



## Oral Vaccination of Skunks and Raccoons with Recombinant Rabies Virus Vaccines

An abstract entitled "Oral vaccination of skunks and raccoons with recombinant rabies virus vaccines" will be presented by C. E. Rupprecht, J. Blanton, M. Niezgoda, W. Weldon, C. Hanlon, J. Self, S. Murphy, B. Dietzschold\* at the XVI International Conference of Rabies in Americas on October 16-21, 2005 in Ottawa, Canada. Centers for Disease Control & Prevention, Atlanta, GA and \*Thomas Jefferson University, Philadelphia, PA

### Abstract

In the United States, the only currently licensed wildlife rabies biological is the vaccinia-rabies glycoprotein (V-RG) recombinant virus vaccine. Although the V-RG vaccine has demonstrated utility in Europe and North America for foxes and/or raccoons (among others), not all important carnivore species are adequately covered by current formulations. Clearly, the ability to equally immunize all critical hosts (including skunks, mongoose, etc.) would be a major improvement for developmental considerations. Recently, advances in RNA virus reverse genetics technology have resulted in the design of several new potential candidate rabies virus vaccines. By the use of such techniques, direct modifications to the glycoprotein (G) gene can result in highly attenuated properties (e.g., at codon site 333, GA or GAS), as well as the ability for expression of dual G genes (e.g., GAGA, GASGAS). The objective of this research was a preliminary experimental investigation of the safety, immunogenicity and efficacy of recombinant rabies virus vaccines (e.g., spbnGA, GAGA, GAS, or GASGAS) by the oral route in naive raccoons and skunks. For each experiment, after routine quarantine, captive animals were sedated, administered 1 ml of vaccine per os at a concentration of  $\sim 1 \times 10^8$  TCID (controls received PBS), bled for evidence of rabies virus neutralizing antibodies (VNA =  $> 0.06$  IU/ml) weekly, observed daily for suggestive adverse clinical events associated with vaccination, infected with challenge virus approximately 4-8 weeks post vaccination, and euthanized if signs of rabies manifested. No signs of illness were observed after vaccination. Four of five skunks vaccinated with the GA vaccine, and three of five skunks vaccinated with the GAGA vaccine, developed rabies VNA within 2-3 weeks of vaccination. All vaccinated skunks developed an apparent anamnestic rabies VNA response within 7 days post-challenge. Four of these five skunks vaccinated with the GA vaccine, and all the skunks vaccinated with the GAGA vaccine, survived experimental challenge with a skunk street rabies virus, in which all controls succumbed. In another trial, four of four raccoons vaccinated with the V-RG vaccine, one of five raccoons vaccinated with the GAS vaccine, and three of five raccoons vaccinated with the GASGAS vaccine, developed rabies VNA within 2-3 weeks of vaccination. Most vaccinated raccoons developed an apparent anamnestic rabies VNA response within 7

days post-challenge. Two of five raccoons vaccinated with the GAS vaccine, and all raccoons vaccinated with the GASGAS or V-RG vaccines, survived experimental challenge with a raccoon street rabies virus, in which 80% of controls succumbed. These preliminary data provide added proof of concept as to the safety and efficacy of these recombinant rabies biologicals by the oral route. Future focus should entail comparisons of minimum effective dose, duration of immunity, and delivery via baits in these and other major carnivore species.

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