

AMANDA A. ADAMS

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Department of Veterinary Science
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EDUCATION

Assistant Professor

Veterinary Science, Sept 2011-present
Equine Immunology and Endocrinology

University of Kentucky
Lexington, KY

Postdoctoral Scholar

Veterinary Science, Sept 2008-Sept 2011
Equine Immunology and Infectious Disease

University of Kentucky
Lexington, KY
Dr. David Horohov

Ph.D. Veterinary Science candidate, 2004-2008
Dissertation emphasis: Equine Immunology
August 2008 degree

University of Kentucky
Lexington, KY
Advisor: Dr. David Horohov

B.S. Major in Biology, 1999-2003
Minor in Chemistry &
Equestrian Business Management

Stephens College
Columbia, MO

PROFESSIONAL RESEARCH EXPERIENCE

Assistant Professor, University of Kentucky, Lexington, KY (October 2011-present)

- Characterizing the immune system of the geriatric horse, by identifying mechanisms responsible for immunosenescence, inflamm-aging and altered immune responses to vaccination. The ultimate goal of my research program is to use the geriatric horse as a model system for human aging to further understand the process of inflamm-aging, ways to modulate inflamm-aging, and to identify strategies to improve the immune response to influenza vaccination in the elderly. In addition to this goal, we are improving the health and well-being of the aged horse, by identifying interventions, such as exercise and nutritional supplementation that have the potential to decrease chronic inflammation and we want to know more basic knowledge of how we can better care for these senior horses in terms of management practices of deworming, etc.
- To characterize the immune system of a unique subset of 'aged' horses that are Pituitary Pars Intermedia Dysfunction (PPID), a.k.a. Equine Cushings disease (ECD). To further understand mechanisms responsible for PPID and to improve diagnostics of PPID.
- To further understand the effect of adiposity on the inflammatory response of the horse, in particular the equine metabolic syndrome (EMS) horse. There is a growing need to understand mechanisms responsible, and pathways involved in equine metabolic syndrome. Thus, my goal is to identify potential treatments that target both the inflammatory and metabolic component of EMS and to improve diagnostics of EMS.

- Further, my research involves investigating models of ‘stress’ in particular how the process of weaning, as a model of stress, impacts immune and metabolic functions.
- Lastly, a component of my research program involves supportive, immunological studies in vaccine development and post-licensing characterization of immune responses.

Post-doctoral Training, University of Kentucky, Lexington, KY (August 2008-September 2011)

- Studies examining the effects of dietary components (tocopherols, omega fatty acids, plant polyphenols and prebiotics/probiotics) on age-associated changes of immune function including, responses to recall and novel vaccinations and inflammatory and anti-oxidant responses in the horse.
- Studies further characterizing the immune response of the aged horse by measuring telomerase activity, investigating T-cell membrane raft components and identifying “biomarkers” of aging.
- Studies to determine the effects of polyphenols (resveratrol) on both immune and metabolic responses of Equine metabolic Syndrome horses.
- Characterization of the immune response during the time of weaning and understanding the effect of probiotic supplementation on fecal microflora and cell-mediated immunity, in particular interferon-gamma production.
- Investigating early vaccination of foals in the face of maternal antibody interference.

Ph.D. Training, University of Kentucky, Lexington, KY (January 2004-August 2008)

- Characterization of age-associated changes in equine immune function, including measuring proliferation responses (*in vitro*) via flow cytometry and thymidine incorporation, quantitating inflammatory cytokine production (*in vitro* & *in vivo*) using intracellular staining (ICS), ELISAs and Real-Time PCR (RT-PCR).
- Characterization of the “inflamm-aging” response in the aged horse. In particular, characterizing the effects of adiposity on the pro-inflammatory response of aged horses by conducting a dietary restriction study while measuring inflammatory cytokines over time.
- Characterization of humoral & cell-mediated responses of aged horses to influenza vaccination and challenge (*in vitro* & *in vivo*) were measured using equine influenza virus (EIV)-isotypic ELISAs, hemagglutination inhibition antibodies (HI), EIV induced proliferation, intracellular IFN- γ production, Th1 and Th2 cytokine production using RT-PCR, and clinical disease responses.
- As a side note, at the beginning of my PhD program, I was extensively involved with the start-up of the Immunology lab, as my PI, Dr David Horohov was new in joining the Gluck Center and thus the lab was empty.

Laboratory Technician, Companion Animal Research & Development, Intervet, Inc., DeSoto, KS (May 2003-December 2003)

- Optimized ELISA procedure for detecting Equine Herpes Virus Type 1 and 4 antigens, detected Equine Influenza Virus in nasal swabs of horses, performed hemagglutination (HA) test of Equine Influenza Virus, sub-cultured and maintained equine cell lines, helped with a growth optimization study of *Ehrlichia risticii* causative agent of Potomac Horse Fever, assisted in development of monoclonal antibodies in mice and involved in equine vaccination trials.

Laboratory Technician, Dr Harold Laughlin, Veterinary Biomedicals, University of Missouri, Columbia, MO (August 2001-May 2003)

- Actively participated in studies which involved understanding the effects of exercise and diet on cardiovascular function using the swine as a model. Assisted in isolation of hearts and muscle tissue from rats and pigs, operated large and small vessel rigs to determine vasoreactivity of arteries, performed SDS gel electrophoresis and immunoblot analysis, and mapped skeletal blood vessels.

Teaching Assistant, Natural Sciences, Stephens College, Columbia, MO (August 2001-May 2003)

- Prepared laboratory materials for Biology, Molecular Biology and Microbiology undergraduate laboratory courses, graded laboratory assignments, monitored laboratory activities and assisted students with learning laboratory techniques.

Pharmaceutical Research & Development Intern, Boehringer Ingelheim Vetmedica Inc., Saint Joseph, MO (May thru August 2002)

- Performed stability testing of Metcam, Ventipulmin, Buscopan Tank Oral Solution, and Sedivet products by means of physical analysis, HPLC, GC and Karl Fischer Water Titrator. In addition, continued research with the Biological Research, actively participated in *Lawsonia Intracellularis* foal project in collaboration with University of Minnesota.
- In addition, helped with the move of the Biological Equine R & D lab from the old building to the new research facility, with this gaining experience with requirements for lab start-up.

Biological Research & Development Intern, Equine Research & Development, Boehringer Ingelheim Vetmedica Inc., Saint Joseph, MO (May thru August 2001)

- Expressed, isolated and quantitated Equine Arteritis Virus glycoprotein. Involved in a canine parvovirus back-passage study evaluating hematology histograms. Worked with bioreactor, microcarrier and roller bottle cell culture systems.

Laboratory Technician, Clean Earth Technologies LLC, Columbia, MO (2000-2001)

- Conducted bacterial death curves using bacteriophage to evaluate the University of Missouri, Columbia, department of defense antibiological warfare inventions.

TECHNICAL SKILLS

- ABI 7500 RT-PCR System
- ABI 7900 RT-PCR System
- Viiia7 RT-PCR System
- 2 Eppendorf 5070 Automated Pipetting Stations
- 2 iPrep Purification Instruments
- BD *FACSCalibur* Flow cytometry
- Cell culture and virology skills
- SDS PAGE/Western Blot
- ELISA
- Luminex

CURRENT FUNDED PROJECTS AS PRINCIPAL INVESTIGATOR (PI) STATUS
not including Gift Account and Fee for Service Work

Adams, AA, Elzinga, S. Do horses with Equine Metabolic Syndrome (EMS) have reduced immune responses to vaccination, AQHA

Adams, A.A. PI, Effects of Stevioside on metabolic dynamics & inflammation in EMS horses, LMU/Gluck Internal Grant

A.A. Adams, PI, Title: Do horses with Pituitary Pars Intermedia Dysfunction (PPID) respond as well to vaccination when compared to non-PPID, aged-matched horses? Boehringer Ingelheim (BIVI). 2013.

A.A. Adams, PI, Title: Characterization of Cell-mediated and Humoral immune responses to a multi-pathogen "Combination" vaccine in naïve ponies. BIVI. 2013.

A.A. Adams, PI & D.W. Horohov, Co-PI. Title: The effect of Endophyte-Infected Tall Fescue consumption on epigenetic regulation of inflammation in horses. USDA-ARS, NP101. 2013-2015.

A.A. Adams, PI. Title: Is there a relationship between the status of circulating vitamin and fatty acid levels to systemic inflammation and muscle mass in aged horses? Buckeye-Waltham Foundation. 2013-2014.

A.A. Adams, PI. Title: Effect of an immunostimulant containing *Propionibacterium acnes* (EqStim™) on cell-mediated immunity and nasal shedding of respiratory pathogens using a model of 'weaning' stress in foals. Neogen. 2013-2014.

A.A. Adams, PI & M. Nielsen, Co-PI. Title: Geriatric horses (>20 yrs): Do they respond immunologically different to anthelmintic treatment when compared to younger adult horses (5-15 yrs)? Zoetis LLC. 2013-2014.

A.A. Adams, PI. Title: Efficacy of a blended vegetable extract in combination with calcium butyrate or calcium butyrate alone to reduce stress and inflammation in geriatric horses. Cooperative research farms. 2013-2014.

A.A. Adams, PI. Title: Serological Testing of Equine Serum. BIVI. 2013.

A.A. Adams, PI. Title: The New Formulation of Purina®Equine Senior® Feed: To determine the effect of different levels of Nutritek, a Diamond V yeast fermentate additive on immune function in aged horses O'LAKES PURINA FEED LLC. 2013-2014.

A.A. Adams, PI Title: The effect of DHA supplementation on immune and metabolic parameters of the EMS horse. Alltech. 2014-2015.

A.A. Adams, PI & David Horohov, Co-PI, & Kristine Urschel, Co-PI. Title: Evaluating seasonal influences on hormone responses to a diagnostic test advocated for early diagnosis of Equine Cushing's disease. Morris Animal Foundation. 2013-2015.

Adams, AA, PI, Horohov DW, Co-PI. Do old horses (>20 yrs) have delayed and reduced CMI and humoral immune responses to vaccination when compared to adult horses (5-15 yrs)? Zoetis. 2013-2015.

Adams, AA, Sanz, M, Fernanda, C. Effects of yeast (Lesaffre) supplementation on immune function in foals during weaning. Lesaffre. 2013-2014.

Adams, AA, Siard, MH, Elzinga, S. Effect of curcumin supplementation on inflammation and endocrine function in geriatric horses. CRF. 2013-2014.

A.A. Adams, Co-PI & David Horohov, PI. Title: The New Formulation of Purina®Equine Senior® Feed: The effect of n-3 polyunsaturated fatty acids (DHA) and prebiotic (Yeast-"ImmuSure") supplementation on inflammatory cytokine production, oxidative status and immune responses to vaccination in old horses. O'LAKES PURINA FEED LLC. 2011-January 2012.

A.A. Adams, PI, & David Horohov, Co-PI. Title: Identifying the role of a "metabolic master switch" in Equine Metabolic Syndrome and its implications for targeted treatment. AQHA Foundation. 2011-2012.

OTHER PROJECTS (UNFUNDED RESEARCH EFFORTS)

Equine Metabolic syndrome (EMS) horses: Do EMS animals' serum resistin, insulin, leptin, and ferritin, concentrations correlate to each other for resting concentrations and how do they respond to a glycemic challenge? Also, might these values correspond to a marker of inflammation, such as TNF- α ? Might the microbiota of the EMS affected animal possibly be different than the known microbiota of the healthy animal?

Effects of Season on Immune Responses in Horses (Aged vs. Young).

Equine Respiratory Disease Biosurveillance in Broodmares, foals and weanlings.

Effects of transportation and relocation on immune function in horses.

Effects of PPID on basic immune function in horses.

What does Inflamm-aging mean for the geriatric horse?

TEACHING EXPERIENCE

Graduate and undergraduate Student Advising

- 1.) Major advisor, Melissa Siard (B.S.), PhD candidate, Fall 2012-present, In progress
- 2.) Major advisor, Sarah Elzinga (M.S.), PhD candidate, Fall 2013-present, In progress
- 3.) Comm. Advisor, Caroline Loos, P, PhD candidate, Fall 2013-present, In progress
- 4.) Co-Advisor Ashton Miller, PhD candidate, Spring 2015-present, In progress
- 5.) Co-Advisor, M.S. Committee, Breanna Gaubatz, graduated Spring 2013.
- 6.) Co-Advisor, M.S. Committee, Laurel Mastro, graduated Summer 2013.
- 7.) Advisor, Visiting Scientist, Dr. Bin Gong, China, 2011-2012.
- 8.) Mentored Several Undergraduate students including Equine Science undergraduate students, Applied Biotechnology undergraduate students, Georgetown Howard Hughes Fellow undergraduates, Asbury undergraduate students

University of Kentucky

- University of Kentucky Lectures Taught: Adams, AA, EQM 351 Equine Health and Disease-January 6, 2015, "Immunology 101"Adams, AA, VS 597 aka Gen300-005/VS791-003-Equine Infectious Diseases in the Genomics Era-January 29, 2015, "Overview of Immunology".
- Lincoln Memorial University Lectures Taught: Adams, AA, CVM 722 Veterinary Immunology and Cellular Pathobiology-April 21, 2015 "Cytokines"; Adams, AA, CVM 722 Veterinary Immunology and Cellular Pathobiology-April 24, 2015 "Immunoassays".
- Asbury University Lectures Taught: Adams, AA, BIO 399 Introduction to Biological Research-March 24, 2015 "Overview of Equine Immunological Studies"
- Guest lecturer at University of Kentucky for Equine Science course, Equine Health and Disease, Fall 2012
- National Horse Show, Lexington, KY, Educational program lecturer, Fall 2011
- Guest lecturer at University of Kentucky for Equine Science course, Equine Health and Disease, Fall 2011
- Guest lecturer at University of Kentucky for Pre-Vet Science course, Equine Health and Disease, Fall 2011
- Chellgren Scholar 2011 Mentor, student presented at UK undergrad showcase
- Aberysworth MSc student Mentor 2011
- Equine Science Intern 2011 Mentor
- Asbury Biology Intern 2011 Mentor
- Mentored 2 Agriculture Biotech Students research projects, May 2010-present

- Train technicians, visiting scientists, graduate and undergraduate students laboratory techniques, 2005-present
- Guest lecturer at University of Kentucky for Equine Science course, Equine Health and Disease, Fall 2010,
- Guest lecturer at Asbury University for Introduction to Scientific Research, Spring 2010
- Guest lecturer at University of Kentucky for Equine Science course, Equine Health and Disease, Fall 2009
- Guest lecturer at University of Kentucky for an Animal Science course, Equine Management, Fall 2007
- Examiner at University of Kentucky for an for Animal Science Lab Practical, Equine Management, Fall 2007
- Tutor for Immunobiology undergraduate course, University of Kentucky, Fall 2007
- Fayette County Math, Science and Technology Program mentor, Summer-Spring 2006

EDITORSHIP, REVIEW PANELS, REVIEWER SERVICE

- Reviewer for *The Veterinary Journal*
- Reviewer for *Journal of Animal Science*
- Reviewer for *An International Journal of Animal Bioscience*
- Reviewer for *Comparative Exercise Physiology*
- Reviewer for *Journal of Equine Veterinary Science*
- April 26, 2012-Poster Judge for MS and PHD-UK Animal and Food Science Competition
- July 30, 2012-Reviewer (Amanda Adams) for NCState Multidisciplinary Research Grant Program

FELLOWSHIPS and AWARDS

2008-2011 Paul Mellon Post-Doctoral Scholarship

2007 1st Place Oral Presentation Award, American Association of Veterinary Immunologist

2006-2007 Geoffrey C. Hughes Fellowship

2007 University of Kentucky Travel Grant Award to attend the 8th International Veterinary Immunology Symposium, Ouro Preto, Brazil

2006 University of Kentucky Travel Grant Award to attend the 87th Conference of Research Workers in Animal Disease, Chicago, Illinois

2006 Fayette County Math & Science & Technology Mentor Award

2005 University of Kentucky Travel Grant Award to attend the 86th Conference of Research Workers in Animal Disease, St. Louis, Missouri

2003 Cum Laude Honors, Stephens College

1999-2003 Stephens College Presidential Scholarship Award

1999-2003 Stephens College Leadership Scholarship Award

2002 Alumnae Honor Scholarship Award, Stephens College

2002 Mortar Board Scholarship Award, Stephens College

2001 Trustee Scholarship Award, Stephens College

PROFESSIONAL MEMBERSHIPS

American Association of Immunologists

American Association of Veterinary Immunologists

American Quarter Horse Association

Conference of Research Workers in Animal Disease

Gamma Sigma Delta

REFERRED PUBLICATIONS

Adams, AA, Betancourt, A, Barker, VD, Siard, MH, Elzinga, S, Amodie, DM, Nielsen, MK. Comparison of the immunological response to anthelmintic treatment in old versus middle-aged adult horses. *JEVS* 35 (2015) 873-881.

Mastro LM, **Adams AA**, Urschel KL. Pituitary pars intermedia dysfunction does not necessarily impair insulin sensitivity in old horses. *Domest Anim Endocrinol*. 2014 Aug 1;50C:14-25.

Mastro LM, **Adams AA**, Urschel KL. Whole-body phenylalanine kinetics and skeletal muscle protein signaling in horses with pituitary pars intermedia dysfunction. *Am J Vet Res*. 2014 Jul;75(7):658-67.

Wagner AL, Urschel KL, Betancourt A, **Adams AA**, Horohov DW. Effects of advanced age on whole-body protein synthesis and skeletal muscle mechanistic target of rapamycin signaling in horses. *Am J Vet Res*. 2013 Nov;74(11):1433-42.

Brummer M, Hayes S, **Adams AA**, Horohov DW, Dawson KA, Lawrence LM. The effect of selenium supplementation on vaccination response and immune function in adult horses. *J Anim Sci*. 2013 Aug;91(8):3702-15. Epub 2013 May 8.

Adams, A.A. Understanding the Differences between EMS and PPID. *Bluegrass Equine Digest*. June 2013.

Adams AA, Horohov DW. The effect of an immunomodulator (parapoxvirus ovis) on cell-mediated immunity (CMI) in abruptly weaned foals. *Vet Immunol Immunopathol*. 2013 May 15;153(1-2):118-22. Epub 2012 Dec 13.

Sun L, Gong Z, Oberst EJ, Betancourt A, **Adams AA**, Horohov DW. The promoter region of interferon-gamma is hypermethylated in neonatal foals and its demethylation is associated with increased gene expression. *Dev Comp Immunol*. 2013 Mar;39(3):273-8. Epub 2012 Oct 11.

Ault A, Zajac AM, Kong WP, Gorres JP, Royals M, Wei CJ, Bao S, Yang ZY, Reedy SE, Sturgill TL, Page AE, Donofrio-Newman J, **Adams AA**, Balasuriya UB, Horohov DW, Chambers TM, Nabel GJ, Rao SS. Immunogenicity and clinical protection against equine influenza by DNA vaccination of ponies. *Vaccine*. 2012 Jun 6;30(26):3965-74.

Adams, AA, A. Betancourt, M. Brummer, L. Sun, P. Lawless and D.W. Horohov. *In Vitro* and *In Vivo* Immunomodulatory Effects of Resveratrol on Immune Function in Aged Horses. Submitted to *Mechanisms of Ageing and Development*.

Adams, A. *Equine Disease Quarterly*. 2012 April, 21 (2). The 'Older' Horse: An Immunological Perspective.

Liu C, Betancourt A, Cohen DA, **Adams AA**, Sun L, Horohov DW. Granzyme B-mRNA expression by equine lymphokine activated killer (LAK) cells is associated with the induction of apoptosis in target cells. *Vet Immunol Immunopathol*. 2011 Sep 15;143(1-2):108-15.

Sun L, **Adams AA**, Page AE, Betancourt A, Horohov DW. The effect of environment on interferon-gamma production in neonatal foals. *Vet Immunol Immunopathol*. 2011 Sep 15;143(1-2):170-5..

Page AE, Loynachan AT, Bryant U, Stills HF Jr, **Adams AA**, Gebhart CJ, Pusterla N, Horohov DW. Characterization of the interferon gamma response to *Lawsonia intracellularis* using an equine proliferative enteropathy challenge (EPE) model. *Vet Immunol Immunopathol*. 2011 Sep 15;143(1-2):55-65.

Horohov, DW, **Adams, AA**, Chambers, TM. Immunosenescence of the equine immune system. *Journal of Comparative Pathology*. 2010 Jan;142 Suppl 1:S78-84. [Epub 2009 Nov 7].

Lehnhard, R.A., **A.A. Adams**, A. Betancourt, D.W. Horohov, N.R. Liburt, J.M. Streltsova, W.C. Franke, K.H. McKeever. Phenylbutazone blocks the cytokine response following a high intensity incremental exercise challenge in horses. *Equine Vet J*. 2010 Nov;42 Suppl 38:280-8.

Liburt, N, **Adams AA**, Betancourt, A, Horohov, DW and McKeever, K. Exercised-Induced increases in inflammatory cytokines in muscle and blood of horses. *Equine Veterinary Journal*. Recently accepted for publication, 2010 April.

Adams, AA, Sturgill, T, Chambers, T, Horohov, DW, Siger, L, and Minke, JM. Comparison of humoral and cell-mediated immune responses of young and old horses following influenza recombinant canarypox virus vaccination and challenge Adams AA, Sturgill TL, Breathnach CC, Chambers TM, Siger L, Minke JM, Horohov DW. *Vet Immunol Immunopathol*. 2011 Feb 15;139(2-4):128-40.

Adams, AA, Katepalli, M, Kohler, K, Reedy, S, Stilz, JP, Vick, MM, Fitzgerald, BP and Horohov, DW. Effect of body condition, body weight and adiposity on inflammatory cytokine responses in old horses. Manuscript accepted October 31, 2008 [Epub ahead of print] to *Veterinary Immunology and Immunopathology*.

Adams AA, Breathnach CC, Katepalli M, Kohler K, Horohov DW. Advanced age in horses affects divisional history of T cells and inflammatory cytokine production. *Mechanisms of Ageing and Development*. 2008 Nov; 129 (11): 656-64. [Epub Sept 2008].

Katepalli M, **Adams AA**, Lear TL, Horohov DW. The effect of age and telomere length on immune function in the horse. *Developmental and comparative immunology*. 2008; 32 (12): 1409-15. [Epub 2008 July 9].

Vick MM, **Adams AA**, Murphy BA, Sessions DR, Horohov DW, Cook RF, Shelton BJ, Fitzgerald, BP. Relationships among inflammatory cytokines, obesity, and insulin sensitivity in the horse. *Journal of Animal Science*. 2007 May; 85 (5): 1144-55.

Breathnach CC, Sturgill-Wright T, Stiltner JL, **Adams AA**, Lunn DP, Horohov DW. Foals are interferon gamma-deficient at birth. *Veterinary Immunology and Immunopathology*. 2006 August 15; 112 (3-4): 199-209.

EXTENSION PUBLICATIONS

Adams, A.A. Bluegrass Equine Digest. 2014, October. Preparing your old horse for winter.

Adams, A.A. The Horse. 6-30-15, Vaccines, Dewormers, and Nutrition for Senior Horses.

Adams, A.A. The Horse. 6-15-15, Does Equine PPID affect Immune Responses to Vaccination.

Adams, A. Equine Disease Quarterly. 2013, October, 22 (4). The Importance of Nutrition in Enhancing Immunity in the Aging Horse.

Adams, A.A. Understanding the Differences between EMS and PPID. Bluegrass Equine Digest. June 2013.

Adams, A. Equine Disease Quarterly. 2012 April, 21 (2). The 'Older' Horse: An Immunological Perspective.

ABSTRACTS AND PRESENTATIONS

Siard, M.H., A. Betancourt, P.A. Harris, A.D. Moffett, K.E. McMurry, S.E. Reedy, and **A.A.**

Adams. 2015. Comparison of inflammation, nutritional status, muscle mass, pituitary function, and age in geriatric horses. J. Equine Vet. Sci. 35: 5, 402. ESS, St Pete, FL, May 2015.

M.H. Siard, A.L. Wagner, B. Médina, I.D. Girard, **A.A. Adams.** Effects of the novel feed additive Phytozen on immune and endocrine function in senior horses. Journal of Equine Veterinary Science, Volume 35, Issue 5, 414. Equine Science Society, St Pete, FL, May 2015.

A.A. Adams, K.R. Vineyard, M.E. Gordon, S. Reedy, M.H. Siard, D.W. Horohov. The effect of n-3 polyunsaturated fatty acids (DHA) and prebiotic supplementation on inflammatory cytokine production and immune responses to vaccination in old horses Journal of Equine Veterinary Science, Volume 35, Issue 5, 407 – 408. ESS, St Pete, FL, May 2015.

Characterization of lipid and inflammatory profiles in horses with equine metabolic syndrome S. E. Elzinga, P. L. Wood, **A. A. Adams.** Equine Science Society, St Pete, FL, May 2015.

Britt Conklin, Glenn Blodgett, **Amanda Adams,** Steven Grubbs, and George Milliken, The ELISA WNV IgG Antibody Response in Foals Following Vaccination with Vetera[®] VEWT+WNV (With and Without Maternal Antibody), ACVIM, 2015

Steve T. Grubbs, Stephanie Reedy, Melissa H. Siard, Sarah Elzinga, Thomas M. Chambers and **Amanda A. Adams.** Characterization of influenza-specific cell-mediated and humoral immune responses to a commercially available combination vaccine in influenza naïve ponies. ISIVR, 2015

Adams, AA, Oral Presentation, Proceedings, "Physiology of Aging-Focus on the Horse", Purina Vet Conference, St. Louis, MO, October, 2014

Adams, AA, Oral Presentation, Abstract, "Managing for Gut Health & Efficiency in horses with the use of yeast Lesaffre conference", Lesaffre's Animal Health and Productivity Forum, Monterey, CA, October, 2014

Siard, MH, Betancourt, A, PA Harris, AD Moffett, KE McMurry, SE Reedy, DW Horohov, **AA Adams,** Oral Presentation, Abstract, "Comparison of inflammation, nutritional status, muscle mass, pituitary function and age in geriatric horses", 2nd Dorothy Havemeyer Geriatric Workshop, Middlesburg, VA, Nov, 2014

Adams' AA*, J. L. Brogie, L. Costa, D.W. Horohov, D. McFarlane & M.R. Paradis, Oral Presentation, Abstract, "Interleukin-6: A predictor of metabolic health status in the geriatric horses? 2nd Dorothy Havemeyer Geriatric Workshop, Middlesburg, VA, Nov, 2014

AA Adams*, MH Siard, SE Reedy, J.P. Little, S Grubbs, M.P. Little. Oral Presentation, Abstract, "Does Equine Pituitary Pars Intermedia Dysfunction (PPID) affect immune responses to vaccination?" 2nd Dorothy Havemeyer Geriatric Workshop, Middlesburg, VA, Nov, 2014

AA Adams*, MH Siard, SE Reedy, J.P. Little, S Grubbs, M.P. Little. Oral Presentation, Abstract, "Does Equine Pituitary Pars Intermedia Dysfunction (PPID) affect immune responses to vaccination?" American Association of Equine Practitioners, Salt Lake City, UT, Dec, 2014

Adams, AA*, Oral Presentation, Abstract, "Managing for Gut Health and Efficiency: Focus on the Immune System", Mid-Atlantic Nutrition Conference (MANC), Baltimore, Maryland, 03/24/14

Adams, A. A., M.H. Siard, S.E. Reedy, C. Stewart, A. Betancourt, M.G. Sanz and D.W. Horohov. Identifying the role of a "caloric restriction mimetic", resveratrol, in Equine Metabolic Syndrome and its implications for targeted therapy. Equine Science Society Symposium, Mescalero, New Mexico, 2013.

M.H. Siard, K.E. McMurry, D.W. Horohov, and **A.A. Adams**. Effects of polyphenolic bioactive compounds (pterostilbene, resveratrol, curcuminoids, quercetin, and hydroxypterostilbene) on pro-inflammatory cytokine production *in vitro*. Equine Science Society Symposium, Mescalero, New Mexico, 2013.

Adams, A. A., M.H. Siard, K. L. Urschel and D.W. Horohov. A novel diagnostic tool for horses with pituitary pars intermedia dysfunction (PPID). Dec 2012 93rd Conference of Research Workers in Animal Disease, Chicago, Illinois.

Adams, A. A., M.H. Siard, K. McMurry, and D.W. Horohov. Comparison of nutritional compounds (pterostilbene, resveratrol, curcuminoids, quercetin, and hydroxypterostilbene) to NSAIDs on equine cytokine production *in vitro*". Dec 2012 93rd Conference of Research Workers in Animal Disease, Chicago, Illinois.

Adams, A. A. Equine Metabolic Syndrome (EMS): Challenges and Advances. Kentucky Equine Research Symposium, May 2012.

Adams, A. A. Getting the right start - The overlooked art of nutritional influences on weaning stress "The importance of the immune system". 27th Alltech International Feed Industry Symposium, Nicholasville, Kentucky, 2011.

A. A. Adams, A. Simpson & D.W. Horohov. The effect of age on telomerase activity and reactive oxygen species (ROS) production in plasma and peripheral blood mononuclear cells of horses. 92nd Conference of Research Workers in Animal Disease, Chicago, Illinois, 2011.

The effect of flunixin meglumine on the equine immune response to vaccination. W.M. Zoll*, A. E. Page, J.T.N. Dunham, A. Betancourt, S. Reedy, T.M. Chambers, **A. A. Adams**, & D.W. Horohov. 92nd Conference of Research Workers in Animal Disease, Chicago, Illinois, 2011.

Comparison of the ability of two different adjuvants to stimulate antigen presenting cells function *in vivo*. Chong Liu*, Jordon Dunham, **A.A. Adams**, & David W. Horohov. 92nd Conference of Research Workers in Animal Disease, Chicago, Illinois, 2011.

Wagner, A.L. Ennis, R.B., **Adams, A.A.**, Horohov, D.W. and Urschel, K.L.. Non-steroidal anti-inflammatory drug (NSAID) administration to mature and old horses influences the activation of translation initiation factors. Abstract, Experimental Biology Conference, Washington, DC, 2011.

Adams, A.A., Lean, M.S., Reedy, S.E. Chambers, T.M. and D.W. Horohov. Comparison of immune responses in aged horses given commercially available live or inactivated equine influenza (EI) vaccines. Oral Presentation, the 91st Conference of Research Workers in Animal Disease, Chicago, Illinois, 2010.

Adams, A.A., Lean, M.S., Reedy, S.E. Chambers, T.M. and D.W. Horohov. Comparison of immune responses in aged horses given commercially available live or inactivated equine influenza (EI) vaccines. Poster Presentation, 1st International Workshop on the Geriatric Horse-Havemeyer Foundation, Boston, Massachusetts, 2010.

Adams, AA, Betancourt, A, Brummer, M, Sun, L, Lawless, P and Horohov, DW. *In Vitro* and *In Vivo* Immunomodulatory Effects of Resveratrol on Immune Function in Aged Horses. Poster presentation. 1st International Workshop on the Geriatric Horse-Havemeyer Foundation, Boston, Massachusetts, 2010.

Adams, AA, Sturgill, TL, Breathnach, CC, Chambers, TM, Horohov, DW, Siger, L and Minke, JM. Comparison of humoral and cell-mediated immune responses of young and old horses following influenza recombinant canarypox virus vaccination and challenge. Oral presentation, 89th International Veterinary Vaccines and Diagnostic Conference, Madison, Wisconsin, 2009

A.A. Adams and D.W. Horohov. Effect of weaning on interferon-gamma (IFN-g) production in the foal. Poster presentation during the 90th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2009.

Adams, AA, Betancourt, A, Brummer, M, Sun, L, Lawless, P and Horohov, DW. *In Vitro* and *In Vivo* Immunomodulatory Effects of Resveratrol on Immune Function in Aged Horses. Poster presentation during the 90th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2009.

Sun, L, **Adams, AA**, Oberst, EJ, Ramos, DM and Horohov, DW. The effect of environment on interferon-gamma (IFN-g)) production in neonatal foals. Abstract: 90th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2009.

Liu, C, Cohen, DA, **Adams, AA** and Horohov, DW. Establishment of a two-color flow cytometry assay for determination of lymphokine activated killer (LAK) activity in horses. Abstract: 90th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2009.

Montgomery, JB, Wichtel, JJ, Wichtel, MG, McNiven, MA, McClure, JT, Markham, F, **Adams, AA** and Horohov, DW. The effect of selenium source on measures of selenium status of mares and selenium status and immune function of their foals. Abstract: 90th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2009.

Adams, AA, Guitierrez, CV, Brown, SE, & Horohov, DW. Evaluation of virus-specific cell-mediated immune responses of foals and yearlings to a modified live *Flavivirus*/West Nile virus (WN-FV) chimeric vaccination. Poster presentation during the 89th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2008.

Adams, AA, Katepalli, M, Kohler, K, Reedy, S, Stilz, JP, Vick, MM, Fitzgerald, BP and Horohov, DW. Effect of body condition score, body weight and adiposity on inflammatory responses in old horses. Oral presentation during 2nd International Workshop on the Chronically Infertile Mare, Havemeyer Foundation, Hilton Head, South Carolina, 2008.

Adams, AA, Breathnach, CC, Sturgill, T, Chambers, T and Horohov, DW. Characterization of the immunological and physiological response of aged horses to equine influenza infection. Oral presentation during the 88th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2007. Won 1st Place Award for this Oral presentation, AAVI.

Adams, AA, Katepalli, M, Kohler, K, Reedy, S, Stilz, JP, Vick, MM, Fitzgerald, BP and Horohov, DW. The contribution of body condition score and percent body fat to the inflammatory response in aged horses. Oral presentation during 8th International Veterinary Immunology Symposium, Ouro Preto, Brazil, 2007.

Adams, AA, Breathnach, CC, Sturgill, T, Chambers, T and Horohov, DW. Characterization of the immunological and physiological response of aged horses to equine influenza infection. Poster presentation during the 8th International Veterinary Immunology Symposium, Ouro Preto, Brazil, 2007.

Adams, AA, Katepalli, M, Kohler, K, Reedy, S, Stilz, JP, Vick, MM, Fitzgerald, BP and Horohov, DW. The relationship of body condition score and body fat to the inflammatory response in aged horses. Oral presentation during the 87th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2006.

Adams, AA, and Horohov, DW. Potential mechanisms for Immunosenescence and inflammaging in the aged horse. Oral presentation during the 86th Conference of Research Workers in Animal Disease, St. Louis, Missouri, 2005.

Adams, AA, Fermaglish D, and Horohov, DW. Further Characterization of the Immunological Response of Aged Horses to In Vitro and In Vivo Stimulation. Poster presentation during the 7th International Veterinary Immunology Symposium, Quebec City, Canada, 2004.

PROFESSIONAL MEETINGS ATTENDED

AAEP, Las Vegas, NV, December 2015; WVMA, Madison, Wisconsin, October 2015; Equine Science Society, St Pete, FL, May 2015; Lesaffre's Animal Health and Productivity Forum, Monterey, CA, October, 2014

2nd Dorothy Havemeyer Geriatric Workshop, Middlesburg, VA, Nov, 2014; American Association of Equine Practitioners, Salt Lake City, UT, Dec, 2014

Lesaffre's Animal Health and Productivity Forum, Monterey, CA, October, 2014

2nd Dorothy Havemeyer Geriatric Workshop, Middlesburg, VA, Nov, 2014

American Association of Equine Practitioners, Salt Lake City, UT, Dec, 2014

Equine Science Society Symposium, Mescalero, New Mexico, 2013

Equine Science Society Symposium, Mescalero, New Mexico, 2013

93rd Conference of Research Workers in Animal Disease, Chicago, Illinois, 2012

Kentucky Equine Research Symposium, May 2012

92nd Conference of Research Workers in Animal Disease, Chicago, Illinois, 2012
27th Alltech International Feed Industry Symposium, Nicholasville, Kentucky, 2011
91st Conference of Research Workers in Animal Disease, Chicago, Illinois, 2010
1st International Workshop on the Geriatric Horse-Havemeyer Foundation, Boston, Massachusetts, October 2010
26th Alltech International Feed Industry Symposium, Nicholasville, Kentucky, 2010
89th International Veterinary Vaccines and Diagnostic Conference, Madison, Wisconsin, 2009
90th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2009
89th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2008
2nd International Workshop on the Chronically Infertile Mare-Havemeyer Foundation, Hilton Head, South Carolina, 2008
88th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2007
8th International Veterinary Immunology Symposium, Ouro Preto, Brazil, 2007
23rd Alltech International Feed Industry Symposium, Nicholasville, Kentucky, 2007
87th Conference of Research Workers in Animal Disease, Chicago, Illinois, 2006
86th Conference of Research Workers in Animal Disease, St. Louis, Missouri, 2005
AAI Introductory Course in Immunology, University of Pennsylvania, 2004
7th International Veterinary Immunology Symposium, Quebec City, Canada, 2004

INVITED SEMINAR SPEAKER

Adams, AA, “Overview of the Immune System”, “Overview of Equine Vaccines”, “Young Horse Immunology”, “Effect of Weaning Stress on Immune function”, “Geriatric Horse Immunology”, “Understanding the differences between EMS and PPID”, 100th WVMA Meeting, Wisconsin, October 2015

Adams, AA, “Overview of the Immune System and Collaborative Studies”, BIVI National Sales Meeting, Atlanta, GA, Feb 2015.

Adams, AA*, Oral Presentation, “Managing for Animal Health: Focus on the Immune System”, Purina Mills, St. Louis, MO, 06/06/14

Adams, AA*, Oral Presentation, “Managing for Animal Health: Focus on the Immune System”, Purina Mills, St. Louis, MO, 06/06/14

Siard, MH*, Reedy, SE, McMurry, K, and **Adams, AA**, Oral Presentation, “Comparison of Inflammatory and Endocrine Measures in Geriatric Horses”, American College of Veterinary Internal Medicine, Nashville, TN, 06/06/14

Sarah, E* & **Adams, AA**, Oral presentation, “Equine Metabolic Syndrome”, Buffalo Trace Veterinary Medical Association, Morehead, KY, 05/31/14

Adams, AA*, Oral Presentation, “Equine Metabolic Syndrome vs. Equine Cushing’s Disease”, Asbury University, Wilmore, KY 04/23/14

Adams, AA*, Oral Presentation, “Overview of the Gluck Equine Research Center”, Asbury University, Wilmore, KY 03/3/14

Adams, A.A. Resveratrol: A Sirtuin-1 Activator that promotes healthy aging in animals and humans. Presented at Academy VMA, Nashville, TN, June 2013.

Adams, A.A. Resveratrol: A Sirtuin-1 Activator that promotes healthy aging in animals and humans. Presented at Southeast KY VMA, Corbin, Kentucky. April 2013.

Adams, A.A. Overview of the Gluck Equine Research Center, Presented at the Fort Harrod Back Country Horsemen Meeting, Harrodsburg, Kentucky. April 2013.

Adams, A.A. The Geriatric Horse: Define and Management. Presented at the Kentucky Equine Networking Association meeting, Lexington, Kentucky, May 2013.

Adams, A.A. The Geriatric Horse: Define and Management. Presented at the Kentucky Equine Networking Association meeting, Lexington, Kentucky, May 2013.

Adams, A.A. Obesity in Horses: What’s wrong with being Fat? Presented at the Kentucky Equine Networking Association meeting, Lexington, Kentucky, March 2013.

Adams, A.A. Novel therapies for Equine Metabolic Syndrome: Do they work? Presented at the 3rd Breeders Short Course, Lexington, Kentucky 2012.

Adams, A.A. Vaccination strategies and immunity in young horses. Presented at the 2nd Breeders Short Course, Lexington, Kentucky 2011.

Adams, AA. Getting the right start - The overlooked art of nutritional influences on weaning stress "The importance of the immune system". Presented at the 27th Alltech International Feed Industry Symposium, Nicholasville, Kentucky, 2011.

Adams, AA. From Foals to Geriatrics-Immunological Response and Age. Presented at the 26th Alltech International Feed Industry Symposium, Nicholasville, Kentucky, 2010.

Adams AA. Characterization of the immunological and physiological response of aged horses to equine influenza infection. The Gluck Equine Research Foundation Seminar presented April 7, 2008 at The Maxwell H. Gluck Equine Research Center auditorium.

Adams AA. Immunosenescence and Inflamm-aging in the horse. PhD Defense Seminar presented June 27, 2008 at The Maxwell H. Gluck Equine Research Center auditorium.

Adams AA. The contribution of body condition score and adiposity to Immunosenescence and Inflamm-aging in the aged horse. Seminar presented April 17, 2007 at The Maxwell H. Gluck Equine Research Center auditorium.

Adams AA. Characterization of the "Aged" Immune System of the Old Horse. Seminar presented November 15, 2005 at The Maxwell H. Gluck Equine Research Center auditorium.

OUTREACH AND SERVICE

State 4H Horse Contest Judge, June 2015

Eastern 4H Horse Nationals Contest Judge, November 2015

UK participant in the Asbury Draft Horse Day Educational series, 2014

UK participant at the University of Kentucky Equine Programs Field Day, June 2013

UK participant in the Asbury Draft Horse Day Educational series, 2013

UK participant at the University of Kentucky Equine Programs Field Day, June 2013

UK participant in the Asbury Draft Horse Day Educational series, 2013

COMMITTEES SERVED

Gluck Strategic Advisory Planning Committee 2015-present

Breeders Short Course/UK Showcase Planning Committee 2013-present

Clay Fellowship Committee 2013-2015

Gluck Equipment Committee 2015

Equine Science Nutrition Working Group 2014-2015

Distinguished Lecture Series Planning Committee, 2013-present

Distinguished Lecture Series Planning Committee, 2013, 2014

Breeders Short Course/UK Showcase Planning Committee, 2013

Breeders Short Course/UK Showcase Planning Committee

Gluck Center 25th Year Anniversary Planning Committee

ADDITIONAL ACTIVITIES

- UK Research Club Co-Advisor, 2011-2013
- Kentucky Horse Park, United States Equestrian Federation, Drug testing technician, Summer 2005-present
- Department of Veterinary Science Graduate Student Congress Representative, 2007
- 4-H Equine Eastern Nationals "Team Problem" Judge, Fall 2007, Fall 2008
- Keeneland 2 year old sales, Drug testing technician, Spring 2005 and 2006

- Alltech, Inc. 2010 FEI World Games Volunteer
- NUMC member

NARRATIVE STATEMENTS: To date, my research program in Equine Immunology involves four areas of study listed below, with the objectives of each area described in detail and highlighting funding to support such research.

(1) Characterizing the immune system of the geriatric horse, by identifying mechanisms responsible for immunosenescence, inflamm-aging and altered immune responses to vaccination. The ultimate goal of my research program is to use the geriatric horse as a model system for human aging to further understand the process of inflamm-aging, ways to modulate inflamm-aging, and to identify strategies to improve the immune response to influenza vaccination in the elderly. In addition to this goal, we are improving the health and well-being of the aged horse, by identifying interventions, such as exercise and nutritional supplementation that have the potential to decrease chronic inflammation.

(2) To characterize the immune system of a unique subset of ‘aged’ horses that are Pituitary Pars Intermedia Dysfunction (PPID), a.k.a. Equine Cushing’s disease (ECD).

(3) To further understand the effect of adiposity on the inflammatory response of the horse, in particular the equine metabolic syndrome (EMS) horse. There is a growing need to understand mechanisms responsible, and pathways involved in equine metabolic syndrome. Thus, my goal is to identify potential treatments that target both the inflammatory and metabolic component of EMS.

(4) Lastly, my research involves investigating models of ‘stress’ in particular how the process of weaning, as a model of stress, impacts immune and metabolic functions.

The current objective of my geriatric horse research program is to **improve the health of the aged horse** by understanding what role nutritional intervention and exercise may have on age-related changes in immune function, in particular chronic inflammation or inflamm-aging. Dietary components of interest are omega fatty acid, docosahexaenoic acid (DHA) and probiotics (yeast). DHA has been shown in other aged species to decrease inflammation, improve responses to vaccination, and thus a potential to improve immune function of the aged horse. Thus, our research has involved a large, ongoing, funded study with Purina Animal Health to ask the above questions. Further, I have received funding from Cooperative Research Farms to determine the efficacy of a blended vegetable extract in combination with calcium butyrate or calcium butyrate alone to reduce stress and inflammation in geriatric horse. More recently, CRF has provided some funding to determine the effect of curcuma on the inflammatory response of aged horses. I have recently received a grant from the Waltham-Buckeye foundation to further investigate if there a relationship between the status of circulating vitamin and fatty acid levels to systemic inflammation and muscle mass in aged horses?

In addition to the ‘aged’ horse research, we have accumulated a unique subset of ‘aged’ horses that are characterized as being PPID or **Equine Cushing’s disease (ECD)**. My goal to further understand how this endocrine disease affects the immune system of these aged horses. In addition, my goals are to help improve the diagnostics and treatments for ECD. I currently have funding from Boehringer Ingelheim Vetmedica investigating: Do horses with Pituitary Pars Intermedia Dysfunction (PPID) respond as well to vaccination when compared to non-PPID, aged-matched horses? In addition, I have recently obtained funding from the Morris Animal Foundation: Evaluating seasonal influences on hormone responses to a diagnostic test advocated for early diagnosis of Equine Cushing’s disease. Most recently, I have received funding from Zoetis to determine the immune response to WNV vaccination in both non-PPID and PPID horses.

Lastly, I have received recent funding to understand how this inflamm-aging may affect the immune response to antihelmintic treatments in aged horses and moreover if aged horses shed more fecal eggs of strongyles.

Overall, my geriatric research program is growing in leaps and bounds with a large amount of interest from the horse industry due to the numbers of aged horses in the USA and worldwide. Veterinarians and horse owner's want to know how to best care for their older horse and we are providing that information to them by attending large Equine meetings (attended by both DVMS and horse owner's) and sharing data from these studies and by sharing our information via lay articles and peer-reviewed manuscripts.

The long-term goal of the 'aged' horse research is to develop **the horse as a model system for human aging** to further understand age-related changes in immune response, in particular mechanisms responsible for chronic inflammation or inflamm-aging and strategies to improve the immune response to influenza vaccination. We have characterized many aspects of aging immune system of the horse of which are key components that have been identified in the elderly, in particular, alterations in T-cell proliferation, reduction in telomere length, increased production of inflammatory cytokines (TNF- α and IFN- γ) and decreased response to influenza vaccination. My goal is to further characterize age-related changes in immune response of aged horses in order demonstrate that the geriatric horse is an excellent model for unraveling the many unknowns in human aging. While the precise mechanism responsible for inflamm-aging and decreased immune responses to influenza vaccination remains unknown, age-related changes that involve inflamm-aging and specific defects in cell-mediated immunity to the virus may be mechanisms responsible. Thus, I recently submitted a grant to the USDA/NIH Dual grant program benefiting both the animal and human, in order to unravel some of these questions: **Adams, AA**, PI, Chambers, TM, and Horohov DW. Influenza and the elderly: identifying immune correlates of protection for targeted vaccine development. USDA/NIH, Dual Purpose with Dual Benefit: Research in Biomedicine and Agriculture Using Agriculturally Important Domestic Animal Species (R01), PAR-13-204. \$1,740,838. 2014-2020.

There is a growing need, and it is my goal to **characterize mechanisms responsible for Equine Metabolic Syndrome (EMS) and to identify possible treatments for EMS**. Unfortunately, we have limited understanding of the pathophysiology of EMS due to its complexity involving both alterations in metabolism and inflammation. I am quite excited because I have just accepted a PhD candidate, Sarah Elzinga, to work on this area of research. We have ongoing studies to answer the following questions: Do EMS animals' serum resistin, insulin, leptin, and ferritin, concentrations correlate to each other for resting concentrations and how do they respond to a glycemic challenge? Also, might these values correspond to a marker of inflammation, such as TNF- α ? Might the microbiota of the EMS affected animal possibly be different than the known microbiota of the healthy animal? We are collaborating with Dr. Scott Weese in Canada and Dr. Paul Wood at LMU, Tenn. Further, there are currently no treatments for EMS horses beyond decreasing caloric intake and increasing exercise. Thus, I have obtained funding from Alltech to not only sponsor Sarah Elzinga's stipend and tuition but to determine the effect of DHA supplementation on immune and metabolic parameters of the EMS horse. We just submitted an AQHA grant, asking the question: Does Equine Metabolic syndrome affect immune responses to vaccination?

Both the **Geriatric and EMS horse** populations are significantly expanding and thus research funding for these types of horses are high priority areas. Moreover, these types horses could potentially be used for 'model' systems' to undertake 'aging', 'obesity' and 'dietary' studies applicable for human research. I plan to continue to my independent research program by pursuing the research goals above. I am currently the Major Advisor for two PhD graduate

students, Melissa Siard and Sarah Elzinga. Melissa's dissertation work involves characterizing the immune system of the geriatric horse. Sarah's dissertation work involves characterizing both immune and endocrine components of Equine Metabolic Syndrome.

Weaning of foals is a critical period of time during a horse's life. It is widely recognized, by both, scientific and local anecdotal evidence, that weaning is one of the most stressful events in the life of both companion and food animal species. The weaning process involves a number of stressful events including maternal separation, abrupt changes in the diet, social isolation, and environmental and management changes. Weanlings are of great value to the horse industry and yet like weaned pigs and cattle, they often face post-weaning challenges including diarrhea, decreased feed intake, weight loss, all of which are deleterious to health and function, often resulting in increased susceptibility of the animal to infections. While weaning stress has been well documented to negatively impact the immune system of pigs, cattle and horses, the molecular mechanisms by which weaning stress induces changes in the immune function remains unclear. I have recently published a peer-reviewed manuscript showing how 'weaning' stress affects immune function in foals. This has received quite a bit of attention from the industry. Thus, my goal is to further determine molecular mechanisms that regulate the immune system during the time of weaning stress. The **long term goal** of this research program is to develop improved, science-based recommendations of management strategies for weaning of horses, including vaccination guidelines and methods of weaning, which will minimize disease susceptibility and improve the welfare of these animals during the time of weaning. Most recently, I just received funding to understand if probiotics fed prior to weaning may improve immune function post weaning and at the same time improve feed digestibility.