

PHAGE-GNRH CONSTRUCTS FOR POPULATION CONTROL OF FERAL ANIMALS: EVALUATION IN CATS

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Our research focus is the development of anti-fertility vaccines composed of whole phage particles carrying peptides with contraceptive properties for use in feral animals. The vaccines are designed to trigger antibody production against gonadotropin releasing hormone (GnRH). The antibodies inactivate GnRH, causing reduced release of gonadotropic hormones and gonadal atrophy. Phage-GnRH constructs with potential contraceptive properties were generated via selection from a phage display library using cat and dog GnRH antibodies as selection targets, allowing identification of phages displaying GnRH-like peptides. When tested in mice, these constructs invoked the production of antibodies against GnRH and suppressed serum testosterone. The goal of this study is to evaluate the potential of these vaccines in cats. Sexually mature male cats were characterized as to their reproductive parameters and injected with a phage-GnRH vaccine according to the following treatment groups: single phage-GnRH vaccine with adjuvant (group 1, n=5), a phage-GnRH vaccine without adjuvant and a half-dose booster one month later (group 2, n=5), or a phage-GnRH vaccine with adjuvant and a half-dose booster with adjuvant three months later (group 3, n=5, in progress). Anti-GnRH antibodies and testosterone in serum, testicular volume by ultrasound, and quality and quantity of sperm were evaluated monthly during a 7-month period following immunization. All cats developed anti-GnRH antibodies of varying levels following immunization. Serum antibody levels increased significantly after booster immunization in groups 2 and 3. In group 1, serum testosterone was suppressed in four cats at three time points post-immunization. The total testicular volume (TTV) decreased in four cats in group 1 by a range of 22-42%, indicating potential gonadal atrophy. All experimental cats in groups 1 and 2 produced sperm at month seven with up to a 38% decrease in normal sperm cells. At three months after primary immunization, the TTV in group 3 had decreased by a range of 9-30%. This ongoing study has thus far demonstrated the potential of phage-GnRH vaccines for immunocontraception of cats.