

Reproductive Biology 101

Amy Fischer, PhD

ACC&D, Board of Directors

University of Illinois, Animal Sciences

Companion Animal Biology & Humane Education



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*A big thanks to WSPA for
sponsoring this session!*



The plan for this evening

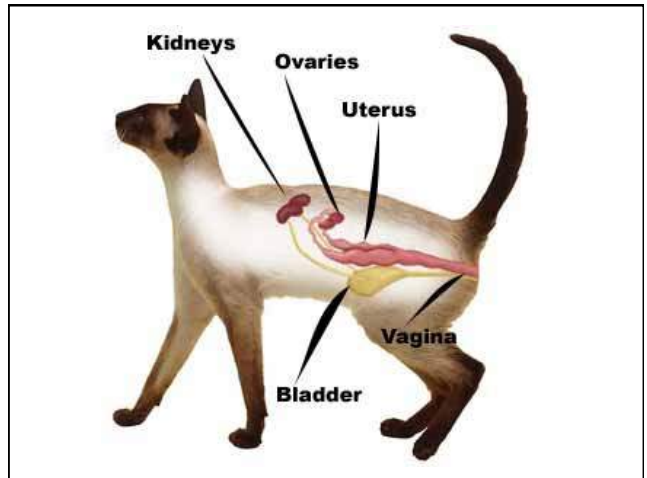
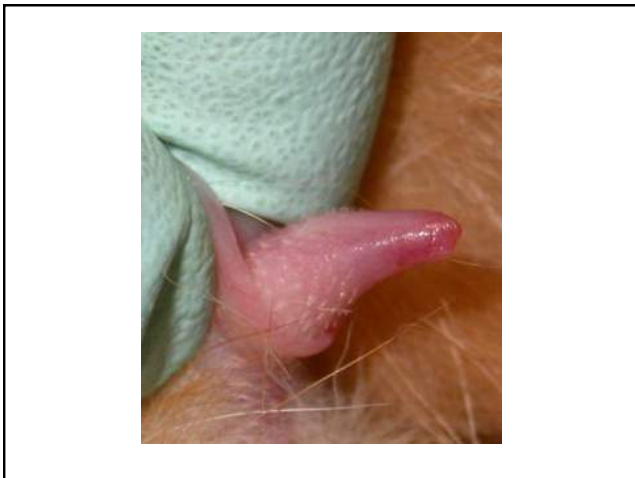
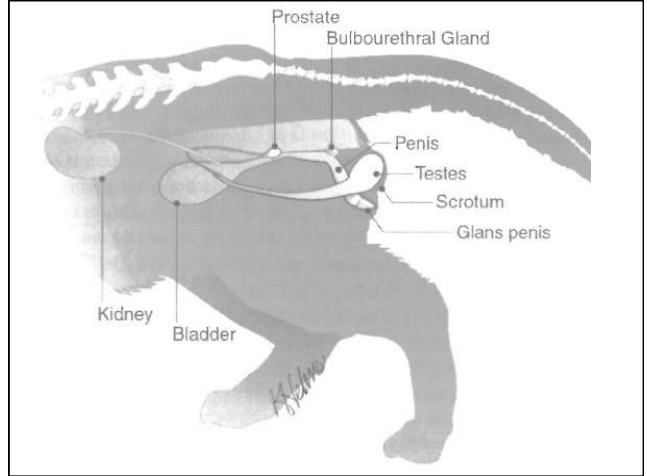
- Basic reproduction of the cat
- Basic reproduction of the dog
- The brain's control of reproduction
- *Our* control of cat and dog reproduction

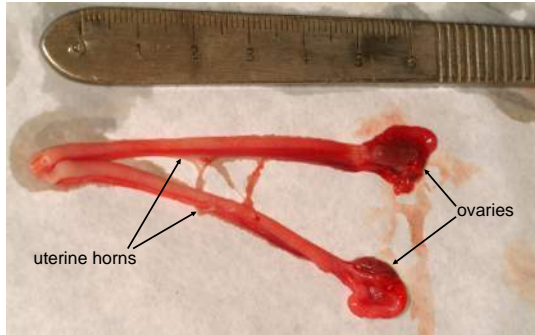
- Welcome reception!



Why must they be so darned good at it?







Estrous cycle of the queen

- Can begin by 4-5 months of age



Estrous cycle of the queen

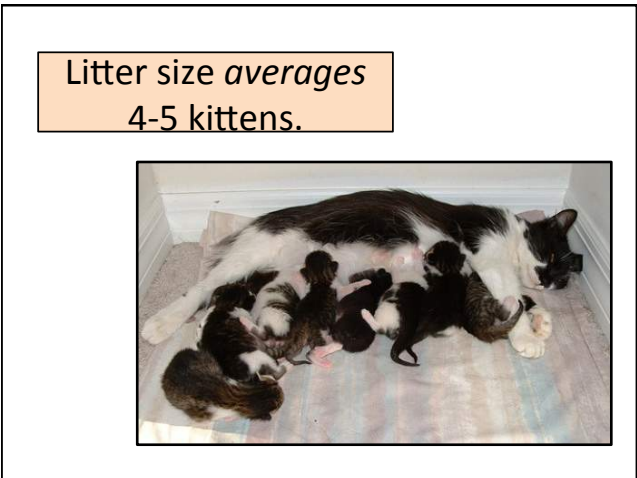
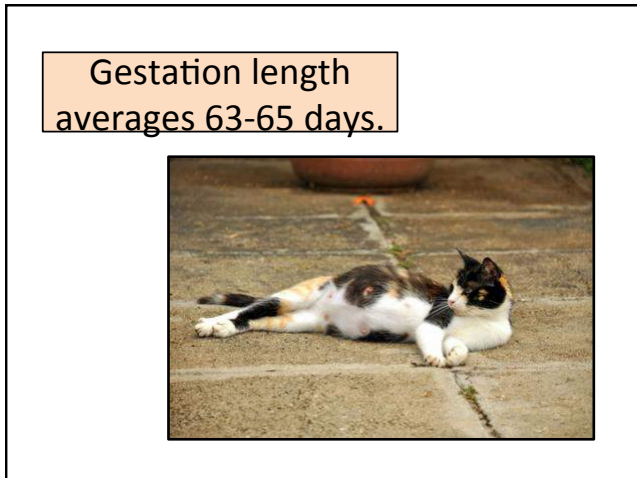
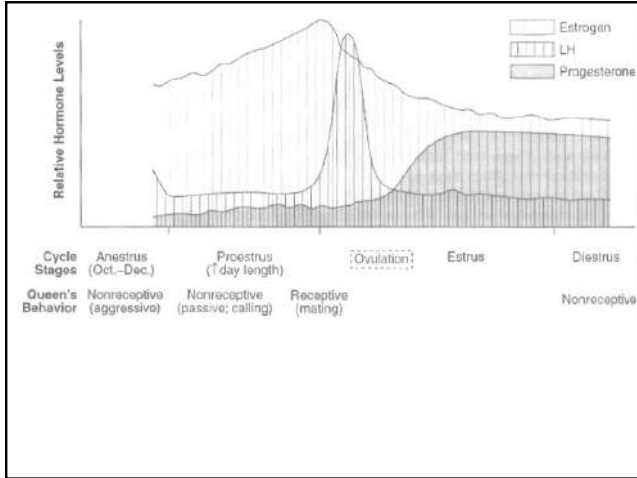
- Can begin by 4-5 months of age
- Seasonally polyestrous



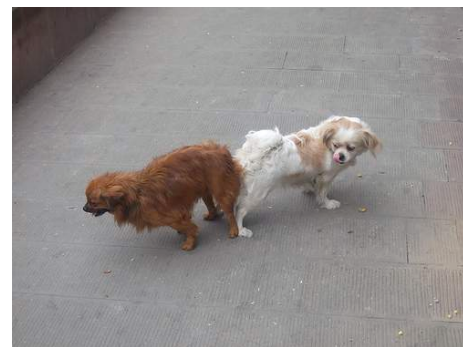
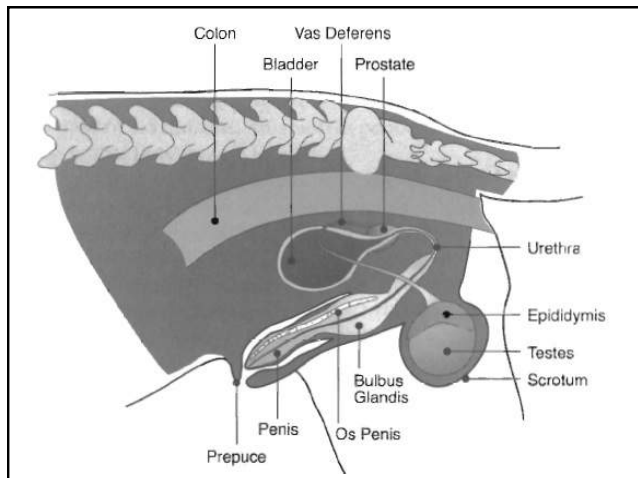
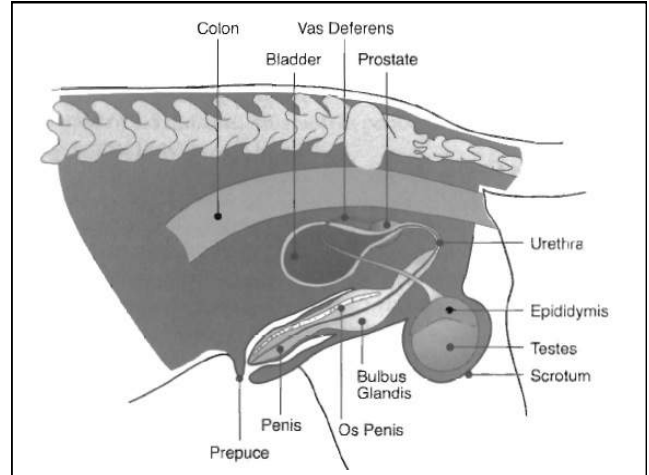
Estrous cycle of the queen

- Can begin by 4-5 months of age
- Seasonally polyestrous
- Induced ovulation

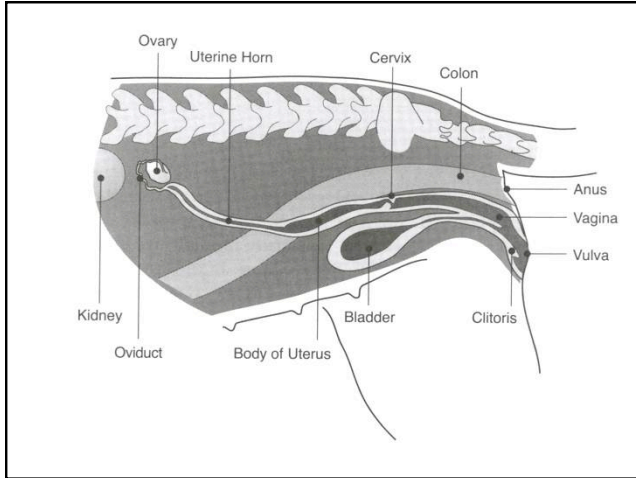




Basic reproduction of the dog

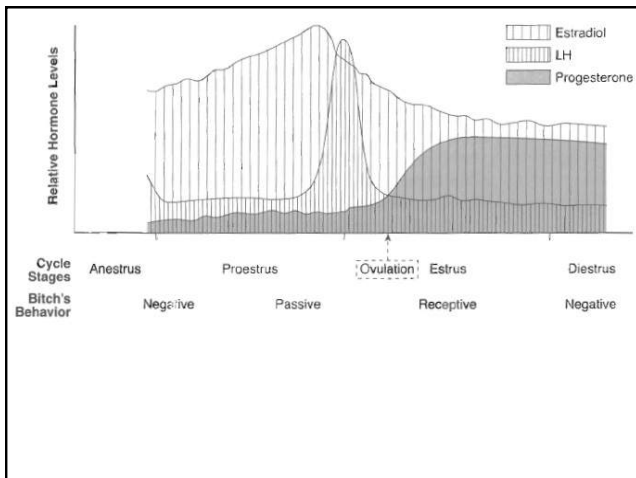


Copulatory (coital) tie



Estrous cycle of the bitch

- Variable depending on breed and size
- Starts at 6 to 18 months of age
- Occurs every 7 months *on average*
- Spontaneous ovulation



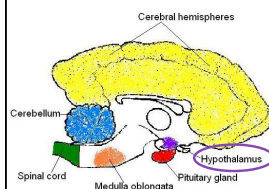
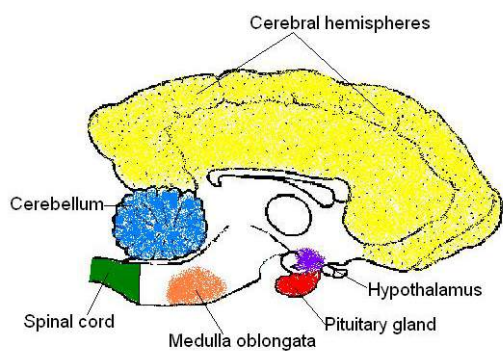
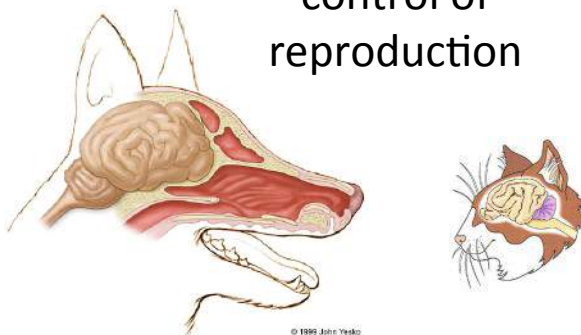
Gestation length averages 63-65 days.
Larger litters → shorter gestations



Litter sizes
Smaller breeds: 2 to 10 pups
Larger breeds: 5 to 20 pups



The *brain's* control of reproduction



Gonadotropin Releasing Hormone **GnRH**

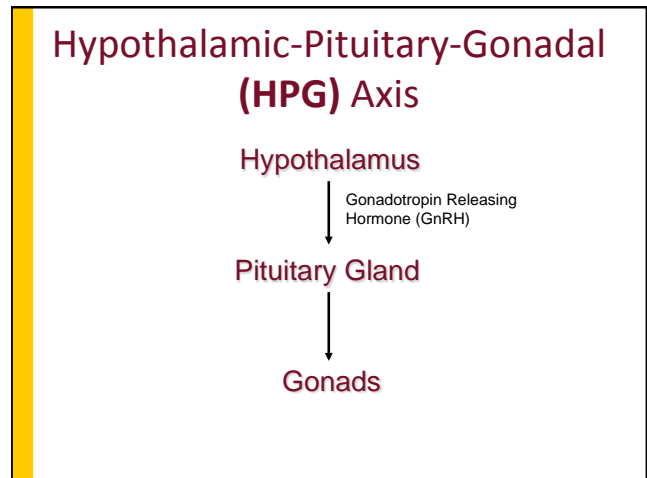
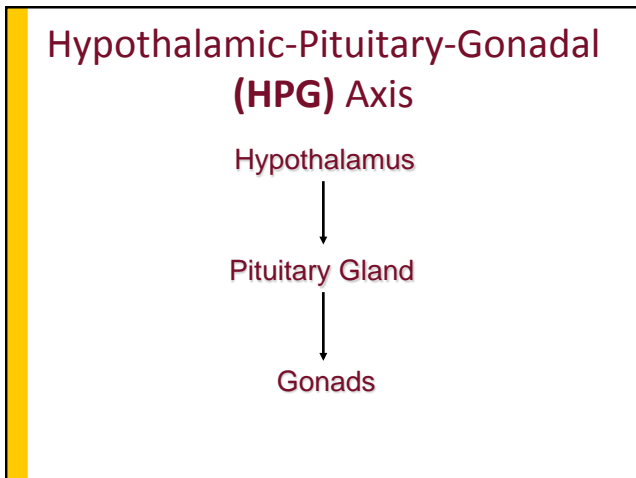
- Released by the hypothalamus
- Acts directly on the pituitary
 - Delivered in pulses
- “Master reproductive hormone”

Gonadotropins
 Follicle Stimulating Hormone, **FSH**
 Luteinizing Hormone, **LH**

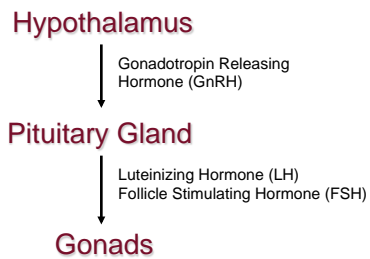
- Released by the pituitary
- Bind to receptors on the gonads
- Also delivered in pulses

What do the gonadotropins do?

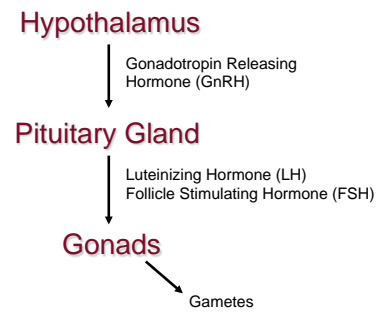
| MALE | FEMALE |
|---|---|
| <ul style="list-style-type: none"> • Sperm maturation • Testosterone production | <ul style="list-style-type: none"> • Coordination of estrous cycle • Estrogen and progesterone production |



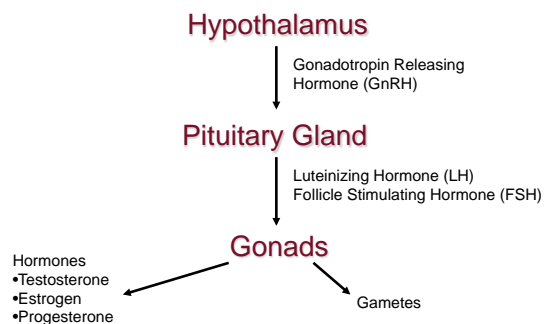
Hypothalamic-Pituitary-Gonadal (HPG) Axis



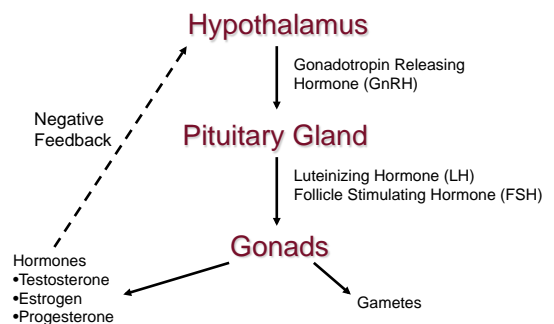
Hypothalamic-Pituitary-Gonadal (HPG) Axis



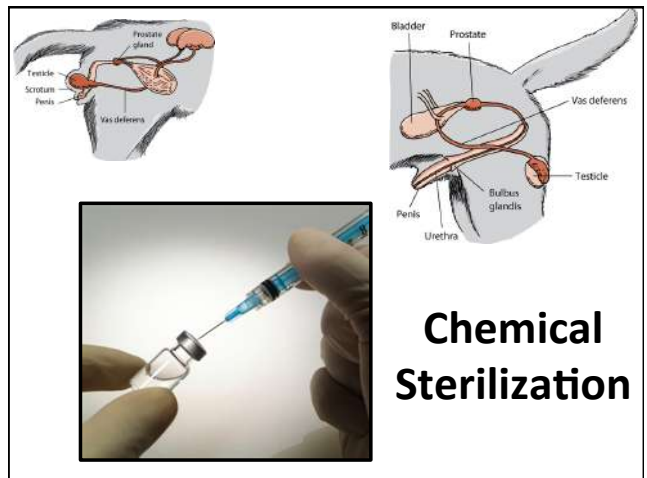
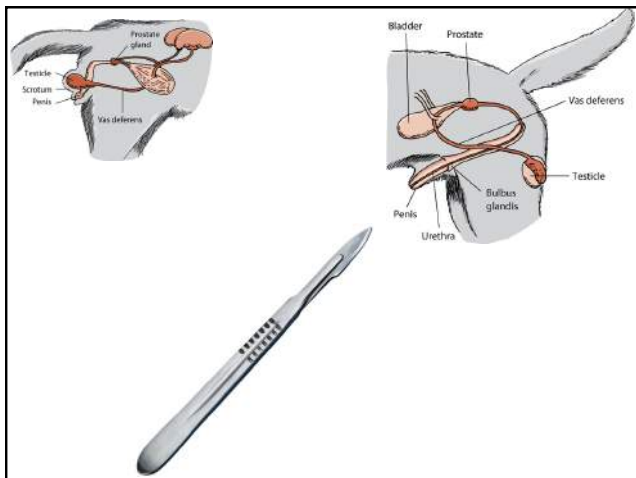
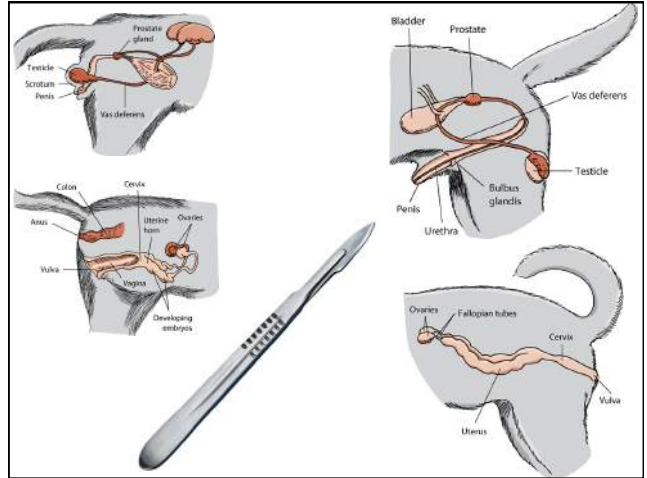
Hypothalamic-Pituitary-Gonadal (HPG) Axis



Hypothalamic-Pituitary-Gonadal (HPG) Axis



Ways to control cat and dog reproduction



Chemical sterilization

The use of chemical compounds which destroy and/or render ineffective essential component(s) of the reproductive system



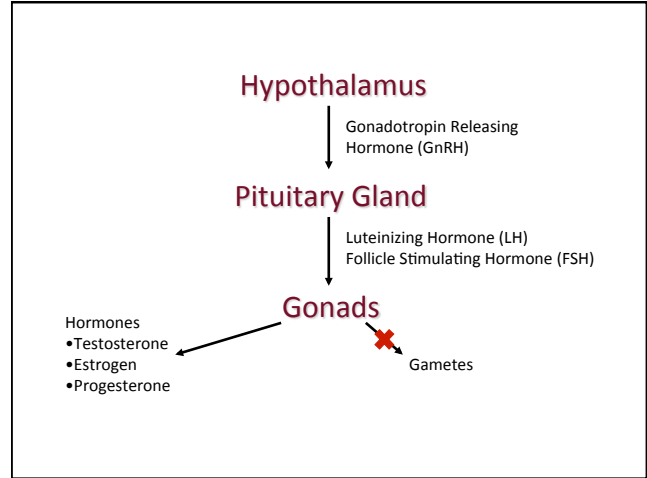
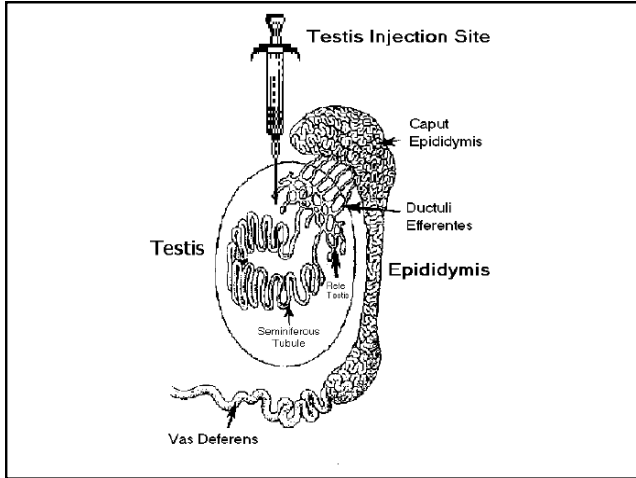
Chemical sterilization

The use of chemical compounds which destroy and/or render ineffective essential component(s) of the reproductive system

Zinc gluconate neutralized by L-arginine
Zeuterin, Esterisol (Ark Sciences)

Calcium chloride



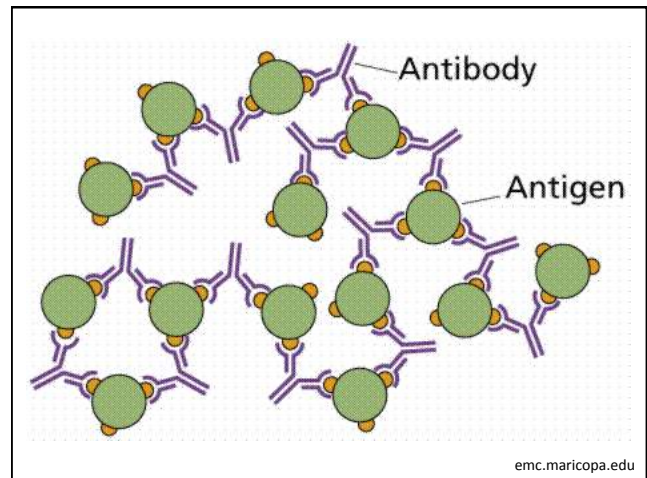


Immunocontraception

The use of an animal's immune system to prevent successful reproduction

↓

vaccine technology



Slimmy receives a rabies vaccine.

Her body makes antibodies against the virus.

If exposed to the virus, circulating antibodies bind it. The virus does not reach its receptor.

Slimmy is not infected.

Thanks!

Slimmy receives a GnRH vaccine.

Her body makes antibodies against her own GnRH.

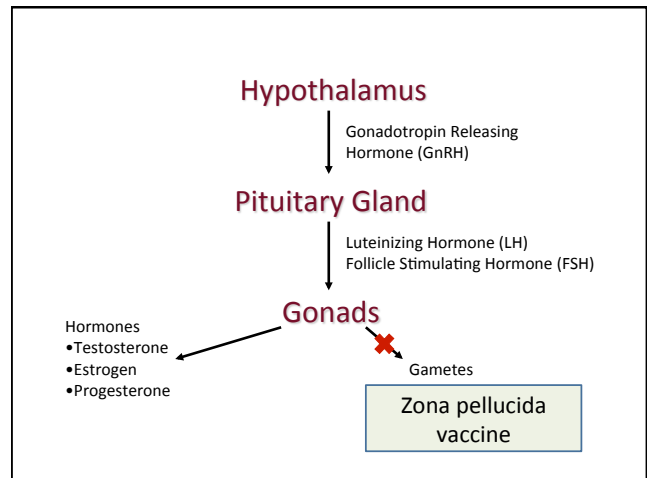
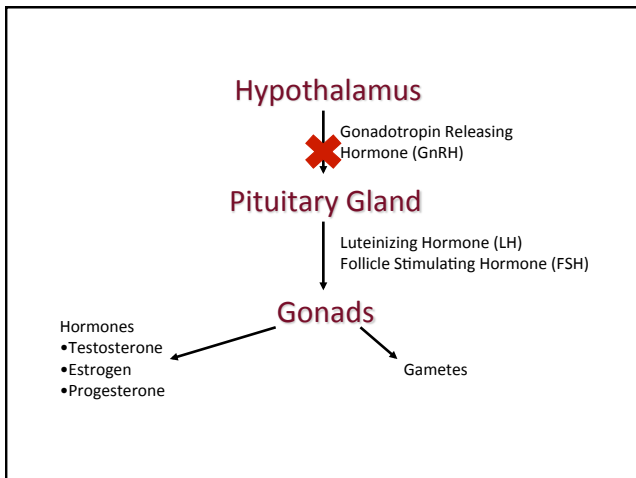
When her hypothalamus releases GnRH, antibodies bind it.

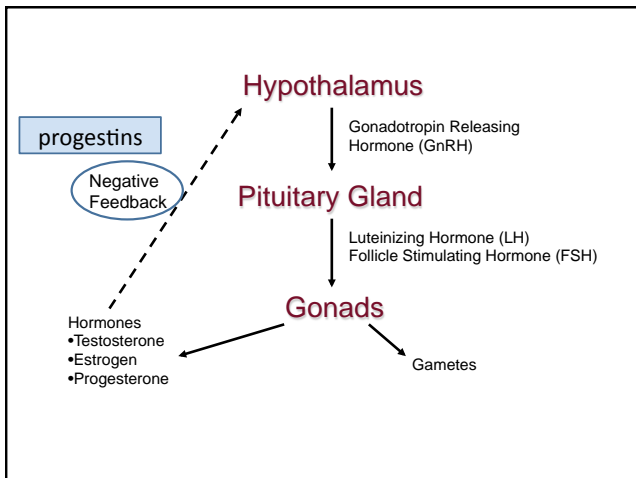
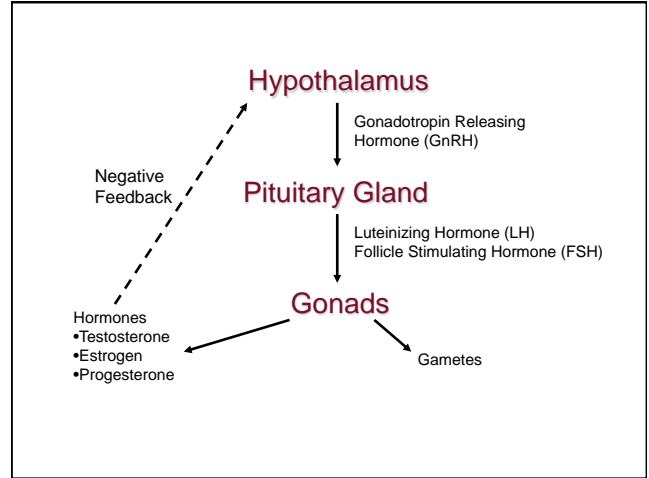
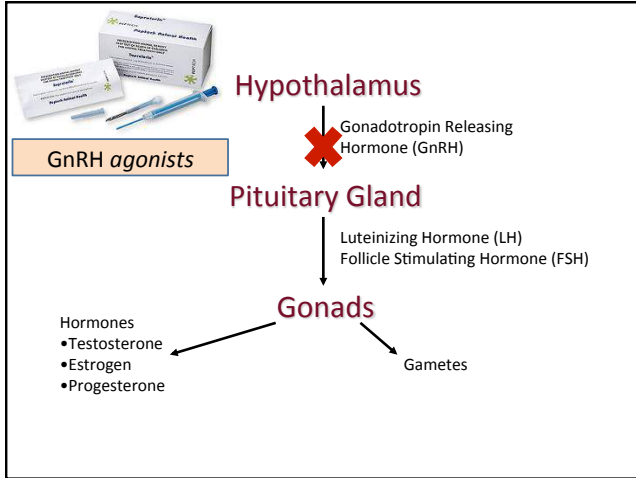
GnRH does not reach its receptors in the pituitary.

FSH and LH are not released.

Slimmy is contracepted.

Again, thanks!





FoundAnimals

What lies ahead...

gamete proteins and peptides

gene silencing *chemical spay*

immunocontraception

cytotoxin conjugates

hormonal downregulation

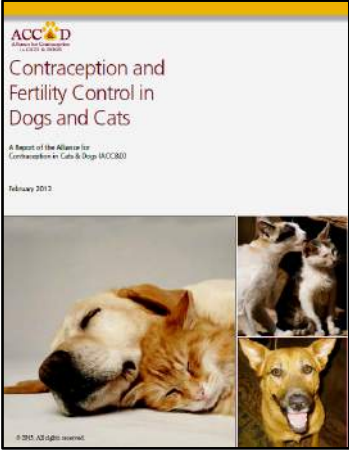
controlled release technologies

ACC&D
Alliance for Contraception
in CATS & DOGS

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Alliance for Contraception
in CATS & DOGS

Contraception and Fertility Control in Dogs and Cats

A Report of the Alliance for Contraception in Cats & Dogs (ACC&D)
February 2012



Download from
acc-d.org

Thank you!

WSPA
World Society for the
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imagine...
preventing unwanted litters without surgery