

Animal Science 434

Sexual Behavior
a. General Behavior



1

Reproductive Behavior

- Very strong drive and can take precedence over other activities
- Purpose
 - » Promote copulation
 - » Assure sperm and oocyte meet
 - » Primates – Social bonding (family groups)
- Goal is to achieve pregnancy and parturition
 - » or social bonding

2

Stages of Reproductive Behavior

- precopulatory
- copulatory
- post copulatory

3

Precopulatory Stage

- Search for sexual partner
 - » in female, generally limited to estrus
 - increased physical activity
 - In primates can occur at any time
 - » in male can occur at any time
 - » involves all of the senses
 - sight
 - smell
 - hearing
 - tactile

4

Search For Partner



5

Search For Partner



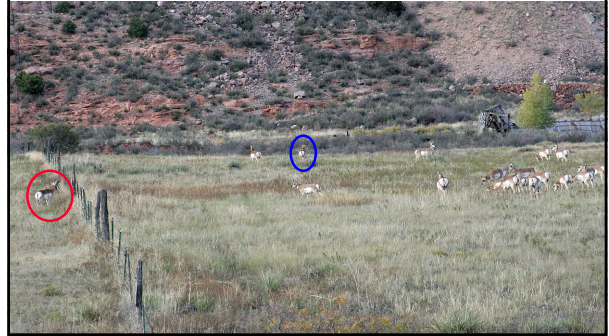
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Search for Partner



7

Search for Partner



8

Search for Partner



9

Precopulatory Stage (cont.)

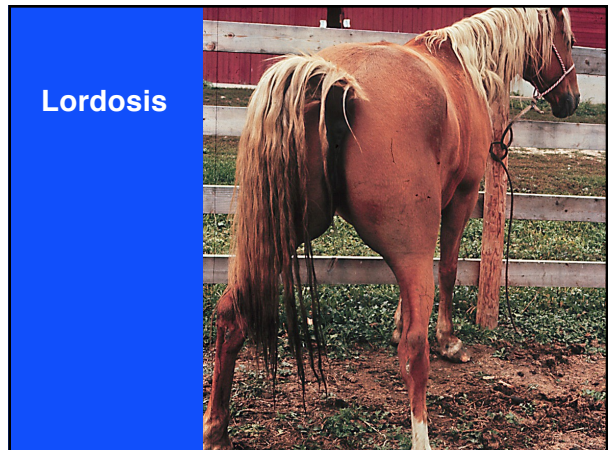
- Courtship
 - » species specific events
 - sniffing of the vulva by male
 - urination by the female
 - flemen lip curl
 - chin resting on female rump
 - increased phonation
 - male checks for female lordosis
 - » human
 - eye contact, touching, detection of pheromones

10



11

Lordosis



12

**Winking
of the
Vulva**



13

Sniffing the Vulva



14

Biting To Check For Lordosis



15

Unresponsive Mare



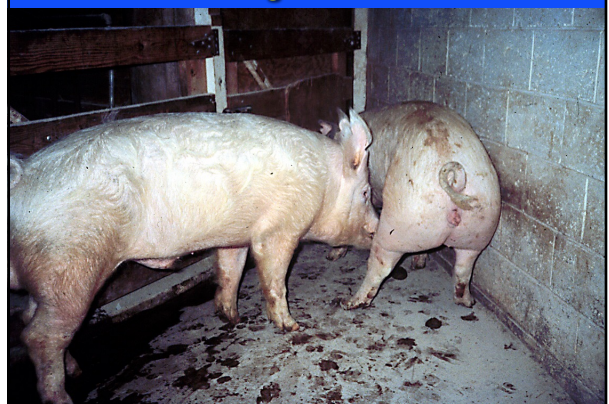
16

Sniffing the Vulva



17

Checking for Lordosis



18

Sniffing Vulva



19

Chin Rest



20

Lordosis and Mount



21

Phonation of Elk



22

Listen to Elk Phonation

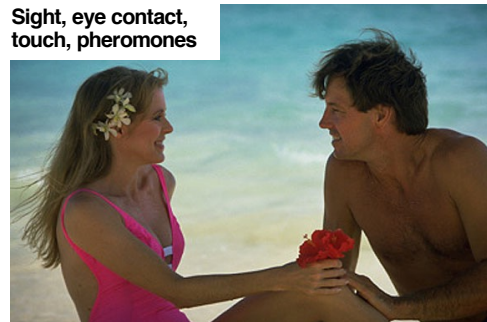
Go to

http://www.ansci.wisc.edu/jjp1/ansci_repro/lec/lec_15a_b_behavior/elk_phonation.html

23

Human Courtship

Sight, eye contact,
touch, pheromones



24

Human Behavior

To view video clip go to

View in Kaltura

https://mediaspace.wisc.edu/media/Human+Courtship+Behavior/0_t7jom6wa

View in adjustable html page

http://www.ansci.wisc.edu/jjp1/ansci_repro/lec/lec_15a_behavior/human_behavior_2017.html

25

Human Courtship



What do you see
in this image?

Wisconsin State Journal, Amber Arnold (photographer), Oct 29, 2017.

26

Precopulatory Stage (cont.)

- Search for sexual partner
- Courtship
- Sexual arousal
 - » Female
 - Lordosis
 - Presents hindquarters to male
 - Vaginal Secretions
 - » Male
 - Erection
 - Penile protrusion

27

Copulatory Behavior

- Mounting
- Intromission
- Ejaculation

28

Copulatory Behavior (cont.)

- Varies among species
 - » short copulators (1 - 3 seconds)
 - bull
 - ram
 - » sustained copulator (5 - 20 minutes)
 - boar
 - » intermediate (20 to 60 seconds)
 - stallion

29

Short Copulator



30

Short Copulator



31

Short Copulator



32

Copulatory Behavior (cont.)

- **Varies among species**
 - » **short copulators (1 - 3 seconds)**
 - bull
 - ram
 - » **sustained copulator (5 - 20 minutes)**
 - boar
 - » **intermediate (20 to 60 seconds)**
 - stallion

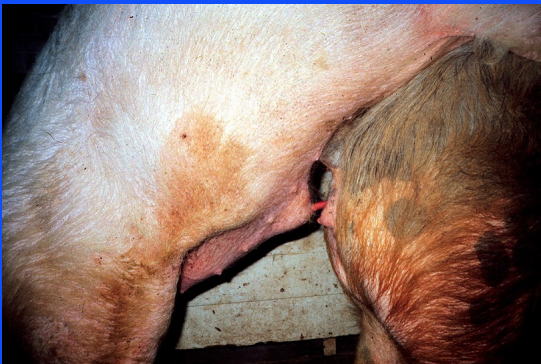
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Sustained Copulator



34

Sustained Copulator



35

Copulatory Behavior (cont.)

- **Varies among species**
 - » **short copulators (1 - 3 seconds)**
 - bull
 - ram
 - » **sustained copulator (5 - 20 minutes)**
 - boar
 - » **intermediate (20 to 60 seconds)**
 - Stallion
 - human

36

Intermediate Copulator



37

Postcopulatory Behavior

- Male
 - » Dismounting
 - » Refractory period - all males have this
 - time when copulation will not occur
 - Dependent on:
 - Species dependent
 - sexual rest prior to copulation
 - age of male
 - degree of female novelty
 - number of previous ejaculates
 - for semen collection try to minimize
- » Memory
 - a bad experience will carry over
- Female - will often mate again immediately

38

Endocrine Effects on Sexual Behavior

- Prenatal steroid exposure
 - » Feminization – No steroid exposure
 - » Masculinization (defeminization) – estradiol or testosterone
- Postnatal Behavior
 - » castrated female
 - no steroids - no estrus behavior
 - plus estradiol - estrus behavior
 - plus progesterone and then estradiol - maximum estrus behavior
 - plus testosterone - male-like behavior

39

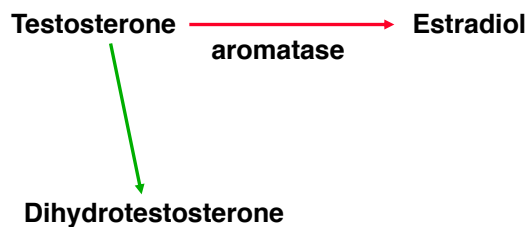
Sexual Behavior (cont.)

- Postnatal Behavior
 - » castrated male
 - no steroids - decreased sexual behavior
 - plus testosterone - sex behavior restored
 - plus dihydrotestosterone - decreased sex behavior
 - plus estradiol - sex behavior restored

What does this tell you about hormonal receptors required to control behavior in the male?

40

Aromatization



41

Sexual Behavior (cont.)

- both male and female sexual behavior is dependent on estradiol receptors in brain

42

Control of Reproductive Behavior

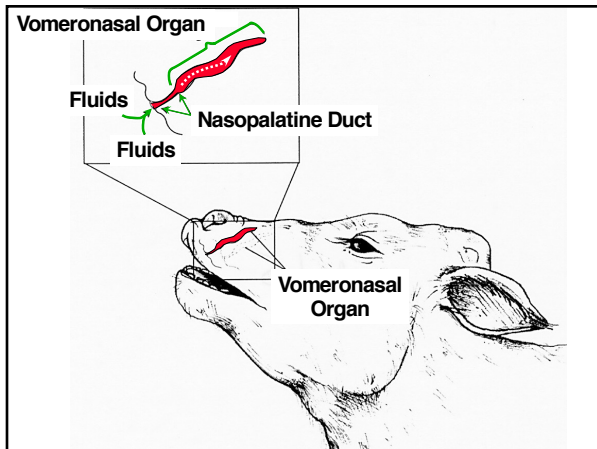
- Sensory systems
 - » Olfactory, visual, auditory, tactile
- Hypothalamus
 - » Estradiol receptors, increase response to sensory neurons
- Midbrain
 - » Signals from hypothalamus
 - » Speeds up nerve impulses
- Medulla
 - » Coordinates lordosis and mounting
- Spinal Chord
 - » Sends signals to specific muscles

43

Sensory Inputs for Reproductive Behavior

- specific importance varies with species
- olfaction
 - » pheromone
 - volatile substance which elicit specific behavior in the recipient
 - males produce
 - boars
 - humans
 - females produce during estrus
 - dogs and rats can sense cow pheromones
 - flehmen response

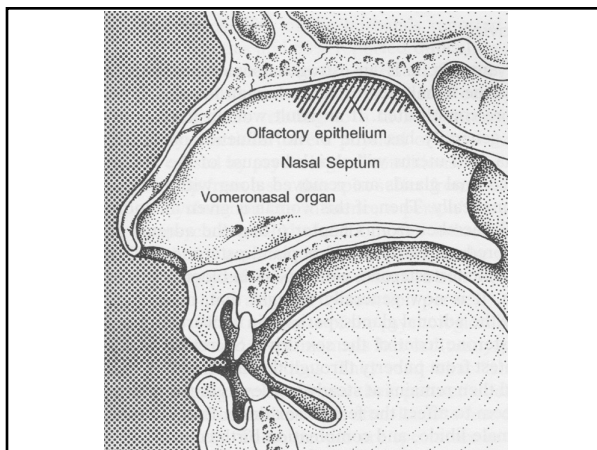
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45



46



47

Sensory Inputs for Reproductive Behavior (cont.)

- Auditory
 - » cows bellow
 - » sows grunt
 - » good for long-range signaling
- Visual
 - » posturing
 - » males observing other males or females mounting
 - » valuable for close encounters

48

Sensory Inputs for Reproductive Behavior (cont.)

- Tactile
 - » biting on neck or withers of mare
 - » chin resting on cow
 - » boar nudging of sow flank
 - » final stimulus before copulation
 - » leads to erection

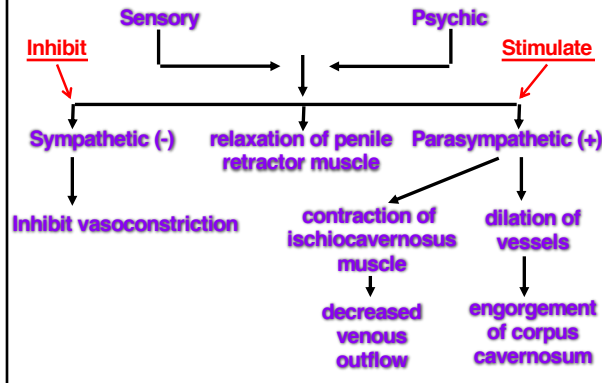
49

Erection, Emission and Ejaculation

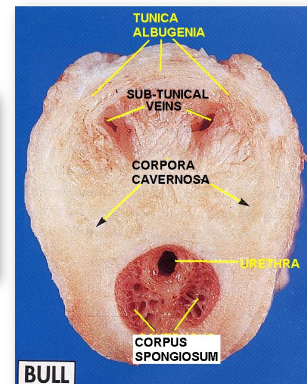
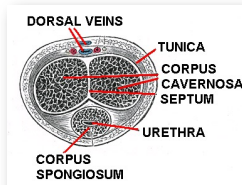
- Erection
 - » Vasodilatation, inhibit vasoconstriction, relax retractor penis muscle
- Emission
 - » Contraction of cauda epididymis and vas deferens
 - Oxytocin from posterior pituitary
 - Sympathetic neurons
 - » Release of accessory gland fluid
 - Sympathetic neurons
- Ejaculation
 - » Contraction of smooth and striated muscles

50

Erection

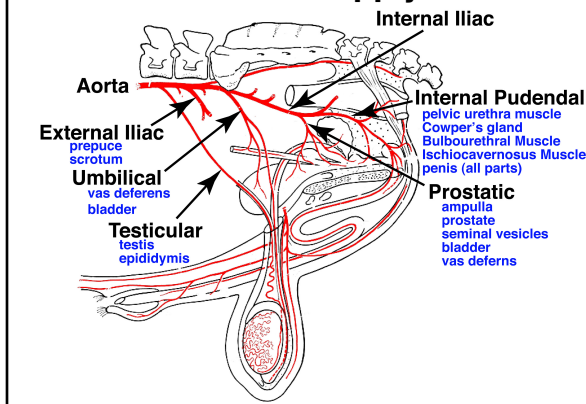


51



52

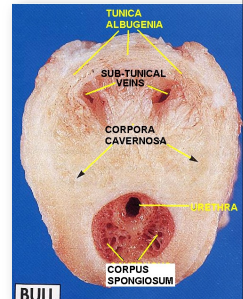
Arterial Supply



53

Flaccid State of Penis

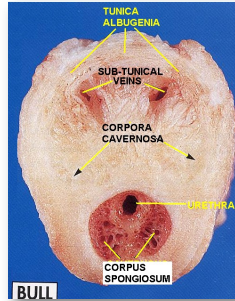
- Corpus Cavernosum (CC)
 - Internal Pudendal Artery
 - Helical arterioles to corporal sinusoids
- Subtunical veins
 - Drain CC
- Relaxed state
 - Sympathetic nerves active
 - Norepinehrine (NE) released
 - Arterioles contract
 - Smooth muscle of Corpus Spongiosum (CS) contract



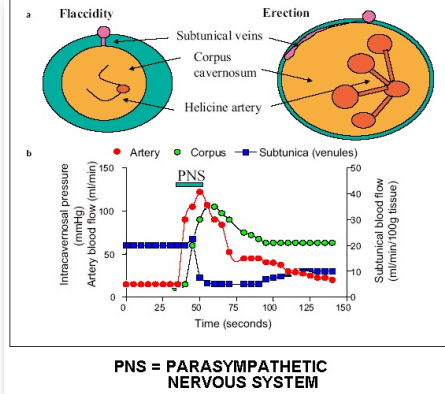
54

Erect State of Penis

- Sympathetic nerves inhibited
- Parasympathetic nerves stimulate
 - » Nitric Oxide (NO)
 - » Helical arterioles dilate and corporal sinusoids swell
 - » Smooth muscle of Corpus Spongiosum (CS) relax
 - » Sub-tunical Veins compressed
 - » Ischiocavernosus muscle contracts



55



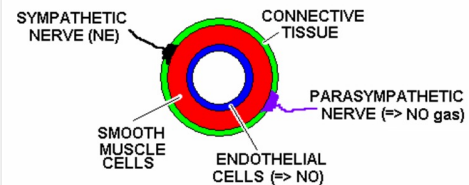
56

EVENTS IN ERECTION

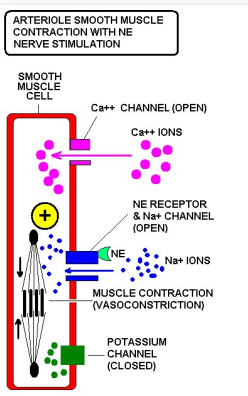
1. **SEXUAL AROUSAL**: AFFERENTS FROM HIGHER CNS & GENITALIA TO LUMBAR SPINAL "ERECTION CENTER" IN LUMBAR SPINAL CORD (IN BOTH MALES AND FEMALES).
2. **PARASYMPATHETIC MOTOR NERVES TO PUDENDAL ARTERIOLES** OF PENIS [or CLITORIS] GENERATE **NITRIC OXIDE (NO)** IN ARTERIOLE SMOOTH MUSCLE →
3. RELAXATION OF ARTERIOLES → MAJOR **VASODILATION** →
4. INCREASED BLOOD FLOW FILLS TISSUES (**CORPUS CAVERNOSUM & SPONGIOSUM**) →
5. SWELLING BLOCKS **SUB-TUNICA VEINS** OUTFLOW →
6. RAPID RISE IN **Corpus Cavernosum** TISSUE PRESSURE →
7. ERECTION

57

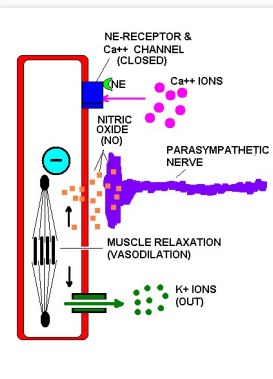
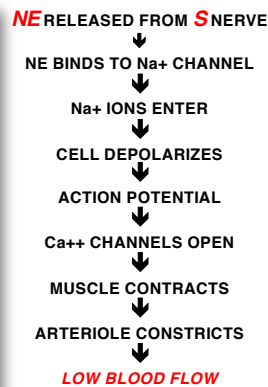
ANATOMY AND INNERVATION OF PENIS or CLITORIS ARTERIOLE



58



59



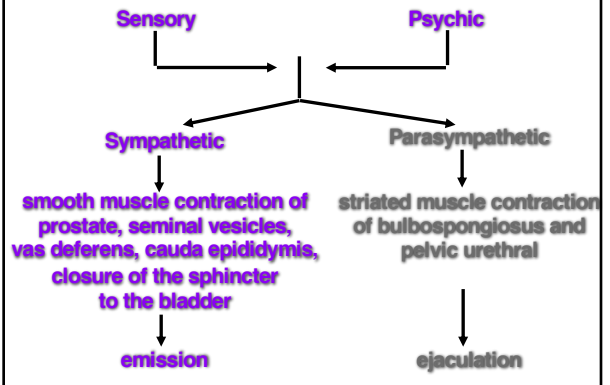
60

Sildenafil - Viagra

- cGMP is broken down by phosphodiesterase 5 (PDE₅)
- Sildenafil is an inhibitor of PDE₅
 - » cGMP remains elevated and thereby the erection
 - » Side effect – erection over 4 hours
- Go to Emergency Room – you could not ever have another erection!

61

Emission and Ejaculation



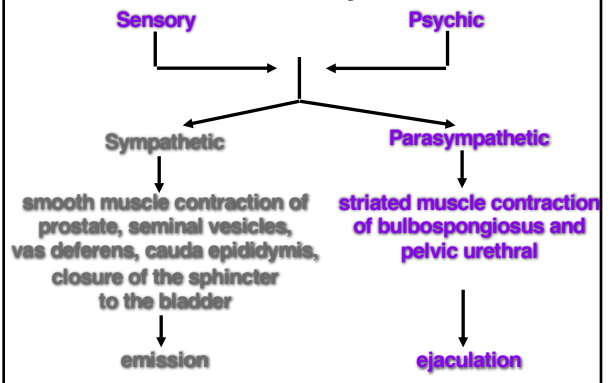
62

Erection, Emission and Ejaculation

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63

Emission and Ejaculation



64

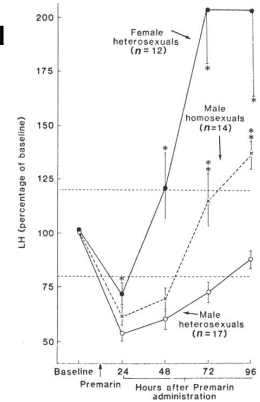
Homosexual Behavior

- common in farm animals
- useful to detect when females in heat
 - » selection by man may have enhanced this
- can collect bulls off of other bulls as mounts

65

Same Sex / Homosexual Behavior in Humans

- Learned behavior
- Genetic
- Hormonal Exposure



66



67



68

Maternal Behavior

- **Prepartum**
 - » High estrogen, low progesterone (leading to parturition)
 - » Prolactin (crosses blood brain barrier)
- **Postpartum**
 - » Prolactin (mostly lactation, promotes paternal and alloparental care)
 - » Oxytocin (does not cross blood brain barrier)
 - Intracerebral production - social bonding
 - » Opioids (decreases promote social bonding)
 - » Serotonin (low levels associated with increased maternal behavior, opposite infant rejection)

69