

## Approaches with Potential for Nearer-term Impact

### GonaCon™ in Male and Female cats

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## Brief History

- 1991: USDA National Wildlife Research Center began research for control of wild and feral species
- Active in deer, rats, squirrels, pigs, rabbits, coyotes, horses, bison . . .
- 2009: Registered for use in female white-tail deer
- 2013: Registered for use in wild horses and burros



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## Why GonaCon Has Current or Near-Term Potential

- Proven efficacy in multiple species
- Effective in both male and female cats
- Durable effect with a single dose
- Already registered for use in several species

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## Mode of Action

- Immunocontraceptive vaccine against GnRH
  - Synthetic GnRH conjugated to KLH or Blue carrier protein
  - Mycobacterium avium in light mineral oil adjuvant (derived from Mycopar)
  - Water-in-oil emulsion
  - Single intramuscular injection
- Antibodies inhibit activity of GnRH
  - Suppresses downstream hormone release (LH, FSH, estrogen, testosterone)
  - Infertility
  - Loss of secondary sex characteristics and sexual behavior

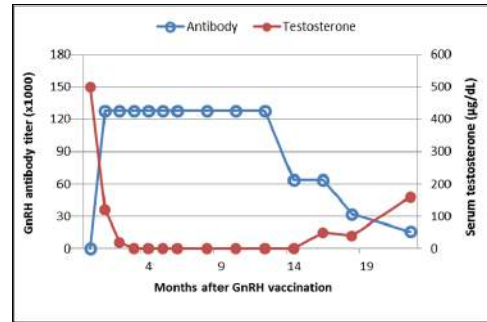
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### Summary of Key Research: Male Cats

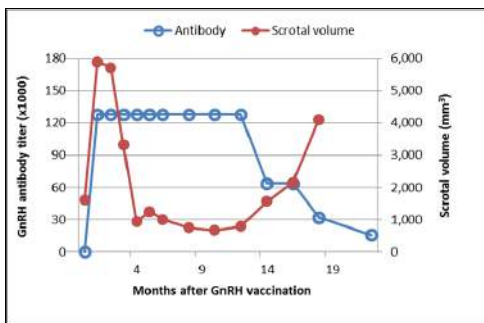
- Single dose GonaCon
- 24 adult male SPF cats
  - Antibody titer
  - Testosterone
  - Semen analysis
  - Secondary sex characteristics
- Testicular histology
- Breeding trial
- 3-year follow-up



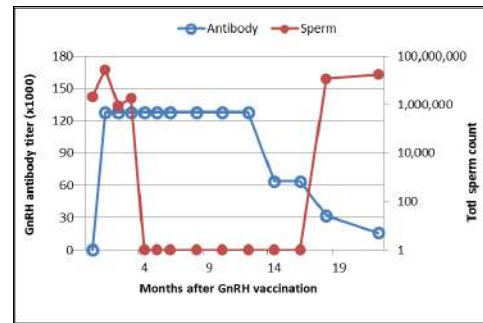
### GnRH Antibodies vs. Testosterone



### GnRH Antibodies vs. Scrotal Volume



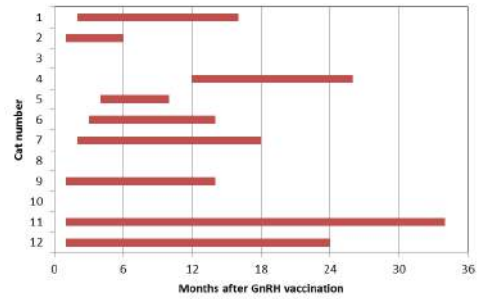
### GnRH Antibodies vs. Sperm



## Secondary Sex Characteristics



## Male Cats: Testosterone Suppression

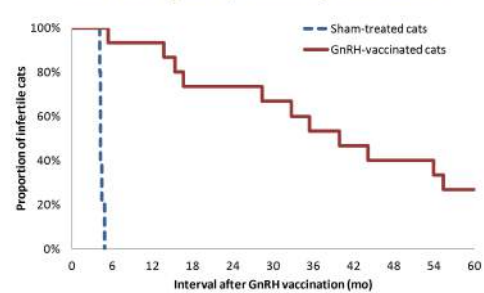


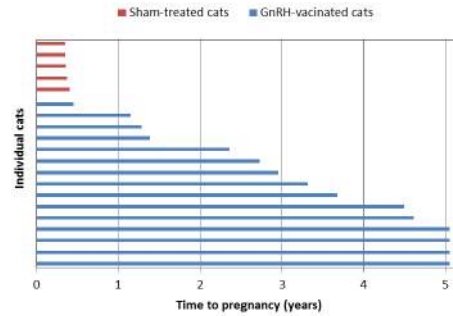
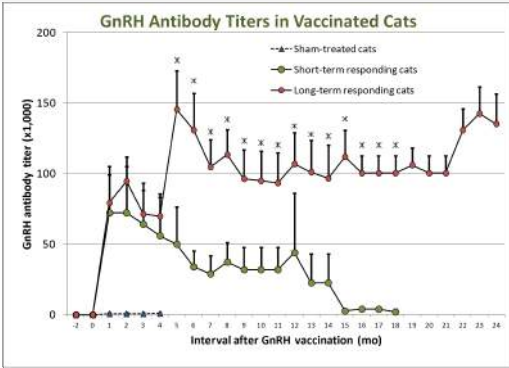
## GonaCon in Female Cats

- 20 adult female SPF cats
- Single dose GonaCon
- Monthly measurements
  - GnRH antibody titers
  - Estrogen, progesterone
- Breeding trial
- 5-year follow-up



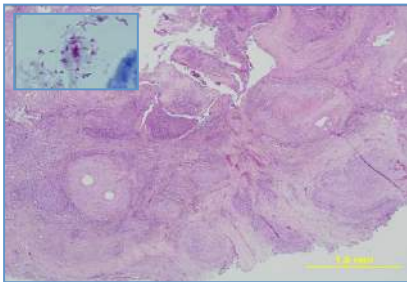
## Time to Pregnancy Following Vaccination





### Injection-Site Reactions

Late onset at ~24 months in 6/20 cats – non-painful



### Current Status of Gonacon Commercialization/Availability Status

- In the United States
  - Registered with EPA for use in white-tailed deer, wild horses, and burros
  - EPA would likely be route of approval for use in “feral” cats and FDA for “pet” cats
  - Current cost ~\$25/dose
- Internationally
  - No known activity regarding cats

## Target Market(s)

- Community cat management programs



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## Challenges

- Injection-site reactions
- Variability of contraceptive effect
- Scale-up manufacturing vs. affordability?
- Meeting cold-chain requirements in remote & developing locations
- Need for someone to undertake registration with EPA for feral cats

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## Summary: 3 Key Takeaways

- 1: GonaCon can be easily administered in the field to contained cats without sedation
- 2: Immune response controls both fertility and nuisance sexual behaviors; more effective in females
- 3: Half of female cats were infertile for at least 3 years following a single dose; may be useful in population management of community cats

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