

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel in the order listed on Form Page 2.
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NAME OF SPONSOR (CO-SPONSOR) David W. Horohov		POSITION TITLE Schlaikjer Chair in Equine Immunology & Professor	
eRA Commons User Name David.Horohov			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Pennsylvania State University, University Park,	BS	1978	Entomology
Purdue University, W. Lafayette, IN	MS	1981	Entomology
University of Tennessee, Knoxville, TN	Ph.D.	1985	Microbiology
Food and Drug Administration, Bethesda, MD	Post-Doc	1988	Cytokine Biology

A. Personnel Statement

My research program focuses on the immune response of horses to various infectious and non-infectious diseases. The emphasis of this work has been on the identification and characterization of equine cytokines and the role they play in protective and pathologic immune responses.

B. Positions and Honors

- 2014 Chair of Department of Veterinary Science and Director of Gluck Equine Research Center, University of Kentucky.
- 2012 Jes E. and Clementine Schlaikjer Chair & Professor, Gluck Equine Research Center, Department of Veterinary Science, University of Kentucky
- 2003 William Robert Mills Chair, Gluck Equine Research Center, Department of Veterinary Science, University of Kentucky
- 2002 Pfizer Award for Research Excellence, School of Veterinary Medicine, Louisiana State University
- 19/95 Professor of Veterinary Immunology, Department of Pathobiological Sciences, School of Veterinary Medicine, Louisiana State University
- 1997 Faculty Distinguished Scholar Award, School of Veterinary Medicine, Louisiana State University
- 1995 University Award for Excellence in Teaching, Louisiana State University
- 1992 Smith Kline Beecham Research Award, School of Veterinary Medicine
- 1991 Associate Professor of Veterinary Immunology, Department of Veterinary Microbiology and Parasitology, School of Veterinary Medicine, Louisiana State University
- 1988 Assistant Professor of Veterinary Immunology, Department of Veterinary Microbiology and Parasitology, School of Veterinary Medicine, Louisiana State University
- 1985 Staff Fellow. Division of Cytokine Biology, Food and Drug Administration, Bethesda, MD

C. Contribution to Science

My research program has focused over the past 25 years on the immune response of horses to various infectious and non-infectious diseases. The emphasis of this work has been on the identification and characterization of equine cytokines and the role they play in protective and pathologic immune responses. Towards that goal we have cloned, sequenced and developed real-time PCR assays for detecting immune related gene expression in equids.¹⁻⁷ One of the major research focuses of my laboratory is on the immune

response of young foals and its relationship to their unique susceptibility to *Rhodococcus equi*, an important cause of bronchopneumonia. Towards that end we have characterized the early regulation of interferon gamma expression in foals and developed a novel infectious challenge model for this disease that more closely replicates natural infections⁸⁻¹². We have also characterized the cell-mediated immune response to equine infectious anemia virus, demonstrating that the maturation of this response involves the shifting of T cell recognition from variable epitopes to more stable ones.¹³⁻¹⁶ I also have a continuing interest in the effect of ageing on the equine immune response.¹⁷⁻²²

1. Horohov DW, Dunham J, Liu C, et al. Characterization of the in situ immunological responses to vaccine adjuvants. *Veterinary immunology and immunopathology* 2015;164:24-9.
2. Betancourt A, Lyons ET, Horohov DW. Characterisation of the inflammatory cytokine response to anthelmintic treatment in ponies. *Equine veterinary journal* 2015;47:240-4.
3. Tadros EM, Frank N, Newkirk KM, Donnell RL, Horohov DW. Effects of a "two-hit" model of organ damage on the systemic inflammatory response and development of laminitis in horses. *Veterinary immunology and immunopathology* 2012;150:90-100.
4. Tompkins D, Hudgens E, Horohov D, Baldwin CL. Expressed gene sequences of the equine cytokines interleukin-17 and interleukin-23. *Veterinary immunology and immunopathology* 2010;133:309-13.
5. Horohov DW, Breathnach CC, Sturgill TL, et al. In vitro and in vivo modulation of the equine immune response by parapoxvirus ovis. *Equine veterinary journal* 2008;40:468-72.
6. Horohov DW. Equine T-cell cytokines. *Protection and pathology. The Veterinary clinics of North America Equine practice* 2000;16:1-14.
7. Swiderski CE, Klei TR, Horohov DW. Quantitative measurement of equine cytokine mRNA expression by polymerase chain reaction using target-specific standard curves. *Journal of immunological methods* 1999;222:155-69.
8. 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. *Developmental and comparative immunology* 2013;39:273-8.
9. Sanz M, Loynachan A, Sun L, Oliveira A, Breheny P, Horohov DW. The effect of bacterial dose and foal age at challenge on *Rhodococcus equi* infection. *Veterinary microbiology* 2013;167:623-31.
10. Sun L, Adams AA, Betancourt A, Stewart JC, Liu C, Horohov DW. The role of proliferation in the regulation of interferon gamma (IFN γ) expression in foals. *Developmental and comparative immunology* 2012;36:534-9.
11. Sun L, Adams AA, Page AE, Betancourt A, Horohov DW. The effect of environment on interferon-gamma production in neonatal foals. *Veterinary immunology and immunopathology* 2011;143:170-5.
12. 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;112:199-209.
13. Craig JK, Ezzelarab C, Cook SJ, et al. Protective efficacy of centralized and polyvalent envelope immunogens in an attenuated equine lentivirus vaccine. *PLoS pathogens* 2015;11:e1004610.
14. Liu C, Cook SJ, Craig JK, et al. Epitope shifting of gp90-specific cellular immune responses in EIAV-infected ponies. *Veterinary immunology and immunopathology* 2014;161:161-9.
15. Craig JK, Ezzelarab C, Cook SJ, et al. Envelope determinants of equine lentiviral vaccine protection. *PloS one* 2013;8:e66093.
16. Liu C, Cook FR, Cook SJ, et al. The determination of in vivo envelope-specific cell-mediated immune responses in equine infectious anemia virus-infected ponies. *Veterinary immunology and immunopathology* 2012;148:302-10.

17. Hansen S, Baptiste KE, Fjeldborg J, Horohov DW. A review of the equine age-related changes in the immune system: comparisons between human and equine aging, with focus on lung-specific immune-aging. *Ageing research reviews* 2015;20:11-23.
18. Hansen S, Baptiste KE, Fjeldborg J, Betancourt A, Horohov DW. A comparison of pro-inflammatory cytokine mRNA expression in equine bronchoalveolar lavage (BAL) and peripheral blood. *Veterinary immunology and immunopathology* 2014;158:238-43.
19. Hansen S, Sun L, Baptiste KE, Fjeldborg J, Horohov DW. Age-related changes in intracellular expression of IFN-gamma and TNF-alpha in equine lymphocytes measured in bronchoalveolar lavage and peripheral blood. *Developmental and comparative immunology* 2013;39:228-33.
20. Adams AA, Sturgill TL, Breathnach CC, et al. Humoral and cell-mediated immune responses of old horses following recombinant canarypox virus vaccination and subsequent challenge infection. *Veterinary immunology and immunopathology* 2011;139:128-40.
21. Adams AA, Katepalli MP, Kohler K, et al. Effect of body condition, body weight and adiposity on inflammatory cytokine responses in old horses. *Veterinary immunology and immunopathology* 2009;127:286-94.
22. Adams AA, Breathnach CC, Katepalli MP, Kohler K, Horohov DW. Advanced age in horses affects divisional history of T cells and inflammatory cytokine production. *Mechanisms of ageing and development* 2008;129:656-64.

Public URL for my bibliography is:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/david.horohov.1/bibliography/50911084/public/?sort=date&direction=ascending>.

D. Ongoing Research Support

2013-68004-20360

Balasuriya (PI)

01/01/13-12/31/17

USDA-NIFA

Identification of genetic factors responsible for establishment of equine arteritis virus carrier state in stallions. The goal of this project is to identify the host factors involved in EAV persistence, as well as tissue and cellular localization of the virus in the male reproductive tract.

Grayson Jockey Club Research Foundation Horohov (PI)

04/01/16 - 03/31/17

IgG(T) antibodies identify foals at risk for R.equi.

The goal of this project is to determine whether foal susceptibility to *Rhodococcus equi* is associated with a particular sub-isotype of IgG expression post-exposure.

Completed Research Support

Further characterization of the immunological response to Metastim®, Pfizer Animal Health, \$34,671, October 2010 – September 2012.

New formulation of Purina Equine Senior®, Land O Lakes Purina Feed LLC, \$100,720, April 2011 – March, 2013.

Do NSAIDS affect the immune response of horses to vaccination? Grayson Jockey Club Research Foundation, \$54,776, April 1, 2012 – March 30, 2013.

Principal Investigator/Program Director (Last, First, Middle):

Determining the role of maternal antibodies in infection and immunity to *Lawsonia intracellularis*, Morris Animal Foundation, \$53,529, January 2012 – February 2014.

The use of Excede metaphylactically to prevent post influenza respiratory infections. Zoetis, \$143,021. August 2013 – August 2015.

The effect of exercise on pro-inflammatory cytokine expression in the young racehorse and its impact on training-related injuries. KHRC, \$189,297, May 2013 – April 2015.

The interaction between anthelmintic treatment and vaccination. Grayson Jockey Club Research Foundation, \$60,466, April 2013 – March 2014. (M. Nielsen, PI)

Identifying the role of a “metabolic master switch” in Equine Metabolic Syndrome and its implications for targeted treatment. AQHA Foundation. 2011-2012. \$20,000.00 (A. Adams).