

**A ROLE FOR IMMUNOCONTRACEPTION IN DUAL ANIMAL POPULATION
MANAGEMENT AND RABIES PREVENTION?**

Charles E. Rupprecht

The Global Alliance For Rabies Control, Manhattan, KS, USA

Dogs serve as the primary global reservoir for rabies, annually responsible for tens of thousands of human deaths, primarily among children (Knobel et al., Bull World Health Org. 2005;83:360-8). The uncontrolled reproduction of community dogs throughout the developing world aggravates opportunities for successful disease intervention (Zinsstag et al., PNAS USA. 2009;106:14996-5001). Nonsurgical methods for canine fertility management would provide alternative solutions to inhumane culling (Morters et al., Integr Zool. 2010;5:15-30). By inference, the construction of one GnRH immune-contraceptive vaccine (GonaCon), for the management of white-tailed deer and other mammalian populations, suggested potential application for carnivores, such as dogs (Fagerstone et al. Integr Zool. 2010;5:15-30). In preliminary studies, no interference was found between concomitant Gonacon administration and rabies vaccination of dogs (Bender et al., Vaccine. 2009;27:7210-3). However, despite such progress, actual canine contraception data from the use of Gonacon were lacking, unlike the supportive situation for cats (Levy et al., Theriogenology. 2011;76:1517-25). Moreover, the need for fairly high concentrations of contraceptive products, and the necessity for coupled adjuvant formulations for minimum immunological reactivity against small molecular weight self-antigens, with potential adverse effects, suggested alternate approaches may be necessary for safe, efficacious practical, cost-effective field applications for a variety of carnivore species, including dogs (Rupprecht et al., 2012, OIE Conf. Comp). In recent years, genetically modified adenoviruses, poxviruses, and lyssaviruses have been developed as expression vectors for viral genes (Smith et al., Adv Virus Res. 2011;79:345-63). Such recombinant viruses have been used as safe and effective biologics for the oral rabies immunization of carnivore reservoirs (Slate et al., PLoS Negl Trop Dis. 2009;3:e549). Besides rabies virus genes, recombinant viruses have been proposed as vehicles for the dual purpose of immuno-contraception (Wu et al., Vaccine. 2009 Nov 27;27(51):7202-9). Such biologics could be considered for individual parenteral application, as conducted in developing countries for mass dog vaccination (Lembo et al., PLoS Negl Trop Dis. 2010;4:e626). Alternatively, oral baits may be distributed to community dogs by hand, rather than be considered for widespread aerial distribution, as performed currently for wild free-ranging carnivores (Bergman et al., Dev Biol (Basel). 2008;131:145-50). To date, the global public health burden of rabies, and the paucity of humane alternatives for animal control, serve as dual incentives for the continued research and development of such novel biologics, as relevant long term solutions to the prevention of significant infectious diseases, and the sensible application towards rationale canine population management based upon applied ecology and host demographics (Gsell et al., BMC Vet Res. 2012;8:236).