



Rebecca Meluch interviews  
Michelle Anne Kutzler, DVM, PhD, DACT



Dr. Michelle Kutzler

The Alpaca Research Foundation (ARF), in conjunction with Morris Animal Foundation (MAF) and other groups in the llama and alpaca communities, provides funding grants to veterinarians and scientists engaged in research that has the potential to improve the health and well-being of our animals. *Alpacas Magazine* is pleased to bring you the fifth in a series of interviews with the researchers carrying on this important work.



## West Nile Virus Vaccine

The day comes when you find that dead crow or blue jay in your pasture – the telltale mark of an invisible monster. West Nile Virus is here.

And it doesn't make you feel a whole lot better if I tell you alpacas are a low risk species. The truth remains that alpacas have died of it, and one death is too many for your herd. So you ask your vet: Should I vaccinate my alpacas?

If you are one of the many alpaca owners out there around Corvallis, Oregon, and the vet you asked is Dr. Michelle Kutzler, then thank you. Your questions launched the Alpaca Research Foundation-sponsored research project aimed at getting the answer.

Originally from Washington, Michelle Kutzler got her veterinary degree at Washington State University. It was while in private practice in Minnesota that she met her husband, Sean. (He was a dairy farmer and she was his veterinarian.) Michelle and Sean, who is just a wee bit Scottish, have three children: Courtney, eight years old; Colleen, five; and Connor, one. After completing a residency and Ph.D. at Cornell University in Ithaca, New York, Michelle is now an assistant professor of Clinical Sciences and an ambulatory large animal clinician at Oregon State University.

I caught up with Michelle Kutzler on a cell phone interview on her way back from her baby's dentist appointment in March 2003. I found it interesting that she took on the West Nile Virus research because, as we spoke, West Nile Virus wasn't in Oregon yet. **Michelle Kutzler (MK):** "No, it's not in Oregon yet, which is one of the reasons why my research here is so important.

In other parts of the U.S. where camelids have been vaccinated, the animals could have been infected previously without showing clinical signs of infection. Their response to vaccination would be much different from animals that have not been previously exposed to West Nile Virus. Using camelids in Oregon as naïve animals – that is, knowing they've never been exposed – we can do the study here and know that the animals that respond to the vaccine are indeed responding to the vaccine and not to previous exposure."

**Rebecca Meluch (RM): Is being bitten by an infected mosquito the only way an animal can be exposed?**

**MK:** "Blood transfusion would be a potential source in alpacas, however unlikely. The other method that West Nile Virus can be transmitted – at least in horses and in people – is transplacentally, which means a pregnant mother who has been infected can infect the unborn child. Transmission by blood transfusion or across the placenta have not been demonstrated in camelids."

**[Author's note:** Infection *does not necessarily mean obvious signs of illness. It means the virus is inside the host – be that a person, horse, or alpaca.*]

**MK:** "Infection can occur without showing any signs or symptoms of illness. The majority of people and animals who become infected with West Nile Virus and who have competent immune systems are able to get rid of the virus. As a result of the infection, they have developed antibodies to the virus and we can measure those antibodies."

Using camelids in Oregon as naïve animals – that is, knowing they've never been exposed [to WNV] – we can do the study here and know that the animals that respond to the vaccine are indeed responding to the vaccine and not to previous exposure.

**RM:** Where do natural antibodies come from? Does that mean the animals have been bitten but fought off the disease and are now resistant?

**MK:** "Yes. In 1999, the first year West Nile Virus was introduced to the U.S., 25 cases were identified in horses in New York State. Eight of those animals died or were euthanized. Blood samples from 68 horses residing on the same premises as the affected horses were collected and revealed thirty-one percent had antibodies to West Nile Virus. This indicates that these horses had been infected with the virus and cleared the disease without showing any symptoms, at least not that the owners noticed."<sup>1</sup>

**RM:** Horses are more susceptible than camelids?

**MK:** "Yes. That is undisputed. Birds, especially those in the corvidae family, are the most susceptible animal species. Humans and horses are also very susceptible, horses more than humans. Camelids and other animals – dogs, cats, sheep, goats, cows, deer, chipmunks, alligators, turtles – you laugh – researchers have taken blood samples from a huge number of animal species and found antibodies to West Nile Virus, which means they've been bitten and have cleared the disease. However, these species can also succumb to West Nile Virus infection and die as well."

There are four parts to the research project:

**What happens without the vaccine?**

**Part 1:** Measure what levels of natural antibodies are occurring in alpacas across the U.S.

**Is the vaccine safe?**

**Part 2:** Administer a commercial WNV

horse vaccine (Fort Dodge) to alpacas with three doses, and monitor for adverse effects. All but eleven of the test subjects are client-owned. The other eleven are part of the Oregon State University herd.

**Is the vaccine effective?**

**Part 3:** Look at the antibody response following vaccination as well as following natural exposure in the vaccinated animals in comparison to the unvaccinated animals from the same Oregon farms. Samples will be taken before and three weeks after each vaccination, as well as in July and November 2003, i.e. before and after natural infection can occur in Oregon.

**Who got sick?**

**Part 4:** Look at animals that have and have not been vaccinated who show symptoms. Perform autopsies on those who cannot be saved to see what kinds of problems are associated with the disease.

**RM:** How are these alpacas going to get infected?

**MK:** "We will not be investigating experimentally-induced West Nile Virus infection in camelids, which would involve taking the animals into a screened room and exposing them to infected mosquitoes. There's a lot of rain in the Northwest. We expect some of our vaccinated and unvaccinated animals will become infected with West Nile Virus. We'll know that from the blood samples."

**RM:** I read you have a level 3 containment lab. Sounds formidable. What's that about?

**MK:** "We need to work with live virus because of the virus neutralization assay [test] we use to measure antibody levels.

Live virus is grown in cell culture and increasing volumes of serum containing antibodies collected from the blood of the animals that we've taken samples from is added. Once we determine how much blood we need to kill the virus, that tells us what the antibody titer [concentration] was in the animals at the time we took the sample."

**RM:** Do you do that?

**MK:** "No. Thank goodness. That would be Rocky Baker, one of my collaborators. Rocky does the lion's share of the lab work. Dr. Donald Mattson is the other virologist I collaborate with. My role is to administer the vaccines and collect the blood samples."

Symptoms of West Nile Virus infection in an alpaca are head tilt, lameness, weakness, fast heartbeat, fast breathing, recumbency, seizure, and death. The disease progresses quickly, with death occurring within 96 hours after first showing symptoms. But it's not contagious from animal to animal.

**RM:** If I read the literature right, do I understand that the mosquitoes can put the virus into the camelid, but they can't get it out?

**MK:** "That's true of people and horses as well. The only animals that mosquitoes can get West Nile Virus out of are birds, and the reason is that in infected mammals, the concentration of the virus in the blood stream is very, very low. There are so few viruses in relation to the vast amount of blood circulating that the chances for a mosquito to ingest blood that has a virus in it is not even likely. It's improbable. Whereas in birds, the level of what they call viremia is very high. When mosquitoes bite birds, the chance of the mosquito ingesting a virus is high

<sup>1</sup> Information can be found on the U.S. Department of Agriculture's website: <http://www.aphis.usda.gov/vs/ep/WNV/summary.html>. Additional serologic prevalence studies have been performed in horses in 1998 (Italy), 1999 (France), and 2000 and 2001 (U.S.).

if the bird is infected with West Nile Virus.”

So you don't need to quarantine your alpaca away from its friends if you suspect WNV infection.

Outside of this project, Michelle Kutzler's main interest in veterinary medicine has been reproductive work, a subject near to any alpaca breeder's heart. While at Cornell, she investigated the use of Ovuplant® for inducing estrus (heat) in dogs. Ovuplant, manufactured by Fort Dodge, is a synthetic hormone, deslorelin, used in horses to induce ovulation. Michelle found that it reliably induces estrus in dogs.

**RM:** Is that the same as HCG they use in alpacas?

**MK:** “Human chorionic gonadotropin

(HCG) is a large protein hormone. You *could* use Ovuplant in alpacas, but it's more expensive than HCG. One of the problems with HCG, and why it doesn't always work when they use it in horses, is that after one or two uses, it will cause antibodies against HCG to form. So essentially it's like vaccinating. Once you develop antibodies to it, when you use it to induce ovulation, it doesn't work anymore.”

**RM:** Oh really? I think I've vaccinated one of my alpacas.

**MK:** “Because HCG doesn't work reliably in horses – because of the antibody problem – this other method was developed. Deslorelin, the hormone in Ovuplant, is a small peptide hormone, much smaller than HCG, so the

body doesn't produce antibodies to it. I hadn't even considered using it in camelids but that maybe a potential avenue for research in the future.”

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