INTRODUCTION

BACKGROUND: In the companion animal world, especially male dogs, there exists a differing perspective towards the health benefits of testosterone on endocrine and metabolic functions. These benefits have been widely underemphasized as attempts to increase steroid levels have focused on the potential promise of behavioral benefits associated with surgical castration, until now, the only method available to permanently sterilize male dogs, causing a reduction circulating testosterone 96-99%

Testosterone, the main androgen, is essential for the development and maintenance of specific reproductive tissue as well as physiological functions such as increased muscle development, hair growth, joint development and bone mass. Accumulated evidence suggested that testosterone deficiency is associated with many diseases, such as cardiovascular disease in humans. Testosterone replacement therapy has been in pharmacology and clinical use since 1955. Today, oral and injectable testosterone therapy has been used widely in clinics. Recent research suggests that the negative impact neutering male dogs may have for reaching health implications for specific breeds.

OBJECTIVE: To determine the effects of Zeuterin (Zinc Gluconate Neutralized by Arginine), an FDA approved non-surgical method to sterilize male dogs 3 to 10 months of age, on testosterone levels of thirty (30) healthy male Beagle puppies, 6 months of age over a 24 month period as compared to a control group.

MATERIALS AND METHODS

Using a single breed-specific dataset, the objective was to examine the effect Zeuterin had on dogs followed for two years in a clinical setting. Forty six-month-old beagles were placed into four groups of ten animals, each by random distribution according to testicular width. Each group received intratesticular injection treatments as follows:

Group 1 – Bacteriostatic water (control);
Group 2 – 25 mg zinc/arginine;
Group 3 – 30 mg zinc/arginine; and
Group 4 – 35 mg zinc/arginine.

This report provides relevant data from a study conducted as part of the FDA approval trial.

RESULTS

This study is the first report following the forty dogs for two years to collect the reproductive parameter, in which the evaluation of the testosterone is critical to the research. Blood testosterone levels were monitored by radioimmunoassay for two years.

The ten control dogs reached the normal canine value, group average ranging from 2.34 ng/mL – 3.69 ng/mL after a ten month sexual maturity period. The testosterone of the thirty (30) zinc/arginine treatment dogs group average ranged from 1.77 ng/mL – 2.17 ng/mL.

The results demonstrated that none of the treatments affected the dogs’ body’s homeostatic functions. The body weight of all dogs increased, there was no clinical effect on rectal temperature, complete blood count and blood chemistry. At two years, blood testosterone levels for dogs in Groups 2-4 averaged 41-52% of the levels for dogs in Group 1. Relative to Group 1, dogs in Groups 2-4 had significantly reduced sizes of testes, epididymis, and prostate; histological examination revealed evidence of nonfunctional testes, and absence of sperm in the epididymis.

Progeny tests resulted in pregnancy for seven dogs in Group 1, and zero dogs in Groups 2-4. Semen was collected on a monthly basis for 21 months post – injection for dogs in Groups 2-4. No sperm were found in the ejaculate of 29 of these 30 dogs; one dog from Group 2 had sperm in the semen, but displayed severe oligospermia, low volume of ejaculation, as well as low sperm motility.

As compared to the control placebo group at the end of the study (twenty-four months post-injection), serum testosterone level of the 25 mg, 30 mg, and 35 mg treated groups had decreased by 44%, 41%, and 52% respectively. The treated animals were docile and easy to handle (not aggressive).

CONCLUSION

To our knowledge, this report is the first evidence which has studied male dogs 6 months of age to 30 months of age to analyze reproductive parameters utilizing a standard operating procedure. This data is has for matching value for clinical and laboratory references focused on male dog reproductive research.

The percentage of testosterone that plays a role in sperm formation is not known. When spermatogenesis is stopped by intratesticular injection of zinc gluconate neutralized by arginine, the remaining testosterone is utilized for body development and maintenance. The results demonstrated that none of the treatments affected their body’s homeostatic functions. The body weight of all dogs increased; there was no clinical effect on rectal temperature; complete blood count and blood chemistry. Testicular size of the dogs treated with Zeuterin was significantly reduced compared to the control group. When sperm production in testes is completely stopped, maintaining certain amount of testosterone is difficult. Therefore, more research is needed to understand the balance between testosterone levels and the development of secondary male characteristics such as muscle development.

Population management strategies play a significant role in animal overpopulation. The recent studies have shown increased risk of disease and cancer associated with spaying and neutering. Although more research needs to be conducted between the disorders or cancer and testosterone levels; it is not too early to pay attention to the facts of animal health.

Zeuterin was effective in causing permanent sterility in the treated animals while only reducing testosterone product 41-52%. These results have tremendous health implications for companion animals and service dogs.

For additional information please contact:
Min Wang, MD
Center of Reproduction Sciences
Ark Sciences, Inc.
zeuterin.com
Ark Sciences, Inc. © 2013