The Use of Birth Control in Zoo and Wildlife Management

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Use in Wildlife Management

- "Pest Species"
  - Impact prey species
  - Overpopulation causes damage to environment
    - E.g. White-Tailed Deer
  - Become "reservoirs" for infectious disease
  - Also includes non-indigenous species
- Lower birth rates rather than increase death rates
  - Hunting unattractive to public

http://magazine.audubon.org/incite/images/ICdeer.jpeg

Why Use at the Zoo?

- Maintain successful breeding program without producing surplus
- Space restrictions
  - Improved husbandry and vet care → low adult mortality/ increase in longevity → overcrowding
- Contraception or castration are preferred methods
  - Physical separation requires surplus facility space and can affect behavior of animals
  - Better option than euthanasia or transferring animals
- Serve as models for wildlife management with contraceptives

Strategies for Fertility Control

- Pre/Anti-Ovulatory
  - Interferes with development of fertile sperm or oocytes
  - Vaccines
  - Chemical manipulation of pituitary-gonadal axis
- Postovulatory
  - Pre-implantation
  - Abortive

GnRH Agonist

- Lab-created version of GnRH
- Interacts with GnRH receptor → Constant stimulation of pituitary → Increase of LH, FSH → Downregulation (Pituitary shuts down) → Decrease in Testosterone
- Can be used for:
  - Treatment of hormone-responsive cancers
  - Estrogen-dependent conditions
  - Delaying puberty in precocious individuals
  - Assisted reproduction
- Usually delivered as a nasal spray for humans
- Highly effective, safe, reversible

Harbor Seals: A Case Study

- Previous methods of reproductive control
  - Anti-androgens
  - Progestagen preparations
    - Severe side effects
  - Castration
    - Irreversible
  - Physical separation
    - Extra space, behavior issues

http://www.alaskawhalefoundation.org/education/marine_mammals/seal_pup_on_the_beach.jpg

As Studied Previously In…

- Hawaiian Monk Seals
  - GnRH agonist used to control aggressive behaviors
  - Side effect of testosterone inhibition for 7-8 weeks noted
  - Similar patterns of testosterone levels for HMS and HS

Materials/Methods

- Seal Station in Friedrichskoog, Germany
  - At the North Sea
- Group consisted of 3 mature females, 1 mature male, 1 immature male (reached maturity during course of study)
- 1st Mature Male
  - Received injections of GnRH agonist (buserelin acetate) in 4 different years
  - In 2000(2), 2001(2), 2004, and 2005

Methods, Continued

- 2nd Male
  - Considered mature in 2004
  - Based on evaluation of testosterone concentrations
  - Given single injections in 2004, 2005
- Neither male received GnRH agonist in 2002 or 2003
  - Tested reversibility in 1st male

GnRH Injections and Births

Year	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*
Injection	Yes	Yes	No	No	Yes	Yes	No
Birth	No	No	No	Yes	Yes	No	No

- Buserelin acetate was 100% effective in suppressing fertility
- Sexual activity reduced, not stopped
- No changes in social structure
- No clinical side effects observed
- Males less aggressive

Summary

- GnRH agonist effective in suppressing fertility
  - Reduces serum testosterone concentrations
- Didn’t harmfully interfere with animals
- Reversible
  - Births in 2003, 2004 when younger male was sexually inactive/immature

References

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