**Gonadotropin Releasing Hormone Vaccination for Immunocastration in Male Dogs**

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**Introduction**

- The Humane Society of the United States estimates that each year between four and six million dogs and cats are euthanized because there are not enough homes for them.
- Many veterinarians within the U.S. recommend surgical sterilization (neutering) for population control in dogs and cats. However, non-surgical methods exist for the control of reproduction.
- Over the past two decades, efforts have been made to develop a vaccine that could suppress fertility in both female and male canids and felids. Several targets of immuncontraception have been identified including Gonadotropin releasing hormone (GnRH).
- Development of GnRH vaccines for immuncontraception is problematic because GnRH is a small decapeptide hormone that is not immunogenic. Subsequently, administration of a vaccine derived from only GnRH results in no antibody production.
- However, if GnRH is altered in a way that induces recognition of itself as a foreign material, such as coupling it with another molecule with many antigenic determinants, an IgG response will occur.3
- The purpose of this study was to determine if a commercially-available canine gonadotropin releasing hormone (GnRH) vaccine4, labeled for the twice annual (every 6 months) management of benign prostatic hyperplasia, would also be effective for immunocastration in male dogs.
- The hypothesis was that, in addition to stimulating anti-GnRH antibody formation, vaccination against GnRH would also decrease testosterone concentration and testes size for at least six months.


2Due to insufficient product sales, this vaccine is no longer commercially-available.

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**Materials & Methods**

- Canine Gonadotropin Releasing Factor Immunotherapeutic* (Pfizer Animal Health; Exton, PA) was subcutaneously administered (1 mL) to intact male dogs (n=6) twice at 4 week intervals.
- Testicular volume was determined at 4 week intervals.
- Venous blood samples (3-5 mL) were collected prior to vaccination and then every four weeks.
- Blood was centrifuged and serum was separated. Serum samples were maintained at -20°C until analyzed.
- Serum GnRH antibody concentrations were determined every 4 weeks for the duration of the study using an enzyme-linked immunosorbent assay.
- Serum testosterone concentrations were measured using a double-antibody radioimmunoassay (Diagnostic Products Corporation, Los Angeles, CA).
- Data were compared using a one-way ANOVA and significance was defined as p<0.05.

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**Results**

- Testicular volume was significantly reduced at week 8 compared to weeks 0 and 4 but no longer different after 12 weeks following vaccination (Fig. 1).
- Testosterone concentrations were significantly reduced at weeks 8 and 12 compared to week 0 but not after 16 weeks following vaccination (Fig. 2).
- No GnRH antibodies were detected at week 0 but all dogs had detectable titers by week 8, which began to decrease by 12 weeks following vaccination (Fig. 3).

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**Conclusion**

- The results of this study indicate that Canine Gonadotropin Releasing Factor Immunotherapeutic* induces a short-lived humoral response against GnRH with a reduction in testosterone concentration and testicular volume. However, the brief duration of efficacy following vaccination makes this protocol not clinically applicable for immunocastration.

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**Figures**

**Figure 1.** Mean testicular volume following GnRH vaccination.

**Figure 2.** Weeks from Initial GnRH Vaccination

**Figure 3.** Individual GnRH antibody titers following GnRH vaccination.