Gerard P. Andrews
Department of Veterinary Sciences, UW
Wyoming State Veterinary Laboratory
1174 Snowy Range Rd.
Laramie, WY, 82070

EDUCATION

Ph.D., Microbiology and Immunology
Uniformed Services University of the Health Sciences, 1993

M.S., Microbiology
University of New Hampshire, 1983

B.S., Biology
Pennsylvania State University, 1980

EMPLOYMENT:

Academic Scientist, Pathogenic Bacteriology, *CURRENT.*

Contract Senior Microbiologist (Clinical Research Management), Bacterial Select Agent Medical Countermeasures, 2003 to 2004.

Military Biomedical Scientist, Medical Service Corps, U.S. Army, 1983 to 2003.

POSITIONS HELD:

Associate Professor and Director, Microbiology Program, UW, July 2011 to date. Staff microbiologist in the Department of Veterinary Sciences with research focus on bacterial disease agents of domestic livestock and wildlife. Area of interest is the study of the molecular pathogenesis of plague, brucellosis, tularemia, pasteurellosis, mycoplasmosis, and other agents of chronic infection. Responsible for maintaining an active research program which includes the management of all resources supporting two BSL-2 laboratories and a four-lab, BSL-3 facility at WSVL. Develops, plans, and conducts collaborative research efforts with other staff scientists of the University and the State Veterinary Laboratory. Develops, and executes undergraduate lecture/lab courses in microbiology, as well as a first year medical school bacteriology lecture module. Develops advanced undergraduate/graduate courses supporting the University's microbiology program, and co-instructs student pathobiology seminar. Regularly mentors undergraduates and graduate students in the lab. Oversees the University's interdepartmental undergraduate microbiology program, to include development and implementation of the program's academic and assessment plans, annual budget, logistical management, and year-round advising activities. Advises 25-35 students in the program.

Assistant Professor, Department of Veterinary Sciences, University of Wyoming, August 2004 to June 2011. Staff microbiologist with research focus on bacterial select agents. Area of interest is the study of the molecular pathogenesis of plague, brucellosis, tularemia, anthrax, and other zoonotic bacterial diseases. Responsible for maintaining an active research program which includes the management of all resources supporting two BSL-2 laboratories and a small BSL-3 unit. Develops, plans, and conducts collaborative research efforts with other staff scientists of the University and the State Veterinary Laboratory. Plans, develops, and executes undergraduate lecture and lab courses in microbiology (pathogenic bacteriology), as well as a first year medical school bacteriology lecture module. Develops advanced undergraduate/graduate courses supporting the University's microbiology program. Provides additional services as required.

Applied Research Consultant and Task Area Director, Vaccine Product Development, Bacteriology Division, USAMRIID, February 2003 to July 2004. On-site contract senior principal investigator (research microbiologist). Designed and conducted novel applied research in the development of vaccines against select agents from one to four task areas (plague, anthrax, glanders, and tularemia). Directed and supervised basic and applied research projects of junior principal investigators within the Division. Provided technical guidance, direction, and oversight as team leader for one to three integrated product development teams and/or task area-specific working groups within the Division (consisting of 3 to 10 scientists per group). Responsible for management of logistical assets of each group. Functioned as an active member of multiple technical working groups within the Division, responsible for reviewing and critiquing research plans and progress reports throughout the research planning cycle. Contributed intellectual input as a member of one or more overarching scientific steering committees towards the formulation of strategic research plans and objectives. Co-developed broad-scoped and/or detailed solutions to satisfy stated strategic objectives. Provided both strategic technical and programmatic consultation to the Division Chief, as well as to elements of the Command as required.

Chief, Bacteriology Division, USAMRIID, March 2000 to January 2003. Managed and coordinated the medical countermeasures research operations of the Institute's bacterial vaccines and therapeutics program in support of the U.S. Army's biological warfare defense efforts. Task areas of responsibility include: anthrax, plague, glanders/meliodosis, brucellosis, and therapeutics. Provide oversight and guidance to 28 civilian and military scientists, and 26 technicians. Developed and managed the execution of an annual resource budget of over $12,000,000. Chaired and actively participated on multiple scientific steering committees, and grant proposal review panels within and outside the Institute. Led and directed the efforts of integrated product development teams. Developed, wrote, and implemented scientific strategic plans and supporting research plans within areas of expertise. Established and maintained collaborative efforts with other national and international organizations.

Chief, Department of Pathogenesis and Immunology, Bacteriology Division, USAMRIID, June 1999 to February 2000: Coordinated and managed the scientific research of four military and civilian principal investigators, and eight civilian and military technical staff in the development of countermeasures against the biological warfare threats, plague and glanders. Planned and executed an operational budget in excess of $3,000,000. Functioned as the tech-base project director for the transitioning of a novel plague vaccine candidate into advanced development. Chaired the plague scientific steering committee and developed the Institute's strategic research plan for this task area.

Chief, Microbiology Division, Department of Pathology and Area Laboratory Services, Landstuhl Regional Medical Center, June 1998 to May 1999: Functioned as senior microbiologist for the Department of Pathology, Landstuhl Regional Medical Center. Responsible for the direction and management of operations in seven laboratories with over 20 personnel, a $500,000 resource budget, and over $900,000 of equipment. Ensured all Divisional laboratories met CAP and JCAHO standards. Directed the U.S. Army European-wide HIV testing program. Provided technical consultation to health care providers and the LRMC Command for all clinical and reference microbiological and immunological lab services in the European Theater. Served as the European Regional Medical Command consultant for biological warfare threat agents. Conducted continuing medical education lectures on biowarfare and bioterrorism defense.

Chief, Immunology Branch, Department of Pathology and Area Laboratory Services, Landstuhl Regional Medical Center, July 1996- May 1998: Director of operations for 4 clinical reference laboratories, with more than 10 military and civilian employees. Managed U.S. Army European-wide HIV force testing. Directed reference serum sample processing and shipping for the state-side Department of Defense serum repository. Managed and directed U.S. Army-Europe patient testing for HIV, hepatitis, and immunological testing for the European Regional Medical Center. Directed viral marker screening operations in coordination with US Army-Europe Blood Donor Center, and in compliance with FDA standards. Ensured all the Division laboratories met College of American Pathologists (CAP) and Joint Commission on Accreditation of Health Care Organizations (JCAHO) standards. Advised health care providers on technical issues concerning tests and results interpretation.

Biological Warfare Defense Research Microbiologist, United States Army Medical Research Institute of Infectious Diseases, Aug. 1992- June 1996: Functioned as a principal investigator in the Genetics and Physiology Branch, Bacteriology Division, USAMRIID. Planned and conducted numerous research projects directly related to the development of a new vaccine against the biological warfare threat agent, *Yersinia pestis*. Directed, supervised, and trained both military and civilian laboratory technicians in procedures and experiments applicable to mission objectives. Collaborated with other investigators within the Division on projects related to mission-oriented goals.

Graduate Fellow (doctoral program), Uniformed Services University of the Health Sciences, Aug. 1987- June 1992: Conducted research on the molecular pathogenesis and characterization of novel plasmid-encoded virulence determinants of the enteric pathogen, *Shigella flexneri*, under the mentorship of Anthony Maurelli. Identified and characterized one of the first contact mediated, type-III protein secretion systems (TTSS) in a bacterial pathogen.

Infectious Disease Research Microbiologist, Walter Reed Army Institute of Research, Sept. 1983- Dec. 1986: Served as a principal investigator in the Department of Gastroenterology, WRAIR. Planned and conducted research on the characterization and expression of virulence determinants of enteric bacterial pathogens, and performed studies on the immune responses of the host to infection. Developed techniques and prepared purified bacterial proteins for testing as potential vaccine components against enteric infection. Worked under the direct supervision of the Department Chief, and collaborated with other physician members in the Department on microbiological projects. Supervised enlisted and civilian laboratory technicians.

SPECIAL ASSIGNMENTS

Reviewer, PLoS *ONE*, 2014

Reviewer**,** *Veterinary Immunology and Immunopathology*, 2013

Reviewer, *Veterinary Microbiology*, 2012

Adjunct Faculty**,** Biomedical Sciences Graduate Program, University of Wyoming, Oct., 2011 to date

Reviewer, *Microbiology and Immunology*, 2011 (two invitations)

Chairman**,** Institute Biosafety Committee (IBC), May, 2011 – April, 2012

Coordinator, WWAMI infectious disease course, Jan., 2011 to date

Graduate program coordinator, Department of Veterinary Sciences, 2010-2011

Reviewer, *Vector-Borne and Zoonotic Diseases*, 2010, 2011 (two invitations)

Reviewer, FEMS *Immunology and Medical Microbiology*, 2010

UW Laboratory Animal Management Committee member, 2010 to 2011

Reviewer, *PLoS Pathogens*, 2010

Adjunct Scientist, Lovelace Respiratory Research Institute, Albuquerque, NM, 2009 to date

UW Nucleic Acid Exploration Facility (NAEF) Advisory Committee, 2009 to 2010

Reviewer, Journal of Wildlife Diseases, 2009 (two invitations), 2010, 2011 (two invitations), 2013.

Institute Biosafety Committee (IBC) member, January 2009 to date.

Reviewer, *Vaccine*, 2008, 2009, 2010, 2011

Reviewer, *Molecular and Cellular Probes*, 2008

Ad hoc Reviewer, Textbook of Military Medicine, "Medical Aspects of Biological Warfare", 2008.

BSL-3 Scientific Director, Wyoming State Veterinary Laboratory, April, 2007 to May, 2011.

Affiliate Faculty, Dept. of Microbiology, University of Washington School of Medicine, 2005 to date.

Microbiology Program Steering Committee member, University of Wyoming, Jan. 2005 to date.

Chairman, NIH, NIAID Special Emphasis Review Panel, RFP: Tularemia Vaccine Development Team-Gaithersburg, MD, March, 2005

Working Group Member, Threat Assessment Workshop, National Biodefense Analysis and Countermeasures Center, Department of Homeland Security - Daufuskie Island, SC, Nov. 2003

Consultant, BSL-3 laboratory design, Ordway Research Institute, New York State Department of Health - Albany, NY, Sept. 2003

Session Chair, Applied Research, NATO Advanced Research Workshop on Preparedness Against Bioterrorism and re-Emerging Infectious Diseases - Warsaw, Poland, January 2003

Scientific Review Special Emphasis Panel Member for bacterial pathogenesis and biodefense research proposals (ZGR1 BM-2 90 S) - Bethesda, MD, 2002

Tech-base Product Development Team Leader for the USAMRIID Next-generation (Recombinant) Anthrax Vaccine Candidate, November 2000 to May 2004.

Tech-base Project Director and Team Leader for the USAMRIID Plague Vaccine Candidate, June 1999 to June 2001, and February 2003 to May 2004.

NIH Scientific Review Special Emphasis Panel member for bioterrorism defense Small Business Innovation Research (SBIR) proposals - Bethesda, MD, April, 2002.

Research Pre-proposal and Proposal Review Panel Member for the DARPA Unconventional Pathogens Program – Tyson's Corner, Virginia, June and Sept. 2000.

College of American Pathologists (CAP) Inspector:

Microbiology and Molecular Pathology - UCT International, London, England, Nov. 1998
Molecular Pathology and Toxicology - Kapp Laboratories, Mainz, Germany, June 1997
Molecular Pathology and Special Chemistry - SciCor, Geneva, Switzerland, Jan. 1997

TEACHING

Pathogenic Microbiology, PATB/MICR 2220, 4 credits (lecture and inquiry-based lab), 20 to 40 students; sophmores, juniors, seniors; 27 lectures, 14 labs. Jan., 2005 to date.

Medical Bacteriology, WWAMI Medical Education Program, 2 credit (equivalent) module, 12-20 first-year medical students; 16-18 lectures. Spring, 2005 to date.

Problems in Animal Diseases, PATB 4050. 2-4 credits (laboratory projects), 2 to 4 students per semester; juniors and seniors. Fall, 2005 to date.

Molecular Mechanisms of Bacterial Pathogenesis, PATB/MICR 4220/5220 (formerly, Topics in Pathobiology, 5120). 3 credits, 8-16 students; seniors and graduate students; 24 lectures.
Fall, 2006 to date.

Student Seminar (Infectious Diseases), PATB 4150, 1 credit, 6-10 students. Fall, 2010 to date.

PROFESSIONAL AWARDS, HONORS, and RECOGNITION

Outstanding Educator of the Year, College of Agriculture and Natural Resources, 2013

Granted tenure, 2011

Gamma Sigma Delta Agriculture Honor Society, 2009 to date.

UW Graduate Faculty, 2007 to date.

Nominated for John P. Ellbogen Meritorious Classroom Teaching Award**,** 2007.

"Top Prof", Cap and Gown Chapter of Mortar Board, University of Wyoming, 2005, '06, '08, '09.

Department of the Army, Surgeon General's "A" Proficiency Designator in Microbiology, 2002

Order of Military Medical Merit, 2001

SOCIETY MEMBERSHIPS:

National Science Teachers Association (NSTA), 2013 to date.

Wildlife Disease Association, 2011 to date.

National Association of Biology Teachers (NABT), 2009 to date.

Conference of Research Workers in Animal Diseases (CRWAD), 2007 to date.

American Society for Microbiology, 1983 to date.

SPECIAL CERTIFICATIONS/LICENSES:

CDC Select Agent Access Authorization, 2002 to date.

PUBLICATIONS

Journal Articles

1. Lowry, J.E., Leonhardt, J.A., Yao, C., Belden, E.L., and **G.P. Andrews.** 2014. Infection of

C57BL/6 mice by *Trypanosoma musculi*, modulates host immune responses during *Brucella abortus* co-colonization. J. of Wildlife Diseases. 50:11-20.

2. Lowry, J.E., Isaak, D.D., Leonhardt, J., Vernati, G., Fluegel, A.M., Pate, J., and **G. P. Andrews**. 2011. Vaccination with recombinant antigens reduces *Brucella abortus* strain-19 colonization in a mouse model for infection. PLoS *ONE.* March 11; 6(3): e17425.

3. Vernati, G., Edwards, W.H., Rocke, T.E., Little, S.F., and **G.P. Andrews**. 2011. Antigenic profiling of *Yersinia pestis* infection in the Wyoming Coyote (*Canis latrans*). J. of Wildlife Diseases. 47(1): 21-29.

4. Goodin, J.L., Powell, B.S., Enama, J.T., Raab, R.W., McKown, R.L, Coffman, G.L, and **G.P. Andrews**. 2010. Purification and characterization of a recombinant *Yersinia pestis* V-F1 "reversed" fusion protein for use as a new subunit vaccine against plague. Protein Expression and Purification. 76(1):136-44.

5. **Andrews**, **G.P.,** Vernati, G., Ulrich, R., Rocke, T.E., Edwards, W.H., and J.J. Adamovicz. 2010. Identification of in vivo-induced conserved sequences (IVICS) from *Yersinia pestis* during experimental plague infection in the rabbit. Vector-Borne and Zoonotic Diseases. 10(8):749-56.

6. Lowry, J.E., Goodridge, L.D., Vernati, G., Edwards, W.H., Fluegel, A.M., and **G. P. Andrews**. 2010. Identification of *Brucella abortus* genes in elk (*Cervus elaphus*) using in vivo-induced antigen technology reveals novel markers of infection. Veterinary Microbiology. 142:367-372. (published on-line, ahead of print, Oct., 2009)

7. Powell, B.S., Enama, J.T., Ribot, W.J., Webster, W., Little, S., Hoover, T., Adamovicz, J.J., and **G.P. Andrews**. 2007. Multiple asparagine deamidation of *Bacillus anthracis* protective antigen causes charge isoforms whose complexity correlates with reduced biological activity. Proteins: Structure, Function, Bioinformatics. 68:458-479.

8. Little, S.F., Ivins, B.E., Webster, W.M., Norris, S.L., and **G.P. Andrews**. 2007. Effect of aluminum hydroxide adjuvant and formaldehyde in the formulation of rPA anthrax vaccine. Vaccine.25:2771-2777.

9. Vitale, L., Blanset, D., Lowy, I., O'Neill, T., Goldstein, J., Little, S., **Andrews, G.,** Dorough, G., Taylor, R., and T. Keler. 2006. Prophylaxis and therapy of inhalational anthrax by a novel monoclonal antibody to protective antigen that replicates vaccine induced immunity. Infect. Immun. 74:5840-5847

10. Ribot, W.J., Powell, B.S., Ivins, B.E., Little, S.F., Johnson, W.M., Hoover, T.A., Norris, S.L., Adamovicz , J.J., Friedlander, A.M., and **G.P. Andrews.** 2006. Comparative efficacy of protective antigen isoform vaccines against *Bacillus anthracis* spore challenge in rabbits. Vaccine. 24:3469-3476.

11. Little, S.F., Ivins, B.E., Fellows, P.F., Webster, W.M., Pitt, M.L.M., Norris, S.L.W., and **G.P. Andrews**. 2006. Duration of protection of rabbits after vaccination with *Bacillus anthracis* recombinant protective antigen vaccine. Vaccine. 24:2530-2536.

12. Powell, B.S., **Andrews, G.P.,** Enama, J.T., Jendrek, S., Ribot, W., Bolt, C., Pullen, J.K., Worsham, P.S., Hines, H., Smith, L., Heath, D.G., and J.J. Adamovicz. 2005. Design and testing for a Non-tagged F1-V fusion protein as vaccine antigen against bubonic and pneumonic plague. Biotechnology Progress. 21:1490-1510**.**

13. Goodin, J.L., Raab, R.W., McKown, R.L., Coffman, G.L., Powell, B.S., Enama, J.T., Ligon, J.A., and **G.P. Andrews**. 2005. *Yersinia pestis* outer membrane type III secretion protein YscC: expression, purification, characterization, and induction of specific antiserum. Protein Expression and Purification. 40:152-163.

14. Rocke, T.E., Mencher, J., Smith, S.R., Friedlander, A.M., **Andrews, G.P.,** and L.A. Baeten. 2004. Recombinant F1-V fusion protein protects black-footed ferrets (*Mustela nigripes*) against virulent *Yersinia pestis* infection. J. Zoo Wildl. Med. **35**:142-146.

15. Little, S.F., W.M. Webster, and **G.P. Andrews**. 2004. Evaluation of an anti-rPA IgG ELISA for measuring the antibody response in mice. Biologicals. **32**:62-69.

16. Little, S.F., W.M. Webster, B.E. Ivins, P.F. Fellows, S.L. Norris, and **G.P. Andrews**. 2004. Development of an in vitro-based potency assay for a recombinant anthrax vaccine. Vaccine. **22**:2843-2852.

17. Jarrett, C.O., F. Sabbane, J.J. Adamovicz, **G.P. Andrews**, and B.J. Hinnebusch. 2004. A flea-borne transmission model to evaluate vaccine efficacy against naturally acquired bubonic plague. Infect. Immun. 72:2052-2056.

18. Welkos, S.L., **G.P. Andrews**, L.E. Lindler, N.J. Snellings, and S.D. Strachan. 2004. Mμdl1 (Ap *lac*) mutagenesis of *Yersinia pestis* plasmid pFra and identification of temperature-regulated loci associated with virulence. Plasmid. 51(1):1-11.

19. Little, S.F., B.E. Ivins, P.F. Fellows, M.L.M. Pitt, S.L.W. Norris, and **G.P. Andrews.** 2004. Defining a serological correlate of protection in rabbits for a recombinant anthrax vaccine. Vaccine. 22:422-430.

20. Jeddeloh, J.A., D.L. Fritz, D.M. Waag, J.M. Hartings, and **G.P. Andrews**. 2003. A bio-defense driven murine model of pneumonic melioidosis. Infect. Immun. **71**: 584-587.

21. **Andrews, G.P.**, S.D. Strachan, G.E. Benner, A.K. Sample, G.W. Anderson Jr., J.J. Adamovicz, S.L. Welkos, J. Pullen, and A.M. Friedlander. 1999. Protective efficacy of recombinant *Yersinia* outer proteins (Yops) against bubonic plague caused by encapsulated and non-encapsulated *Yersinia pestis*. Infect. Immun. **67**:1533-1537.

22. Benner, G.E., **G.P. Andrews**, W.R. Byrne, S.D. Strachan, A.K. Sample, D.G. Heath, and A.M. Friedlander. 1999. Immune response to *Yersinia* outer proteins and other *Y. pestis* antigens after experimental plague infection in mice. Infect. Immun. **67**:1922-1928.

23. **Andrews, G.P.** 1998. The enteric *Campylobacter*: They are everywhere. Focus: Foodborne Illness. Clin. Lab Sci. **11(5)**: 305-308.

24. Heath, D.G., G.W. Anderson, Jr., J.M. Mauro, S.L. Welkos, **G.P. Andrews**, J.J. Adamovicz, and A.M. Friedlander. 1998. Protection against experimental bubonic and pnuemonic plague by a recombinant capsular F1-V antigen fusion protein vaccine. Vaccine. **16**: 1131-1137.

25. Anderson, G.W., Jr., P.L. Worsham, C.R. Bolt, **G.P. Andrews**, S.L. Welkos, A.M. Friedlander, J.P. Burans. 1997. Protection of mice from fatal bubonic and pneumonic plague by passive immunization with monoclonal antibodies against the F1 protein of *Yersinia pestis*. J. Trop. Med. **56(4)**: 471-473.

26. **Andrews, G.P.**, D.G. Heath, G.W. Anderson, Jr., S.L. Welkos, and A.M. Friedlander. 1996. Fraction 1 capsular antigen (F1) Purification from *Yersinia pestis* CO92 and an *Escherichia coli* recombinant strain and efficacy against lethal plague challenge. Infect. Immun. **64:** 2180-2187.

27. Friedlander, A.M., S.L. Welkos, P.L. Worsham, **G.P. Andrews**, D.G. Heath, G.W. Anderson, Jr., L.M. Pitt, J. Estep, and K. Davis. 1995. The relationship between virulence and immunity as revealed in recent studies of the F1 capsule of *Yersinia pestis*. Clin. Infect. Dis. **21 (Suppl 2)**: S178-181.

28. **Andrews, G.P.**, and A.T. Maurelli. 1992. *mxiA* of *Shigella flexneri* 2a, which facilitates export of invasion plasmid antigens, encodes a homolog of the low calcium response protein, LcrD, of *Yersinia pestis.* Infect. Immun. **60**:3287-3295.

29. **Andrews, G.P.**, A.E. Hromockyj, C. Coker, and A.T. Maurelli. 1991. Two novel virulence loci, *mxiA* and *mxiB*, in *Shigella flexneri* 2a facilitate excretion of invasion plasmid antigens. Infect. Immun. **59**: 1997-2005.

30. Wolf, M.K., **G.P. Andrews**, B.D. Tall, M.M. McConnell, M.M. Levine, and E.C. Boedeker. 1989. Characterization of CS4 and CS6 antigenic components of PCF8775, a putative colonization factor complex from enterotoxigenic *Escherichia coli* E8775. Infect. Immun. **57**:164-173.

31. Wolf, M.K., **G.P. Andrews**, D.L. Fritz, R.W. Sjogren, and E.C. Boedeker. 1988. Characterization of the plasmid from *Escherichia coli* RDEC-1 that mediates expression of adhesin AF/R1 and evidence that AR/R1 pili promote but are not essential for enteropathogenic disease. Infect. Immun. **56**:1846-1857.

Book Chapters

Adamovicz, J.J. and **G.P. Andrews**. 2003. *Plague Vaccines: Retrospective analysis and future developments*. In: *Biological Weapons Defense - Principles and Mechanisms for Infectious Diseases Counter-bioterrorism.* Humana Press.

Carnahan, A.M. and **G. Andrews**. 2000. *Vibrio, Aeromonas, Plesiomonas*, and *Campylobacter* Species. In: *Textbook of Diagnostic Microbiology*. W.B. Saunders Company

Selected Non-peer-reviewed Articles

Andrews, G.P. *Veterinary Sciences-applied process identifies "signatures" of infection in Wyoming elk.* Reflections (University of Wyoming College of Agriculture magazine). June, 2008.

Andrews, G.P. *Open Questions on a Closed Case.* Aug., 2008. NY Times Op. Editorial (invited). A scientific rebuttal to the FBI's alleged charges that Dr. Bruce Ivins was the producer and mailer of the 2001 "anthrax letters".

Patents

"Prophylactic and Therapeutic Monoclonal Antibodies" (against *Y. pestis* V antigen). T. Chanh, **G.P. Andrews**, J.J. Adamovicz, and B.S. Powell. U.S. Patent Application #: 10/987,533. Filed 12 Nov., 2004. Claims allowed, Nov., 2008.

"*Brucella abortus* proteins and Methods of Use Thereof". **Gerard P. Andrews** and John E. Lowry. U.S. Provisional Application #: 61267361. Filed, 7 Dec., 2009. Full patent filed 4 Dec., 2010. Claims allowed Dec., 2013.

Abstracts and Presentations

1. Fluegel-Dougherty AM, Neupane, Szilagyi, B., Goodridge, L., Adamovicz, J., and **G.P. Andrews**. 2013. Evaluation of a single-antigen lateral flow cassette for the sero-detection of *Brucella abortus* infection in wild and domestic hosts**.** The 94th Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

2. **Andrews, G.P**., Leonhardt, J.A., Dougherty, A.M., Lowry, J.E., and R. Bowen**.** 2012. *Brucella abortus* recombinant outer membrane proteins induce clearance immunity against virulent challenge in BALB/c mice. The 93rd Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

3. Dougherty, A.M., Vernati, G., Leonhardt, J.L., Lowry, J.E., and **G.P. Andrews**. 2012. Characterization of a lipoprotein 28-deficient mutant of *Brucella abortus* S19. The 93rd Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

4. Lowry, J. E., Leonhardt, J., Yao, C., Belden, L. E., and **G. P. Andrews.** 2011. Infection of C57BL/6 mice by *Trypanosoma musculi*, modulates host immune responses during *Brucella abortus* co-colonization. The 92nd Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

5. Leonhardt, J.A., Lowry, L., Bowen, R., and **G. P. Andrews**. 2010. Immunization with recombinant *Brucella abortus* outer membrane protein (Omp) 25d, reduces bacterial load after challenge in a murine model for brucellosis. The 91st Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

6. Vernati, G. and **G.P. Andrews**. 2010. Application of change-mediated antigen technology (CMAT) in the identification of *Francisella tularensis* gene products up-regulated during infection. The 91st Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

7. Lowry, J. E. , Leonhardt, J. A., Isaak, D. D., Vernati, G., Fluegel, A. M., and **G. P. Andrews**. 2009. *Brucella abortus* malate dehydrogenase (Mdh) modulates production of anti-inflammatory cytokines during infection. The 90th Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

8. Fluegel, A.M., Lowry, J.E., Belden, E.L., and **G.P. Andrews**. 2009. Quantification of cytokine mRNA and expression patterns in brucellosis infected elk. 58th Annual International Conference of the Wildlife Disease Association, Blaine, WA. Poster Session.

9. Vernati, G., Edwards, W.H., Rocke, T.E., and **G.P. Andrews.** 2008. Characterization of the humoral immune response to *Yersinia pestis*, the causative agent of plague, in the Coyote (*Canis latrans*), a host refractory to disease. The 89th Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

10. Lowry, J.E., Isaak, D.D., Leonhardt, J., Vernati, G., Fluegel, A.M., and **G. P. Andrews**. 2008. Vaccination with recombinant antigens reduces *Brucella abortus* strain-19 colonization in a mouse model for infection. The 89th Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

11. **Andrews, G.P.,** Vernati, G., Ulrich, R., Rocke, T.E., Edwards W.H., and J.J. Adamovicz. 2008. Identification and Characterization of In Vivo-induced Conserved Sequences (IVICS) from *Yersinia pestis* during Infection in Different Susceptible Host Species. The Symposium on the Ecology of Plague and its Effects on Wildlife, Ft. Collins, CO. Podium Presentation.

12. **Andrews, G.P.** 2007. In vivo Survival Strategies of Facultative Intracellular Bacterial Pathogens: Gene Discovery in Plague and Brucellosis. Lovelace Respiratory Research Institute. Albuquerque, NM. Seminar.

13. Vernati, G., Lowry, J.E., Edwards, W.H., Rocke, T.E., and **G.P. Andrews**. 2007. *Yersinia pestis*, the etiology of plague, displays differentially up-regulated genes during infection in different mammalian hosts. 2007. The 88th Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

14. Lowry, J.E., Vernati, G., Goodridge, L.D., Edwards, W.H., Fluegel, A.M., **and G. P. Andrews**. 2007. Identification of novel virulence genes up-regulated during *Brucella abortus* infection in Wyoming elk. 2007. The 60th Annual Brucellosis Research Conference and the 88th Annual Meeting of the Conference of Research Workers in Animal Diseases (CRWAD), Chicago, IL. Poster Session.

15. Gelhaus, C., Rozak, D., Wargo, E., **Andrews, G.**, and J. Adamovicz. 2006. Recombinant F1 and V Subunit Vaccine Efficacies are Impacted by Differences in *Yersinia pestis* Growth Temperatures. 9th International Symposium on *Yersinia*. Lexington, KY. Poster Session.

16. Vause, L. and **G.P. Andrews**. 2006. Identification and Characterization of Lecithin-dependent Hemolytic Activity from *Yersinia pestis*. IICAB Symposium on Virulence Mechanisms of Bacterial Pathogens. Ames, IA. Poster Session

17. Vernati, G., Ulrich , R., Adamovicz, J., and **G.P. Andrews.** 2006**.** Identification of Novel In Vivo-Induced Virulence Genes from *Yersinia pestis* using Sera from Experimentally Infected Rabbits. IICAB Symposium on Virulence Mechanisms of Bacterial Pathogens. Ames, IA. Poster

18. Youmans, B., and **G.P. Andrews.** 2005. Characterization of the *Brucella* Multi-copy Open Reading Frame, BMEI1214, and Evaluation of the Recombinant Gene Product for the Serological Diagnosis of Sheep Brucellosis. Abstracts of the 2005 National Conference of the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS). Denver, CO. Poster Session.

19. Goodin, J.L., and **G. P. Andrews**. 2004. Characterization of a Recombinant *Yersinia pestis* V-F1 "Reversed" Fusion Protein for use as a New Subunit Vaccine Against Plague. 2004. Abstracts of the American Society for Microbiology Biodefense Research Meeting. Baltimore, MD. Poster Session.

20**. Andrews, G.P.,** C.R. Bolt, L.M. Pitt, and J.J. Adamovicz. 2004. Passive Protection in Mice from Fatal Pneumonic Plague by Antibody Raised Against a Recombinant *Yersinia pestis* F1-V Fusion protein Vaccine Candidate. Abstracts of the American Society for Microbiology Biodefense Research Meeting. Baltimore, MD. Poster Session.

21. Adamovicz, J.J., **Andrews, G.P**., Bolt, C., Wilhelmson, C.L., Raymend, J.W., and L.M. Pitt. 2002. Efficacy of the F1-V fusion protein vaccine in non-human primates. Abstracts of the 8th International Symposium on *Yersinia*. Turku, Finland. Podium Presentation

22. Anderson, Jr., G.W., P.L. Worsham, **G.P. Andrews**, C.R. Bolt, S.L. Welkos, A.M. Friedlander, and J.P. Burans. 1995. Passive immunization with monoclonal antibodies against the F1 antigen of *Yersinia pestis* protects mice from fatal bubonic and pneumonic plague. Abstracts of the 44th annual meeting of the American Society of Tropical Medicine and Hygiene. San Antonio, TX. Poster Session.

23. **Andrews, G.P.** 2001. Current Research in Vaccines against Plague. Fourth Annual Conference on Vaccine Research. Arlington, Virginia. Podium Presentation.

24. **Andrews, G.P.,** and B.S. Powell. 2001. The F1-V fusion protein: A new recombinant vaccine candidate for plague. NATO, Human Factors in Medicine (HFM) Symposium on Operational Medical Issues in Chemical and Biological Defense. Lisbon, Portugal. Podium Presentation.

25. **Andrews, G.P**., J.J. Adamovicz, C.R. Bolt, H.S. Heine, S.L. Welkos, S.A. Tobery, L.M. Pitt, T.C. Chanh, W.R. Byrne. 2000. Antibody to the F1-V plague vaccine candidate passively protects mice against lethal parenteral challenge by *Yersinia pestis.* Abstracts of the 100th general meeting of the American Society for Microbiology. Los Angeles, CA. Poster Session.

26. **Andrews, G.P.**, C. Coker, and A.T. Maurelli. 1989. Characterization of protein fusions in the invasion plasmid of *Shigella flexneri* 2a. Abstracts of the 89th annual meeting of the American Society for Microbiology. New Orleans, LA. Poster Session.

27. **Andrews, G.P.** , D.G. Heath, G.W. Anderson, Jr., S.L. Welkos, and A.M. Friedlander. 1995. Protective efficacy of active immunization with purified fraction 1 capsular antigen (F1) from *Yersinia pestis* and an *Escherichia coli* recombinant strain against parenteral lethal plague challenge. Abstracts of the 95th annual meeting of the American Society for Microbiology. Washington D.C. Poster Session.

28. **Andrews, G.P.**, G.B. Howe, J.T. Debelak, G.W. Anderson, Jr., S.L. Welkos, and A.M. Friedlander. 1996. Immunogenicity and protective efficacy of recombinant YopD, E, and H from *Yersinia pestis* strain CO92. Abstracts of the 96th annual meeting of the American Society for Microbiology. New Orleans, LA. Poster Session.

29. **Andrews, G.P.**, W.L. Houston, and E.C. Boedeker. 1985. Immunoelectrophoretic analysis of differential expression of surface antigens on adherent and nonadherent variants of *Escherichia coli* strain RDEC-1. Abstracts of the 85th annual meeting of the American Society for Microbiology. Las Vegas, NV. Poster Session.

30. **Andrews, G.**, G. Howe, D. Heath, C. See, A. Maurelli, and A. Friedlander. 1994. Temperature-dependent expression of *Yersinia pestis* fraction 1 capsular antigen (F1) is controlled by a homolog of the thermoregulatory loci, *hns* of *Escherichia coli* and *virR* of *Shigella flexneri*. Abstracts of the 94th annual meeting of the American Society for Microbiology. Las Vegas, NV. Slide Session.

31. **Andrews, G.P.**, A.E. Hromockyj, and A.T. Maurelli. 1990. Characterization of a secretion mutant of *Shigella flexneri* which is defective for export of invasion plasmid antigens. Abstracts of the 30th Interscience Conference on Antimicrobial Agents and Chemotherapy. Atlanta, GA. Slide Session.

32. **Andrews, G.P.**, C. McQueen, and E.C. Boedeker. 1986. Quantitative Western blot analysis of the secretory IgA response of rabbits orally immunized with an *Escherichia coli* strain expressing an adherence factor. Abstracts of the 86th annual meeting of the American Society for Microbiology. Washington D.C. Slide Session.

33. **Andrews, G.P.**, M.K. Wolf, B.D. Tall, M.M. Levine, and E.C. Boedeker. 1986. Characterization of CS4 and CS6 components of the antigen complex PCF8775 expressed on Enterotoxigenic *E. coli* strain E8775. Abstracts of the 26th Interscience Conference on Antimicrobial Agents and Chemotherapy. New Orleans, LA. Slide Session.

34. Benner G., **G.P. Andrews**, W.R. Byrne, D.G. Heath, and A.M. Friedlander. 1997. The immune response to *Yersinia* outer proteins (YOPs) and other virulence determinants after experimental plague infection in the mouse. Abstracts of the 97th annual meeting of the American Society for Micrbiology. Miami, FL. Poster Session.

35. Davis, D., R. Reid, P. Ferren, **G. Andrews**, L. Tseng, K. Sau, and E. Boedeker. 1988. Primary *in vitro* antibody response to the N-terminal 1-13 peptide of CFA/I recognizes the pilus protein.

Abstracts of the 88th annual meeting of the American Society for Microbiology. Miami Beach, FL. Poster session.

36. Heath, D.G., **G.P. Andrews**, G.B. Howe, S. Chatmon, and A.M. Friedlander. 1994. Purification and characterization of the fraction 1 capsular antigen (F1) from *Yersinia pestis* CO92 and an *Escherichia coli* F1 recombinant. Abstracts of the 94th annual meeting of the American Society for Microbiology. Las Vegas, NV. Poster Session.

37. Heine, H.S., J. Bassett, L.M. Pitt, W.R. Byrne, **G.P. Andrews.** 2002. Development of an anthrax-spore inhalation challenge model in mice for testing antibiotic efficacy. Abstracts of the 42nd annual Interscience Conference on Antimicrobial Agents and Chemotherapy. San Diego, CA. Poster Session.

38. Heine, H.S., Dicks, R., and **G.P. Andrews**. 2001. In vitroactivity of oritavancin (LY333328), levofloxacin, meropenem, GAR936, and linezolid against strains of *Bacillus anthracis*. Abstracts of the 41st annual Interscience Conference on Antimicrobial Agents and Chemotherapy. Chicago, IL. Poster session.

39. Houston, W.L., **G.P. Andrews**, and E.C. Boedeker. 1985. Culture conditions for AF/R1 pilus expression by the enteroadherent *Escherichia coli* strain RDEC-1. Abstracts of the 85th annual meeting of the American Society for Microbiology. Las Vegas, NV. Poster session.

40. Little, S., Ivins, B., Fellows, P., Webster, W., and **G. Andrews.** 2002. Development of an *In Vitro*-based potency assay for anthrax vaccine. Abstracts of the 3rd International Conference on Dangerous Pathogens. Bath, U.K. Poster Session.

41. McQueen, C.E., **G.P. Andrews**, and E.C. Boedeker. 1985. Identification by Western blot analysis of the immunogenic components of an enteropathogenic *E. coli* (strain RDEC-1). Abstracts of the 14th annual William Beaumont Gastrointestinal Symposium, El Paso, TX. Podium Presentation.

42. Reinhard, M.A., **G.P. Andrews**, and E.C. Boedeker. 1986. Purification of the AF/R1 pilus by heat extraction and detergent treatment. Abstracts of the 86th annual meeting of the American Society for Microbiology. Washington D.C. Poster session.

43. Ribot, W.J., B.E. Ivins , B.S. Powell , S.F. Little, W. M. Johnson , T. A. Hoover , J. Adamovicz, A.M., Friedlander, and **G. P. Andrews**. 2003. Comparative Efficacy of Protective Antigen Vaccine Isoforms Against *B. anthracis* Spore Challenge in Rabbits. Abstracts of the American Society for Microbiology Conference on Future Directions for Biodefense Research: Development of Countermeasures, Baltimore, MD. Poster Session.

44. Samuel, J.E., H.C. Krivan, D.L. Weinstein, L.P. Perera, **G.P. Andrews**, and A.D. O'Brien. 1988. Comparison of Shiga-like toxin (SLT) II, II variant (v) and II/IIv hybrid proteins. Gordon Conferences. NH. Poster session.

45. Strachan, S.D., **G.P.Andrews**, and A.M. Friedlander. 1996. Cloning, expression, and characterization of the *Yersinia* outer membrane protein B (YopB) from *Yersinia pestis*. Abstracts of the 96th annual meeting of the American Society for Microbiology. New Orleans,

LA. Poster Session.

46. Strachan, S.D., **G.P. Andrews**, A.M. Friedlander, and J.K. Pullen. 1997. Cloning, sequencing, and expression of *Yersinia* YopK from *Y. pestis*, *Y. enterocolitica*, and *Y. pseudotuberculosis*. Abstracts of the 97th annual meeting of the American Society for Microbiology. Miami, FL. Poster Session.

47. Welkos, S.L., and **G.P. Andrews.** 1995. Mud1 insertion mutagenesis of the F1-capsule encoding plasmid pFra of *Yersinia pestis*. Abstracts of the 94th annual meeting of the American Society for Microbiology. Washington D.C. Poster Session.

48. Welkos, S.L., D. Heath, P. Worsham, **G. Andrews**, and A. Friedlander. 1994. Contribution of the F1 capsule-associated plasmid pFra to the virulence of *Yersinia pestis*. Abstracts of the 94th annual meeting of the American Society for Microbiology. Las Vegas, NV. Slide Session.

49. Wolf, M.K., **G.P. Andrews**, and E.C. Boedeker. 1986. Characterization of the 86 Md plasmid from *Escherichia coli* strain RDEC-1 that mediates expression of the AF/R1 adhesin. Gastroenterology 90: 1694. Annual meeting of the American Gastroenterological Association. San Francisco, CA.

50. Wolf, M.K., **G.P. Andrews**, W.L. Houston, and E.C. Boedeker. 1986. Transfer of the plasmid mediating AF/R1 pili from enteropathogenic *E. coli* strain RDEC-1. In Lark, *et al.*, eds., Molecular Biology of Microbial Pathogenicity, Role of Protein/Carbohydrate Interactions, Academic Press, London. FEMS Meeting on the Molecular Biology of Pathogenic Microorganisms. Lulea, Sweden. Poster session.

51. Wolf, M.K., **G.P. Andrews**, and E.C. Boedeker. 1987. Construction of an *E. coli* RDEC-1 mutant lacking the AF/R1 pili responsible for adherence to rabbit Ileum. Abstracts of the 87th annual meeting of the American Society for Microbiology. Atlanta, GA. Poster session.

52. Wolf, M., I. Pintado, **G. Andrews**, R. Sjogren, and E. Boedeker. 1987. AF/R1 pilus expression by *Escherichia coli* strain RDEC-1 promotes colonization and disease but is not essential for *in vivo* enteroadherence. Abstracts of the 87th annual meeting of the American Society for Microbiology. Atlanta, GA. Poster Session.

53. Worsham, P.L., M.-P. Stein, and **G.P. Andrews.** 1994. Spontaneous regulatory mutations in the operon encoding the *Yersinia pestis* F1 capsule antigen. Abstracts of the 94th annual meeting of the American Society for Microbiology. Las Vegas, NV. Slide Session.

54. Worsham, P.L., S.L. Welkos, G.W. Anderson Jr., D.G. Heath, **G.P. Andrews**, M.L.M. Pitt, and A.M. Friedlander. 1997. *Yersinia pestis*: Virulence Factors and Vaccine Development. International Conference on Emerging Zoonotic Infectious Diseases. Taipei, Taiwan R.O.C.

Research Support (while at UW)

Cooperative Research and Development Agreement (CRADA), with United States Army Medical Research Institute of Infectious Diseases (approved 6 Feb. 2006; #W81XWH-06-0117);

from DTRA research plan: "Induction of protective immunity to *Yersinia pestis* causing pneumonic plague"; **G. Andrews (co-PI),** Years 2006-2008. $5,000 - $7,000 /yr, indirect

Wyoming Wildlife/Livestock Disease Research Partnership, proposal (awarded September, 2005): "Studies on Brucellosis", goal #4: "Develop a lateral flow device (LFD) using in vivo induced antigen technology (IVIAT)". L. Goodridge (PI)**, G. Andrews (co-PI)**, W. Edwards (co-PI). $101,400, 2 yrs ($50,700/yr); Years 2006-2007

Faculty Grant-in-Aid (awarded May 2005): "Characterization and Evaluation of Novel *Brucella ovis* Virulence Proteins in an Improved Diagnostic Assay for Sheep Brucellosis". **G. Andrews (PI),** B. Youmans; $7,400, 1 yr (2005)

University of Wyoming, Agricultural Experiment Station (AES) Grant Proposal (WYO-395-04; awarded 6 Dec. 2004): "Identification and characterization of novel virulence determinants from *Brucella abortus* using In Vitro Induced Antigen Technology" **G. Andrews (co-PI),** L. Goodridge (co-PI); $60,000, 3 yrs ($20,000/yr); Years: 2005-2007.

Cooperative Research and Development Agreement (CRADA), with United States Army Medical Research Institute of Infectious Diseases (approved 14 Dec. 2004; #W81XWH-05-0047); from DTRA research plan: " Identification, characterization, and comparative analysis of in vivo expressed virulence determinants from *Yersinia pestis* and *Francisella tularensis* using In Vivo Induced Antigen Technology". **G. Andrews (co-PI)** Years: 2005-2009; $22,000 indirect support (supplies and small equipment items), fiscal yr. 2005

Cooperative Research and Development Agreement (CRADA), with United States Army Medical Research Institute of Infectious Diseases (approved 22 Nov. 2004; #W81XWH-05-0032); from DTRA research plan #: "Identification and characterization of loci on plasmid pFra that encode virulence-associated factors and potential new plague vaccine candidates". **G. Andrews (co-PI);** $2,500 - 8,000/yr. indirect; Years: 2005-2007.

Wyoming Wildlife/Livestock Disease Research Partnership, proposal (September, 2007): "Assessment of the Role of *Brucella abortus* COGs (Clusters of Orthologous Groups [of proteins]) in the Pathogenesis and Host Immunity of Brucellosis"." **G. Andrews (PI),** D. Isaak; $64,400; Years 2008-2009

USDA, CREES Special Research Grants Program, proposal (April, 2008): "Assessment of the role of IVI antigens in the pathogenic processes of high profile, re-emerging bacterial infections: Plague, Brucellosis and Tularemia." **G. Andrews (PI),** P. Elzer, and R. Ulrich $117,000 Years 2008-2011

USDA, CREES Special Research Grants Program, proposal (August, 2009): "Studies on Brucellosis: Evaluation of novel antigens for subunit vaccines [part A] and improved diagnostics [part B], mathematical models to study the impact of vaccination and environmental factors on disease incidence, and the economics of Brucellosis outbreaks and vaccination in livestock and wildlife". D. Montgomery (co-PD/PI), **G. Andrews (co-PI),** 7 co-investigators; $170,000 (parts A and B), 2010-2011.

USDA, NIFA Special Research Grants Program, proposal (February, 2010): "Continuing studies

on biomedical countermeasures against brucellosis in wild and domestic hosts: subunit vaccine efficacy in ruminants, discovery of novel virulence factors, and vaccination economics". **G. Andrews (PD/PI),** D. Montgomery (co-PI), 3 co-investigators; $279,200, 2010-2012.

Wyoming Wildlife/Livestock Disease Research Partnership, proposal (May, 2011): "Identification and characterization of *Pasteurellaceae* and *Mycoplasma* virulence-associated proteins up-regulated during infection in sheep using in vivo-induced antigen technology (IVIAT)". **G. Andrews**; $84,500; 2011-2013.

Wyoming Department of Agriculture, special research grant proposal: "A Novel mouse model for *Brucella abortus* vaccine research". J. Adamovicz (PI), **G. Andrews (co-PI),** $110,000, 2012-2013.

Wyoming Department of Agriculture, Special Award: "Development of a Rapid, Chute-side Cassette Test for Brucellosis". **G. Andrews (PI),** L. Goodridge (co-PI), $50,000, 2012-2013.

Wyoming Wildlife/Livestock Disease Research Partnership, proposal (June, 2013): "Assessment of the behavior of *Brucella abortus* mutants and role of their disease factors in mice engrafted with the elk immune system." **G. Andrews (PI),** J. Adamovicz (co-PI); $64,662; 2013-2014

Wyoming Department of Agriculture, special research grant proposal: "Continued development of a chute-side, rapid test for brucellosis in susceptible hosts". **G. Andrews (PI),** L. Goodridge (co-PI), Jake Lowry (co-PI); $55,350, 2013-2014.