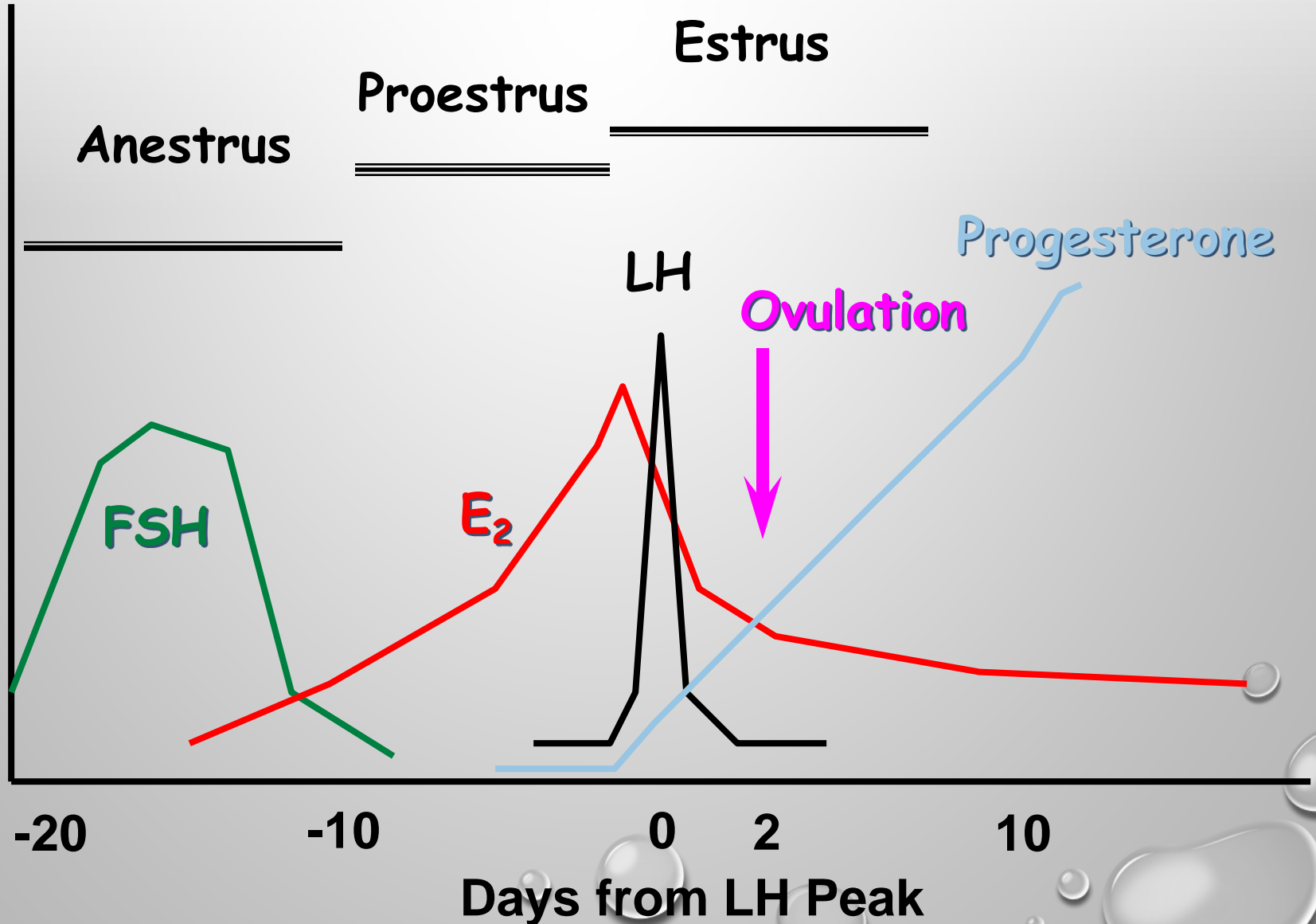


Indicates Day of  
Peak in LH

**Table 7-1.** Characteristics of Estrous Cycles in Domestic Animals

<u>Species</u>	<u>Classification</u>	<u>Length of Estrous Cycle</u>		<u>Duration of Estrus</u>		<u>Time From</u> <u>Onset of Estrus</u> <u>to Ovulation</u>	<u>Time From</u> <u>LH Surge</u> <u>to Ovulation</u>
		<u>Mean</u>	<u>Range</u>	<u>Mean</u>	<u>Range</u>		
<b>Bitch</b>	Monoestrus	6 mo	(3-9 mo)	9d	(4-21d)	4-24d	2-3d
<b>Cow</b>	Polyestrus	21d	(17 - 24d)	15h	(6 - 24h)	24 - 32h	28h
<b>Ewe</b>	Seasonally polyestrus (Short Day)	17d	(13 - 19d)	30h	(18 - 48h)	24 - 30h	26h
<b>Llama</b>	Polyestrus	10d	(8-12d)	5d	(4-5d)	Induced Ovulator	24-36h
<b>Mare</b>	Seasonally polyestrus (Long Day)	21d	(15 - 26d)	7d	(2 - 12d)	5d	2d
<b>Queen</b>	Polyestrus	17d	(4-30d)	9d	(2-19d)	Induced	30-40h

# HORMONAL CHANGES



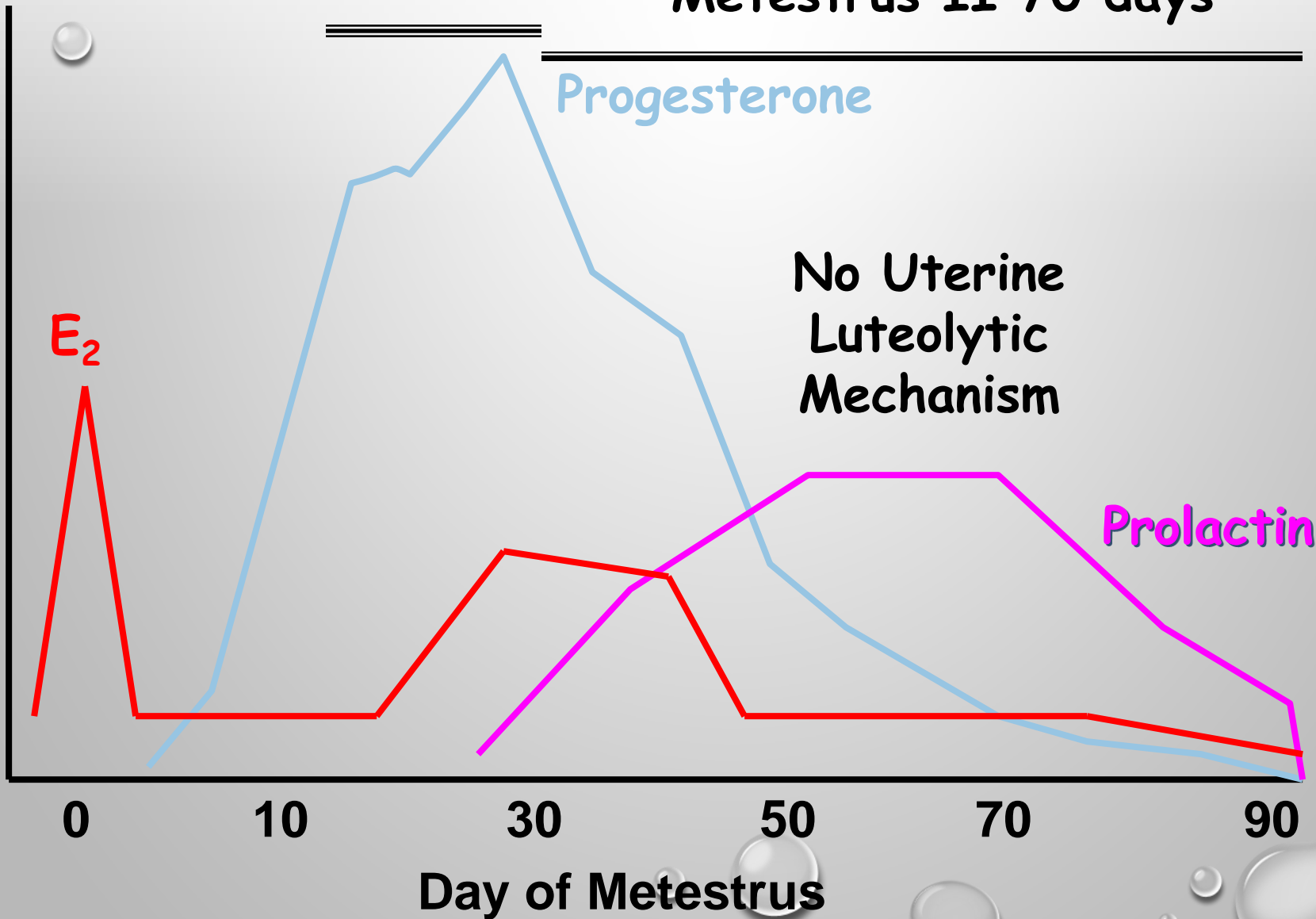
# Diestrus

Estrus

20 day

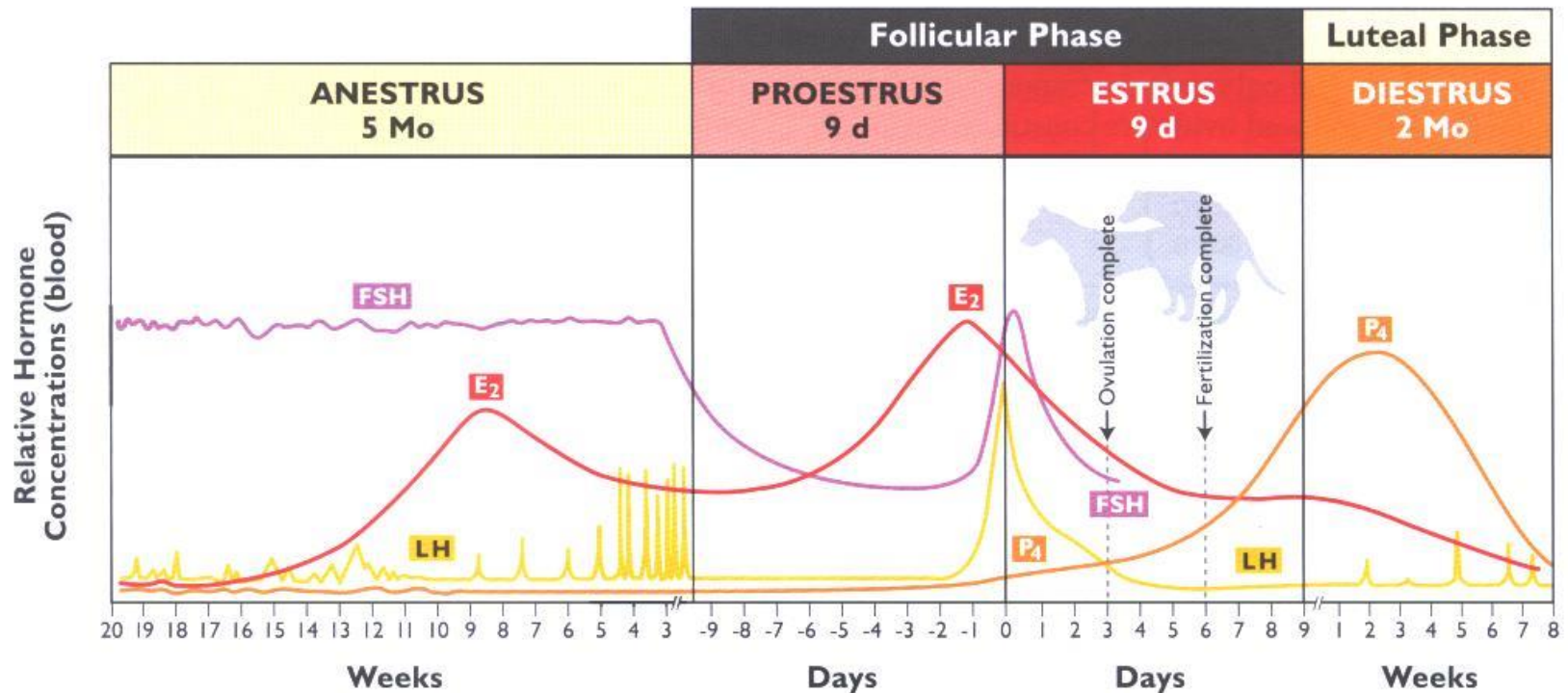
Metestrus I

Metestrus II 70 days



## Figure 7-4. The Annual Reproductive Cycle of the Bitch

(Modified from Johnston, Root Kustritz and Olson. 2001. *Canine and Feline Theriogenology*)



### Anestrus

A period of reproductive quiescence. This long anestrus period is responsible for a cyclic profile of three cycles in two years.

### Proestrus

Proestrus begins with the appearance of a blood-tinged vaginal discharge and by vaginal swelling. It ends when the bitch accepts the male for mating. The ovaries contain large follicles at the onset of proestrus. Estradiol gradually increases and peaks slightly before the onset of estrus.

### Estrus

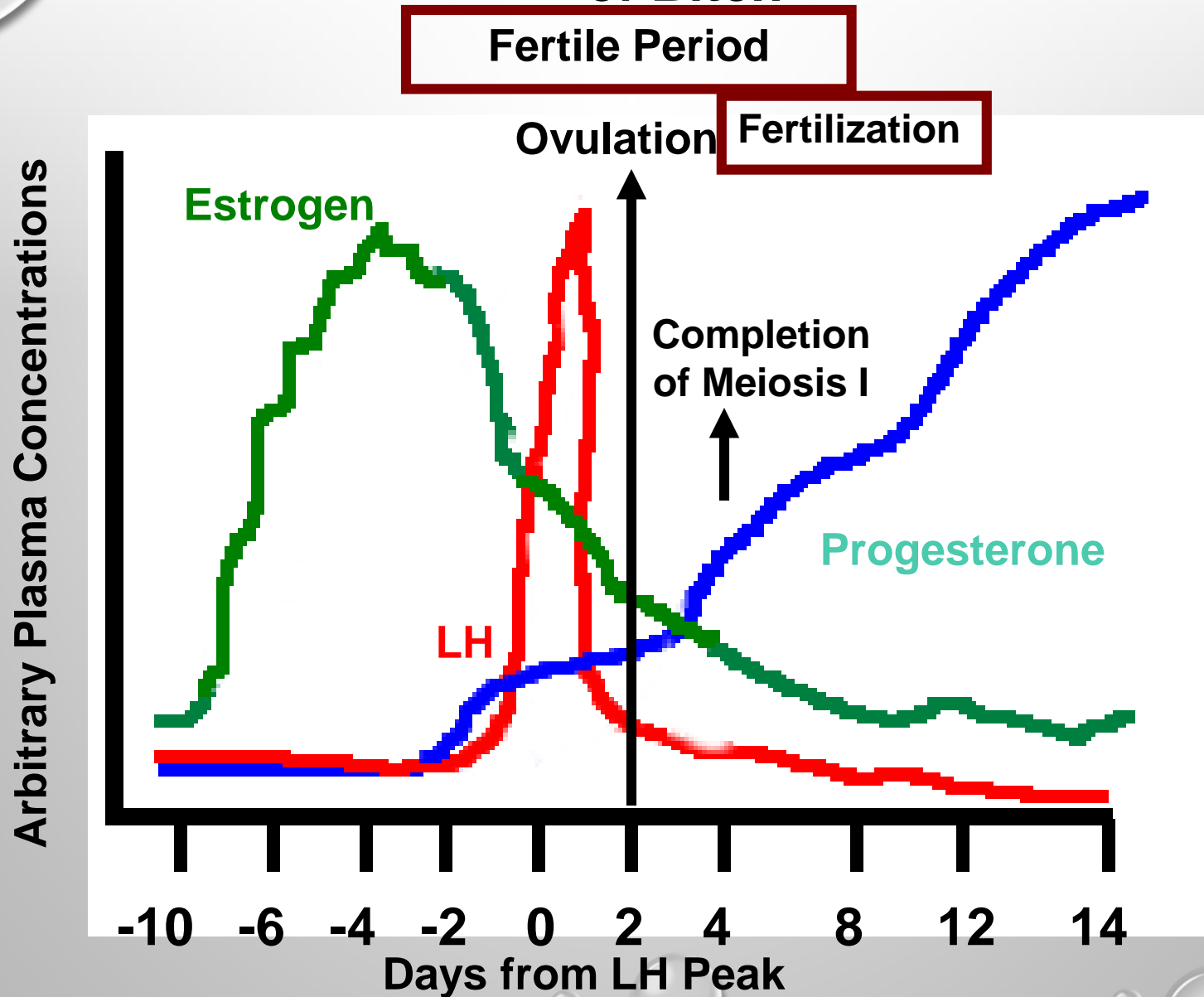
Shortly after peak estradiol, behavioral estrus begins. Both LH and FSH peak in early estrus. Ovulation is completed at about the third day of estrus and fertilization is completed at about the sixth day. Progesterone increases during the latter part of estrus signifying luteinization.

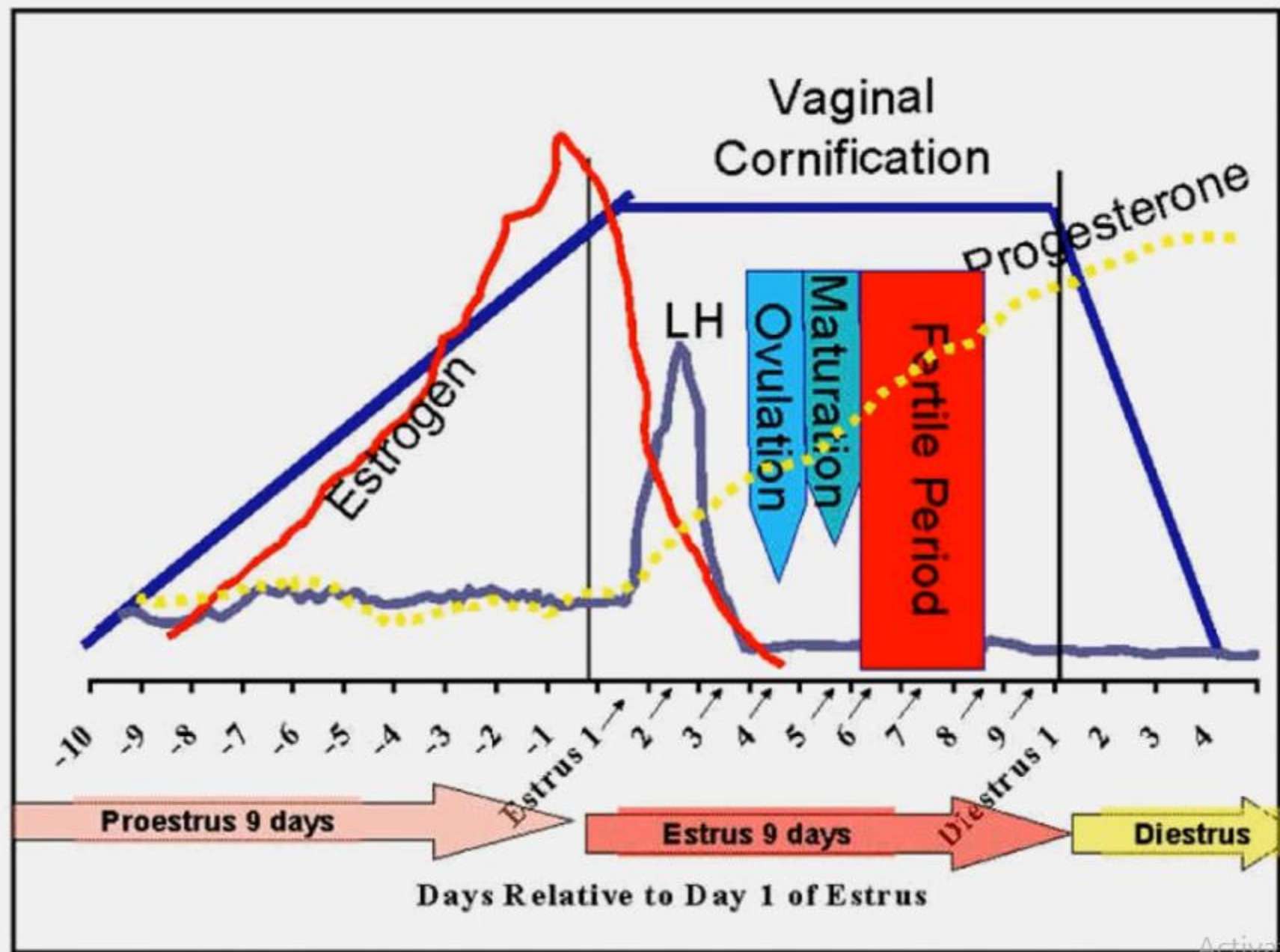
### Diestrus

Both pregnant and open bitches are considered to be in diestrus. Pregnancy status does not alter the length of diestrus. Progesterone peaks at about 15 days then decreases gradually. Bitches that do not become pregnant are often considered to be pseudopregnant.



# Hormonal Patterns During Estrous Cycle of Bitch





# ESTROUS CYCLE - PREGNANT

- **PROESTRUS (9 DAYS)**

- VULVA SWOLLEN
- BLOODY DISCHARGE
- ATTRACTED TO MALE BUT DOES NOT MATE

- **ESTRUS (9 DAYS, OVULATION DAY 2)**

- ACCEPTS MALE
- STRAW-COLORED DISCHARGE

- **PREGNANT METESTRUS/DIESTRUS (50 - 60 DAYS)**

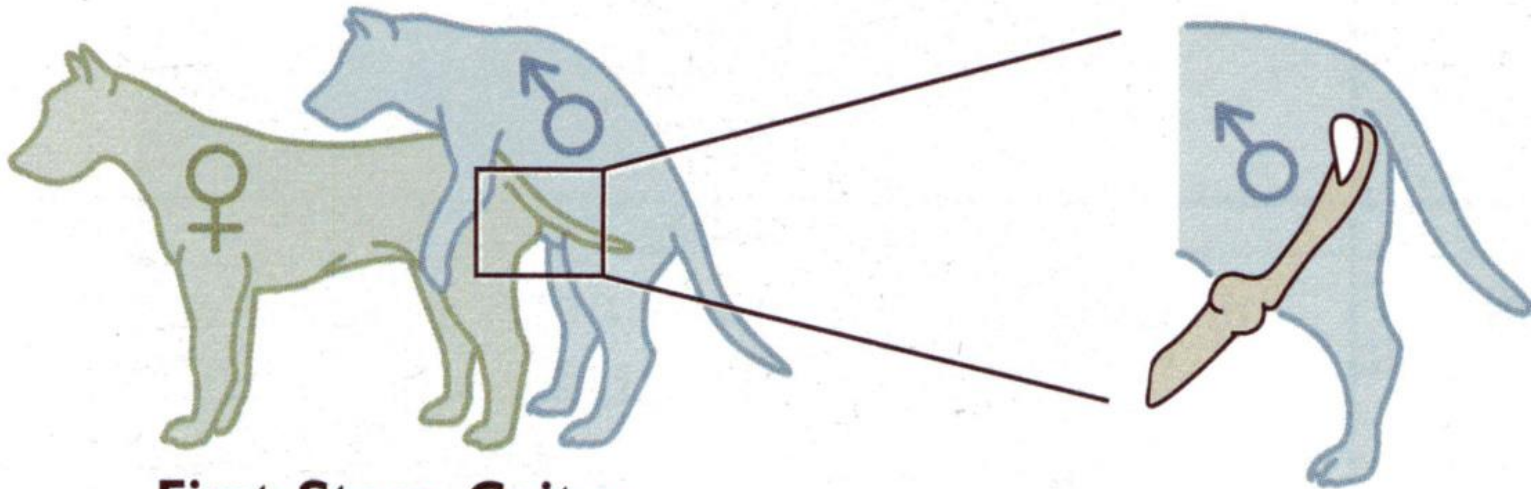
- PREGNANCY
- PARTURITION (63 DAYS FROM OVULATION)

- **ANESTRUS (5 MONTHS)**

- SEXUAL INACTIVITY

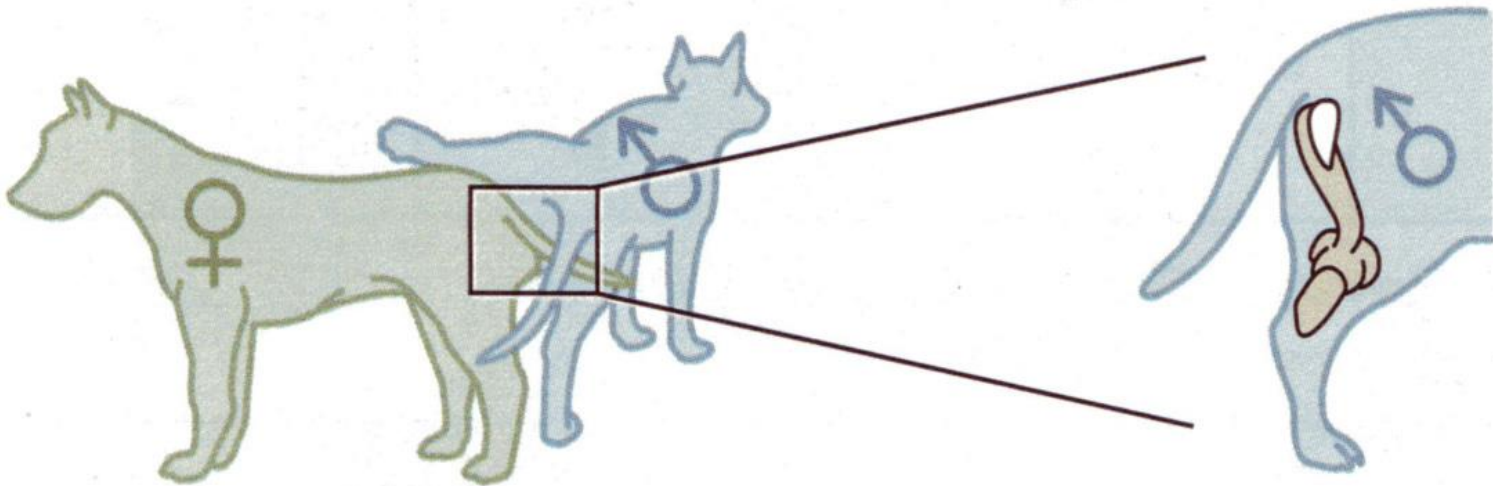
# MATING

- OCCURS DURING ESTRUS
- **LENGTH OF COURTSHIP BY MALE IS VARIABLE**
  - LICKS VULVA
  - BITCH STANDS WITH TAIL TO ONE SIDE
- **MOUNTING**
  - MALE MOUNTS WITHOUT ERECTION AND PENETRATES
    - OS PENIS
  - IN VAGINA, MALE BULBUS GLANDIS ENGORGES, THRUSTING
  - MALE DISMOUNTS AND TURNS AROUND BUT PENIS REMAINS IN VAGINA “THE TIE”
  - EJACULATION
  - TIE LAST 5 MIN TO 1 HOUR



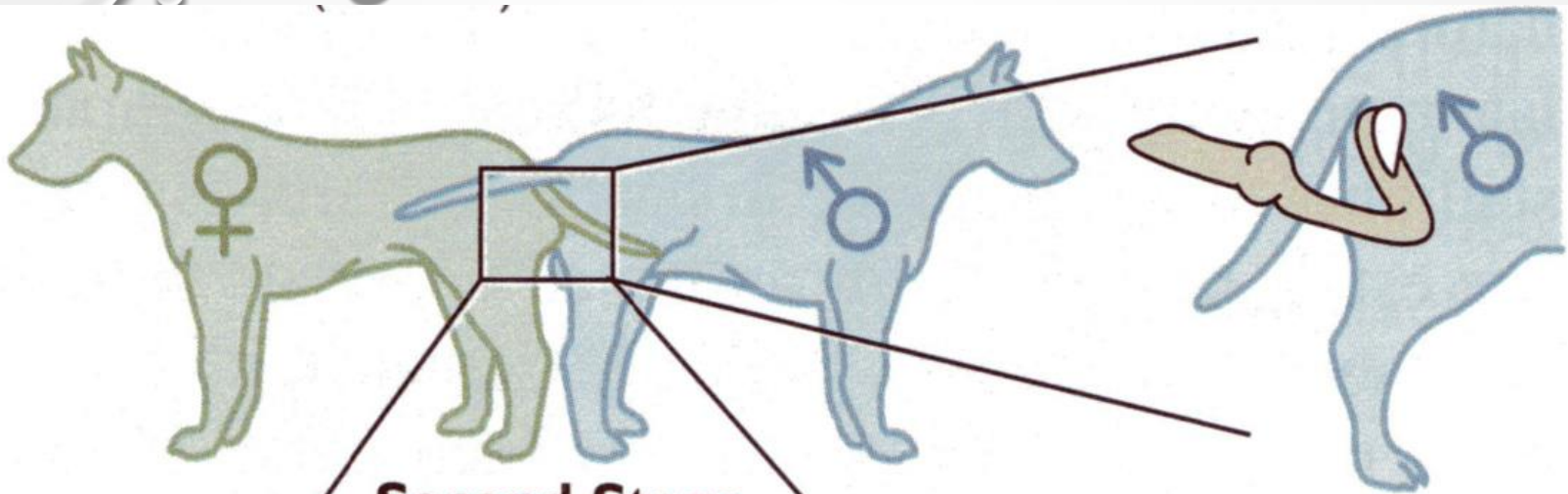
### First Stage Coitus

(1-2 min)

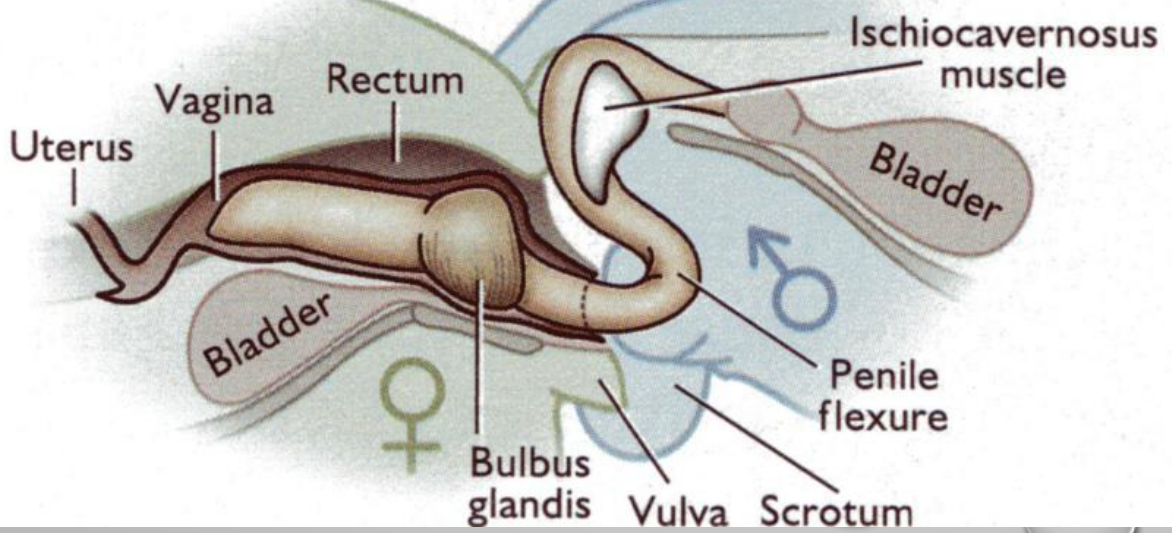


### The Turn

(2-5 sec)



**Second Stage  
Coitus**  
(5-45 min)





@nfasbekesh

# MATING (CONT.)

- MATE 2 TIMES
  - DAYS 11 AND 13 AFTER START OF PROESTRUS
    - SPERM LASTS UP TO 7 DAYS IN FEMALE
- INFERTILITY
  - OFTEN FROM MATING NOT AT APPROPRIATE TIME
- HORMONAL DETECTION OF OVULATION
  - LH INCREASE ASSOCIATED WITH PROGESTERONE >0.5 NG/ML
  - OVULATION PROGESTERONE 2-5 NG/ML

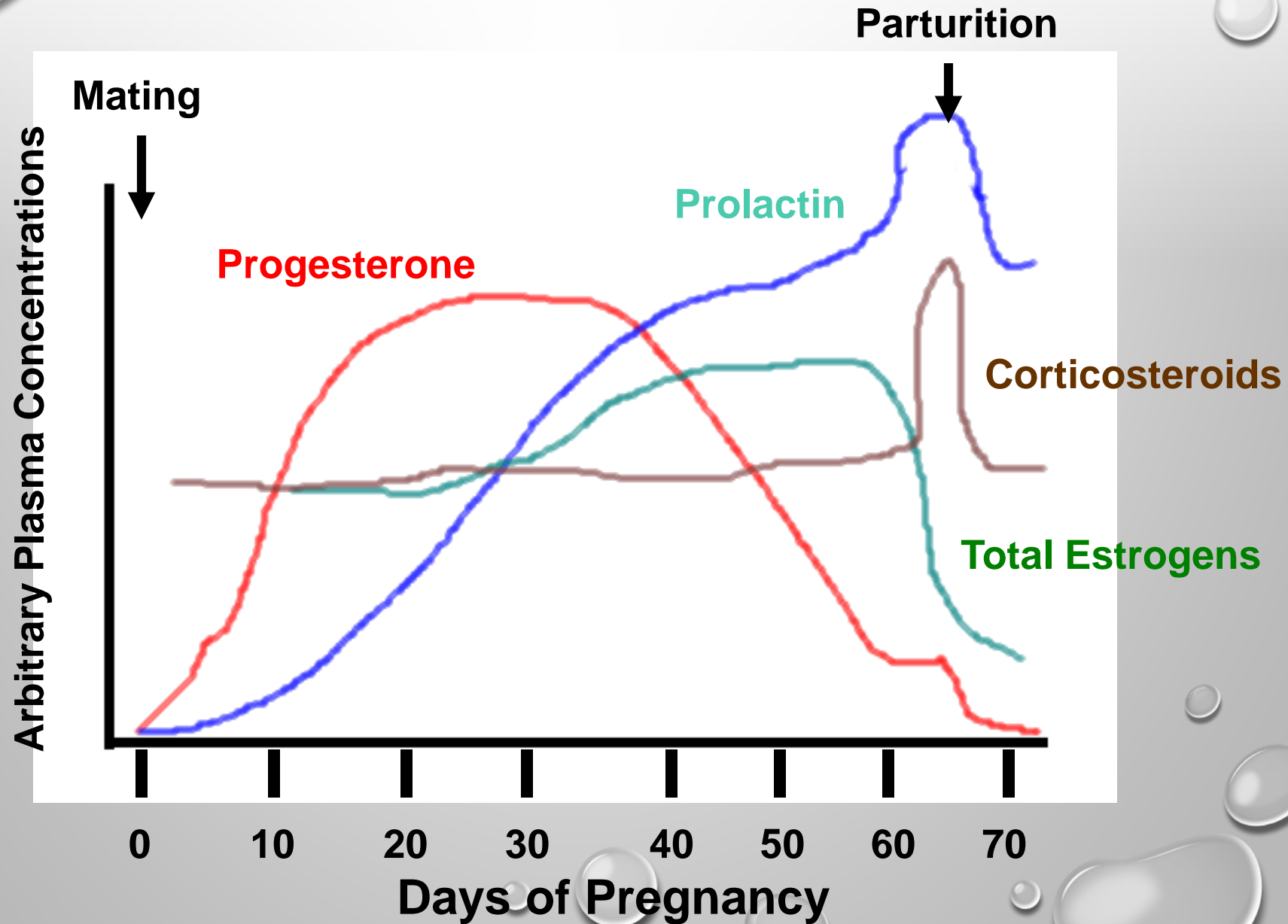


# PREGNANCY

- **63 DAYS (58-68)**
  - RANGE DUE TO DATING FROM BREEDING NOT FERTILIZATION
- **HORMONAL CHANGES**
  - SIMILAR TO NOT MATED
  - PROGESTERONE MAINTAINED HIGHER
  - CL REQUIRED TO MAINTAIN PREGNANCY
    - NO PLACENTAL PROGESTERONE
  - PLACENTAL RELAXIN
  - DROP IN PROGESTERONE TRIGGERS PARTURITION
- **DETECTION**
  - ADOMINAL PALPATION AT 3 - 4 WEEKS
  - ULTRASOUND AFTER DAY 16
- **PARTURITION**
  - HORMONES SIMILAR TO OTHER FARM ANIMALS



# Hormone Concentrations During Pregnancy and Parturition



# PARTURITION

- **DELAYED PARTURITION**
  - PRIMARY INERTIA
    - DOES NOT SHOW SIGNS OF PARTURITION
    - DOES NOT PROGRESS FROM STAGE 1 - STAGE 2
    - IF GREEN FLUID, CAESARIAN
    - GIVE OXYTOCIN IN SEVERAL SMALL DOSES
  - SECONDARY INERTIA
    - UTERINE EXHAUSTION
    - OXYTOCIN

# ESTRUS CONTROL

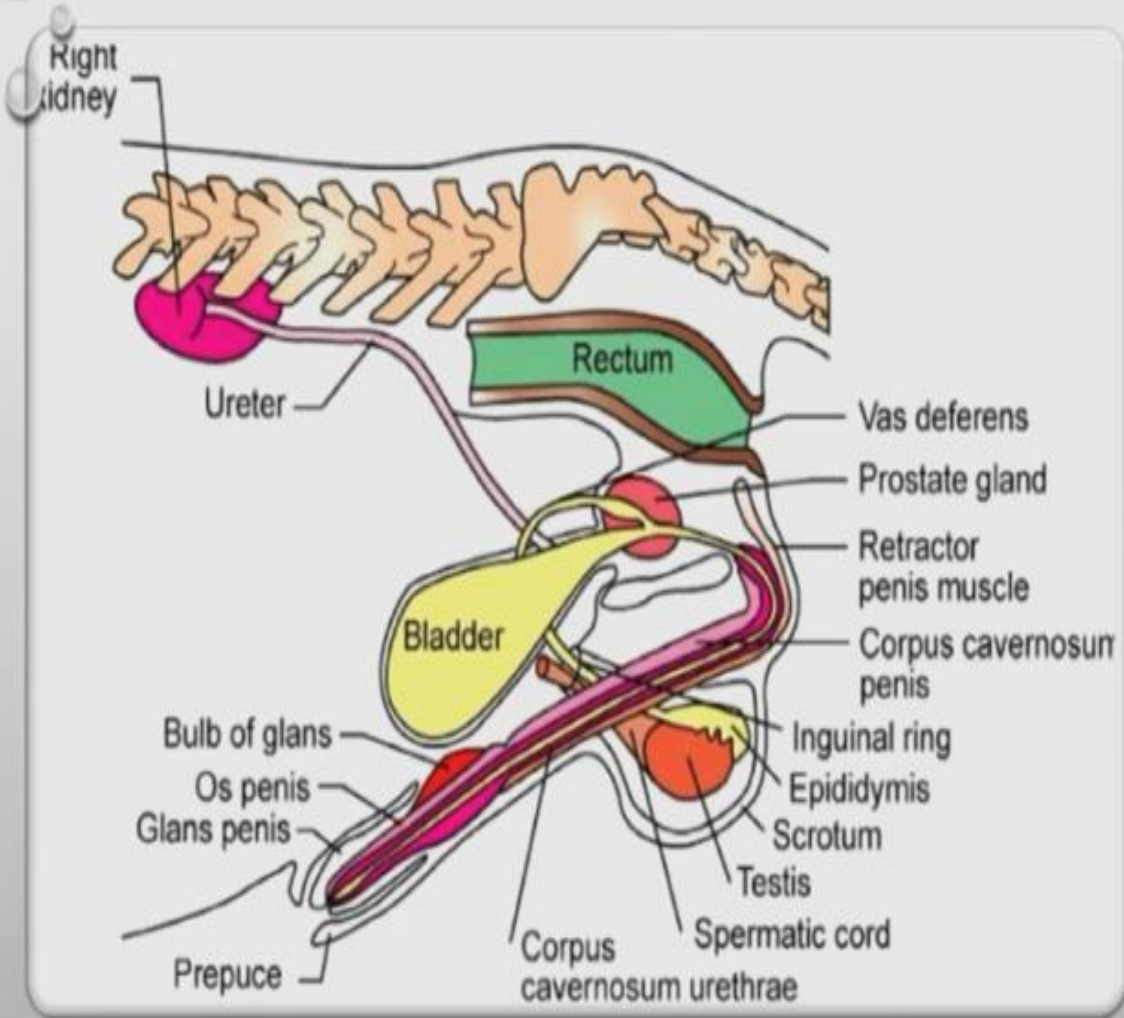
- **INDUCTION**
  - ECG
- **PREVENTION**
  - PROGESTINS

# DISORDERS OF THE BITCH

- **CYSTIC ENDOMETRIAL HYPERPLASIA (PYOMETRA)**
  - UTERUS FILLS WITH FLUID
    - PROGESTERONE INCREASES FIRST
    - CONTAMINATION OF UTERUS BY VAGINAL BACTERIA
    - TOXEMIA RESULTS FROM ABSORPTION OF FLUID AND ENDOTOXINS
  - THIRST, VOMITING, INAPPETENCE, SHOCK, DEATH
  - 4-6 WEEKS AFTER ESTRUS
  - BITCHES >9 YEARS THAT HAVE NOT HAD A PREVIOUS PREGNANCY
  - CAN BE OPEN OR CLOSED
  - HYSTERECTOMY

# DISORDERS OF THE BITCH

- **FALSE PREGNANCY**
  - NORMAL TO SOME EXTENT
  - 60 DAYS AFTER ESTRUS
  - MAY LACTATE, GAIN WEIGHT, NESTING BEHAVIOR
- **MAMMARY TUMMORS**
  - THOUGHT MAY BE RELATED TO SIMILARITY TO PREGNANCY AND NON-PREGNANCY

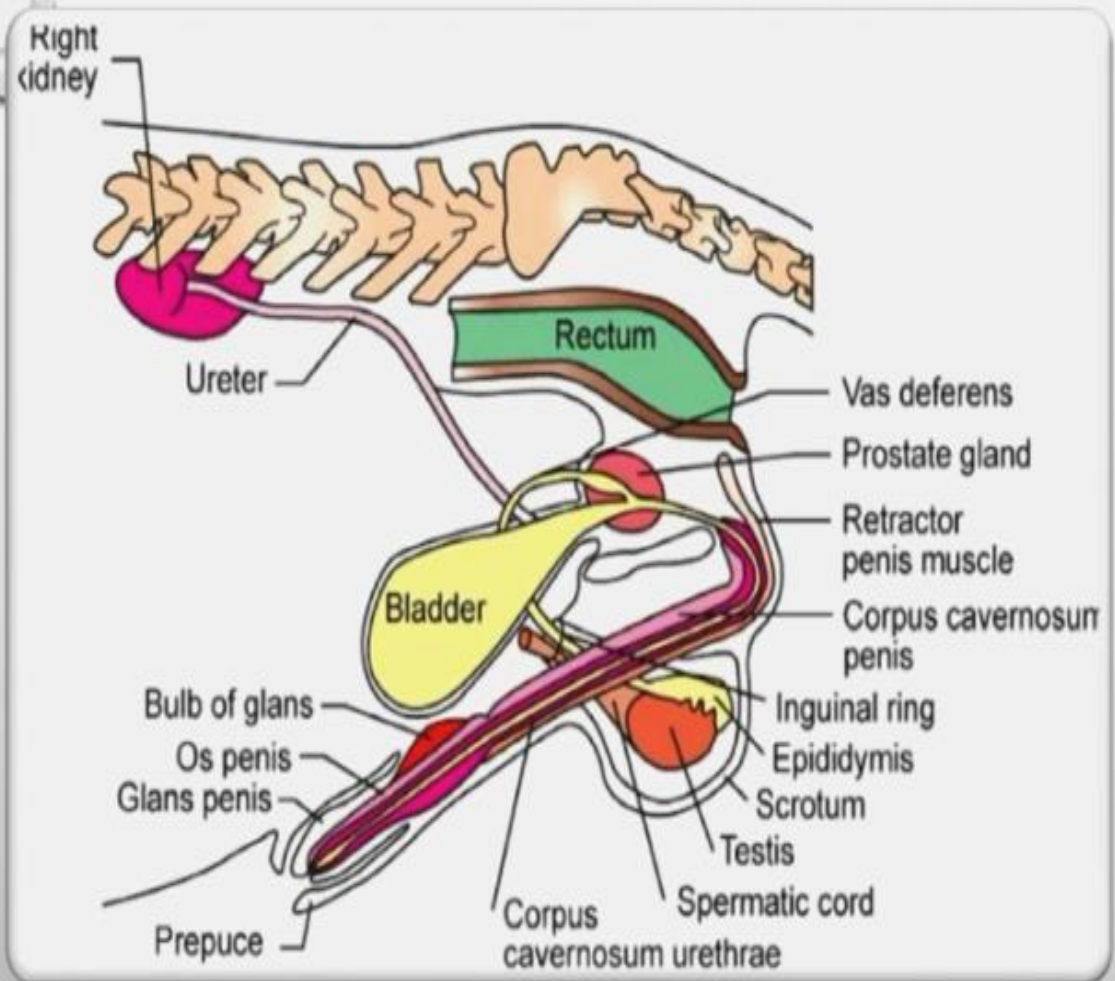


## CANINE MALE

- KEY COMPONENTS:

- TESTES
- INGUINAL RING
- EPIDIDYMIS, VAS DEFERENS, PAMPINIFORM PLEXUS
- PENIS
- BULBUS GLANDIS
- PREPUCE
- PROSTATE GLAND





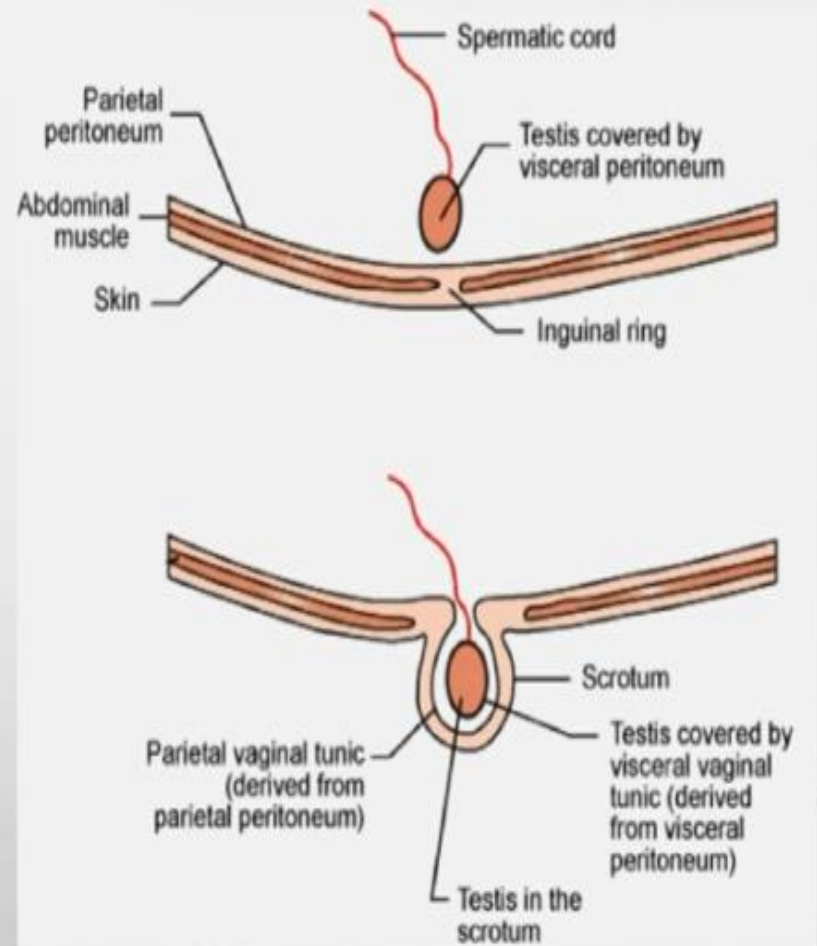
# MALE REPRODUCTIVE FUNCTIONS (ALL SPECIES)

- PRODUCES MALE SEX HORMONES
- DEVELOPS SPERMATOZOA
- DELIVER THE SPERMATOZOA TO THE FEMALE SYSTEM AT THE APPROPRIATE TIME



# DEVELOPMENT OF TESTES

- GUBERNACULUM – BAND OF CONNECTIVE TISSUE THAT ATTACHES TESTES TO SCROTUM
- TESTES GRADUALLY PULLED CAUDALLY AND VENTRALLY
- INGUINAL RINGS - OPENINGS IN ABDOMINAL MUSCLES THROUGH WHICH TESTES DESCEND
- ONLY ONE TESTICLE DESCENDED?
  - MONORCHID
- NO TESTICLES DESCENDED?
  - CRYPTORCHID





# TESTICLES ARE LIKE ONIONS

- PARIETAL VAGINAL TUNIC  
FORMS A PROTECTIVE BARRIER  
OUTSIDE OF EACH TESTICLE
- TUNICA ALBUGINEA  
FIBROUS CONNECTIVE TISSUE  
CAPSULE SURROUNDING EACH  
TESTIS BENEATH TUNICS- THE  
OUTERMOST LAYER OF EACH  
TESTICLE (IF YOU CUT INTO  
THIS, YOU ARE CUTTING INTO  
TESTICLE!)



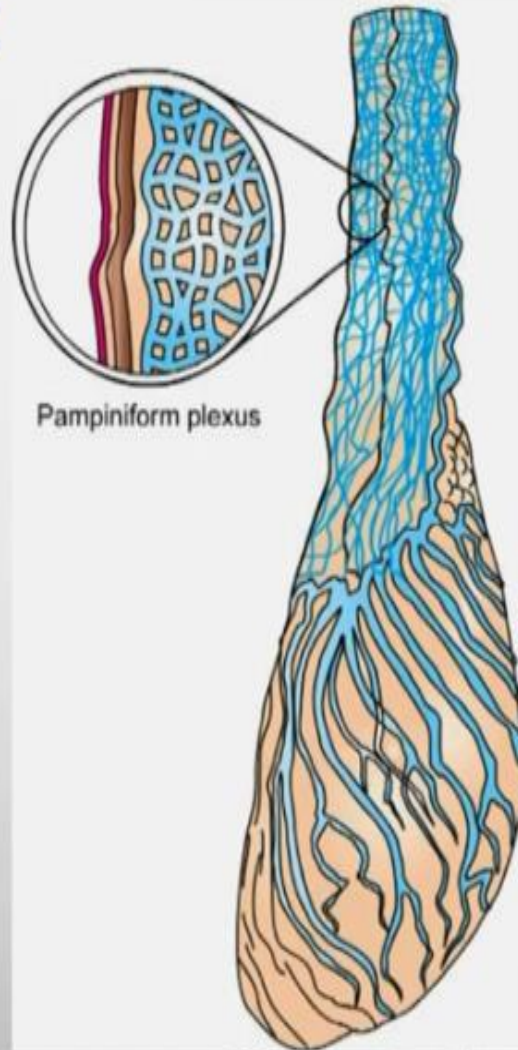
Cut the tunic...



to expose the  
testicle (and tunica albuginea)

# SPERMATIC CORDS

- BLOOD AND LYMPHATIC VESSELS, NERVES, AND THE VAS DEFERENS.
- PAMPINIFORM PLEXUS - MESHWORK OF VEINS THAT SURROUNDS TESTICULAR ARTERY



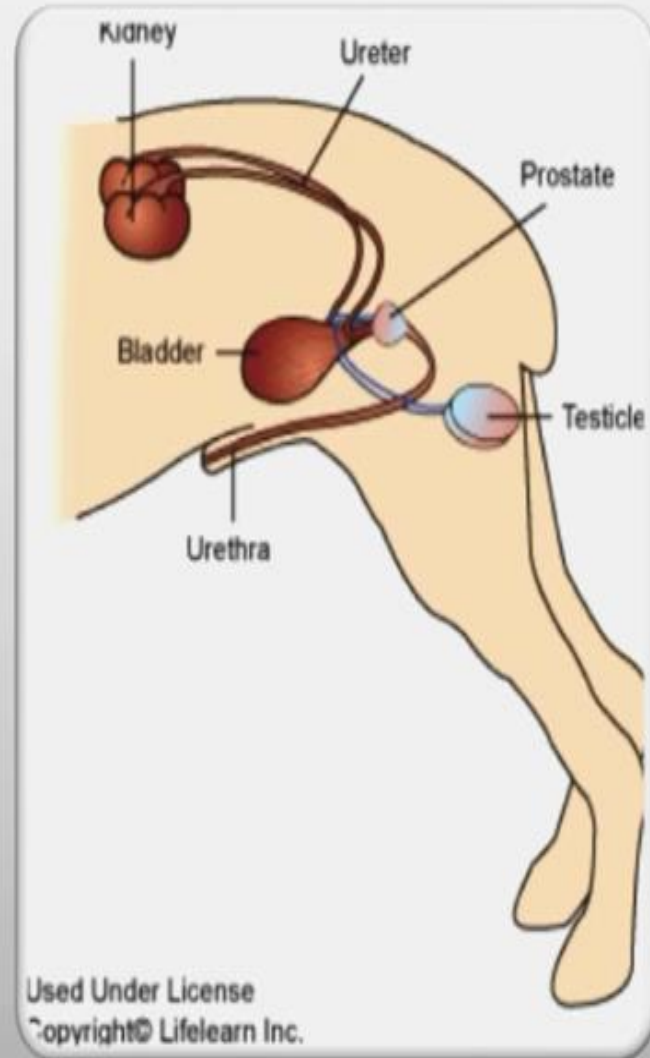
Animal	Seminal Vesicles	Prostate Gland	Bulbourethral Glands
Boar	+	+	+
Bull	+	+	+
Cat	-	+	+
Dog	-	+	-
Human	+	+	+
Ram	+	+	+
Stallion	+	+	+

+ indicates the presence of a gland; - indicates the gland is absent.

## ACCESSORY REPRODUCTIVE GLANDS

# PROSTATE GLAND

- Surrounds the urethra
- Multiple ducts carry secretions into urethra
- Dogs, cats, bulls, stallions...it's a popular gland



What's the problem with an enlarged prostate?



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**BUT WHAT ABOUT  
THIS?**





# BULBUS GLANDIS

# DISORDERS OF THE MALE DOG

- **HYPERSEXUALITY**

- CASTRATE
- PROGESTERONE

- **CRYPTORCHIDISM**

- NORMAL DESCENT AT DAYS 7-10 AFTER BIRTH
- SHOULD BE REMOVED IF RETAINED FOR >1 YR.

# PARAPHIMOSIS



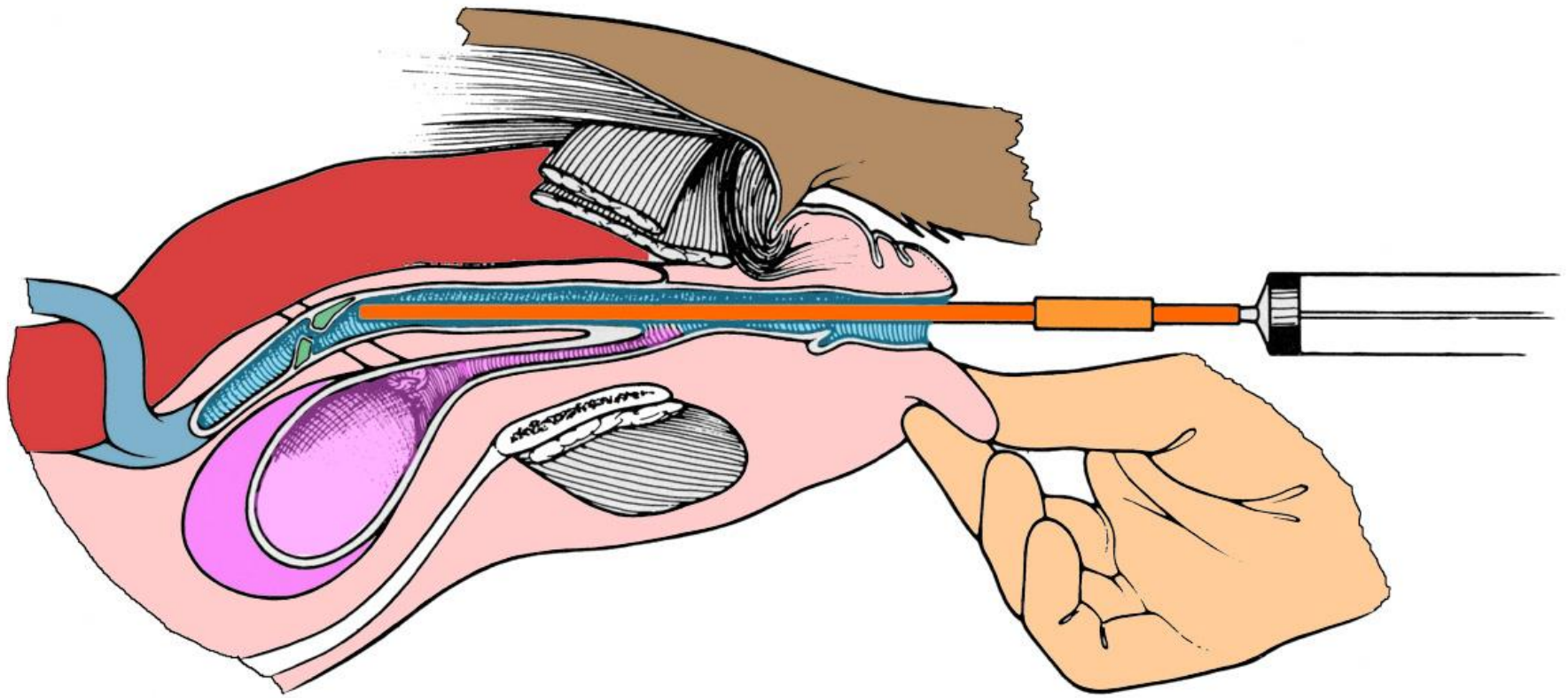
# ARTIFICIAL INSEMINATION

- BITCH DOES NOT ACCEPT THE MALE
- SHIPMENT OF SEMEN
- MINIMIZE THE NUMBER OF BREEDINGS

# INSEMINATION OF THE BITCH

- BITCHES OVULATE AROUND DAY 10 AFTER THEY ENTER PROESTRUS (DISCHARGE) OR ABOUT 1 - 2 DAYS OF ESTRUS.
  - OVULATION CAN BE DETECTED BY:
    - LH ASSAY (PEAK LH VALUE + ONE DAY)
    - PROGESTERONE ASSAY (>5 NG/ML)
    - CYTOLOGY OF VAGINAL SMEAR (>50% CORNIFIED CELLS)
- REMEMBER OOCYTES IN THE CANINE ARE OVULATED AS 1° OOCYTES AND MUST MATURE IN THE OVIDUCT TO A 2° OOCYTE BEFORE FERTILIZATION.
- FRESH OR COOLED SEMEN, INSEMINATE 2 DAYS AFTER OVULATION DETECTED AND AGAIN 48 - 72 HR LATTER.
- FROZEN SEMEN, INSEMINATE ON DAY 5 - 7 AFTER OVULATION
- UTERINE INSEMINATION BETTER THAN CERVICAL

# ARTIFICIAL INSEMINATION IN THE BITCH





# Signs of Impending Parturition

- Nest building,
- Restlessness and seeking quiet, out of sight areas.
- Relaxation of pelvic and abdominal muscles is a consistent sign of impending parturition.
- Decrease in body temperature from 38 to 37°C just before parturition.

# Parturition

## First Stage of Labor

- Averages 4 hours but can last 6-12 hours
- Period in which the cervix dilates
- Bitch will be uneasy, refuse food, pant, vomiting and
- frequently looking at flank.

## Second State of Labor

- Visible straining of bitch in the sitting position
- Placental membrane will break and there will be fluid discharge from vulva.
- Membrane will rupture spontaneously or through licking of dam.
- After the start of labor first fetus cannot be expected to survive more than 6 hours in the uterus.
- Fetuses should be delivered within 2 hours of each other.
- Usually interval between puppies is about 30 minutes.

## **Third Stage of Labor**

**Passage of fetal membranes should take 5 to 15 minutes.**

### **Dystocia**

**Definition: Any problem with delaying normal birth of fetus.**

### **Symptoms**

**Abnormal fetal presentation, position or posture**

**Strong and persistent labor for 20 minutes without delivery of fetus.**

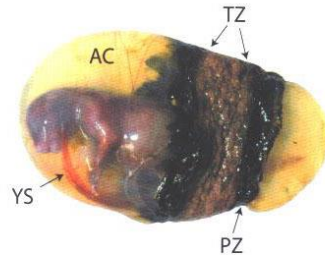
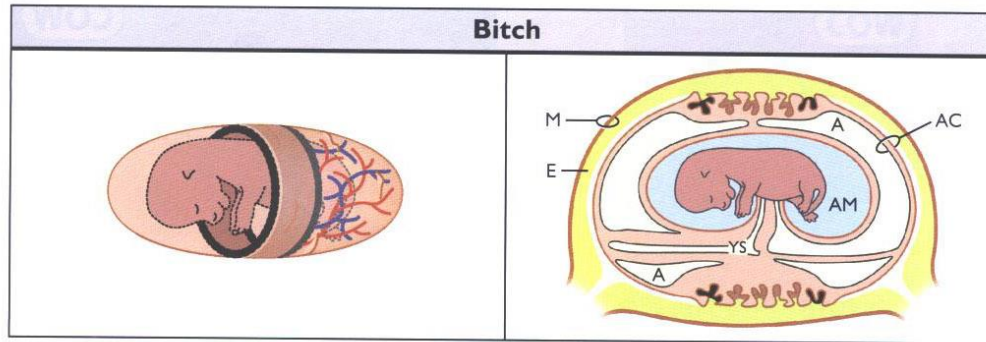
**Weak and infrequent contractions for 2 to 3 hours**

**More than 4 hours from delivery of last fetus (if not**

**last one)**

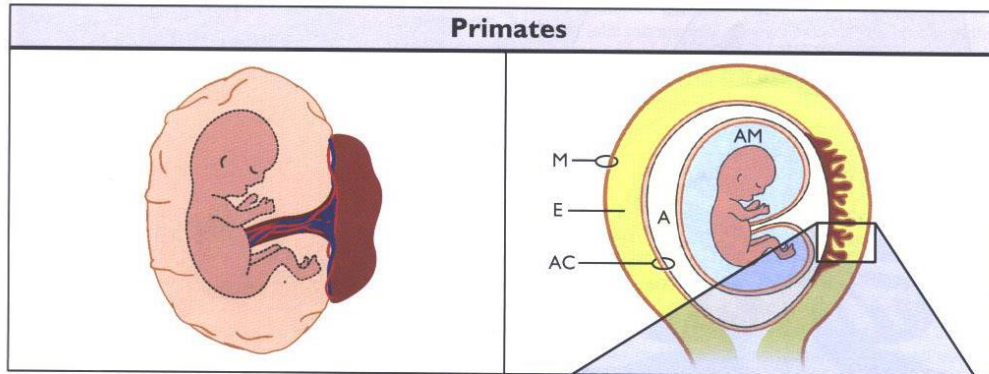
**Most common problem is uterine inertia (weak contractions),  
size of fetus and birth canal.**

**Figure 14-2.** The Zony and Discoid Placentas



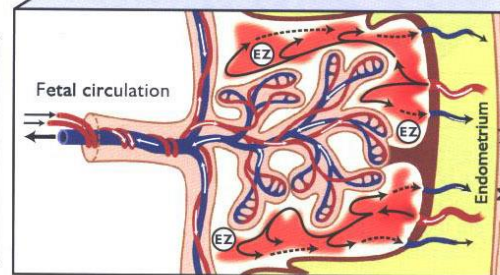
The zony placenta consists of three distinct zones; a transfer zone (TZ), a pigmented zone (PZ) and a relatively nonvascular zone, the allantochorion (AC). In the zony placenta, a band of tissue forms around the conceptus where nutrient transfer occurs. The pigmented zone (PZ) or paraplacenta represents local regions of maternal hemorrhage and necrosis.

A= Allantois, AC= Allantochorion, AM= Amniotic Cavity, E= Endometrium, M= Myometrium, YS= Yolk Sac



The discoid placenta consists of a round patch of chorionic tissue that forms the fetal-maternal interface. Vessels from the exchange zone merge to form the umbilical vessels that supply the fetus with blood. The vasculature of the chorion (within the disc) is immersed in pools of blood where metabolic exchange takes place.

A = Allantois, AC = Allantochorion,  
AM = Amniotic Cavity, E = Endometrium,  
EZ = Exchange Zone, M = Myometrium



# CANINE HEAT DETECTION

## Sample Collection

- gather equipment
- open labia
- moisten swab
- collect sample
- prepare the slide
- stain





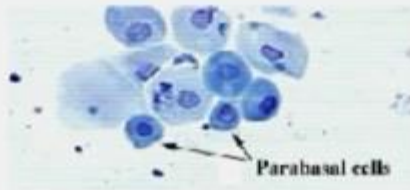
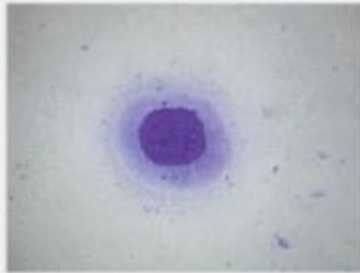
**P**arabasal

**I**ntermediate

**S**uperficial

**A**nuclear

# Parabasal cell



- Small, round or oval cell
- Large, round healthy nucleus
- Healthiest , young cells
- Dominant in anestrus

# Intermediate Cells

- Cell roughly twice the size of a parabasal
- Nuclei smaller; first step in cell death
- Dominant in anestrus, proestrus, estrus

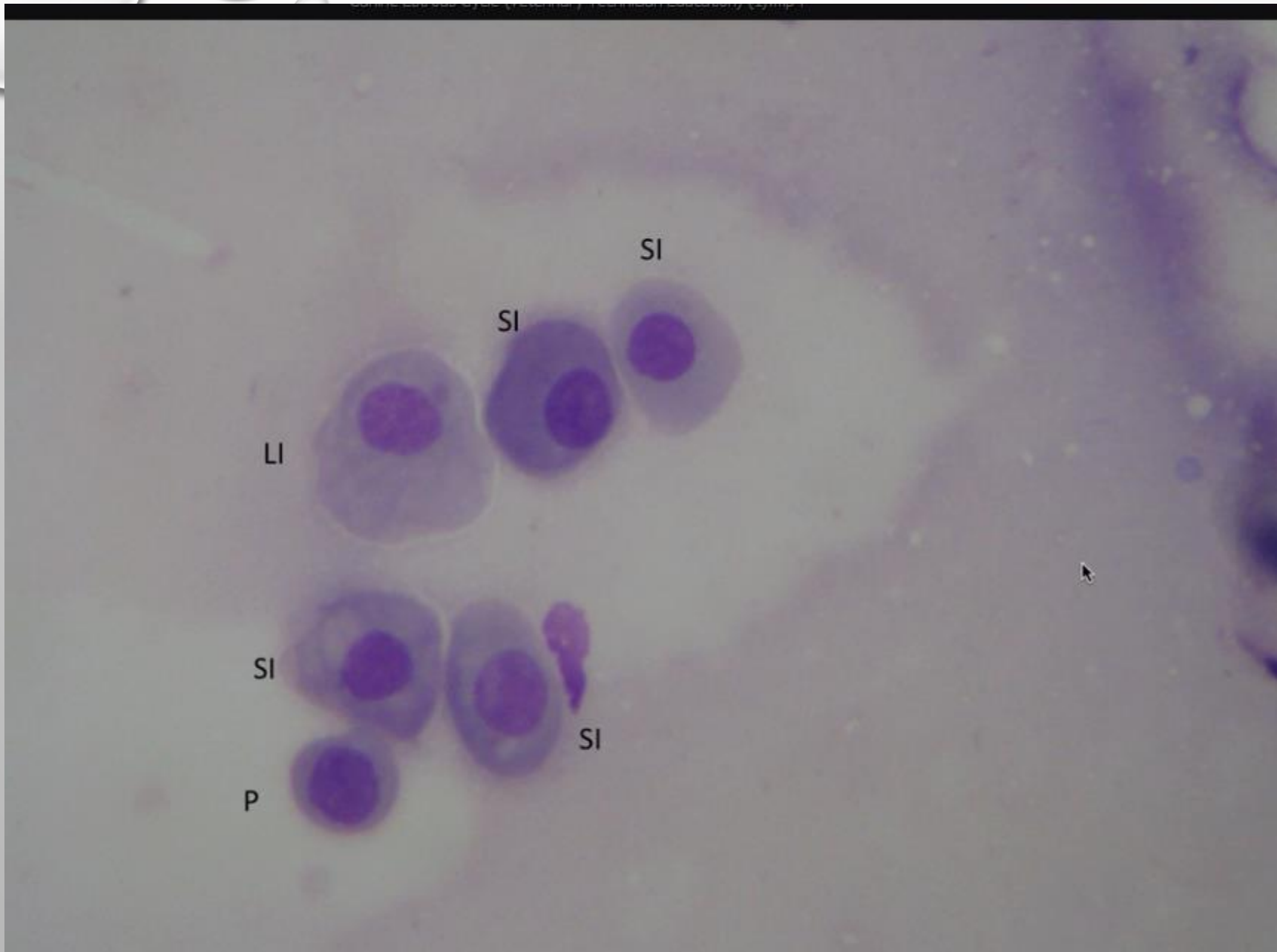
## SMALL

- Cell starting to change shape, less round

## LARGE

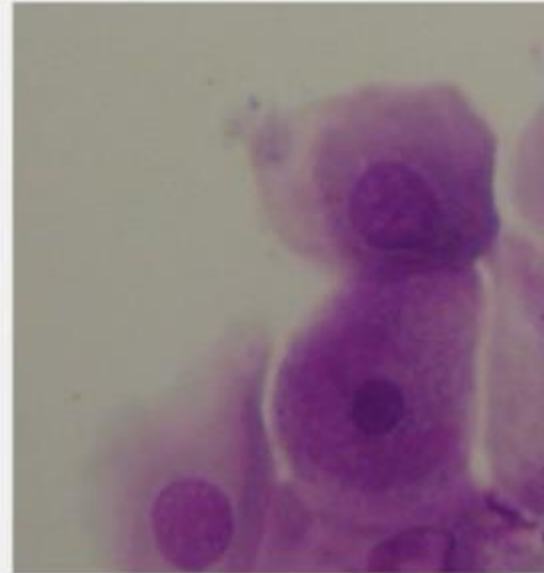
- Cell edges start to fold over; taking angular shapes
- Healthy nuclei, round
- Flatter cells





# Superficial Cells

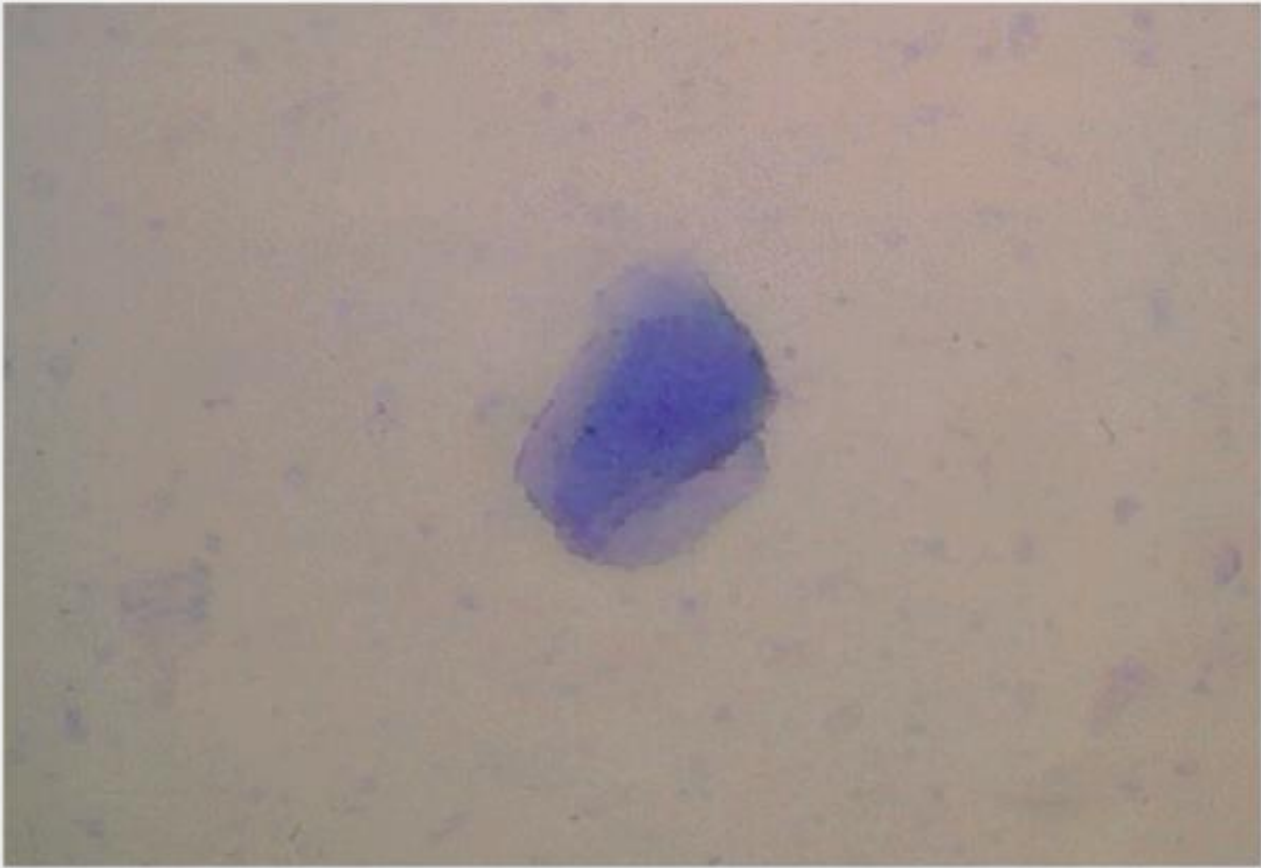
- Largest epithelials
- Pyknotic nucleus
- Stain poorly
- Cell getting flatter, larger during death
- Most abundant during estrus



# Anuclear Cell

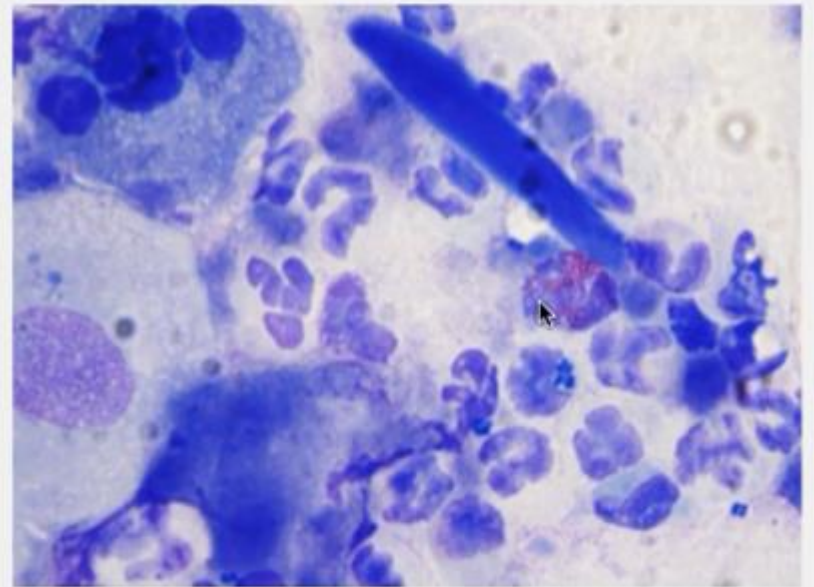
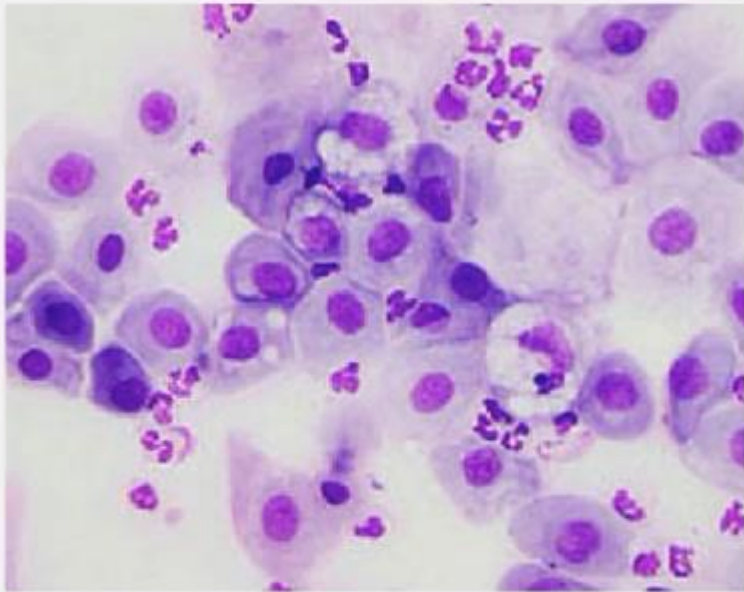
- End of keratinization of parabasal cell, end of life
- Largest cell
- No visible nucleus (sometimes a shadow)
- Angular irregular cell edges, folded
- Most abundant in estrus





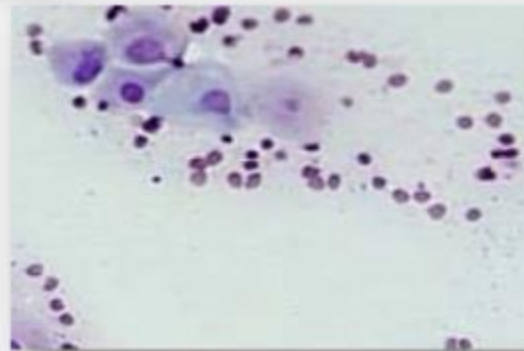
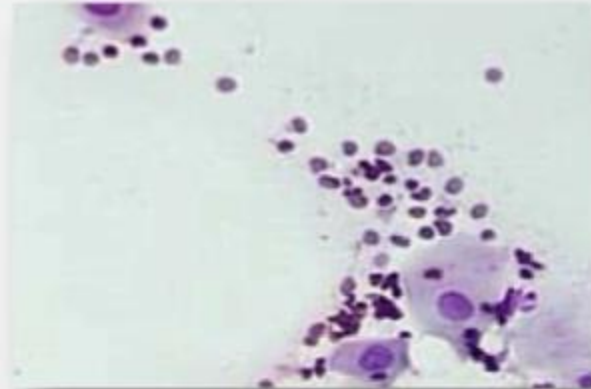
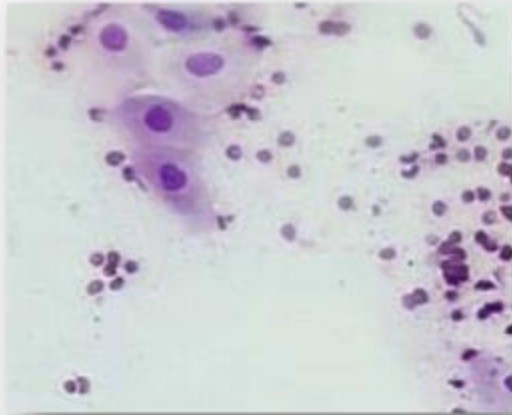


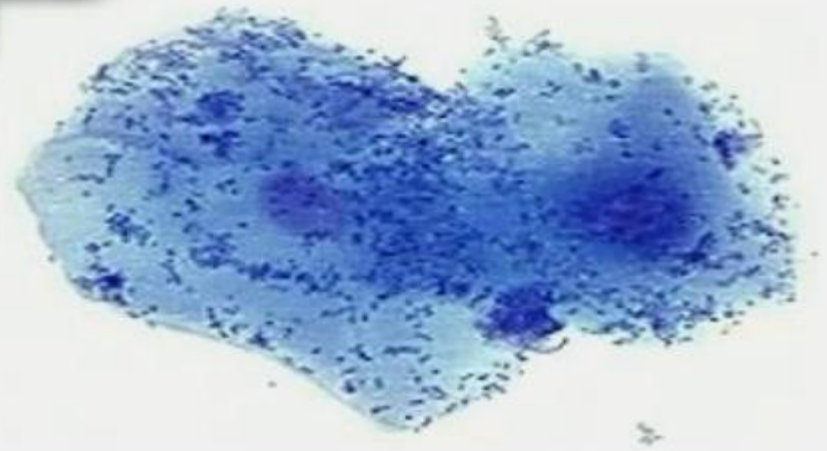
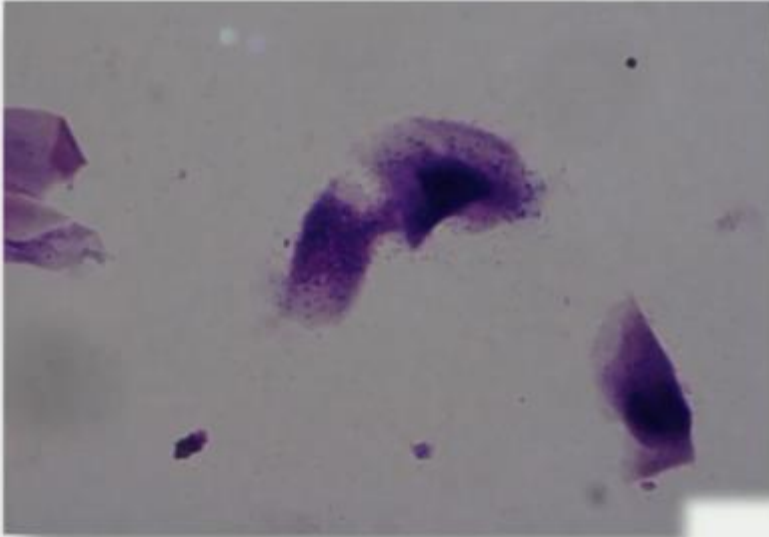
# Neutrophils





# Red Blood Cells





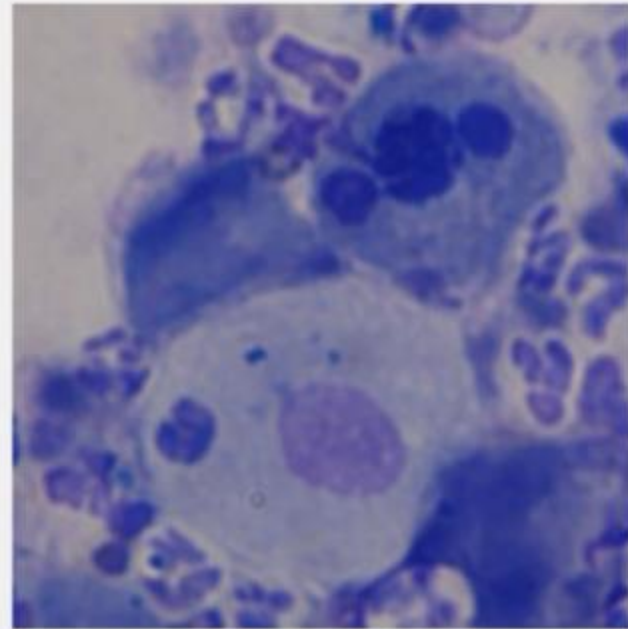
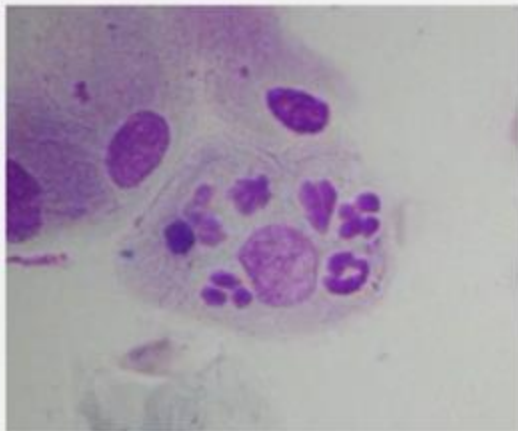
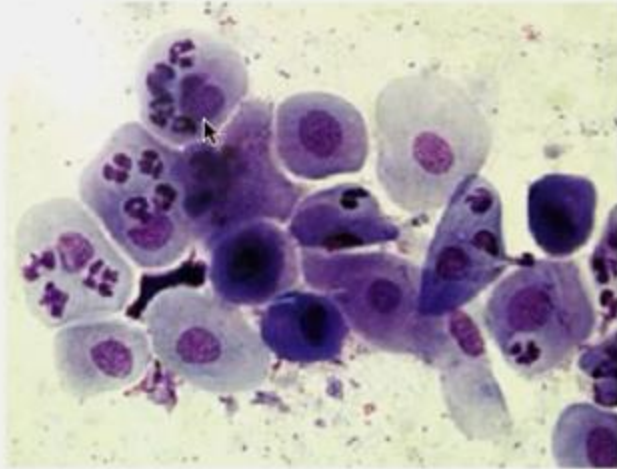
**Bacteria**

# Metestrus Cells

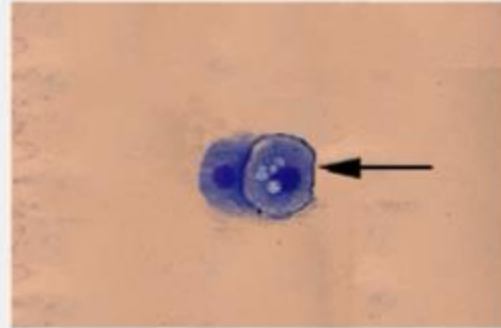
- Also referred to as metestrum cells
- Large intermediate cells
- See one or more neutrophils in cytoplasm
  - **EMPERIPOLESIS** the process of a smaller cell passing through a larger cell. *Example: metestrus cell*



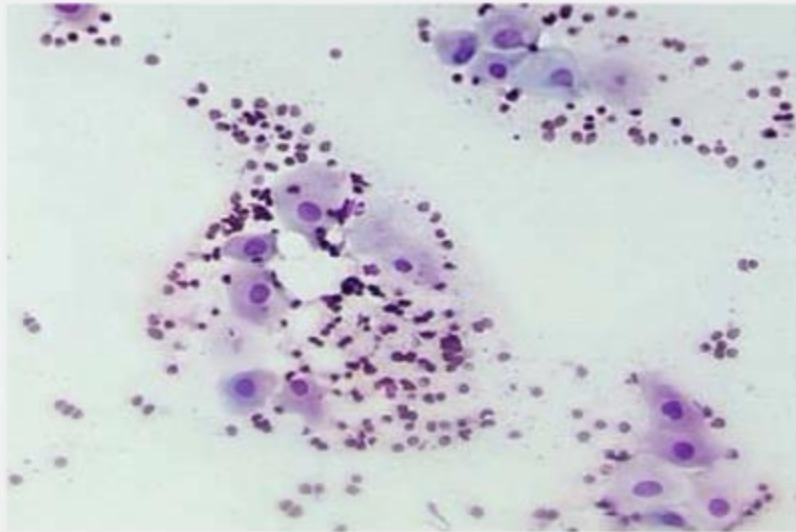
# Metestrus cell



# Foam cell



- Parabasal or intermediate cell with vacuolated cytoplasm
- Seen in diestrus, anestrus
- *Rarely* seen in proestrus

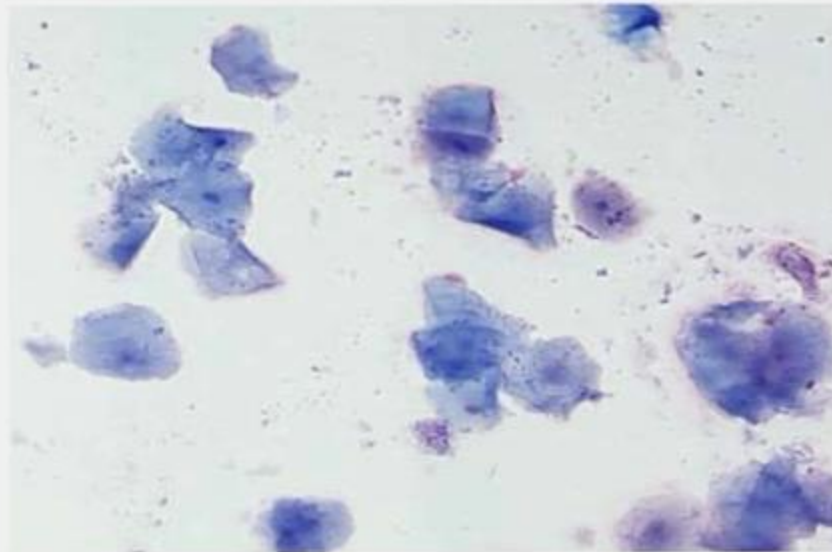


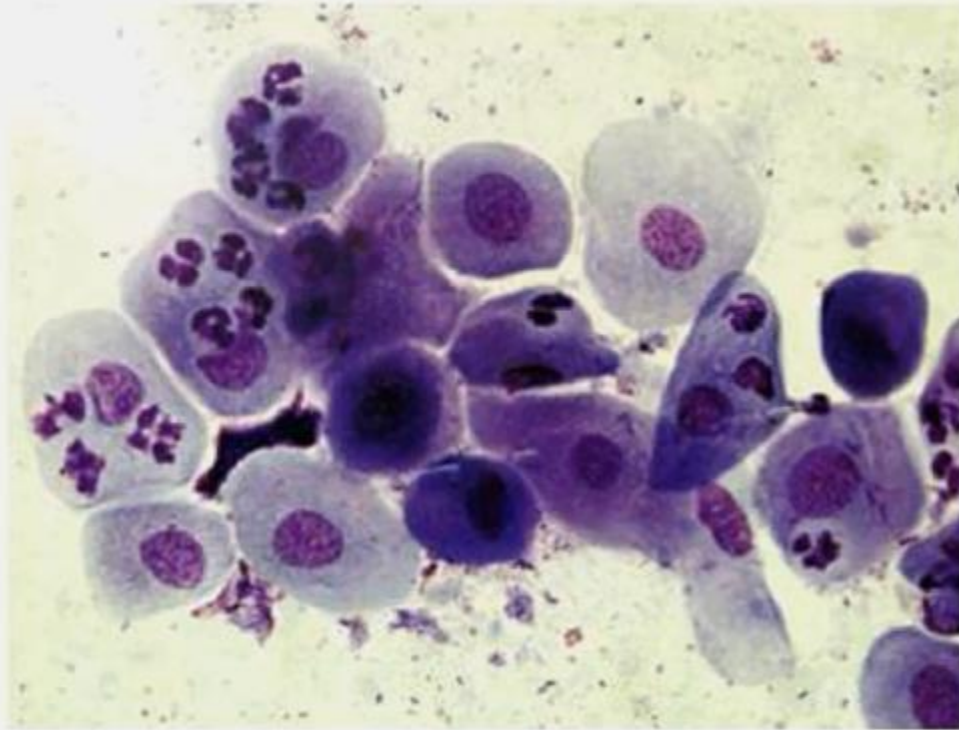
- parabasals
- intermediate
- superfluentials
- neutrophils (early)
- RBCs

# Proestrus

# Estrus

- >90% superficial cells
- no neutrophils
- +/- RBCs
- +/- bacteria



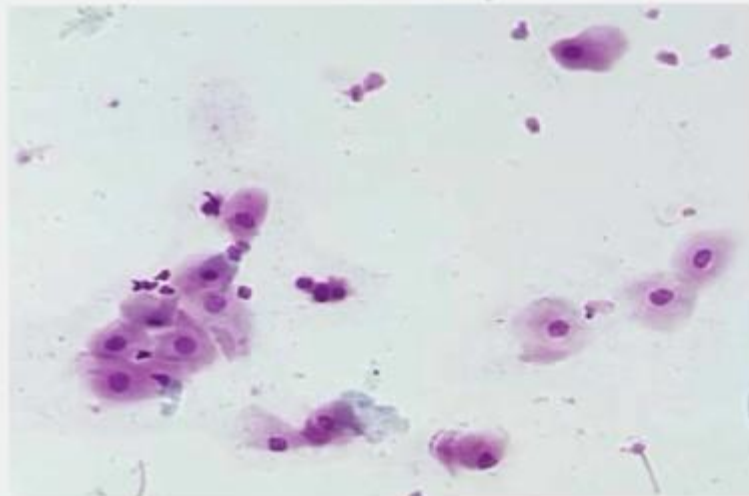


- 50% superficial
- 50% parabasals, intermediates
- can look like proestrus

# Diestrus

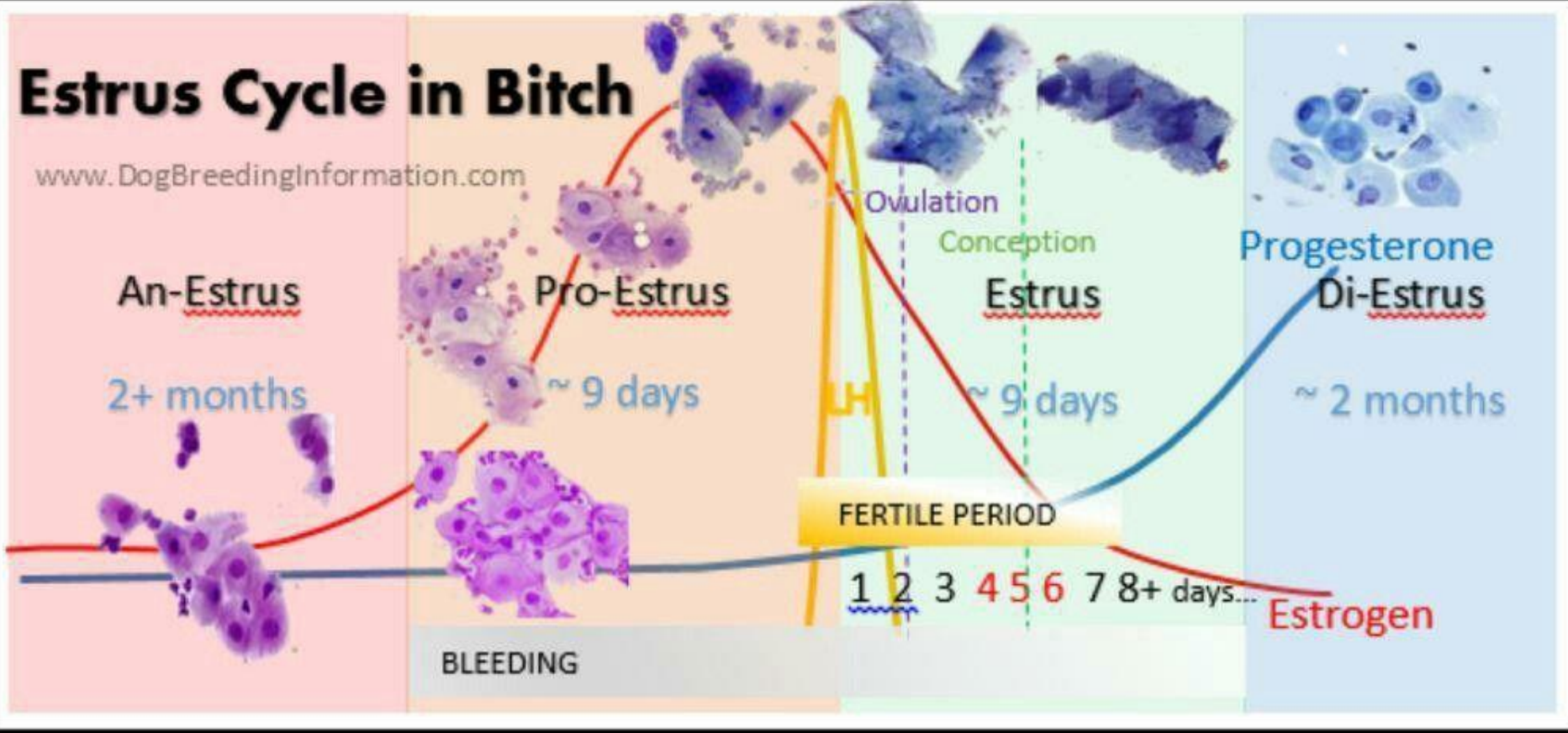
# Anestrus

- parabasals
- intermediates



# Estrus Cycle in Bitch

www.DogBreedingInformation.com



# FELINE REPRODUCTION





# FELINE REPRODUCTION

- ▶ FEMALE-QUEEN

- ▶ MALE - TOM

- ▶ PUBERTY

  - ▶ 6 - 9 MONTHS

- ▶ ESTROUS CYCLE

  - ▶ SEASONAL

    - ▶ JANUARY TO SEPTEMBER

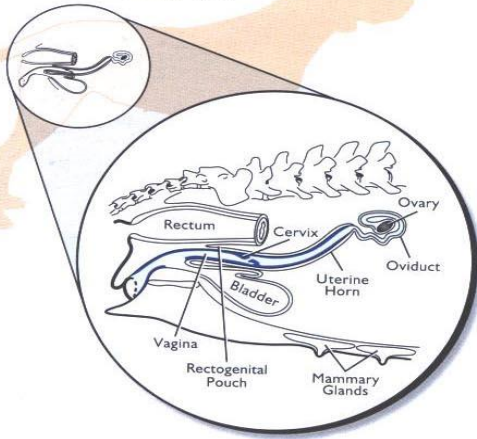
    - ▶ HOUSE CATS MAY CYCLE YEAR ROUND

# ANATOMY

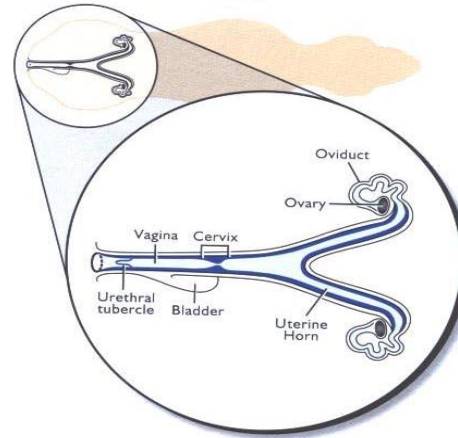
Figure 2-8 Lateral/Dorsal View of Bitch and Queen

## Bitch

Lateral view

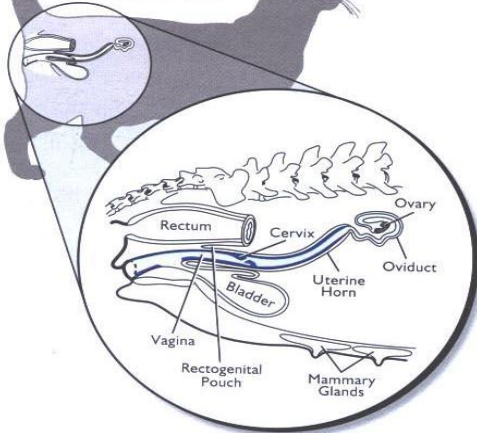


Dorsal view

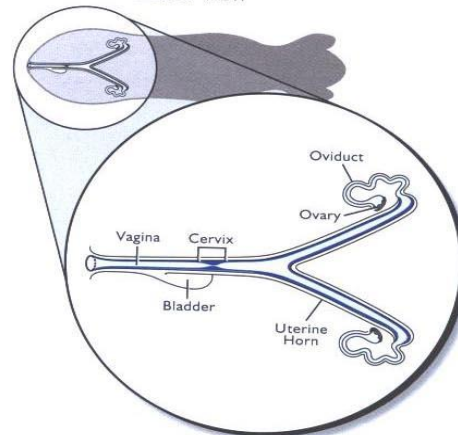


## Queen

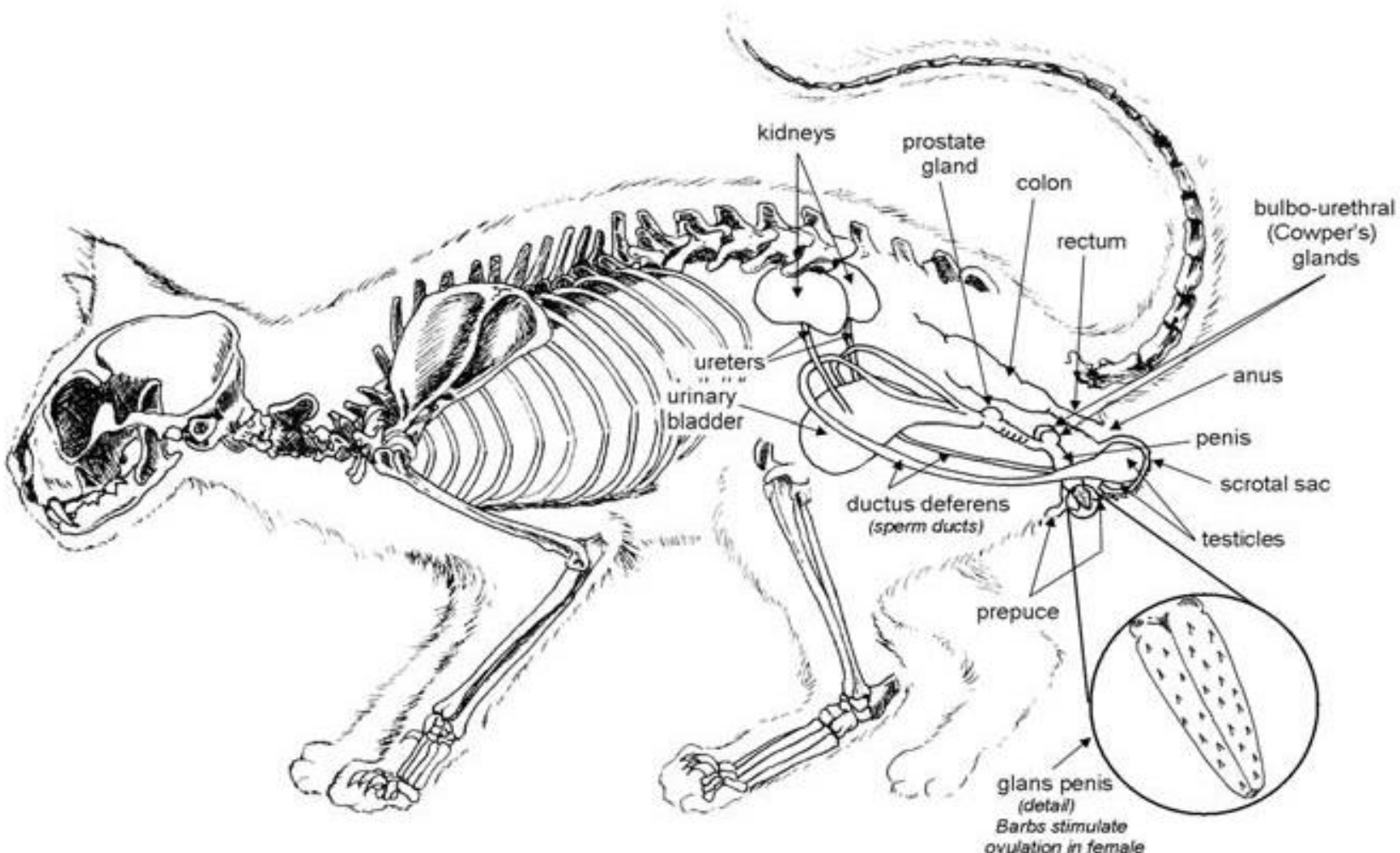
Lateral view

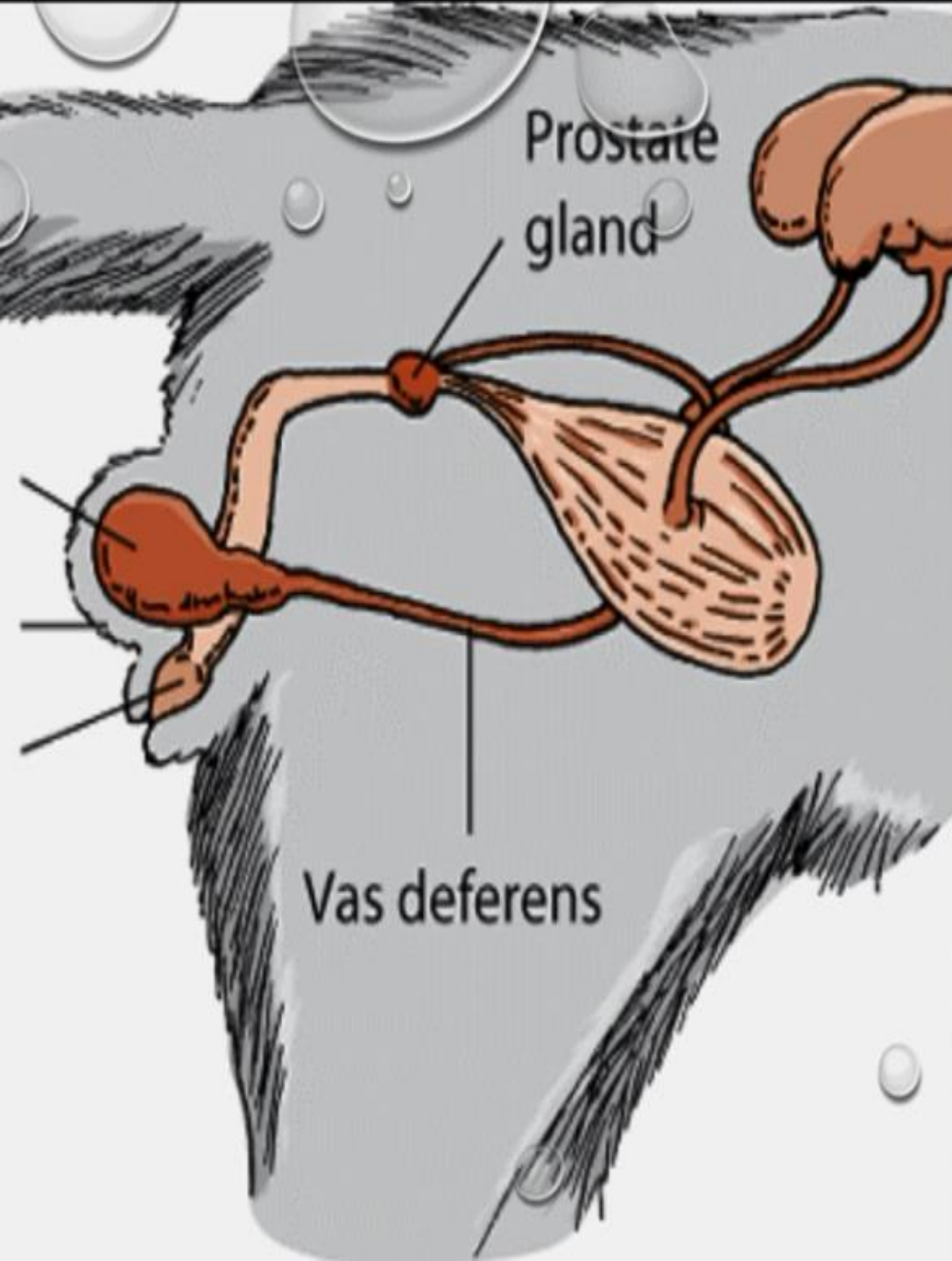


Dorsal view



# TOM ANATOMY





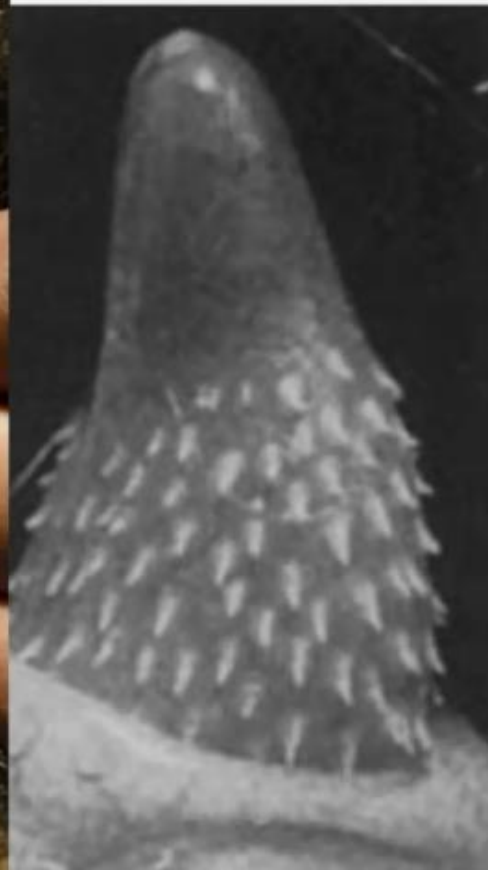
FELINE SETUP

copyright Pet Informed.



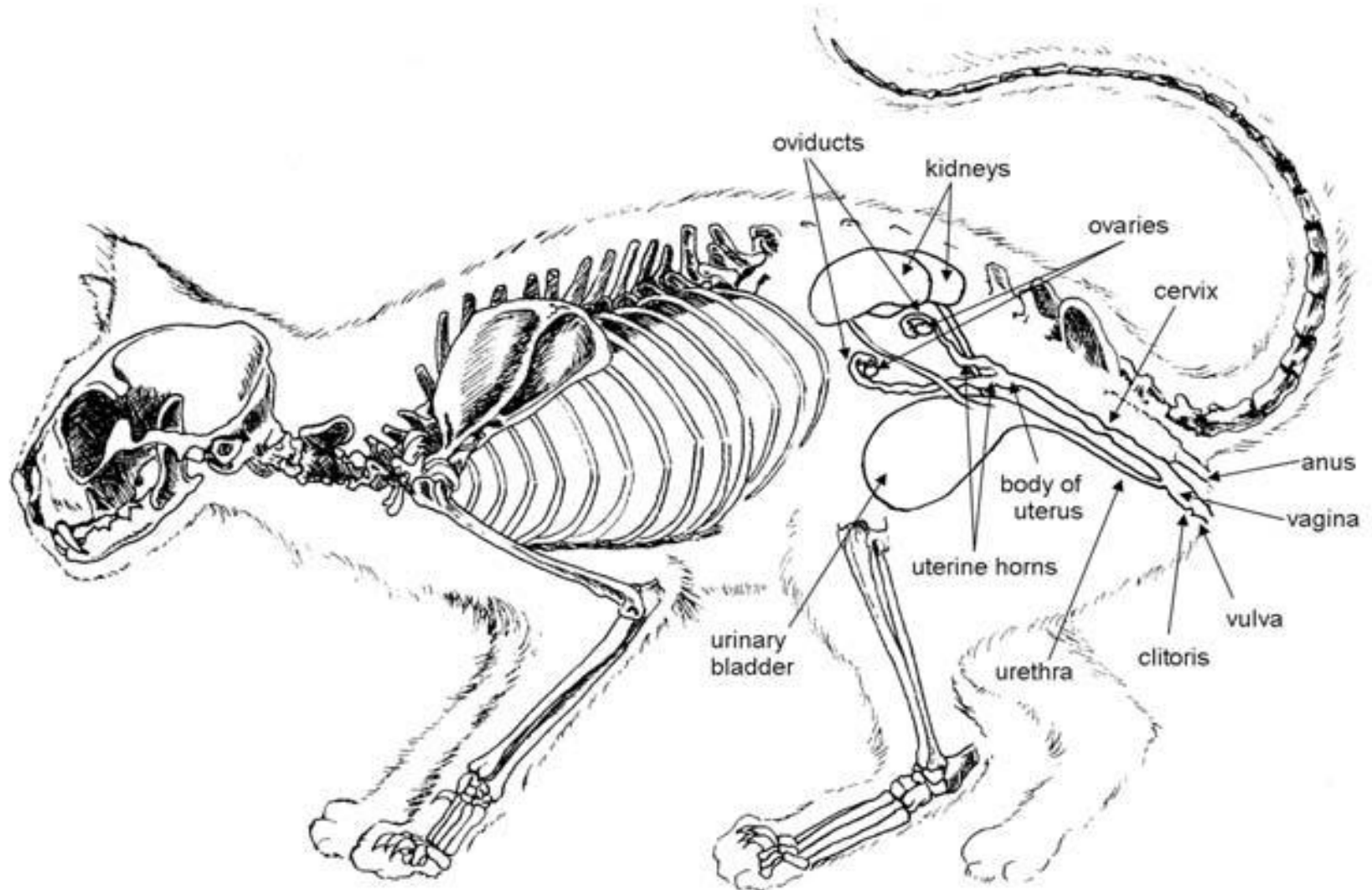
Cat, Male, Neutered, 7 years  
Difficulty in passing urine

FLUTD in the cat  
toapayohvets.com  
Apr 28, 2011



# QUEEN ANATOMY

*Female, intact*



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**Table 6-1. Average Ages (Range) of Puberty in the Male and Female of Various Species**

---

<b><u>Species</u></b>	<b><u>Male</u></b>	<b><u>Female</u></b>
<b>Alpaca<sup>2</sup></b>	2-3 yrs	1 yr
<b>Bovine</b>	11 mo (7-18)	11 mo (9-24)
<b>Camel<sup>2</sup></b>	3-5 yrs	3 yrs
<b>Canine<sup>1</sup></b>	9 mo (5-12)	12 mo (6-24)
<b>Equine</b>	14 mo (10-24)	18 mo (12-19)
<b>Feline</b>	9 mo (8-10)	8 mo (4-12)
<b>Llama<sup>2</sup></b>	2-3 yrs	6-12 mo
<b>Ovine</b>	7 mo (6-9)	7 mo (4-14)
<b>Porcine</b>	7 mo (5-8)	6 mo (5-7)

---

<sup>1</sup> Very breed dependent - See Johnston *et al.* in **Key References.**

<sup>2</sup> See Tibary and Anouassi in **Key References.**

---

# ESTROUS CYCLE

- **PRO-ESTRUS**

- 1 - 2 DAYS
- ATTRACTED TO MALES
- RUBS HEAD AND NECK ON OBJECTS
- VOCALIZATION, POSTURING AND ROLLING

- **ESTRUS**

- ACCEPTS MALE
- 4 - 6 DAYS IF MALE PRESENT, 10 DAYS IF NO MALE
- OVULATION 27 HOURS AFTER MATING (INDUCED)
- AFFECTIONATE TO AGGRESSIVE TOWARDS OWNERS



# Feline Estrous Cycle

Cat in lordosis - Photo by Sidereal (Flickr)



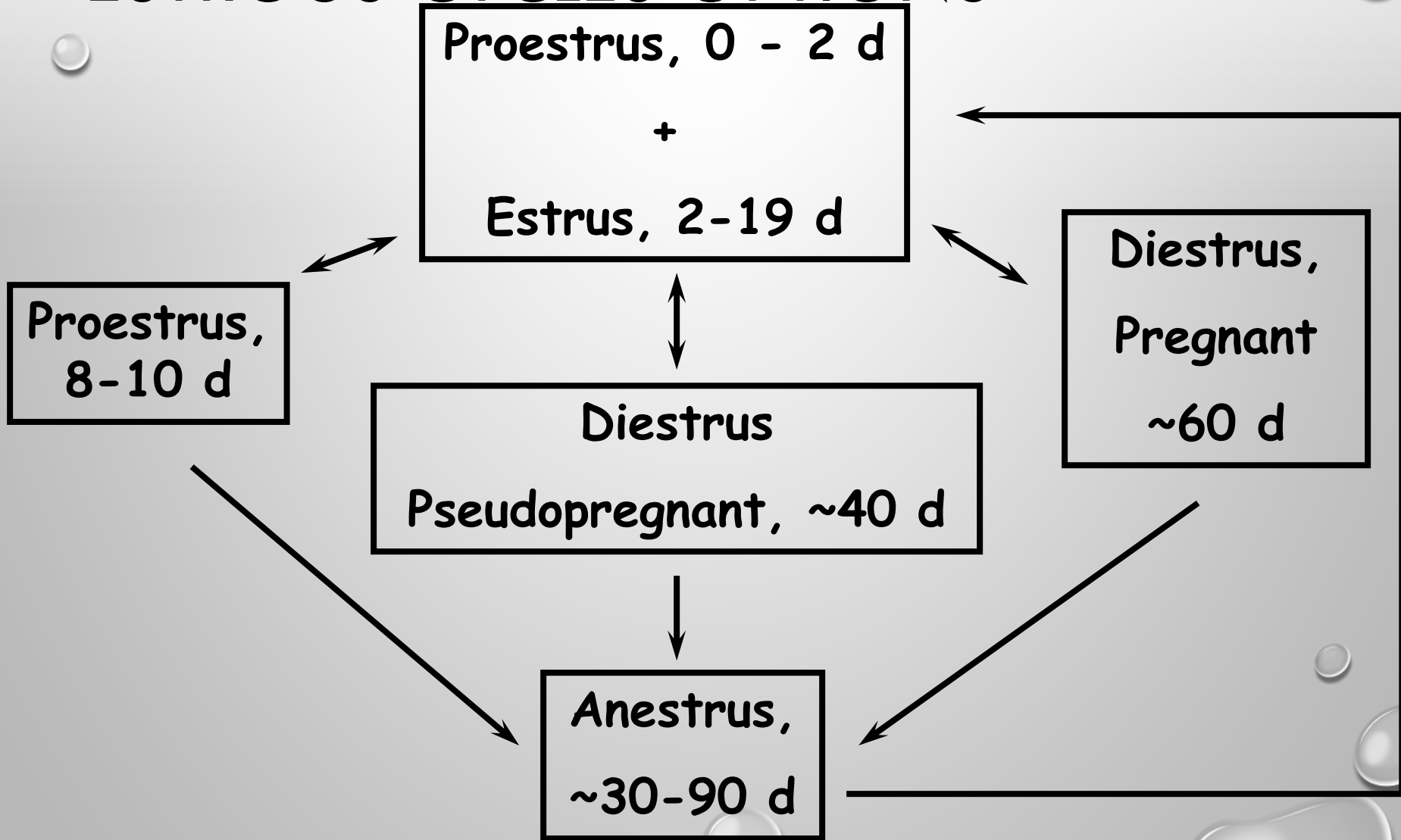
# ESTROUS CYCLE

- **PROESTRUS** IF QUEEN DID NOT OVULATE
  - 8 - 10 DAYS
- **DIESTRUS** AFTER OVULATION
  - PSUEDOPREGNANCY - 40 DAYS
  - PREGNANCY - 60 DAYS
- **ANESTRUS** 3 - 4 MONTHS

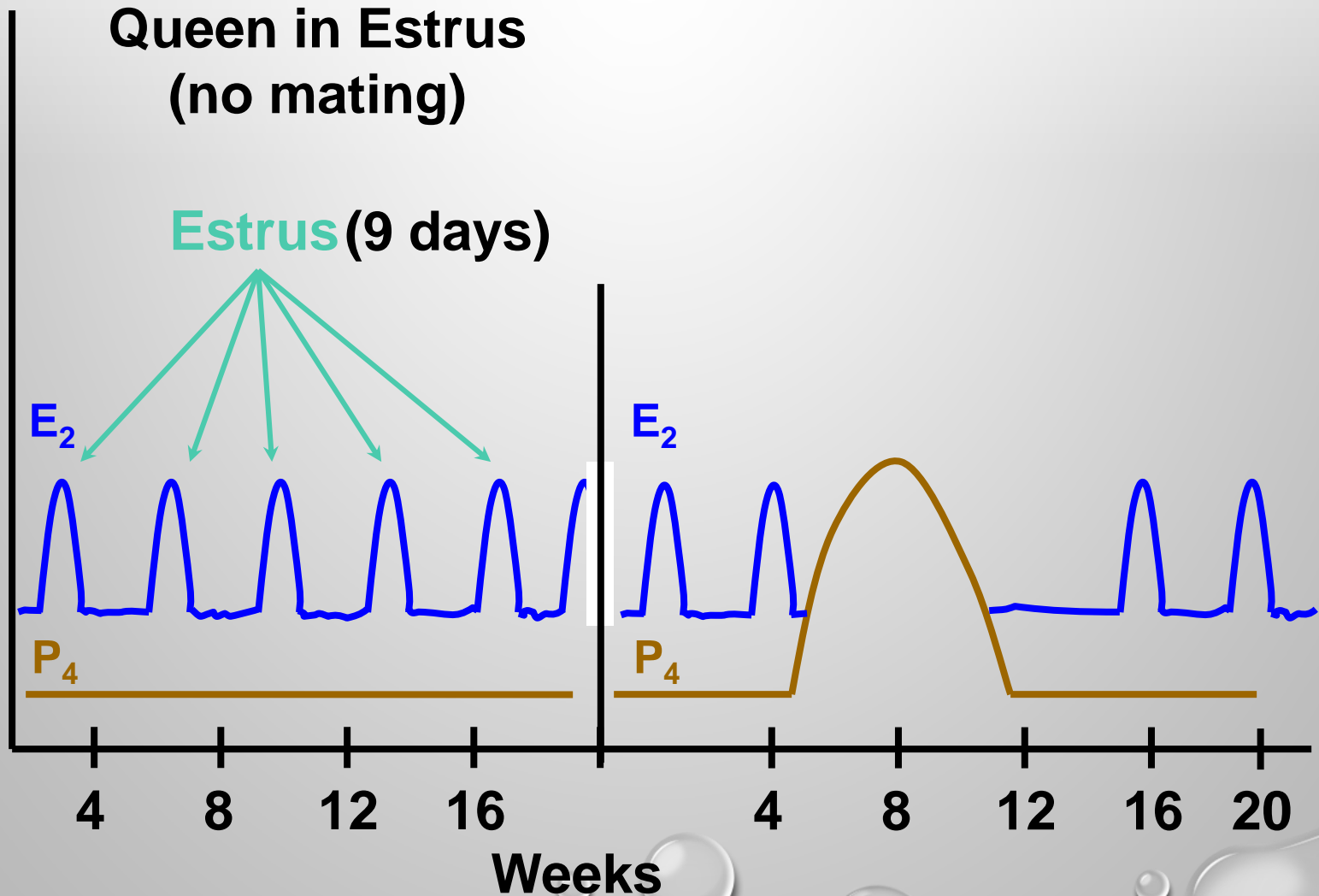
**Table 7-1.** Characteristics of Estrous Cycles in Domestic Animals

<u>Species</u>	<u>Classification</u>	<u>Length of Estrous Cycle</u>		<u>Duration of Estrus</u>		<u>Time From Onset of Estrus to Ovulation</u>	<u>Time From LH Surge to Ovulation</u>
		<u>Mean</u>	<u>Range</u>	<u>Mean</u>	<u>Range</u>		
<b>Bitch</b>	Monoestrus	6 mo	(3-9 mo)	9d	(4-21d)	4-24d	2-3d
<b>Cow</b>	Polyestrus	21d	(17 - 24d)	15h	(6 - 24h)	24 - 32h	28h
<b>Ewe</b>	Seasonally polyestrus (Short Day)	17d	(13 - 19d)	30h	(18 - 48h)	24 - 30h	26h
<b>Llama</b>	Polyestrus	10d	(8-12d)	5d	(4-5d)	Induced Ovulator	24-36h
<b>Mare</b>	Seasonally polyestrus (Long Day)	21d	(15 - 26d)	7d	(2 - 12d)	5d	2d
<b>Queen</b>	Polyestrus	17d	(4-30d)	9d	(2-19d)	Induced	30-40h

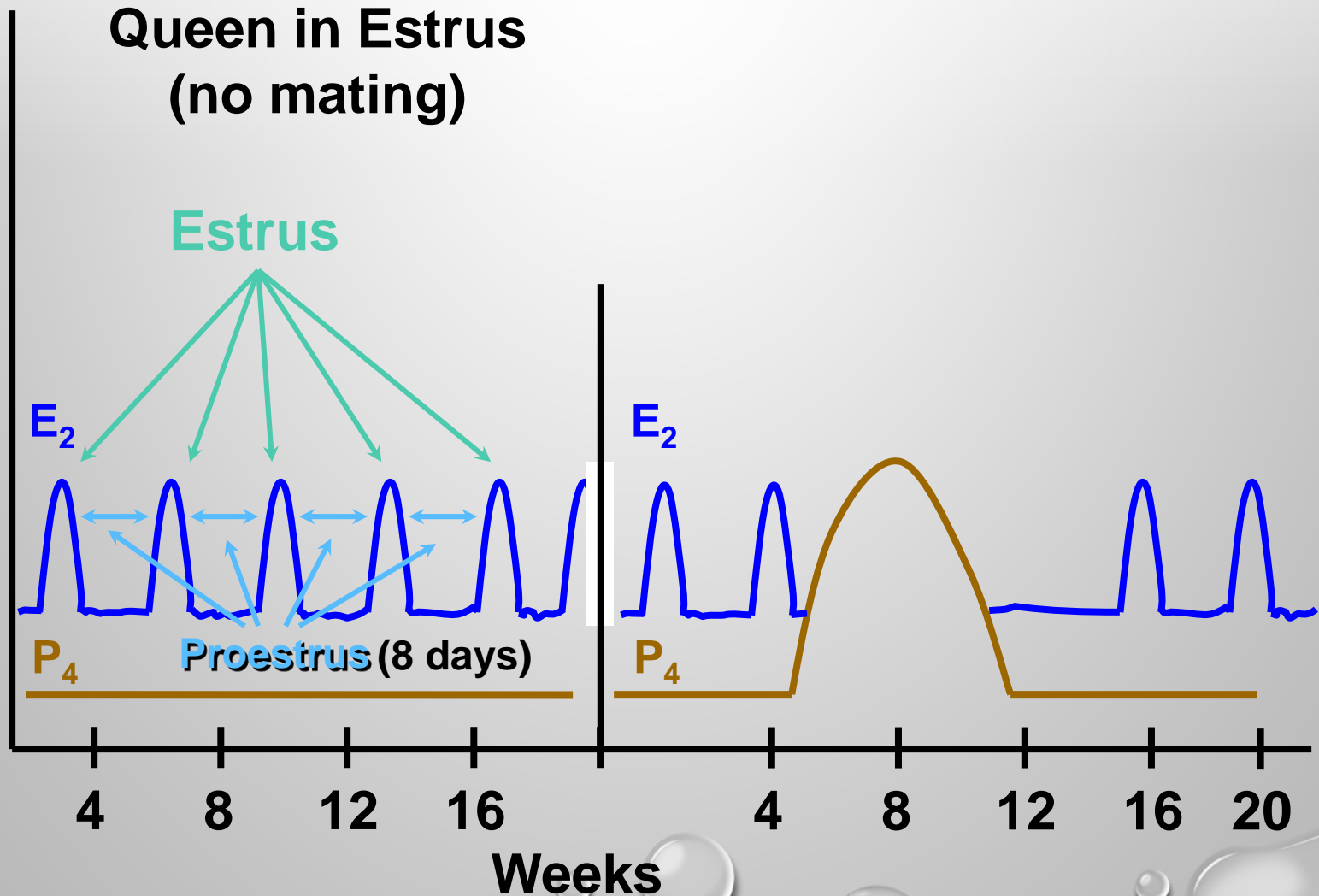
# ESTROUS CYCLES OPTIONS



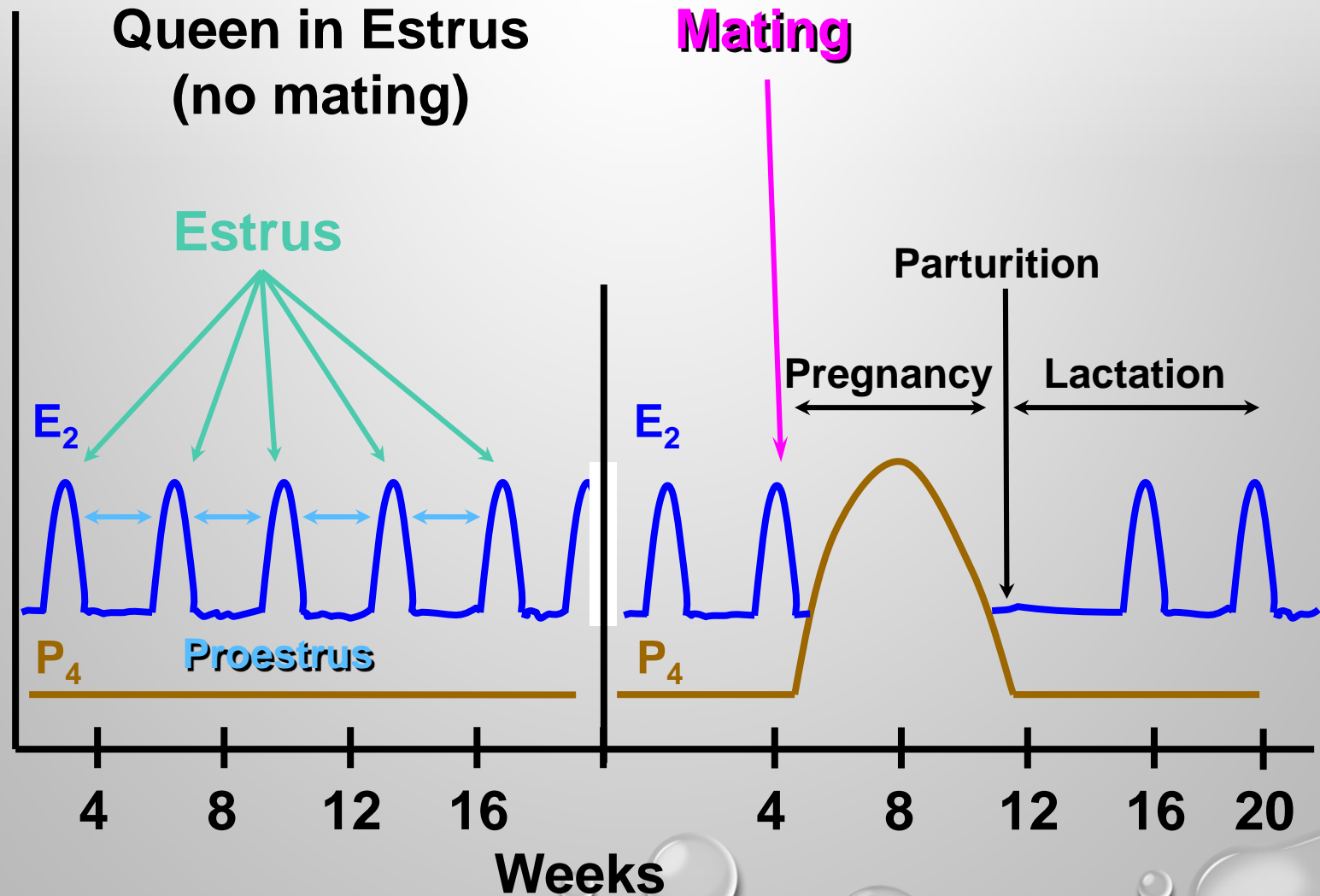
# HORMONAL CHANGES IN THE QUEEN



# HORMONAL CHANGES IN THE QUEEN



# HORMONAL CHANGES IN THE QUEEN







# HORMONAL CHANGES

- **PROESTRUS**

- ESTROGEN INCREASES DUE TO FOLLICULAR DEVELOPMENT

- **ESTRUS**

- ESTROGEN HIGH UNTIL OVULATION
- OVULATION 27 HR AFTER MATING (VAGINAL STIMULATION)

- **DIESTRUS**

- NO CL IF MATING DOES NOT OCCUR, SO NO DIESTRUS
- CL PRODUCES PROGESTERONE (63 DAYS, PEAK DAY 20)
- IF PREGNANCY DOES NOT OCCUR OR FAILS, CL LIFE ONLY 1/2 THAT SEEN IN PREGNANCY.

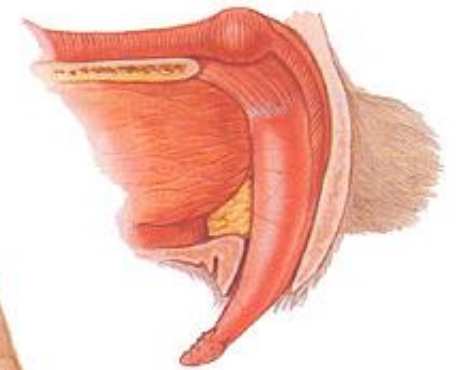
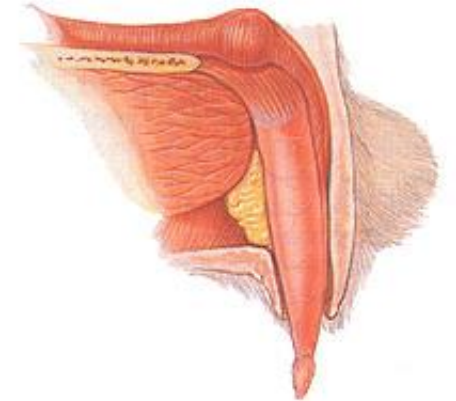
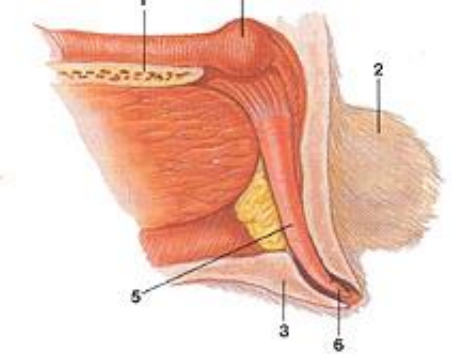
# MATING

- QUEENS CALL OR VOCALIZE (LOW MOANING SOUND)
  - OWNERS MAY THINK A SIGN OF ILLNESS
- DURING MATING
  - TOM BITES NECK FEMALE
  - WITH ERECTION PENIS FACES FORWARD
  - ONLY LASTS 30 SECONDS TO 5 MINUTES
  - AS MALE DISMOUNTS FEMALE GIVES A LOUD COPULATORY CALL AND TOM RETREATS
  - MATING OCCURS 6 - 7 TIMES UNTIL QUEEN DECLINES
  - MAY OCCUR FOR UP TO 4 DAYS

# ERECTION AND MATING



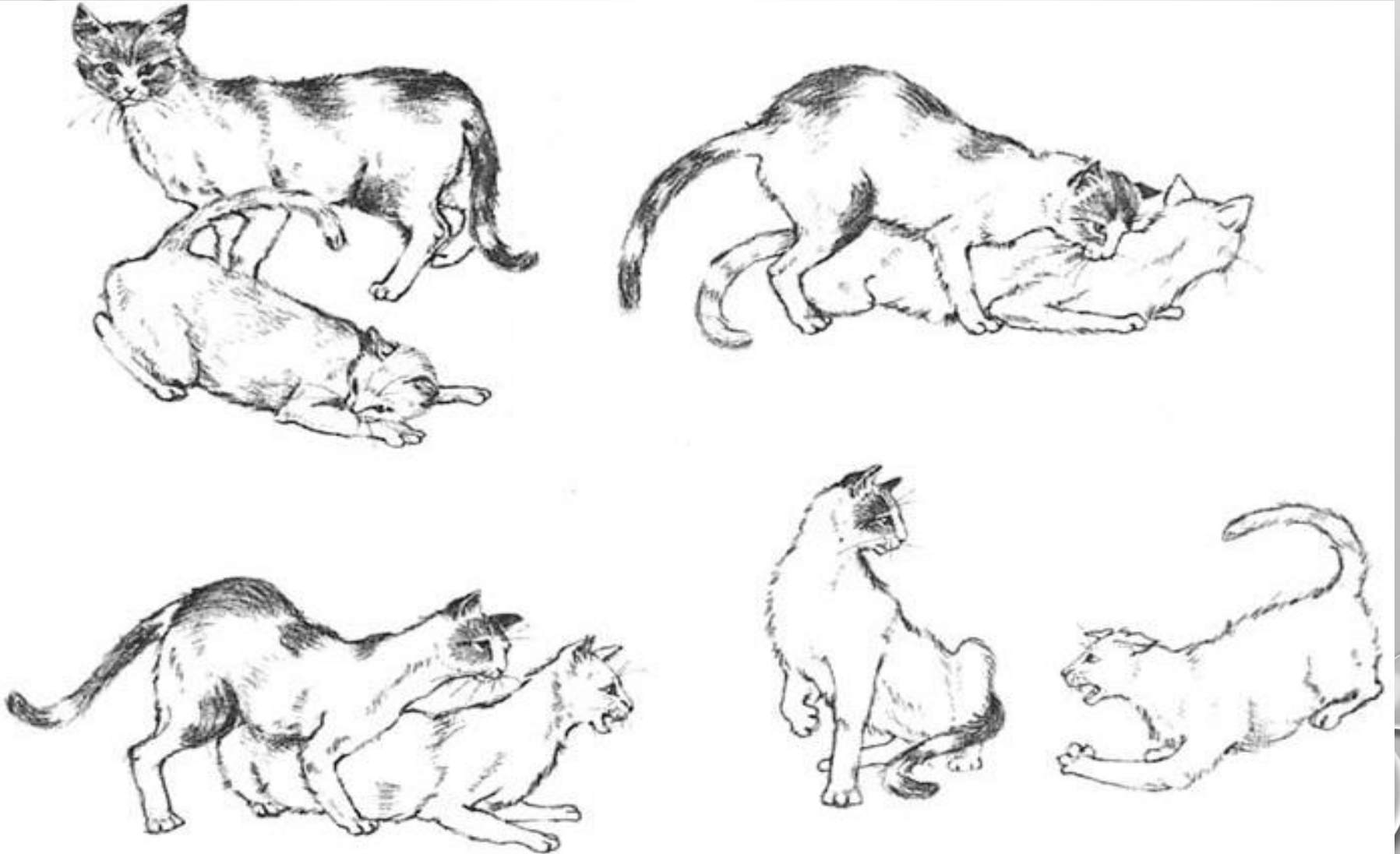
A



C



# MATING



# CAT MATING



# PREGNANCY

▶ 63-69 (65) DAYS

▶ SIAMESE: 71 DAYS

▶ DIAGNOSIS

▶ ABDOMINAL PALPATION DAY 20-25

▶ ULTRASONOGRAPHY: DAY 15

▶ WITNESS KIT: RELAXIN DETECTION, DAY 30

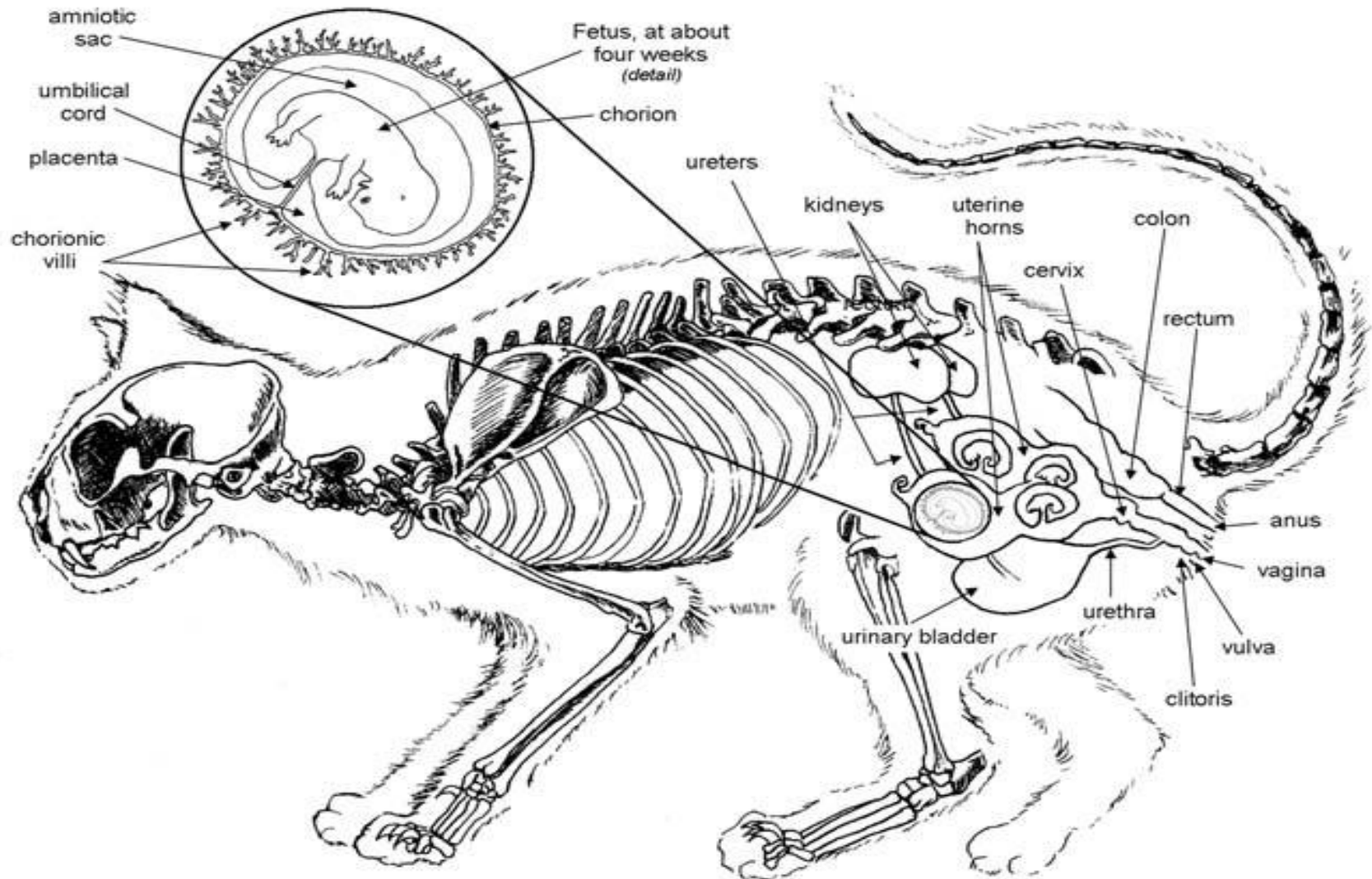
• PROGESTERONE RISE IN SERUM PLASMA: 3<sup>RD</sup> WEEK

• MORNING DISCOMFORT

• 3<sup>RD</sup> – 4<sup>TH</sup> WEEK

• LETHARGY, ANOREXIA, VOMITING

# PREGNANCY



# PARTURITION

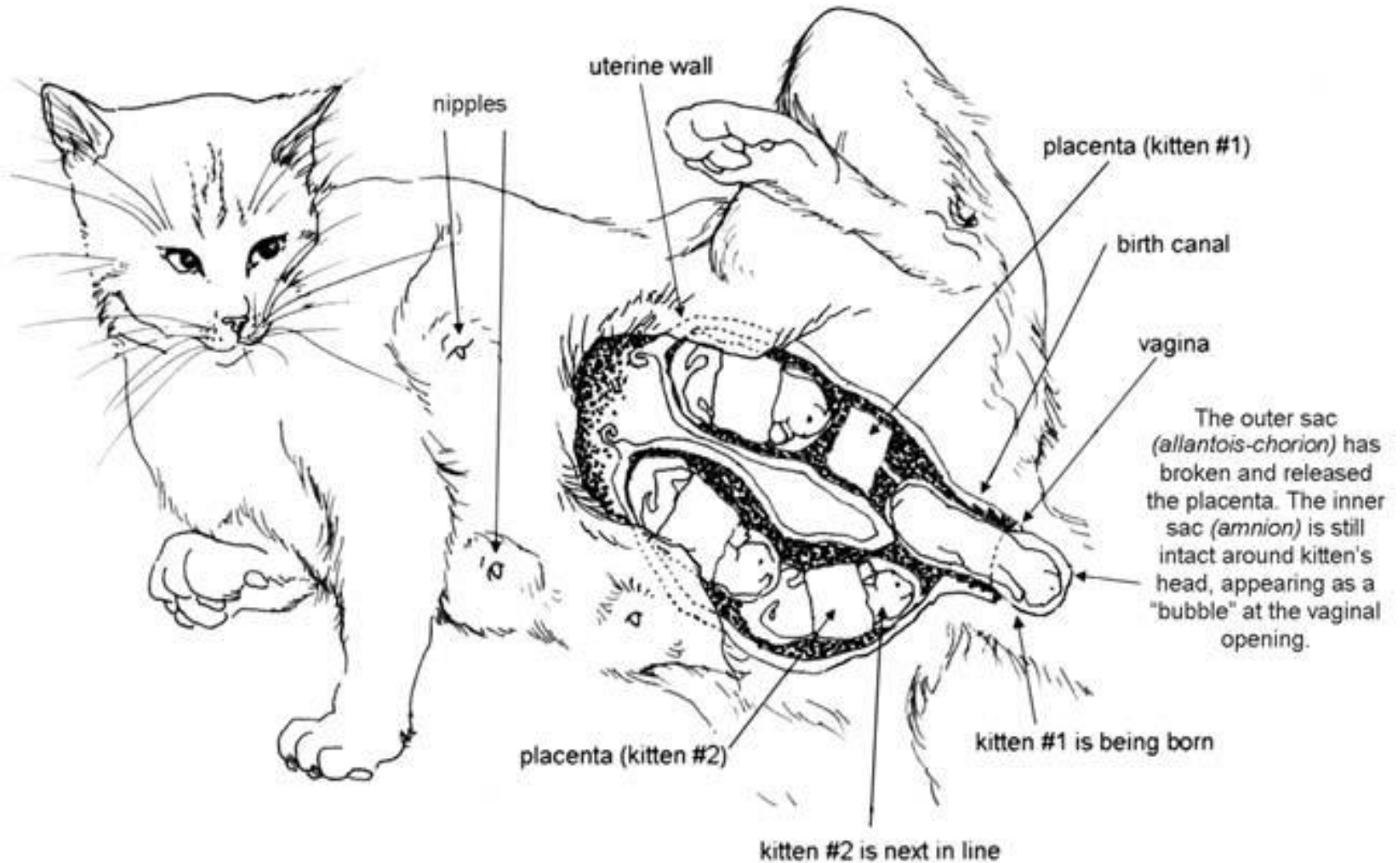
- THE MAMMARY GLANDS INCREASE IN SIZE DURING THE LAST WEEK OF GESTATION.
- AROUND TWO DAYS BEFORE THE QUEEN GIVES BIRTH, SHE WILL START PRODUCING MILK.
- SHE MAY START NESTING.
- NORMAL TEMPERATURE IN A CAT IS 100 - 102.5°F (37.7 - 39.1°C). A DAY OR TWO BEFORE BIRTH, HER TEMPERATURE DROPS TO 99°F (37.2°C).
- CHANGE IN BEHAVIOUR. DURING THE LAST WEEK OR SO, YOUR QUEEN MAY BECOME EITHER RECLUSIVE (POSSIBLY SEEKING OUT A SECLUDED PLACE), OR MORE AFFECTIONATE, ESPECIALLY IF SHE IS PARTICULARLY CLOSE TO ONE CAREGIVER.
- RESTLESSNESS AND PACING.
- FREQUENT TRIPS TO THE NEST.
- LICKING AT THE GENITALIA FREQUENTLY



# PARTURITION



# PARTURITION



# CONTROL OF ESTRUS

- OVARIOHYSTERECTOMY
- INDUCTION OF OVULATION
  - HCG
  - VAGINAL STIMULATION
- PREVENTION OF ESTRUS
  - PROGESTINS

# DISORDERS OF THE QUEEN

- **PSUEDO-PREGNANCY**
  - MATING TO STERILE MALE
  - VAGINAL STIMULATION OR HORMONAL STIMULATION
- **CYSTIC ENDOMETRIAL HYPERPLASIA (PYOMETRA)**
  - SAME AS IN BITCH
- **FAILURE TO CYCLE**
  - STRESS, POOR NUTRITION, DISEASE, INADEQUATE LIGHT, CYSTIC FOLLICLES

# DISEASES OF THE TOM CAT

- **SPRAYING**
  - CASTRATION
  
- **CRYPTOCHIDISM**
  - DESCENDED AT BIRTH
  - TREATMENT IS CASTRATION

The image features a light gray gradient background with several realistic water droplets of various sizes scattered in the corners. The droplets have highlights and shadows, giving them a three-dimensional appearance. The text 'GOOD LUCK' is centered in the middle of the page.

**GOOD LUCK**

# ESTRUS BEHAVIOR IN A BITCH

[http://www.ansci.wisc.edu/jjp1/as434/powerpoint/fa07/dog\\_estrus4.mov](http://www.ansci.wisc.edu/jjp1/as434/powerpoint/fa07/dog_estrus4.mov)