

SESSION OVERVIEW

Chair: Dr. Linda Rhodes

Speakers: Dr. Luis Lecuona, Dr. Michael Munks, and Dr. Tatiana Samoylova

**IMMUNOLOGICAL APPROACHES TO CONTRACEPTION
AND STERILIZATION OF CATS AND DOGS**

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For over thirty years researchers have explored the possible use of vaccines to suppress fertility in dogs and cats. The basic idea was that if vaccination could cause animals to make antibodies to key proteins involved in reproduction, reproduction could be suppressed. The earliest work was done using gonadotropin releasing hormone (GnRH) as the antigen, and subsequently, the use of zona pellucida proteins as antigens was explored. Antibodies to GnRH could be stimulated with a vaccination regimen, as long as GnRH was coupled to a much larger protein, but several initial and continuing booster injections were required for effectiveness. GnRH vaccines could be used to suppress fertility in male and female dogs and cats. Zona pellucida proteins are the proteins found surrounding mammalian oocytes – pig ovaries were used as a source for the porcine zona pellucida vaccines. Early researchers showed some limited effectiveness in female dogs but not female cats using these antigens.

None of these experimental approaches, however, ever progressed to a commercial vaccine that could be used for contraception in either dogs or cats. Barriers to commercialization included the short duration of immunity, that the vaccines did not work in all treated animals, some preparations caused injection site reactions, and all these factors, along with high regulatory hurdles and product development costs inhibited progress.

Pfizer Animal Health (now Zoetis) did commercialize a GnRH vaccine, but achieved regulatory approval through the USDA, with a claim for the treatment of benign prostatic hypertrophy in dogs (although the vaccine worked to suppress fertility as well as a treatment for BPH, both through suppression of testosterone in males.) Pfizer Animal Health also commercialized a GnRH vaccine to be used as an alternative to surgical castration of piglets (Improvac®).

Although the Center for Veterinary Medicine at the FDA will regulate immunocontraceptives for dogs and cats, the Environmental Protection Agency (EPA) is the regulatory body that oversees immunocontraceptive approvals for wildlife. In the past few years, a GnRH vaccine developed by the National Wildlife Research Center (NRWC) called GonaCon™ has been approved for use in deer, and wild horses, and the EPA has also approved a porcine zona pellucida vaccine for use in wild horses.

So where are we now with immunocontraception for dogs and cats? This session will describe some work exploring the GnRH vaccine technology developed by the NRWC that may be effective in dogs; it is a modification of the formulation of the GonaCon wildlife vaccine, which was necessary because GonaCon caused severe injection site reactions in dogs.

New approaches are badly needed if we are to see progress in immunocontraception for dogs and cats. Researchers are exploring two new approaches: delivering reproductive antigens using viral vectors (Dr. Munks), and filamentous phage as a platform for development of contraceptive vaccines (Dr. Samoylova).