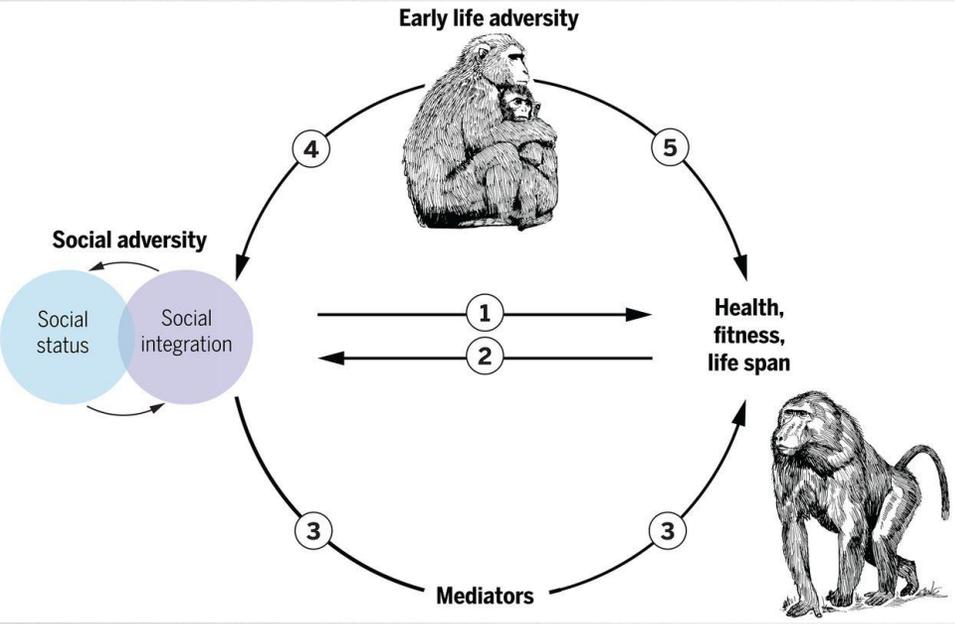
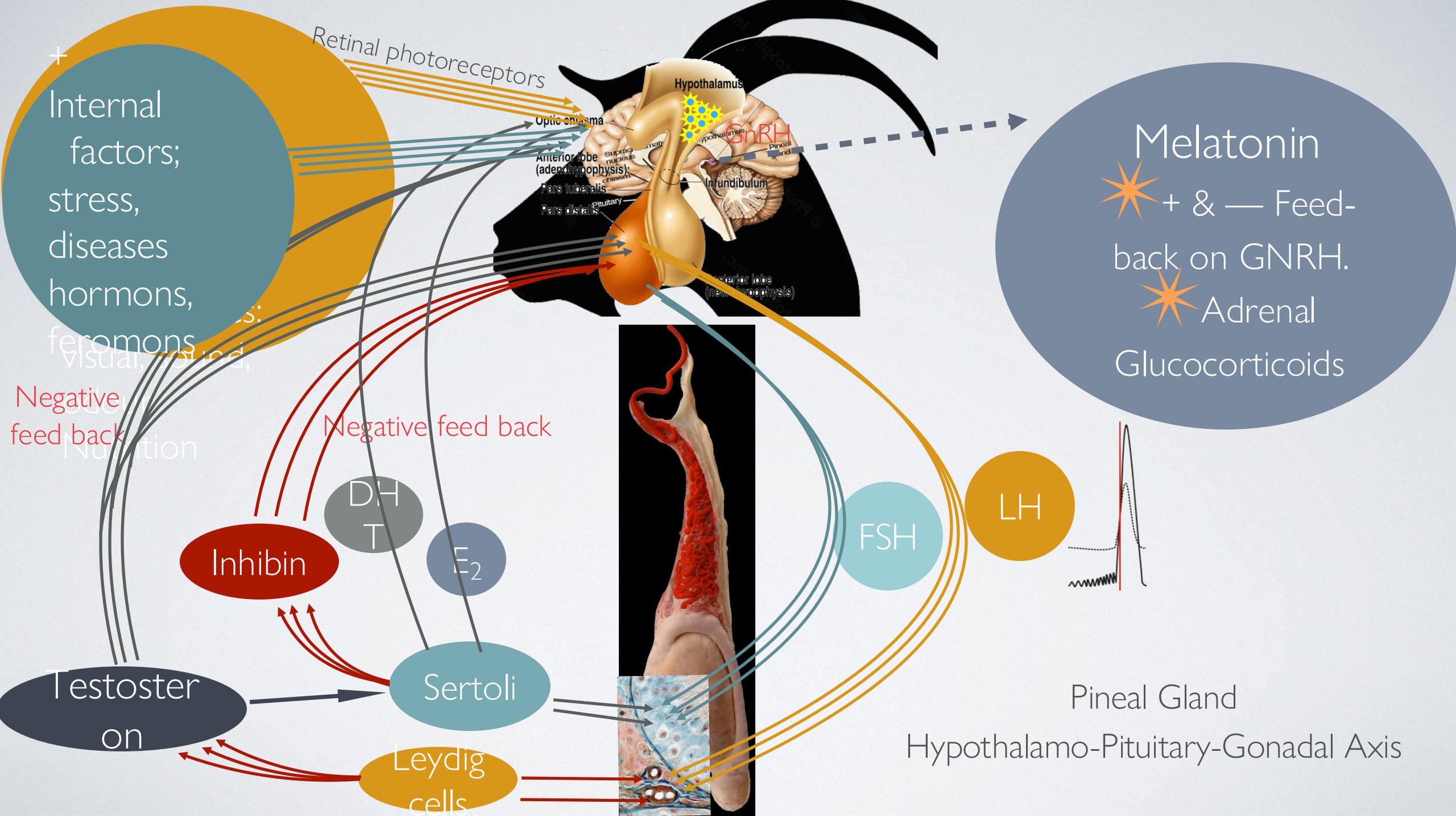


# Why?

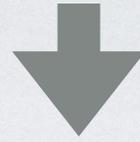
- Social interaction increases life span
- Mutated chromosome can be fixed
- Cleaning to mutational mess



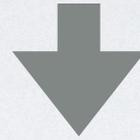
	A	B	C	D	E	
	Hyraxes	Rock hyrax	34	♀♂	More equal associations in network centrality	↑
	Ungulates	Wild horse	16	♀♂	Increased network degree	↑
		Orca	41	♀♂	Increased network centrality (direct and indirect)	↑
		Bottlenose dolphin	67	♀♂	Increased network centrality (direct and indirect)	↑
		Bighorn sheep	231	♀♂	Increased network centrality (direct and indirect)	↑
	Primates	Human	308,849	♀♂	Increased structural and functional measures	↑
		Rhesus macaque	319	♀	Stronger and more stable bonds	↑
		Barbary macaque	47	♀♂	Higher aggression network degree and clustering	↑
		Chacma baboon	44	♀	Stronger and more stable bonds	↑
		Yellow baboon	204	♀	Affiliation (aggregate measure)	↑
		Blue monkey	83	♀	Stronger and more stable bonds	↑
		Rodents	Yellow-bellied marmot	66	♀	Increased network degree and closeness



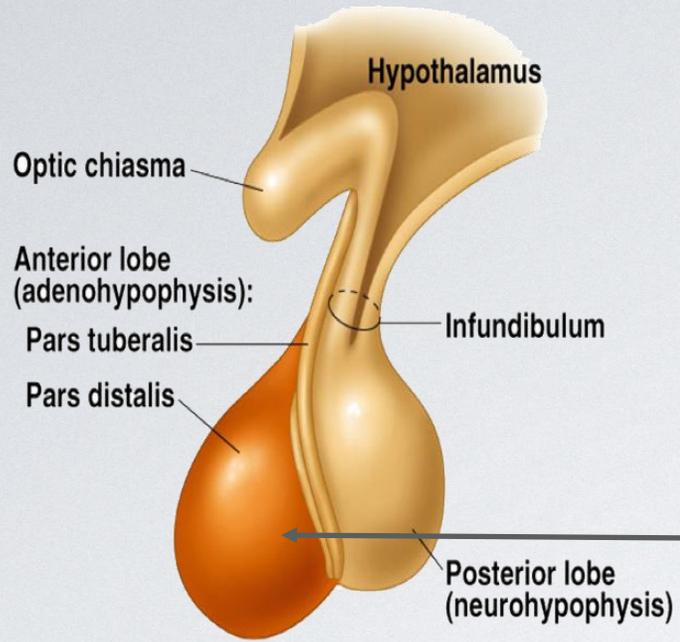
Hypothalamus



GnRH (Gonadotropin releasing hormone)



Anterior Pituitary

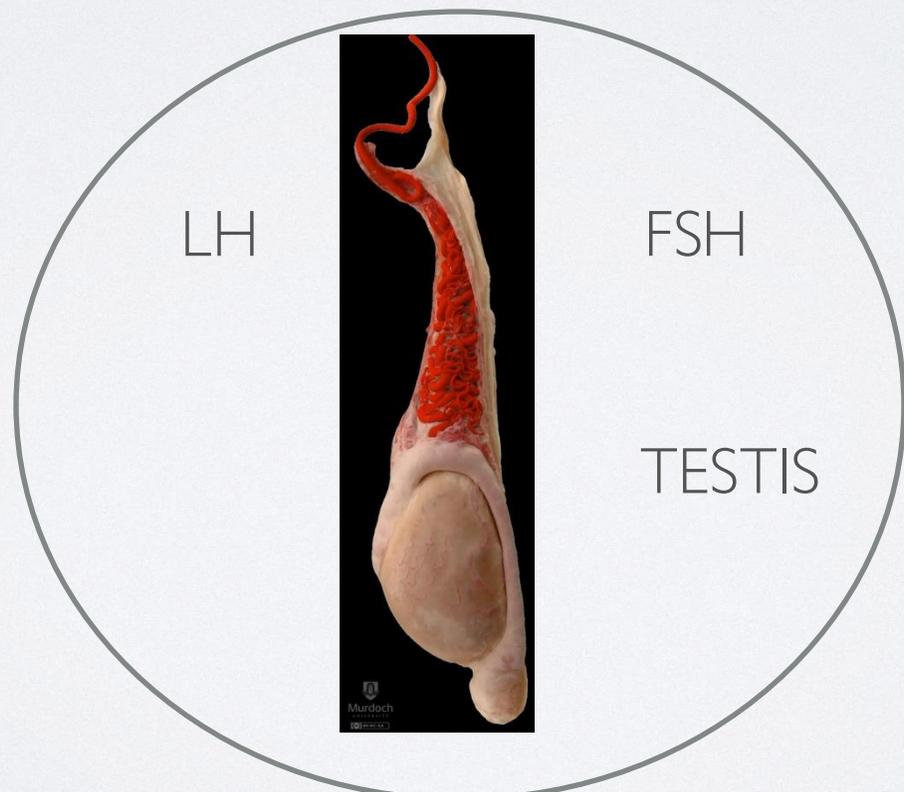


Luteinising Hormone

LH

FSH

Follicle Stimulating Hormone

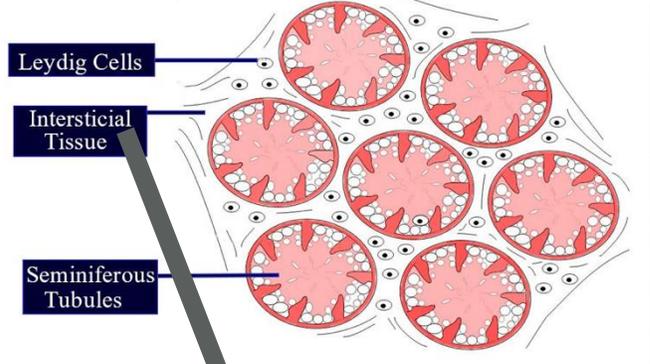


TESTIS

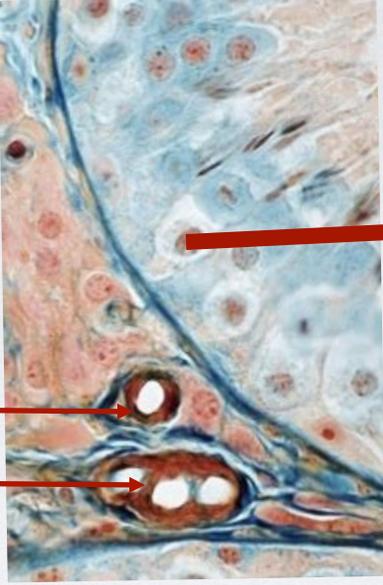
LH



Leydig Cells



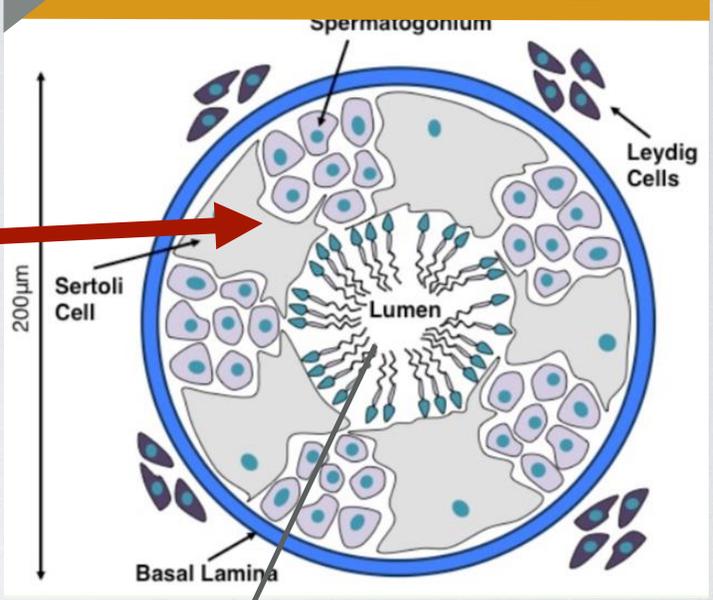
Leydig cells



FSH



Seminiferous Tubule



1. Testosterone



Spermatogenesis  
Maintain Secondary sex characteristics

Regulation of Spermatogenesis

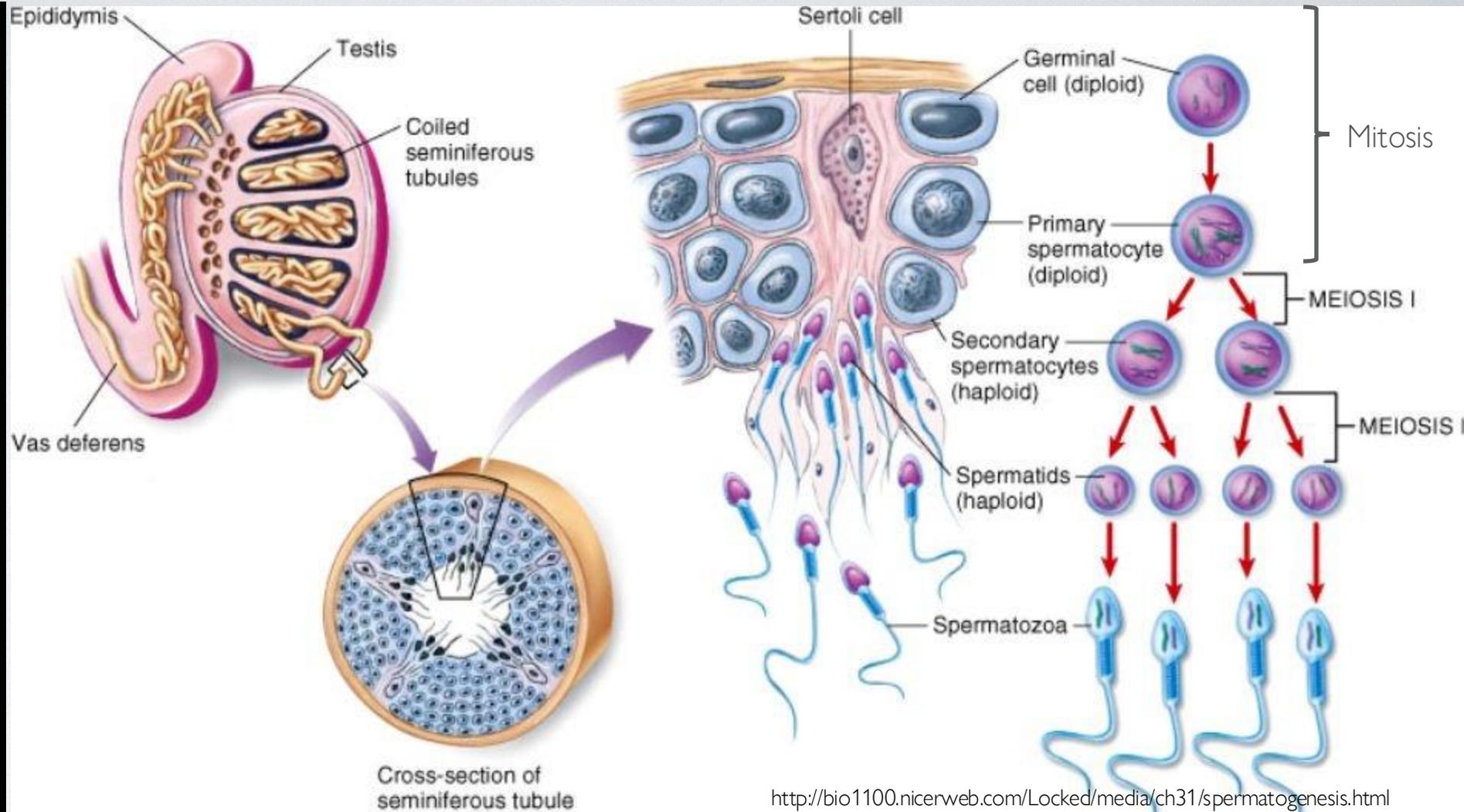
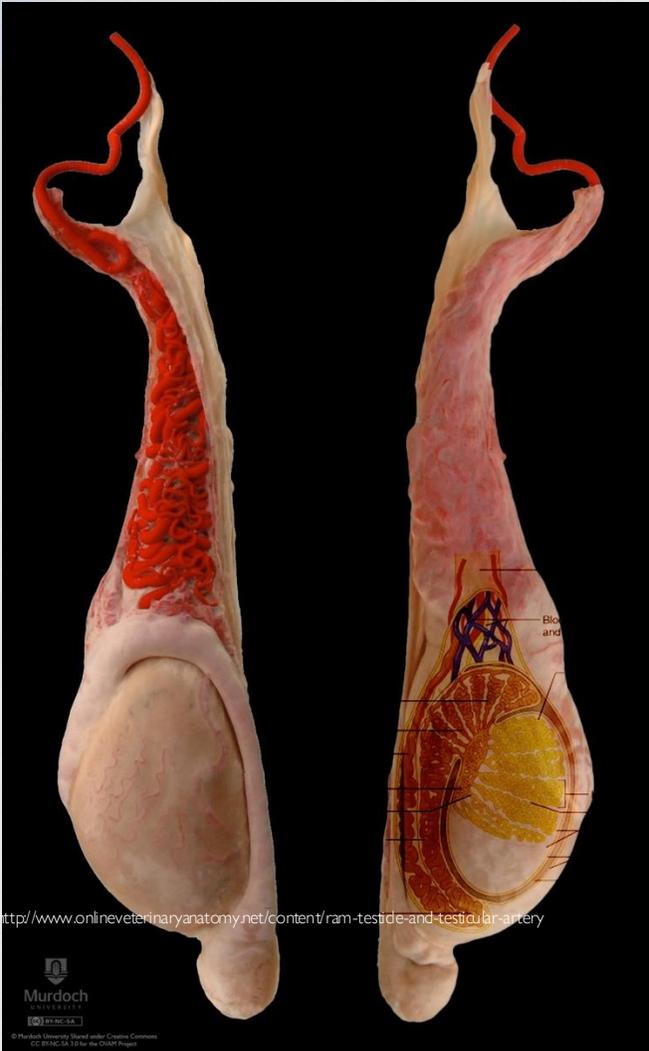
Enhance spermatogenic cells bind to TEST

2. Androgene binding protein (ABP)  
3. Inhibin (dont produce)/Activin (produce)  
Anti müllerian hormon (Amh)

Testosterone Aromatase

Estrogen & 5α-dihydrotestosterone (DHT).

# SPERM PRODUCTION (SPERMATOGENESIS)



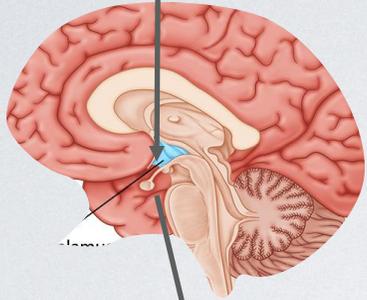
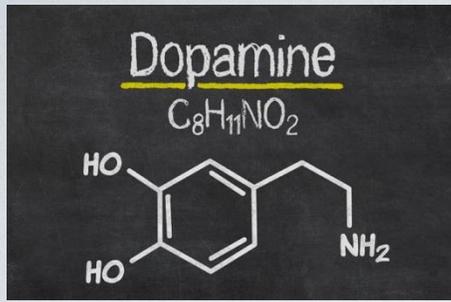
**Spermatogenesis.** A germinal cell in the **seminiferous tubules** of the **testis** matures into a diploid **primary spermatocyte**, which undergoes **meiosis I** to form 2 haploid **secondary spermatocytes**; **meiosis II** then produces 4 haploid **spermatids**. Spermatids develop into **spermatozoa (sperm)**.

Hormon	Source	Effect	Target Organ	Function
FSH	Anterior Pituitary (Hypophysis)	HPG axis / Spermatogenesis	Sertoli cells	Spermatogonia to mature spermatids
LH	Anterior Pituitary (Hypophysis)	HPG axis / Testosterone Production	Leyding cells	Testosterone production, maintaining spermatogenesis, to turn the cholesterol to testosterone
Testosterone	Testis (Leyding/interstitial cells)	Spermatogenesis, secondary sex traits,	Testis, Accesory gland, hair follicles, muscle and bone tissue	Development of ext/internal reproductive organs, testicular descend, Spermatogenesis, libido, protein synthesis, Eritropoesis (Hemotokrit level)
Prolactin	Posterior Pituitary (Hypophysis)	Indirectly controls male reproduction	Hypothalamus, Testis, accessory glands,	LH receptors in leyding cells, Steriodogenesis, spermatogenezis, Motility
Inhibin, Activin, ABP, AMH,	Testis (Sertoli cell)	Spermatogenesis, Sexual differentiation	Testis, pituitary	Sperm production switch on/off button

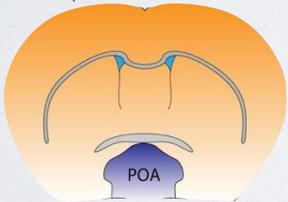
# LIBIDO

Destrudo

Biologic need for sexual activity (the sex drive) and frequently is expressed as sex-seeking behavior.



Hypothalamus



Medial Preoptic area

- Thermoregulation
- Thermoreceptors



mucose membrane



Testesterone



Dopamine



NO

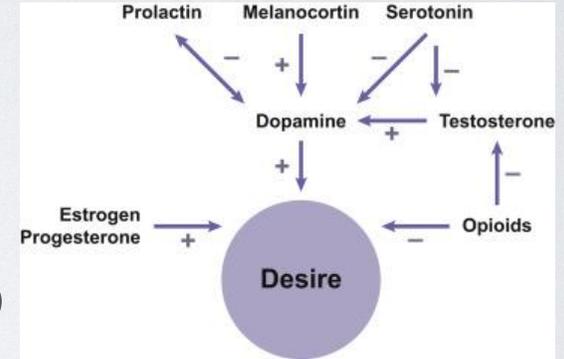
Dop-agonists

Apomorphine,  
Bromocriptine,  
Pergolide



anti-dopaminergic

Antiemetik



# SEXUAL BEHAVIOR

Each species has a special sexual behavior (Specie-spesific) and within species there is a difference between male and female

## Libido

Sexual drive    Attempt to mount

## Mating Ability

Complete the service of a female  
in estrus

## Sevice capacity

Number of services achieved by male

## Mating behavior

Pre-Copulatory, Copulatory, Post Copulatory



# PRE-COPULATORY BEHAVIOR

- Searching of sexual partner
- The identification of sexual partner

Olfactory, Optic, Auditory and Tactile senses

Motor Clues (Posture & Movement)



- Seek & identifying the estrual signs of the female animals
- Sniffing the female external genitalia

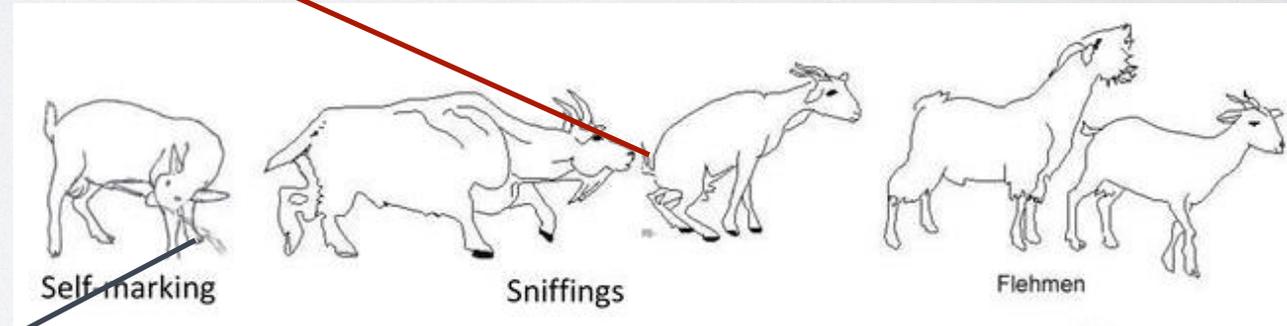
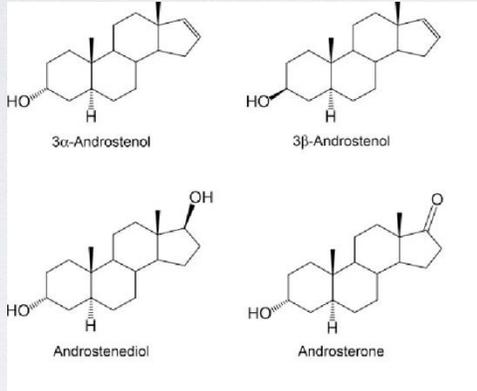
# PRE-COPULATORY BEHAVIOR

## ■ Pheromones

Androstenol

16-androstenes

Mood shifter



Musk like odor

- Testis
- Scent glands
- Preputial pouch
- Horns
- Urine

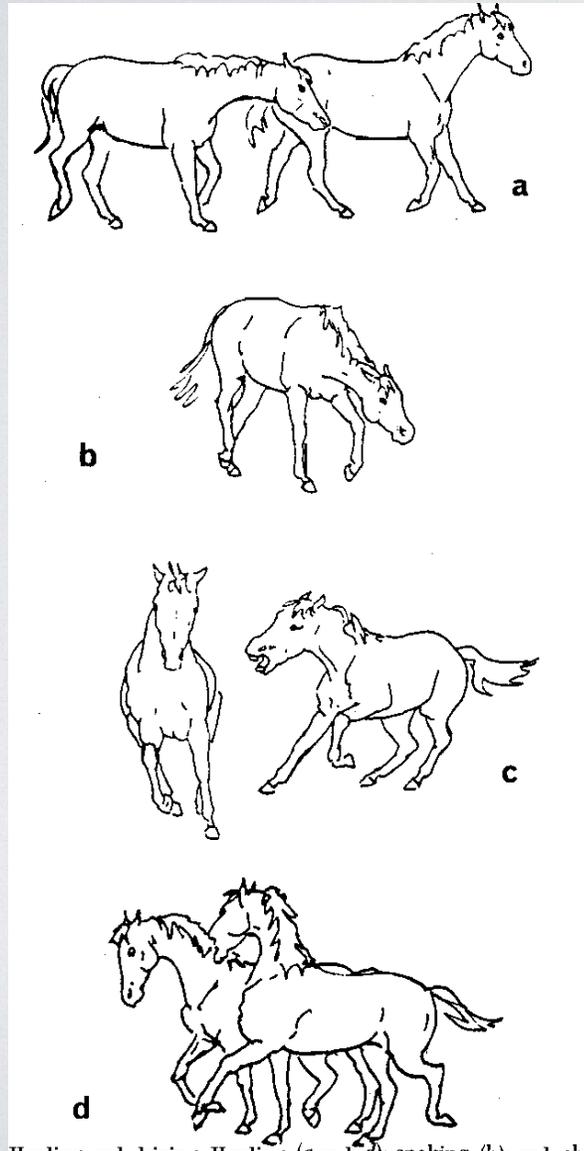


Tarsal marking with urine

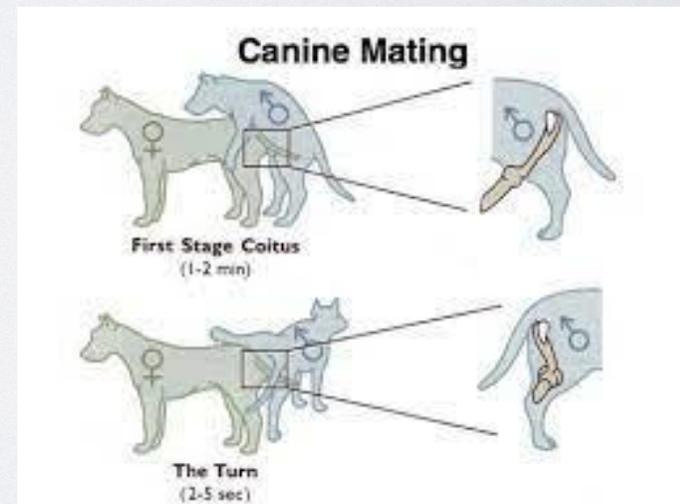
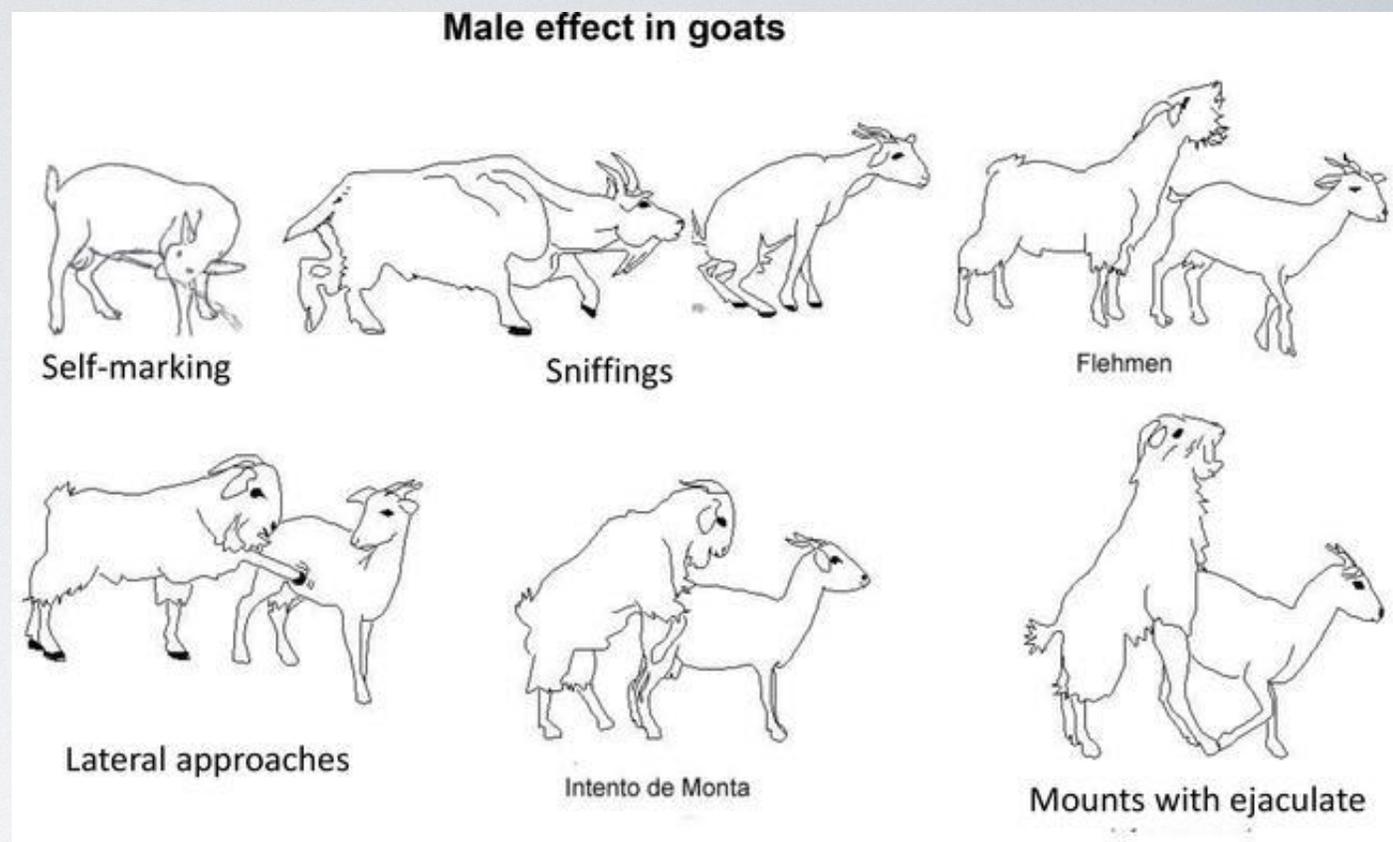
# SEARCHING BEHAVIOR

Specie	Male	Female
Bovine	Testing for mounting, Lordosis and chin resting	Bellowing/Moo, Restlessness, Increased locomotion, Twitching, elevation of tail, mounting
Equine	Vocalisation, Nipping and striking, Visual search	Increased locomotion, Twitching, elevation of tail and winking
Caprine & Ovine	Neck outstretched and head held horizontally Sniffing and licking the ano-genital region, Nudging and exhibiting Flehmen's reflex	Tail wagging, twitching, urination, elevation of tail, restlessness, increased locomotion
Canine	Smell within 1.5 to 5 km distance	Tail aside, lordosis, homosexual drive
Feline	Prowling — move restlessly Vocalisation	Lordosis, restlessness and vocalisation

# Stimulation



Herding and driving. Herding (a and d); snaking (b); and ch...





Chin resting



Mounting



Twitching

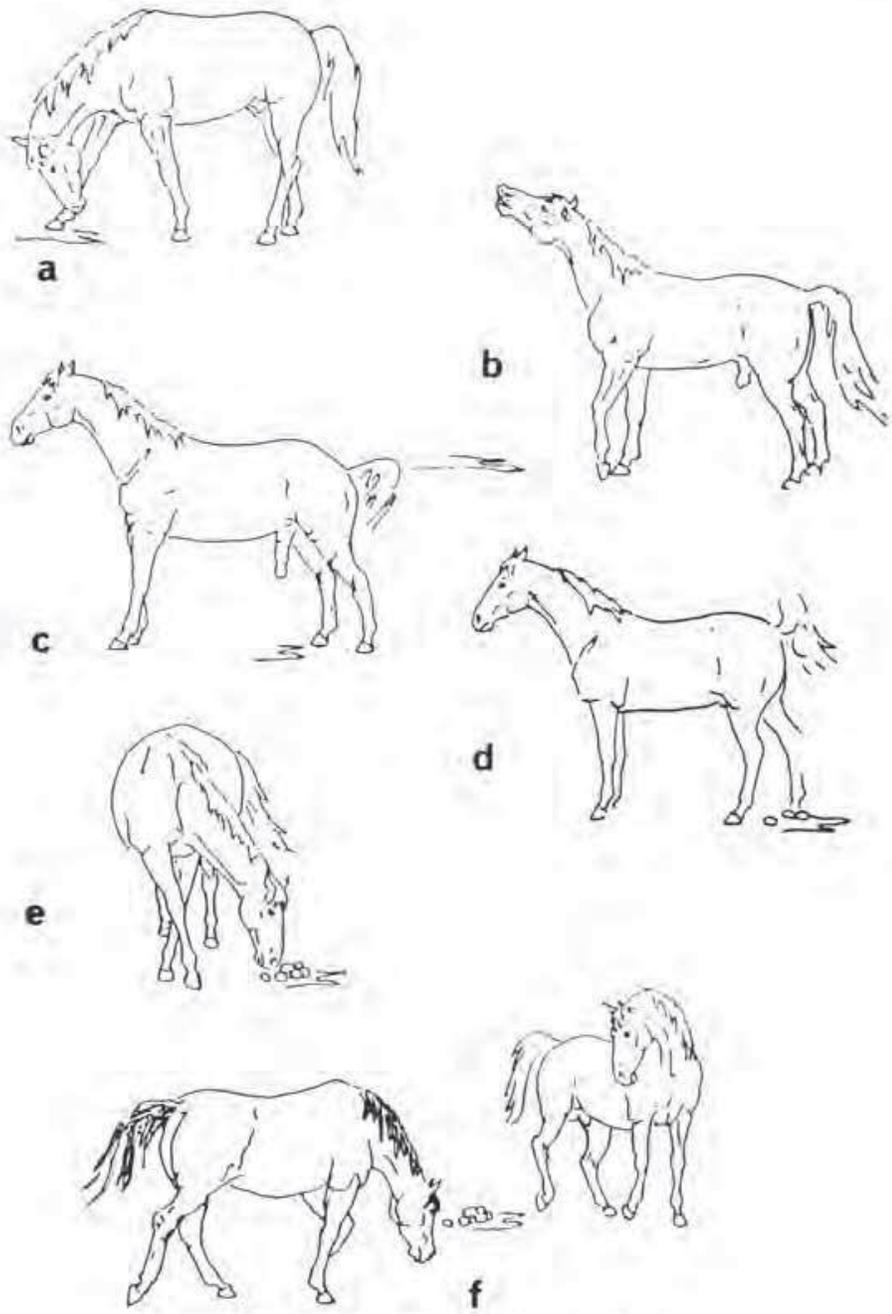
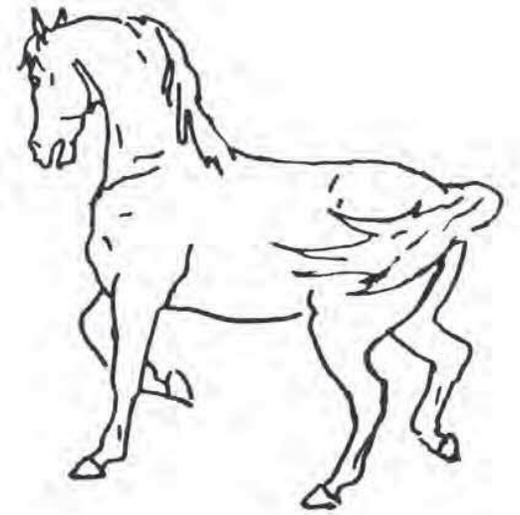


Figure 2. Elimination/marking.

Figure 4. Stallion-typical approach posture and gait.



# COURTSHIP BEHAVIOR

Specie-specific behavior



Sniffing female genitalia



Lordosis

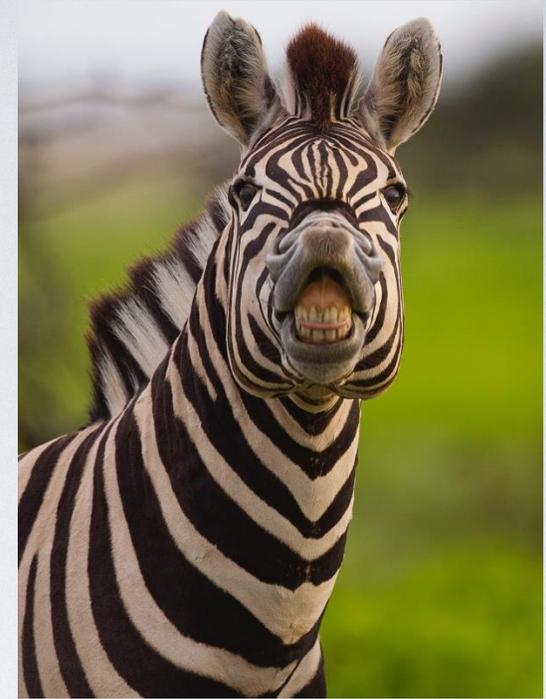
detection of pheromones



Urination by female



touching



Flehmen



Eye contact

# COURTSHIP BEHAVIOR

Specie	Male	Female
<b>Bovine</b>	Flehmen, nuzzling and licking the perineal region	Increased grooming and mounting of other females
<b>Equine</b>	Flehmen and High degree of excitement	Urinating in the presence of stallion
<b>Caprine &amp; Ovine</b>	Flehmen, sniffing and licking of vulva nudging the ewe	Urinating in the presence of ram
<b>Canine</b>	Sniffing and licking the vulva	allow for mount
<b>Feline</b>	Biting the queen at neck	Crouching, head rubbing and rollin

Nuzzling= rub or push against with nose

Sniffing= Smelling

Grooming= Cleaning

Crouching= Bending the knee and bringing the body forward and down

## Stimulation

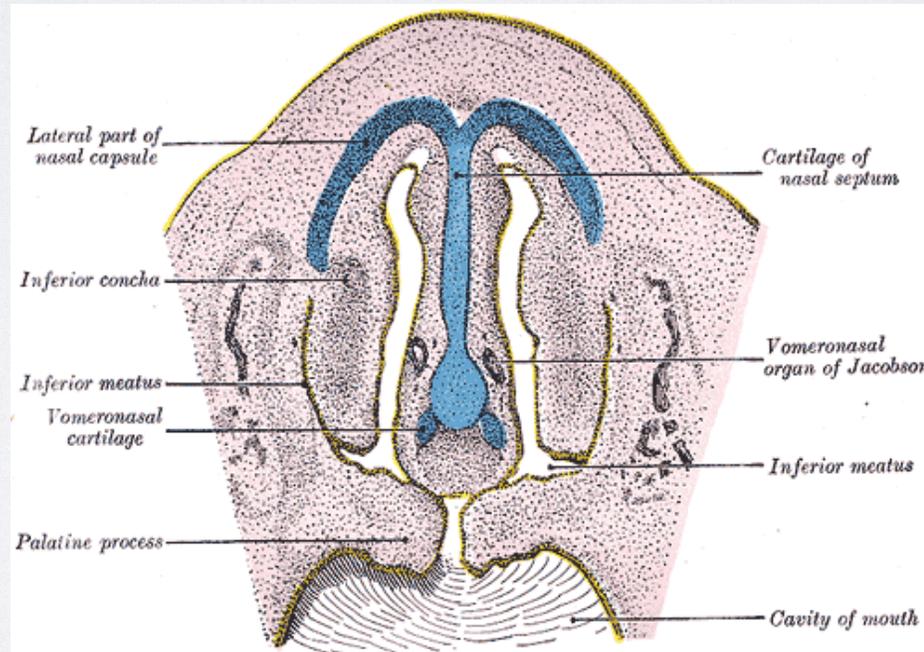
# PHEROMONE

**Pheromones** are chemicals capable of acting like hormones outside the body of the secreting individual, to affect the behavior of the receiving individuals.

## Chemocensors receptors

Potential predator or  
potential mating partner

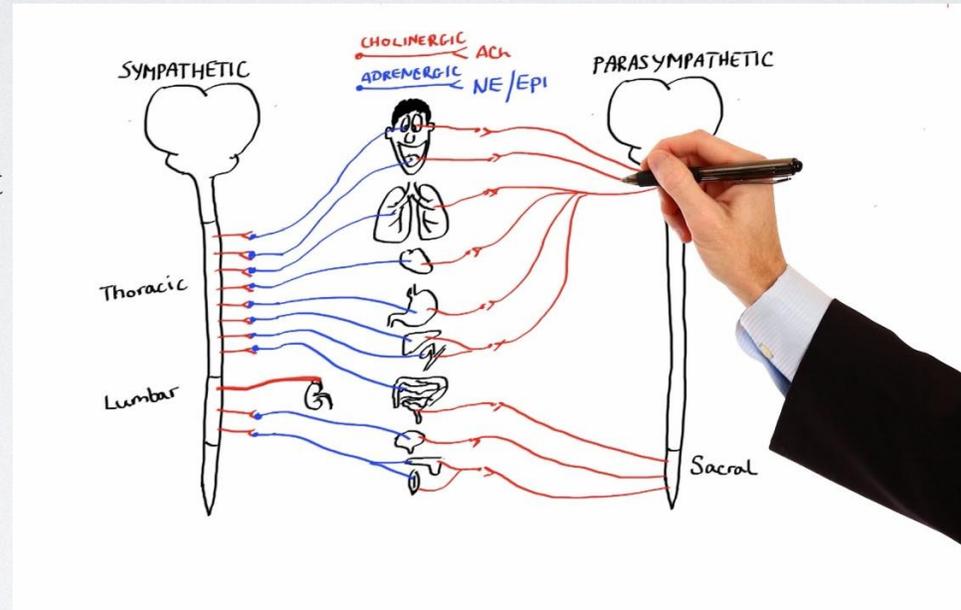
Physical well being,  
Parenting Behaviour  
Defending territory  
Mating



# FIGHT OR FLIGHT OR ?

## Autonomic Nervous System (ANS)

Acceleration of heart rate and breathing  
Flushed skin or pale skin (or an alternating of both)  
Slowing digestion  
Constriction of blood vessels in many internal organs  
Liberation of metabolic energy sources (particularly fat for muscular action)  
Dilation of blood vessels for muscles  
Dilation of pupil  
Inhibition of erection  
Loss of hearing  
Loss of peripheral vision  
Disinhibition of spinal reflexes  
Shaking



Constriction of pupils  
Decreased heart rate and breathing  
Drop in the blood pressure  
Stimulation of digestive glands  
Stimulation of secretion of saliva  
Increased blood flow to the reproductive organs  
Feelings of safety and wellbeing

# SEXUAL STIMULI

- Among all stimuli the olfactory and visual stimuli is most important for the sexual arousal.
- The courtship behaviors will end in immobile stance/willingness to mate by the female, which stimulates the significant sexual arousal in male animals.
- Lordosis behavior or presenting, is the naturally occurring body posture for sexual receptivity to copulation present in most mammals including rodents, elephants, and cats.



# ERECTION & EJACULATION

Stimulation

Somatic

Sympathetic

Erection

Parasympathetic

Emission

Sacral Splanchnic

Pudental

Ejaculation

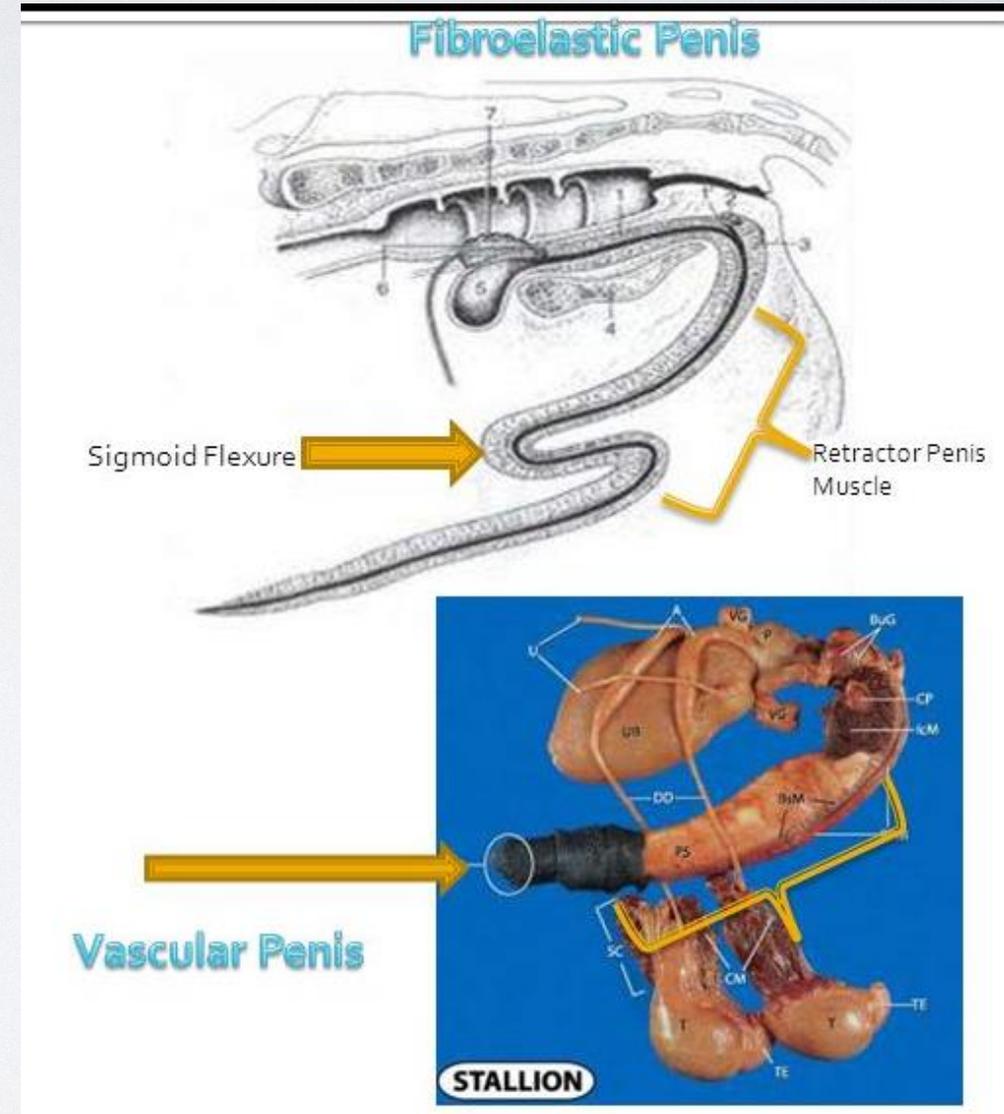
Pelvic Splanchnic

# ERECTION OF THE PENIS

The penis of bull, ram and boar is fibroelastic hence during penile erection the diameter of penis do not increase much

## Penile protrusion

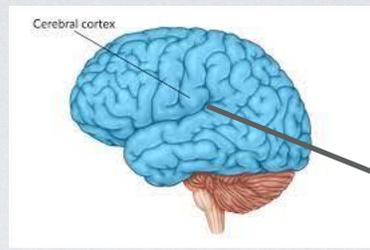
The erection will lead to the separation of the glans penis from the prepuce and protrusion of the penis. During this period, the dribbling of the secretions of Cowper's gland are noticed in bulls.



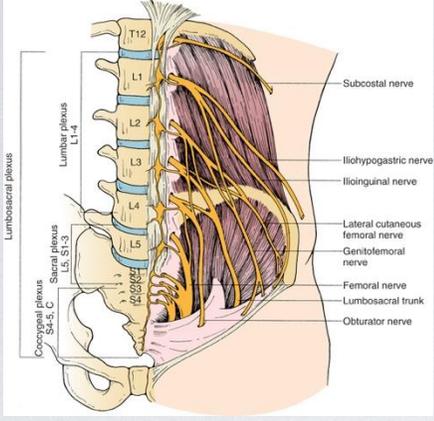
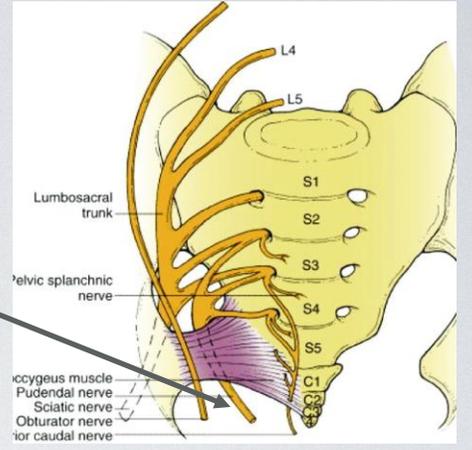
Erection

Emission

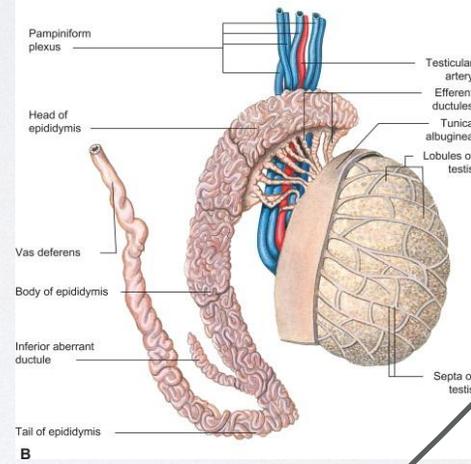
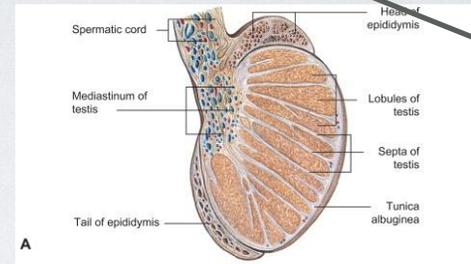
Ejaculation



Parasympatetic Stimuli

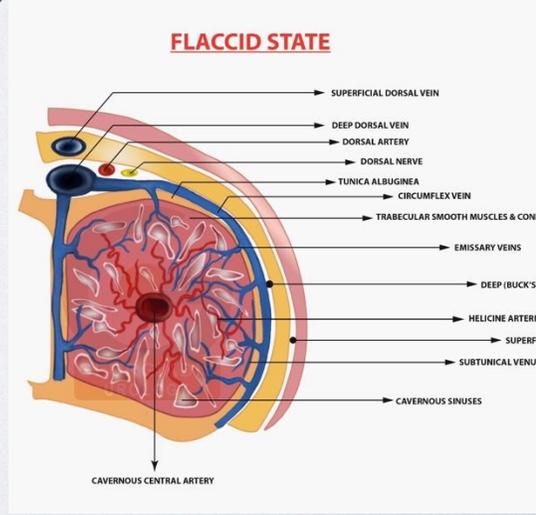
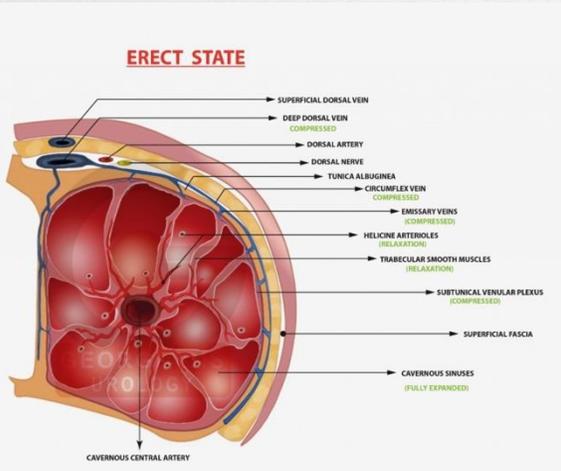
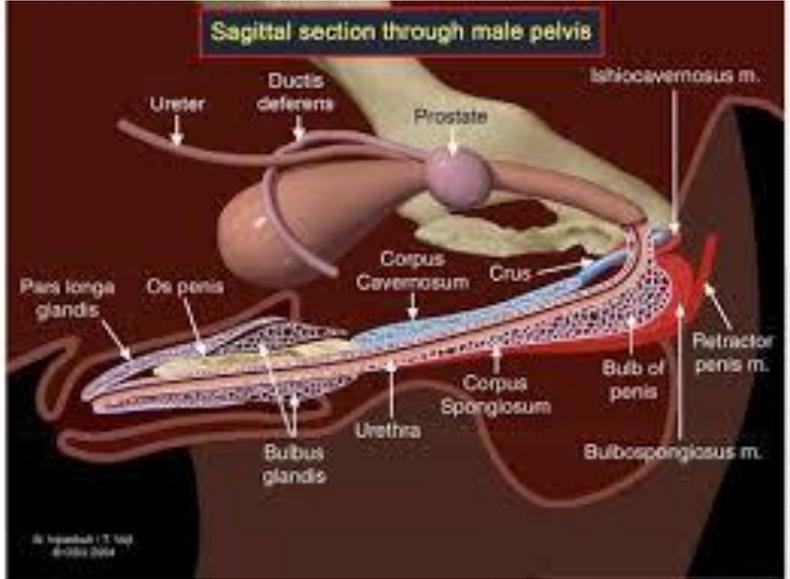


Inf. Mes. gang.



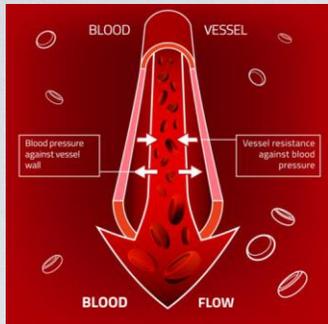
S 2-4

T 12- L2



Pelvic Nerve





Guanyl Cyclase  
NO

Ach

# ERECTION AND PROTUSION

Blod flow in penile artery



Corpus cavernous



Dilatation of corporal sinusoids



Elevated intra-penile pressure



Stretched and rigid penis



Erection



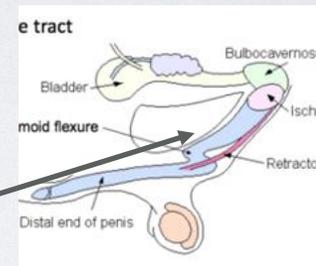
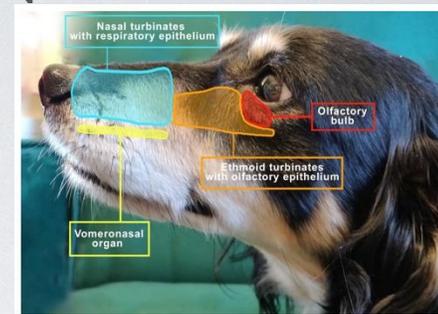
Stimulation



Relaxation of retractor penis muscle



Relaxation of flexure sigmoid





# COPULATORY BEHAVIOUR

Social & hierarchy

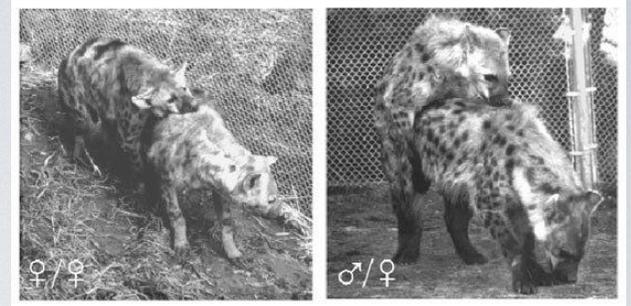
Homosexually

**Mounting Behavior**

Mammals



Common in same sexes



To attract the males

The sexually stimulated active male mounts the female

There could be possible false mounting behavior and the preparation of external genital organs (bulbourethral and bartolin gland) secretions.

Mounting movement of hind limbs and contractions of rectus abdominis muscle will align the penis horizontally and vertically to seek the vulva for intromission

The male will fix the fore limbs around the female body and will perform the rhythmic thrusts



# INTROMISSION

Successful entry of the penis into the vagina is called as intromission.

- The thrusting movement of the pelvis will help intromission.
- The vulvar moisture and heat is identified by to and fro movement of the penis and the sensory nerves of the penis is stimulated.
- This is major factor for intromission. Stallion oscillates the pelvis many times, engorgement of penis occurs and finally the intromission occurs



# EJACULATION

Specie	EJACULAT VOLUME (ML)	SITE OF DEPOSITION	MATING TIME
BULL	2-8	ANTERIOR VAGINA, EXTERNAL CERVICAL OS	1-3 SN
STALLION	30-120	CERVIX AND UTERUS	20-60 SN
RAM/BUCK	0.8-2	FORNIX VAGINA	1-2 SN
PIG	200-250	UTERUS	5-30 DK
DOG	1-60	VAGINA	20-30 DK
CAMELID	1-12	SOME INTRAUTERINE AND CERVICAL	10-20 DK

# EJACULATION

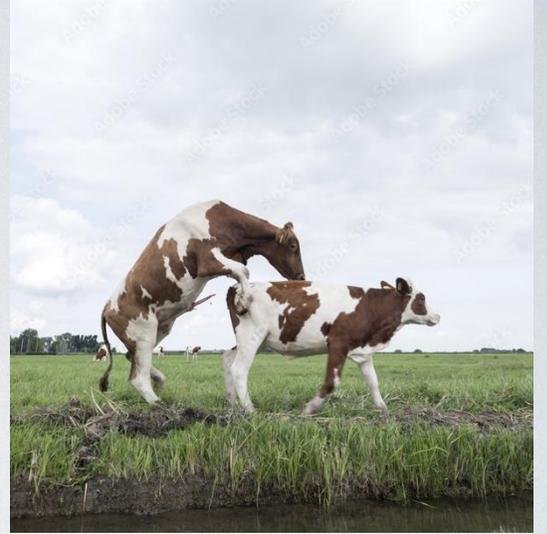
Pelvic thrusts ends  
with ejaculation

Short ejaculation  
Bull, Ram and  
Buck (1-3 sec)

Long ejaculation (30  
min) Dog,  
alpaca ve camelids

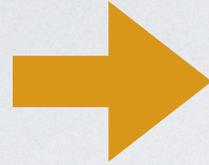
Mid-ejaculation (20 sn-1  
min) aygır

While temperature is very important for bull  
and ram, pressure is very important for  
ejaculation in stallion.



# POST COPULATORY BEHAVIOR

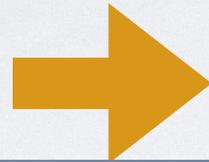
Dismounting



Following ejaculation the male dismounts the female and penis is withdrawn in the prepuce

Post coital play is rare in farm animals

Refractory Behaviour

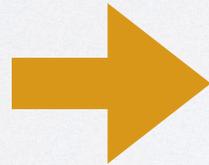


Resting period

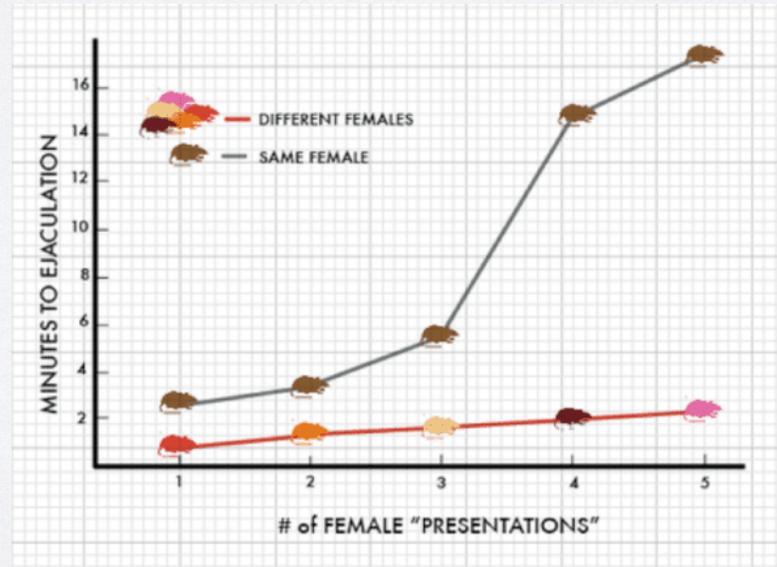
For semen collection try to minimize

Memory !!

Coolidge effect



Restoration of male mating behavior with replacement of novel female



The power of estrogen -- male snakes attract other males

Male rats, for example, are inactive but produce an ultrasonic vocalization after ejaculation.