Measurement of Immunologic Response in Horses Vaccinated With Xenogenic Plasmid DNA Encoding Human Tyrosinase

Luis M. Lembcke, DVM; Stephen A. Kania, PhD; James T. Blackford, DVM, MS, Diplomate ACVS; Diane Trent, BS; Agricola Odoi, PhD; Deborah A. Grosenbaugh, DVM, PhD, Diplomate ACVA; Darrell Fraser, PhD; A. Timothy Leard, DVM, PhD; and Jeffrey Phillips, DVM, MSpVM, PhD, Diplomate ACVIM*

The work presented herein supports the use of a novel gene therapy to treat equine melanoma. Authors’ addresses: Department of Small Animal Clinical Sciences (Lembcke, Phillips), Large Animal Clinical Sciences (Blackford); Comparative Medicine (Kania, Trent, Odoi); College of Veterinary Medicine, University of Tennessee, 2407 River Drive, Knoxville, TN 37996; Merial Ltd, 115 Transtech Drive, Athens, GA 30601 (Grosenbaugh, Fraser, Leard); e-mail: jphill35@utk.edu. *Corresponding author. © 2011 AAEP.

1. Introduction
Xenogenic plasmid DNA constructs have been developed and optimized for immunotherapies targeting cancer in humans and dogs. Specifically, plasmid vectors containing the tumor antigen tyrosinase have demonstrated immunoreactivity and clinical benefit in the treatment of melanocytic tumors in these species. Overexpression of the tyrosinase antigen has also been noted in equine melanocytic tumors, supporting its role as a valid tumor antigen in the horse. Vaccination with plasmid constructs containing tyrosinase may thus have translational immunoreactivity in the treatment of equine melanomas.

2. Materials and Methods
In this study, we evaluated the humoral and cell-mediated responses in five horses vaccinated with xenogenic plasmid encoding human tyrosinase.

3. Results
Vaccination was effective in generating detectable and long-lasting immunoreponses in all patients. No adverse reactions or signs of autoimmunity were detected.

4. Discussion
DNA vaccination against proteins preferentially expressed by tumors is a strategy for cancer therapy. Tyrosinase is a protein that has been targeted for the adjunct therapy of melanocytic tumors. We describe a methodology that is highly sensitive and specific for the detection of both humoral and cell-mediated immunoreactivity against tyrosinase in equine and canine patients.