

**Alpaca Research Foundation Update  
Camelid Community  
August 12-14, 2005**

I. Sources of funding received as of July 2005:

Source	Amount received
AOBA: Donations via check-off on AOBA membership renewal form (AOBA will match donations up to \$10,000)	\$21,067 \$5,050
Stud raffle conducted by ARF at AOBA National Conference	pending
Sale of privately donated alpaca(s) at AOBA National Conference auction; donor designates % of proceeds goes to ARF	
ARI: membership renewal check-off (no matching funds)	\$415
Sale of donated alpacas at private auctions	
Alpacas of America	\$26,000
Parade of Champions –Byram/Ulloa alpaca	\$15,000
Affiliate and breeder events – fund raisers at shows, seminars, etc.	\$28,470.95
ARF annual giving letter	\$5,505
Miscellaneous: memorials, honoraria	\$1,185
<b>TOTAL</b>	<b>\$102,692.95</b>

II. Project Alpacasite: recently approved by BOD. Donations to this project will go into a fund earmarked specifically for peer-reviewed pharmacologic studies of drugs in camelids

III. ARF research projects approved in 2004-2005 for funding at \$87, 286.53:

1. Gregg P. Adams, DVM, PhD, University of Saskatchewan, SK, Canada  
Ovulation Inducing Factor in Seminal Plasma of Alpacas, 1 year, \$14,181.75

Abstract: Camelids have been categorized as induced ovulators and the present dogma suggests that physical stimulation of the genital tract during copulation is primarily responsible for eliciting ovulation. Recent discoveries, however, challenge this dogma. The project focuses on the isolation and characterization of a putative ovulation-inducing factor (OIF) present in the seminal plasma of camelids. The factor was initially reported in Bactrian camels, and until a recent report from the PI's laboratory, had not been identified in the seminal plasma of alpacas. Experiment 1 is designed to confirm the ovulation-inducing effect of seminal plasma in alpacas and to determine if the effect is mediated via elevated circulating LH. Experiment 2 is designed to characterize the bio-active component of seminal plasma responsible for ovulation induction. The existence and nature of this factor has direct implications on fertility, infertility, breeding management, and possibly pharmaceutical development for alpacas. The evolutionary conservation of such a factor raises the possibility of its existence in other induced and spontaneously ovulating species; hence, the characterization of OIF in the seminal plasma of alpacas may have much broader implications.

2. Emilie Campbell, PhD, Brigham Young University, Provo Utah, Investigation of Genes Controlling Pigmentation in Alpacas, 2 years, \$12,087.78

Abstract: The effectiveness of selection for fleece color in alpacas has been limited because the inheritance of this trait is poorly understood. In other species, the genetics of color has been studied more extensively and differences in particular genes have been shown to cause variation in color. Two such genes, MC1R and ASIP, affect the distribution of red and black pigment. The objective of this proposal is to determine if variation in MC1R and ASIP has an effect on color in the alpaca by DNA sequencing of these genes from alpacas of various colors. The hypothesis of this research is both MC1R and ASIP have a function in determining fleece color in alpacas. If this hypothesis proves correct, it will aid in the understanding of the genetics of color in alpacas and may also provide opportunities for selection of desired fleece colors based on DNA testing.

3. Michelle A. Kutzler, DVM, PhD, Oregon State University, Corvallis, Oregon  
Experimental West Nile Virus Infection in Vaccinated and Unvaccinated Alpacas,  
1 year, \$20,630

Abstract: West Nile virus (WNV) is an infectious, noncontagious virus belonging to the family *Flaviviridae*. Mosquito vectors transmit the virus among bird populations and incidentally, to susceptible mammalian species. While infected camelids may not exhibit clinical symptoms, fatal neurologic disease sometimes develops in camelids. Clinical WNV infection in alpacas can result in a range of clinical signs from anorexia, hyperesthesia and facial tremors to incoordination, recumbency and death. Several groups have demonstrated that immunization with commercially available equine WNV vaccines is safe in camelids and results in virus-neutralizing antibody titers. However, it is not known what antibody titer is protective against the development of clinical disease nor are there reports demonstrating the efficacy of a WNV vaccine preventing clinical disease. The objective of this study is to determine if vaccination against WNV can prevent clinical WNV infection in WNV-naïve alpacas when experimentally challenged with a live virus. Experimental transmission using mosquito vectors will be employed instead of direct viral inoculation to provide a more natural route of infection for comparing vaccine efficacy. In addition, valuable clinical information will be gained during the disease time course that will aid practitioners in diagnosing and managing clinical WNV infections on the farm. At the end of the study, the end-organ effects of WNV infection in both clinically normal and affected animals will be elaborated with complete post-mortem examinations, histopathology and virus identification using reverse transcriptase nested polymerase chain reaction and immunohistochemistry.

4. Jeffrey Lakritz, DVM, PhD, The Ohio State University, Columbus, Ohio  
Expression of Matrix Metalloproteinases in CSF Fluid of Alpacas with Meningeal Worm:  
Role in Pathophysiology of Neurologic Deficits, 1 year, \$28,000

Paralytic spinal cord/brain meningeal worm infection in South American Camelids remains an important problem in spite of studies evaluating deworming agents and vaccines. Great clinical progress has been achieved in some animals while mortality remains high. This proposal aims to study one aspect of the inflammatory response associated with meningeal worm infections in hopes of identifying new treatment modalities. The proposed work focuses on the host inflammatory response to parasite migration in nervous tissue and associated expression of tissue degrading enzymes (matrix metalloproteinases) in CNS tissue. Detailed information about key events in the inflammatory response will allow development of new strategies to treat this devastating disease. We will evaluate the spinal fluid from documented meningeal worm cases in

comparison to control CSF samples obtained from healthy animals to define the expression and activity of host proteolytic enzymes. We will characterize the CSF expression of host proteins to determine their activity and inhibitor specificity. In vitro studies evaluating protease inhibitors will provide data needed for determination of suitable pharmacologic candidates to treat this disease.

5. Susan J. Tornquist, DVM, PhD, Oregon State University, Corvallis, Oregon  
Effects of Polymerized Ultrapurified Bovine Hemoglobin Blood Substitute in Anemic Alpacas, 1 year, \$12,387

Anemia, or an abnormal decrease in the number of red blood cells is a common problem in alpacas presented to veterinarians and referral centers for a variety of diseases. Anemia may be the major problem the alpaca is experiencing, or it may be secondary to other diseases or conditions. Although the anemia may be treated directly or resolve when underlying diseases are treated, the lack of oxygen-carrying capacity induced by anemia can delay or prevent successful medical treatment. Blood transfusions may be used, but there are several potential problems associated with transfusions and many veterinarians don't have the resources to safely transfuse patients.

A blood substitute product has been approved for use in dogs for about 5 years. Its safety and effectiveness has been studied in other animal species and in many of these, it can improve the clinical condition of the patient safely and effectively. No studies of use of the blood substitute in alpacas have been published.

In this study, we plan to make alpacas anemic by removing some red blood cells and then measuring the effects of giving the blood substitute on a number of clinical and laboratory parameters. We will compare these effects with those seen when a control-type product is given to replace blood volume. This study should establish whether the blood substitute product is safe and effective for use in alpacas. If it is, it could provide a convenient method of treating anemia.

### III. MAF projects to which ARF has made contributions of \$13,000 to date in 2005:

1. Chris Cebra, Oregon State University, Corvallis, Oregon  
Glucose Tolerance and Sensitivity in Crias, \$1,188, completed February 2005.
2. Warren Johnson, National Cancer Institute, Frederick, Maryland  
An Integrated Radiation Hybrid Map of the Alpaca, \$8,812
3. Geof Smith, North Carolina State University, Raleigh, NC  
Bioavailability and Pharmacokinetics of Oral Omeprazole in Llamas, \$3,000

Abstract: Third compartment (stomach) ulcers are a common cause of sickness and death in camelids (llamas/alpacas) of all ages. Unfortunately, many of the accepted treatments of stomach ulcers in other species have not been found to be effective in camelids. This study proposes to examine the ability of a new oral medication (that is already used successfully in horses), to reduce stomach acidity and decrease ulcers in camelids.

### IV. Out-of-cycle RFP: Bovine Viral Diarrhea Virus Infection in Alpacas\*

\*Note: this RFP is in addition to the regular RFP that will be sent out later in 2005.

Isolated clinical cases of infection with bovine viral diarrhea virus (BVDV) in alpacas including presumptive and confirmed cases of persistently infected (PI) crias have recently been confirmed in North America. Previously, BVDV was thought to pose minimal risk to camelids. In light of the accumulating new information, however, ARF BOD members felt that the role of BVDV as a cause of disease in alpacas should be re-evaluated. To that end, the an out-of-cycle request for proposals addressing the question of BVDV prevalence in North American alpacas was sent to veterinary colleges and veterinary virologists in May. The deadline for submission of proposals is September 1 with funding effective on November 1, 2005. A prevalence study is expected to will help determine just how widespread BVDV exposure currently is in North American alpacas and could lead to more extensive investigations if warranted by the results.

Persistent infection can result when a pregnant female who has not previously been exposed to BVDV develops an acute BVDV infection. The virus crosses the placenta and infects the fetus. If this occurs before the fetal immune system has developed, the fetus becomes immunotolerant to BVDV, i.e., it will not recognize BVDV as “foreign” and fails to develop an immune response against it. In cattle this occurs around 100 days of gestation, but the stage of gestation when this can occur in camelids has not been determined. As a result of immunotolerance to BVDV, the animal is permanently infected with BVDV and will shed infective BVDV (often in large quantities) in virtually all of their bodily fluids, secretions and excretions throughout their lifetime. These PI animals serve as a reservoir of infection and comprise the major source of BVDV transmission within and among cattle herds.

V. Census of Confirmed Cases of Bovine Viral Diarrhea Virus (BVDV) Infection in Camelids in North America by Region on ARF web site

<b>Northeast</b>	<b>1</b>
<b>Southeast</b>	<b>0</b>
<b>Great Lakes</b>	<b>1</b>
<b>Central States</b>	<b>0</b>
<b>Rocky Mountains</b>	<b>0</b>
<b>West Coast</b>	<b>3</b>
<b>Eastern Canada</b>	<b>1</b>
<b>Western Canada</b>	<b>1</b>

(Updated 08/09/2005)

Contact Alan (Abe) Rosenbloom, MD for further information and to report a confirmed case of BVDV, [aar@pinehurst.net](mailto:aar@pinehurst.net) or 919-663-1528.

- Farm and owner's name will be kept strictly confidential.
- Information may be transmitted through your veterinarian or a designated contact person.
- Confirmed cases will be identified by geographic region only and pasted on this site as soon as information is available.