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Department of Veterinary and Biomedical Sciences: 2005 Annual Report

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Department of Veterinary and Biomedical Sciences

2005 Annual Report
Facilities
Department of Veterinary and Biomedical Sciences

Veterinary Basic Science
Lincoln, NE

Veterinary Diagnostic Center
Lincoln, NE

Great Plains Veterinary Educational Center
Clay Center, NE
Great Plains Veterinary Educational Center, Clay Center, NE

Veterinary Science Complex, (Veterinary Basic Sciences, Veterinary Diagnostic Center, Animal Research Facility, Sewage Sterilization Plant and Animal Holding Facility)

UNL Agricultural Research and Extension Center, Mead, NE (VBMS Beef Cattle Herd)
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DEPARTMENT OF VETERINARY AND BIOMEDICIAL SCIENCES
2005 PERSONNEL

Faculty

Barletta, Raúl G.,* BS, MS, PhD ................................................................. Professor
Brodersen, Bruce W.,* BS, DVM, MS, PhD ................................................. Research Associate Professor
Carlson, Michael P., BS, MS, PhD ............................................................... Lecturer
Cirillo, Jeffrey D.,* BA, PhD, MS ................................................................. Associate Professor
Das, Subash 1, DVM, MVS, PhD ................................................................. Research Assistant Professor
Doster, Alan R.,* DVM, MS, PhD, ACVP ...................................................... Professor
Duhamel, Gerald E.,* BS, DMV, PhD, ACVP .............................................. Professor
Ellis, Roger W.,* BS, DVM, MS ................................................................. Lecturer
Fernando, M. Rohan, BS, MSc, PhD, MPhil ................................................ Research Assistant Professor
Griffin, D. Dee,* BS, DVM, MS ................................................................. Professor
Hinkley, Susanne 1, DVM, MS, PhD .......................................................... Assistant Professor
Jones, Clinton J.,* BA, PhD ................................................................. Professor
Kelling, Clayton L.,* BS, MS, PhD, DVM ................................................... Professor
Lou, Marjorie F.,* BS, MS, PhD ............................................................... Professor
Moxley, Rodney A.,* DVM, PhD ........................................................... Professor and Interim Department Head
Orosio, Fernando A.,* MV, MS, PhD, ACVM ........................................... Professor
Pattanaik, Asit K.,* BS, MS, PhD ............................................................... Professor
Paul, Prem S.,* BVSc, PhD ................................................................. Professor, UN-L, Vice Chancellor for Research
Rogers, Douglas G.,* BS, DVM, MS, PhD ........................................... Professor and Interim Department Head
Rupp, Gary P.,* DVM, MS ................................................................. Professor
Schmitz, John A.,* DVM, PhD, ACVP ....................................................... Professor
Smith, David R.,* BS, DVM, PhD, ACVP, ABVP .................................... Associate Professor
Somerville, Greg A.,* PhD, MS, BS .......................................................... Assistant Professor
Steffen, David J.,* BS, DVM, PhD, ABVP .................................................. Professor
Wohlers, Arden, BS, DVM ................................................................. Extension Assistant Professor
Zhang, Yange 2, BS, MS, PhD ............................................................... Research Assistant Professor
Zhou, Joe Y., BSc, PhD ............................................................... Research Associate Professor

1 Appointment Began in 2005  2 Appointment Ended in 2005  *Graduate Faculty

11
VBMS Researchers, Postdoctoral and Senior Research Associates, 2005

Barletta-Chaón, Ofelia ......................................................... Postdoctoral Research Associate
Berberov, Emil M., MSc, PhD .................................................. Researcher
Jaroni, Divya, BS, MS, PhD ....................................................... Postdoctoral Research Associate
Jiang, Yunquan, BS ................................................................. Researcher
Liu, Shuanghu, BS, MD, PhD ..................................................... Senior Research Associate
Pandey, Amit Kumar, BVSc, MSc, PhD ........................................ Postdoctoral Research Associate
Park, Bonggoo, PhD, BS ............................................................ Postdoctoral Research Associate
Peng, Weiping, BS, MS, PhD ..................................................... Senior Research Associate
Samrakandi, Mustapha M., BS, MS, PhD ........................................ Researcher
Subbian, Selvakumar, BS, MS, PhD .......................................... Postdoctoral Research Associate
Topliff, Christina, BS, DVM, MS, PhD ........................................ Postdoctoral Research Associate
Xing, Kuiyi, BS, PhD ................................................................. Senior Research Associate
VBMS Adjunct and Courtesy Faculty, 2005

Campos, Manuel *, DVM, MS, PhD ........................................ Adjunct Associate Professor
Chenoweth, Peter J.*, BVSc, PhD ........................................ Adjunct Professor
DeGroff, Terry, DVM ....................................................... Adjunct Assistant Professor
Dewey, Catherine *, DVM, MS, PhD ...................................... Adjunct Assistant Professor
Donis, Ruben O.*, MV, PhD ................................................ Adjunct Professor
Fajt, Virginia R., DVM, PhD .............................................. Adjunct Instructor
Grothueschen, Dale M.*, DVM, MS ........................................ Adjunct Professor
Hesse, Richard *, BA, MS, PhD ........................................... Adjunct Assistant Professor
Hodgson, Clague P., BSc, PhD ........................................... Adjunct Associate Professor
Hungerford, Laura L.*, BS, DVM, PhH, PhD ............................. Adjunct Associate Professor
Hunsaker, Beck D.*, BS, DVM, MS, PhD ............................... Adjunct Assistant Professor
Kador, Peter *, BA, PhD ................................................... Adjunct Professor
Keen, James Edward, BS, BS, DVM, PhD ................................. Adjunct Associate Professor
Laegreid, William, BS, MS, DVM, PhD ................................. Adjunct Associate Professor
Larson, Robert L., BS, DVM, PhD ......................................... Adjunct Assistant Professor
Lechtenberg, Kelly F.*, BS, DVM, PhD .................................... Adjunct Assistant Professor
Loskutoff, Nadia, BS, MS, PhD ........................................... Adjunct Assistant Professor
Perino, Louis *, BS, DVM, PhD ........................................... Adjunct Associate Professor
Petro, Thomas *, BS, MA, PhD ........................................... Courtesy Professor
Pierce, Vern L., PhD, MS, MS, BS ......................................... Adjunct Assistant Professor
Rock, Daniel *, BSE, PhD ................................................ Adjunct Associate Professor
Ross, Gary, BS, DVM ....................................................... Adjunct Associate Professor
Sanderson, Michael, BS, DVM, MS ...................................... Adjunct Associate Professor
Sargeant, Janice Merrill, DVM, MSc, PhD .............. Adjunct Assistant Professor
Sherman, Gary B., BS, MS, DVM, PhD ................................. Adjunct Courtesy Professor
Solheim, Joyce C., BS, MA, PhD ......................................... Courtesy Assistant Professor
Spire, Mark F.*, BS, DVM, MS ........................................... Adjunct Professor
Spitzer, John C.*, BS, MS, PhD .......................................... Adjunct Professor
Straw, Barbara E.*, DVM, PhD ........................................ Adjunct Professor
Wach, Ricky Sue B., BA, DVM, MA ................................. Courtesy Instructor
Wittum, Thomas *, BS, MS, PhD ......................................... Adjunct Assistant Professor
Wood, Charles *, BA, MA, MPhil, PhD ................................. Courtesy Professor
Wylie, Dwane *, BA, PhD ................................................ Courtesy Professor
Zimmerman, Jeffrey J., BA, DVM, MS, PhD ....................... Adjunct Associate Professor

Emeriti Faculty

Dickinson, Earl *, BS, DVM, PhD ........................................ Professor Emeritus
Erickson, E. Denis *, DVM, PhD, ACVM ................................. Professor Emeritus
Frey, Merwin *, BS, DVM, MS, PhD ................................... Professor Emeritus
Hogg, Alex *, DVM, MS ................................................... Professor Emeritus
Johnson, Jerre L.*, BS, DVM, PhD ..................................... Professor Emeritus
Rhodes, Marvin *, BS, MS ................................................ Professor Emeritus
Rice, Duane, BS, DVM ...................................................... Professor Emeritus
White, R. Gene *, BS, DVM, MS ......................................... Professor Emeritus
### Department Administration Personnel

- **Rogers, Douglas G.,** BS, DVM, MS, PhD  
  Professor and Interim Department Head
- **Moxley, Rodney A.,** DVM, PhD  
  Professor and Interim Department Head
- **Albrecht, Roxann R.**  
  Accounting Clerk III
- **Gellatly, Rene K.,** BS  
  Administrative Team Manager
- **Haahr, Patricia K.**  
  Accounting Clerk II
- **Johnson, Lilo B.**  
  Staff Assistant
- **Martinez, Patsy A., AA**  
  Staff Secretary III

### Animal Care Program

- **Douglas G. Rogers, BS, DVM, MS, PhD**  
  Faculty Supervisor

### ARF (Animal Research Facility), Lincoln, Nebraska

- **Clowser, Blaine, BS**  
  ARF Animal Operation's Manager
- **Fear, Clarence M.,** BS  
  Agricultural Research Technician I
- **Grotrian, Bonita K.,**  
  Office/Service On Call Worker
- **Lytle, Kandy**  
  Research Technician II
- **Tucker, Steve**  
  Office/Service On Call Worker
- **Woolard, Rebecca L.**  
  Office/Service On Call Worker

### VBMS/ARDC - (Agriculture Research and Development Center) Ithaca, Nebraska

- **Bergman, Benjamin**  
  Agricultural Research Technician I
- **Justin Heldt**  
  Office/Service On Call Worker

### Pre-Veterinary Advising Center

- **Steffen, David J.,** BS, DVM, PhD, ABVP  
  Advisor
- **Aerts, Alyse**  
  Peer Advisor
- **Heidbrink, Nathan**  
  Peer Advisor
- **Fry, Pamela**  
  Senior Peer Advisor
- **Painter, Laura**  
  Peer Advisor

### Cataract Research

- **Lou, Marjorie, PhD**  
  Biomedical Biochemist, Professor
- **Chen, Chao-Wei (Kate),** BA, MS  
  PhD Student
- **Fernando, M. Rohan, BS, MSc, PhD, M.Phil.**  
  Research Assistant Professor
- **Liyanage, Namal,** BA  
  MS Student
- **Wang, Yin, BS, MS**  
  PhD Student
- **Xing, Kuiyi,** BS, PhD  
  Senior Research Associate

### Immunology Research

- **TBA**  
  Immunologist

### Microbiology Research

- **Barletta, Raul, PhD**  
  Bacteriologist, Associate Professor
- **Barletta-Chacon, Ofelia, MSc, MD, PhD**  
  Postdoctoral Research Associate
- **Chahal, Harpreet,** BVSc  
  MS Student
- **Dogra, Harshdeep,** BS, MS  
  PhD Student
- **Livneh, Ayala,** MSc  
  Visiting Scholar
- **Liu, Xiaofei, BS**  
  PhD Student
- **Zinniel, Denise, BS, MS**  
  Laboratory Manager
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<thead>
<tr>
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<th>Degree</th>
<th>Role</th>
</tr>
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<tbody>
<tr>
<td>Cirillo, Jeffrey D.</td>
<td>BA, PhD, MS</td>
<td>Bacteriologist, Associate Professor</td>
</tr>
<tr>
<td>Cirillo, Suat</td>
<td>BS, MS</td>
<td>Researcher</td>
</tr>
<tr>
<td>Khoulootham, Manirath</td>
<td>BSc, MSc</td>
<td>PhD Student</td>
</tr>
<tr>
<td>Pandey, Amit Kumar</td>
<td>BVSc, MSc, PhD</td>
<td>Postdoctoral Research Associate</td>
</tr>
<tr>
<td>Park, Bonggoo</td>
<td>PhD, BS</td>
<td>Postdoctoral Research Associate</td>
</tr>
<tr>
<td>Samarakandi, Mustapha</td>
<td>BSc, MSc, PhD</td>
<td>Researcher</td>
</tr>
<tr>
<td>Subbian, Selvakumar</td>
<td>BS, MS, PhD</td>
<td>Postdoctoral Research Associate</td>
</tr>
<tr>
<td>Duhamel, Gerald</td>
<td>DVM, PhD</td>
<td>Pathologist &amp; Microbiologist, Professor</td>
</tr>
<tr>
<td>Dassanayake, Rohanna</td>
<td>DVM, MS</td>
<td>PhD Student</td>
</tr>
<tr>
<td>Gulzar, Ahmed</td>
<td>BVSc</td>
<td>MS Student</td>
</tr>
<tr>
<td>Navarajjine, Dharmika</td>
<td>BVSc</td>
<td>PhD Student</td>
</tr>
<tr>
<td>Risika, Jinadasa</td>
<td>BVSc</td>
<td>MS Student</td>
</tr>
<tr>
<td>Stryker, Cynthia</td>
<td></td>
<td>Research Technician III</td>
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<tr>
<td>Moxley, Rodney</td>
<td>DVM, PhD</td>
<td>Pathologist &amp; Bacteriologist, Professor</td>
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<tr>
<td>Bailey, Doreen</td>
<td>AS, MT (Asst BioSci)</td>
<td>Research Technician III</td>
</tr>
<tr>
<td>Berberov, Emil</td>
<td>MSc, PhD</td>
<td>Researcher</td>
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<tr>
<td>Bretschneider, Gustavo</td>
<td>DVM</td>
<td>PhD Student</td>
</tr>
<tr>
<td>Erume, Joseph</td>
<td>DVM, MS</td>
<td>PhD Student</td>
</tr>
<tr>
<td>Fushia, Kristine</td>
<td>(AnSci)</td>
<td>E. Coli Laboratory Supervisor</td>
</tr>
<tr>
<td>Hansen, Karen</td>
<td>BA</td>
<td>Research Technician III</td>
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<tr>
<td>Somerville, Greg</td>
<td>PhD, MS, BS</td>
<td>Microbiologist, Assistant Professor</td>
</tr>
<tr>
<td>Jacobs, Erik</td>
<td>BS</td>
<td>(Biochemistry Major) PhD Student</td>
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<tr>
<td>Levorson, Erica</td>
<td></td>
<td>Undergraduate Student</td>
</tr>
<tr>
<td>Lucas, Melissa</td>
<td>BS</td>
<td>(Biochemistry Major) PhD Student</td>
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<tr>
<td>Zhu, Yeifei</td>
<td>MEDI, MSvc</td>
<td>PhD Student</td>
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**Virology Research**

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<td>PhD</td>
<td>Virologist, Professor</td>
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<tr>
<td>Geiser, Vicki</td>
<td>BS, MS</td>
<td>PhD Student</td>
</tr>
<tr>
<td>Henderson, Gail</td>
<td>MA</td>
<td>Research Technologist I</td>
</tr>
<tr>
<td>Jiang, Yunquan</td>
<td>PhD</td>
<td>Researcher</td>
</tr>
<tr>
<td>Meyer, Florencia</td>
<td>BS MS (SBS)</td>
<td>PhD Student</td>
</tr>
<tr>
<td>Peng, Weiping</td>
<td>BS, MS, PhD</td>
<td>Senior Research Associate</td>
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<td>Perez de Breitschneider</td>
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<td>Liu, Shuanghu</td>
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<td>Martinsen, Angela M.</td>
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<td>Virologist, Professor</td>
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<td>Aguirre, Sebastian</td>
<td>BSc</td>
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<td>Brito, Monica R.</td>
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<td>Laboratory Manager</td>
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<td>de Lima, Marcelo</td>
<td>DVM, MS</td>
<td>Visiting Scholar</td>
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Garcia, Esther Alvarez, DVM, MS .............................. Visiting Scholar
Hsu, Ching Hsin, BS .............................................. MS Student
Kwon, Byungoon, DVM, MS ................................. PhD Student
Oliveira, Marília, DVM ......................................... MS Student

Research Support Glassware Preparation Laboratory

- Barletta, Raúl, PhD ................................. Bacteriologist, Professor
- Duhamel, Gerald, DVM, PhD ......................... Pathologist & Microbiologist, Professor
- Nilson, David ........................................ Lab Assistant II
- Rajagopol, Janaki ...................................... Lab Assistant II

UNL Core Microscopy Facility – Beadle Center

Zhou, You (Joe), BSc, PhD .............................. Director, UNL Core Microscopy Laboratory

Veterinary Epidemiology Research

- Smith, David, DVM, PhD, ACVPM, ABVP ................ Faculty Supervisor, Extension
- Closwor, Sharon, BS .................................. Extension Assistant

Extension

- Closwor, Sharon, BS ................................ Extension Assistant, Lincoln
- Griffin, Dee, DVM, MS ................................. Feedlot Cattle, GPVEC
- Smith, David, DVM, PhD .............................. Dairy and Beef Cattle Veterinarian, Lincoln

Nebraska Veterinary Diagnostic Laboratory System - Lincoln, North Platte, Scottsbluff

- Rogers, Douglas unsafe, BS, DVM, MS, PhD ................ Interim Executive Director
- Moxley, Rodney A., DVM, PhD ........................ Interim Executive Director
- Steffen, David, DVM, PhD ............................. Director, VDC Lincoln

Veterinary Diagnostic Center (VDC) Office Personnel

- Steffen, David, DVM, PhD .............................. Director
- Ellis, Roxane L, BS ..................................... Specialist
- Henning, Donna J. ...................................... Clerical Assistant III
- Henningson, Jamie, BS, DVM ........................ PhD Student
- Laws, Lenora L. ......................................... Clerical Assistant III
- Seelmiyer, Mavis C. ..................................... Staff Secretary III

Bacteriology

- Hinkley, Susanne, DVM, MS, PhD ................. Bacteriologist, Faculty Supervisor
- Bauman, Jamie ......................................... Research Technician III
- Combs, Recky S. ....................................... Research Technician III
- Ele, Shirley, BS .......................................... Research Technologist I
- Gehers, Angela .......................................... Research Technician III
- Jaroni, Divya, BS ....................................... Postdoctoral Research Associate
- Kuszak, Jennifer, BS ................................... Laboratory Specialist
- Lin, Qin ..................................................... Research Technician III
- Mosier, Trissa ............................................ Research Technician III
- Olsen, Cassandra J. ...................................... Research Technologist
- Pike, Laura G. ............................................. Research Technician III
- Royal, Deb, AS, BS ..................................... Laboratory Manager
- Widner, Kay S, DVM .................................... Research Technician III
- Williams, Patrick D. ..................................... Research Technician III

Glassware Preparation Lab

Heyer, Mary ............................................... Lab Assistant III
Histology
- Doster, Alan, DVM, PhD ........................................... Faculty Supervisor
- Braderic, Marijana ........................................... Histological Technician III
- Claussen, Pat, CDA ........................................... Research Technician II
- Fields, Rosa M ........................................... Histological Technician III
- Johns, LaVonne, HT ........................................... Histotechnician III
- Olmscheid, Robin, HT ........................................... Laboratory Supervisor
- Premaratnemenike, Kalyani, BSc ................................ Histopat hology Technician III

Necropsy
- Doster, Alan, DVM, PhD ........................................... Pathologist, Faculty Supervisor
- Riggert, Christen, BS, AS ........................................... Research Technician III

Pathology
- Doster, Alan, DVM, PhD ........................................... Pathologist
- Brodersen, Bruce, DVM, MS, PhD ................................ Pathologist
- Henningson, Jamie, BS, DVM .................................... PhD Student
- Rogers, Douglas, DVM, PhD ..................................... Pathologist
- Nabity, Paul ........................................... MS Student
- Schmitz, John A, DVM, PhD, ACVP ................................ Pathologist
- Steffen, David, DVM, PhD ........................................ Pathologist

Toxicology
- Carlson, Michael, PhD ........................................... Diagnostic Toxicologist/Analytical Chemist
- Rajurkar, Sanju, MS ........................................... Research Technician II

Virology
- Osorio, Fernando, MV, MS, PhD ................................... Virologist, Faculty Supervisor
- Braswell, Steve, AA, BS ........................................... Research Technician III
- Dabydeen, Fredrick ........................................... Laboratory Assistant II
- Frink, Stephaine K ........................................... Research Technician III
- Galeota, Judi, BS ........................................... Lab Manager
- Lin, Qin ........................................... Research Technician III
- McCoy, Shanna, BS ........................................... Research Technician III
- Mourtal, Timothy W., BS ........................................... Research Technician III
- Russ, Julia A ........................................... Research Technician III
- Schulz, Sean, BS ........................................... Research Technician III
- Stamerova-Berberova, Hristina H ................................ Research Technician III
- Wagner, Angela, BS ........................................... Research Technician III
- Xie, Liping, MD ........................................... Research Technologist

Quality Assurance Program
- Pedersen, Marci, BS, MA ........................................... Quality Assurance Manager

Great Plains Veterinary Educational Center (GPVEC) Clay Center, Nebraska
- Rupp, Gary, DVM, MS ........................................... Director & Professor – Beef Cattle
  - Hermesch, Dennis, BS, DVM ................................ MS Student
  - Kramer, Rolland, BS, DVM ................................ MS Student
  - Reece, Thomas, BS, DVM ................................ MS Student
- Dana, Ramona ........................................... Custodian II
- Ellis, Roger, BS, DVM, MS ................................ Lecturer
- George, Debbie ........................................... Staff Assistant
- Griffin, D. Dee, DVM, MS ................................... Professor – Beef Cattle Extension Feedlot Veterinarian
  - Brockway, William, BS, DVM ................................ MS Student
- Johnson, Steve E., BA ........................................... Systems Analyst
- Shuck, Karen K., CVT ........................................... Veterinary Technician, Agricultural Research Technician II
DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES
HONORS, AWARDS AND RECOGNITIONS, 2005

University of Nebraska Awards

Graduate Students

Rohana P. Dassanayake received the “Milton E. Mohr Fellowship,” from the University of Nebraska-Lincoln, Center for Biotechnology

Rohana P. Dassanayake received “IANR Student Research Travel Funds,” from the University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, Agricultural Research Division to attend the Conference in Research Workers in Animal Diseases in St. Louis, MO, December 4-6, 2005

Rohana P. Dassanayake and Florencia Meyer received the “Maude Hammond Fling Fellowship” from University of Nebraska-Lincoln, Office of Graduate Studies, for their “High Scholastic Performance and Accomplishments” as Student Scholars

Vicki Geiser received the “Ruth L. Kirschstein National Research Service Award,” for Pre-doctoral Fellows from the Department of Health & Human Services, National Institutes of Health

Joseph Erume received the “Frank & Marie Wheeler Fellowship,” from the University of Nebraska-Lincoln, Office of Graduate Studies

Joseph Erume received the “Shear-Miles Fellowship,” from the University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, Agricultural Research Division

Yin Wang received the “Othmer Fellowship,” from the University of Nebraska-Lincoln, Office of the Graduate Studies

Judy Bowmaster, MS candidate, Distant Education, received the “Holling Family Award” for Teaching Excellence from the University of Nebraska-Lincoln, College of Agriculture Sciences and Natural Resources

Yuko Mori received the “Widaman Trust Distinguished Graduate Assistant Award,” for outstanding performance as a graduate student, from the University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, Agricultural Research Division

Faculty Awards and Recognitions

Fernando A. Osorio received the “Dermott Coyne Award” in recognition to leadership and exemplary service to International Students, from the University of Nebraska-Lincoln,
David J. Steffen received a “Certificate of Superior Academic Advising Award” from the University of Nebraska-Lincoln, College of Agricultural Sciences Natural Resources at their annual banquet April 17, 2005

Drs. Bruce W. Brodersen and Douglas G. Rogers were nominees for the “Superior Academic Advising Award” from University of Nebraska-Lincoln, College of Agricultural Sciences and Natural Resources

Drs. Asit Pattnaik and David J. Steffen were promoted to the rank of Professor

Sabash Das, Center for Virology, was promoted to the rank Research Assistant Professor

Department of Veterinary and Biomedical Sciences
Departmental Awards

Paul Nabity, MS Program, received “Best Seminar Award,” from the University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences

Vicki Geiser, PhD Program, received “Best Seminar Award,” from the University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences

Sandra Perez received the “Susan Ann Smith Mills Endowment Award,” from University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences

National and Regional Awards

Dr. Gary Rupp, Director, Great Plains Veterinary & Educational Center, received the “Beef Award,” from the American Association of Bovine Practitioners Conference, Fort Worth, Texas

Dr. David R. Smith, Dairy and Beef Cattle Veterinarian, University of Nebraska-Lincoln, Veterinary and Biomedical Sciences Department, Institute of Agriculture and Natural Resources, received the “Wendell Burgher Beef Industry Award.” The award recognizes Dr. Smith's excellent UNL Extension education and research efforts in animal production food safety issues, including epidemiology of E. coli O157:H7 and salmonella in feedlot cattle. The award was made possible through gifts to the University of Nebraska Foundation by Louis W. Burgher, Fort Calhoun, Nebraska, in memory of his father, Wendell.
University of Nebraska-Lincoln  
Department of Veterinary and Biomedical Sciences  
2005 Service Awards

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<tr>
<td>Sharon Clowser</td>
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<td>Michael P. Carlson</td>
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<td>Seetharaman Gopinath</td>
<td>David J. Steffen</td>
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<td>Lanora Laws</td>
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UNDERGRADUATE STUDENTS
2005 DEAN'S LIST

Veterinary Sciences Majors

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<tr>
<td>Donna Bader</td>
<td>Pamela Fry</td>
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<tr>
<td>Jordan Bader</td>
<td>Cody Hankins</td>
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<td>Elizabeth Farrow</td>
<td>Malori Marotz</td>
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<td>Ashley Meyer</td>
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<td>George Petersen</td>
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<td>Abby Van Hoef</td>
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Veterinary Science Major

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<tr>
<td>Donna Bader</td>
<td>Lindsey Hofman</td>
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<td>Meredith Cruse</td>
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<td>Stephanie Schenkelberg</td>
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Pre Vet

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<tr>
<td>Kelly Kappen</td>
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Undergraduate Award
College of Agricultural Sciences and Natural Resources

Rachel Friedrich received the William Charles Yount Educational Veterinary Scholarship from University of Nebraska-Lincoln, College of Agricultural Sciences and Natural Resources

Outstanding Woman in Science Award

<table>
<thead>
<tr>
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<tr>
<td>Michelle Bader</td>
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## DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES
### 2005-2006 COMMITTEE ASSIGNMENTS

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<td>Gerald Duhamel (Chair/November 05 - October 06)</td>
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<td>September, 2008</td>
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<td>Clayton Kelling</td>
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<td>November, 2005</td>
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<td><strong>Peer Review Committee (3-Yr Appt)</strong></td>
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<td>Gerald Duhamel, Chair</td>
<td>August, 2004</td>
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<td>Greg A. Somerville</td>
<td>October, 2005</td>
<td>September, 2008</td>
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<td>Lee Johnson (Secretarial Support)</td>
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<td><strong>VBMS-IBMS Graduate Committee (3-Yr Appt)</strong></td>
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<td>August, 1999</td>
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<tr>
<td>Robin Olinsbcid (VDC)</td>
<td>September, 1998</td>
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<td>Kandy Lytle (ARF)</td>
<td>February, 2003</td>
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<td>Doreen Bailey (VBS/Technician)</td>
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<td><strong>Veterinary and Biomedical Science Undergraduate Student Research Coordinator</strong></td>
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<td><strong>Seminar, Chairman</strong></td>
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<td><strong>George A. Young Swine Conference Planning Committee</strong></td>
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<td>Gary Rupp (NU/GPVEC)</td>
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<td>Randall Schawang (NVMA Rep)</td>
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<td>Ron Wallman (Veterinarian/Seward Animal Hospital)</td>
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<td>Don Draper (Assoc. Dean/ISU)</td>
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<td>2007</td>
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<td>Monica Howard (Dir Student Prog/ISU)</td>
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<td>2007</td>
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24
DEPARTMENT OF VETERINARY AND

BIOMEDICAL SCIENCES

FACULTY PROFILES
The main focus of my laboratory is the study of bacterial pathogens including Mycobacterium tuberculosis, Mycobacterium avium subsp. paratuberculosis and related pathogens. In this area, the major long-term goals in my laboratory are: 1) to understand virulence and drug-resistance mechanisms in pathogenic mycobacteria, and 2) to develop molecular tools to diagnose and control mycobacterioses.

Drug resistance studies in mycobacteria have focused on the molecular targets of peptidoglycan synthesis inhibitors. We have identified the molecular targets for D-cycloserine. One of these targets is the enzyme D-alanine racemase, involved in the initial steps of peptidoglycan biosynthesis. Furthermore, we have shown that overproduction of D-alanine racemase in mycobacteria underlies the D-cycloserine resistance phenotype of resistant mutant strains. The specific molecular mechanism responsible for the overproduction of this enzyme was shown to be a promoter-up mutation in the control region of the D-alanine racemase gene. We have also studied related enzymes involved in D-alanine metabolism including L-alanine dehydrogenase and D-alanine ligase. We plan to study the essentiality of these genes in the context of drug design and vaccine development in M. tuberculosis.

M. paratuberculosis is the causative agent of Johne's disease, a wasting chronic enteritis affecting all ruminants. We have developed a genetic system for M. paratuberculosis that includes phage infection, plasmid transformation, and transposon mutagenesis. We have identified several attenuated strains from a mutant bank. In collaborative studies, we are testing these mutants in animal models including mice and baby goats. In addition, we have identified and characterized M. paratuberculosis secreted and cellular immunogenic proteins. From these molecular studies, a practical application test to measure the susceptibility of M. paratuberculosis to antimicrobial agents was developed. These steps are essential prerequisites for the understanding of pathogenesis, and the development of anti-microbial therapies and new and more effective vaccines compatible with diagnostics.

My teaching responsibilities include serving as co-instructor for the courses VBMS 951 Advanced Molecular Infectious Diseases and VBMS 424/824 Basic Molecular Infectious Diseases. I advised seven MS and three PhD graduate students who have completed their degrees. I served as co-advisor for 2 MS graduate students who completed their degrees.
My position was created out of a need for more pathologists at the Veterinary Diagnostic Center. The increased need was a result of continual increase in the numbers of case submission. Existing faculty at the Diagnostic Center were not able to meet other commitments as a result of the elevated case load. Funding for my position comes entirely from revenues generated by submission fees received at the Diagnostic Center.

My efforts are directed at coordination of appropriate testing of samples submitted to the Diagnostic Center, assimilating test results for determining a diagnosis, and generating a suitable report to the submitting veterinarian or owner. The range of species that samples originate from is wide and consists mainly of food animals and companion animals with avian species as well as wild and or exotic and aquatic species. I also supervise the contract with the USDA for testing of samples for scrapie in sheep and chronic wasting disease in deer.

I have no formal research FTE, but I am conducting projects which are directed at investigating diseases of cattle. Currently my projects concentrate mainly on bovine viral diarrhea virus (BVDV). One of these studies includes detection of cattle persistently infected with BVDV. I am collaborating with researchers at Auburn University, investigating the role of BVDV as a reproductive disease in cattle.
Michael P. Carlson, MS, PhD
Diagnostic Toxicologist/Analytical Chemist

I serve as a diagnostic toxicologist for the VDC. I review cases submitted for toxicology services, obtain case histories as needed, interpret diagnostic toxicology results, write final toxicology reports for diagnostic cases and report results to case submitters or VDC diagnosticians. I also consult with veterinarians, clients and university faculty and staff about toxicology and analytical services.

I also serve as an analytical chemist for the VDC Toxicology Laboratory. I manage the operation of that laboratory; select and validate methods for analytical services; supervise, train and manage the staff of that laboratory; and assist with performance of analytical services as required.

I teach VBMS 410 – Introduction to Pharmacology and Toxicology, a 4-credit hour, integrated studies course required for Veterinary Science undergraduate majors. The course is intended to introduce students to basic principles of drug action and toxic effects of chemical substances. The course also emphasizes written and oral communication skills. Students are required to write a position paper on a controversial pharmacology or toxicology topic and present their position orally to the class. It is offered annually each fall semester.

My research interest is nitrate toxicosis in cattle, especially chronic nitrate exposure related to abortions.

I also am interested in the application and implementation of international standards for laboratory certification to veterinary diagnostic laboratories.
Our laboratory is interested in the pathogenesis of bacterial lung infections, which currently cause disease in more than one-third of the world’s population; such as, tuberculosis, tularemia and Legionnaires’ disease. We are examining the virulence mechanisms of bacteria using cellular, molecular and genetic techniques. Our primary research goal is to obtain a better understanding of the roles of the pathogen and host in disease so that we may develop novel methods for prevention and treatment. These studies should contribute to our understanding of host-pathogen interactions at the molecular and cellular level. In our current studies we have identified several bacterial genes that are required by these organisms to cause disease in animals and humans. Through the use of genomics, proteomics and functional analysis of these genes and mutant bacterial strains, we have better defined how these organisms invade eukaryotic cells and replicate within them. These mechanisms of invasion are critical to the ability of these organisms to survive both during infections and in environmental reservoirs. Infectious diseases involve both the host and pathogen during interactions that result in pathogenesis. For this reason, we also examine mechanisms of host defense, immune evasion, signal transduction, phagocytosis and intracellular trafficking. The primary cell types involved in virulence of respiratory pathogens are human and murine macrophages, but environmental protozoa also play a role and have many similarities to mammalian phagocytic cells. Through examination of interactions by bacterial pathogens with both mammalian and environmental phagocytic cells we have identified potential receptors, signal transduction pathways, cytoskeletal components and intracellular compartments that are involved in the ability of these organisms to cause disease. This two-pronged approach to understanding infectious disease has allowed us to develop relatively comprehensive models for the mechanisms of invasion and pathogenesis during infections in humans and animals. We expect that the continued application of this approach should yield great insight into infectious diseases in general, in addition to that of respiratory pathogens, some of the most important infections in both animals and humans. My main teaching responsibilities include the continuous updating and improvement of two advanced courses in microbial pathogenesis to support the current Departmental curriculum and Ph.D. program. It is expected that these courses will attract a wide audience of graduate and undergraduate students from both UNL and UNMC.
My research includes the studies on viral gene expression and vaccine design using RNA viruses. The two viruses I am studying are vesicular stomatitis virus (VSV), a non-segmented negative-strand RNA virus and porcine reproductive and respiratory syndrome virus (PRRSV), a non-segmented positive-strand RNA virus. Due to its simple genome organization VSV has served as an attractive model to study the gene expression in negative-stranded RNA viruses. Understanding the mechanism of gene expression and its regulation is essential to identifying unique virus-specific targets for therapeutic intervention in controlling infection. More specifically I am looking at the role of VSV phosphoprotein P in viral transcription, replication and assembly of infectious virus particles. Phosphoprotein of VSV is a multifunctional protein which is an essential subunit of viral polymerase. Using reverse genetics I have demonstrated that phosphorylation at specific residues within the P protein of VSV regulates the activities of the viral RNA-dependent RNA polymerase in transcription and replication and plays a major role in the life cycle of VSV. Using transposon-insertion and deletion mutagenesis we recently found out that the hypervariable hinge region of VSV P protein plays an important role in viral RNA synthesis and assembly of infectious particles. At present we are mapping out the individual amino acids in the hypervariable region of P that is required for virus assembly. Currently efforts are being made to establish a yeast-two-hybrid system to identify the cellular/viral factors involved in the assembly of VSV. We are further planning to investigate the role of nucleotide sequences within the viral genome that control encapsidation, transcription and replication processes.

We have made use of our recent finding that the hypervariable region of VSV P protein can tolerate insertion of 19 amino acids with minimal effect on P protein activity. This has led us to produce a fluorescently labeled VSV with the eGFP inserted at the hypervariable region of P protein. Using this green virus we are investigating the transport of viral nucleocapsids by time lapse microscopy. This has allowed us to track the movement of individual nucleocapsids in infected cells. We have demonstrated that microtubules play an important role in the transport of VSV nucleocapsids from the site of synthesis to the site of assembly and mitochondria may play a role in this process. Several leads in this direction include single-particle tracking of viral nucleocapsids, multicolor live-cell imaging of ribonucleoprotein complexes and identification of microtubule motors involved in the transport.

Another aspect of my work has been the development of viral vaccines by genetic manipulations. At present I am using VSV as a vector to express porcine respiratory and reproductive syndrome virus (PRRSV) glycoproteins to study the immunogenicity of these proteins in animals. Recombinant VSVs expressing PRRSV GP5 and M proteins have been recovered by reverse genetics. Using these recombinant viruses we further plan to study the mechanism of entry and tissue tropism in PRRSV infection. Animal experiments are also being carried out for testing these recombinant viruses for generation of humoral and cell-mediated immune responses against PRRSV and to explore the possibility of using them as vaccines for the prevention of PRRSV infection.
I serve as a Diagnostic Pathologist in the VDC and rotate necropsy duty on a regular basis with other pathologists. We are responsible for the gross examination of various species, histological examination of tissues from necropsies and surgical biopsies; requesting and interpreting results from the bacteriological, serological, virological, toxicological tests which are part of the laboratory work-up; and establishing a diagnosis or rendering an opinion regarding each case. I spend a considerable amount of time on the telephone consulting with veterinarians and livestock owners regarding clinical histories, case submissions, and results of diagnostic testing. I have served as an expert witness many times for legal proceedings or insurance inquiries, the largest being in excess of $20 million. I have acted as a consultant for United States Department of Agriculture regarding foreign veterinary diagnostic laboratory capabilities.

I have no formal teaching FTE, but have served as the faculty coordinator for VBMS 901 (Diagnostic Techniques) and have taught several advanced pathology courses for pathology residents and graduate students. In addition, I have served as major advisor for master's and doctoral students and am a member of several graduate supervisory committees in the Department.

My research interests consist of infectious diseases of cattle and swine. I have been active in pursuing emerging disease syndromes initially seen in the VDC such as porcine reproductive and respiratory syndrome virus (PRRSV) and porcine circovirus infection. The PRRSV project led to the development of a commercially available PRRSV vaccine. I and the other pathologists serve primarily as consultants in a team-oriented approach to research problems where each member of the team contributes his area of expertise to the project. Other faculty in the Department who have major research appointments act as project leaders and request our assistance as necessary.
My long-range goal is to define basic mechanisms of host-parasite interactions, and their relationship to susceptibility or resistance against disease, particularly within the framework of enteric diseases caused by bacteria and viruses. Presently, I am engaged in basic and applied biomedical research aimed at characterizing molecular mechanisms of microbial pathogenesis and host defense with practical applications to diagnosis and control of enteric diseases of animals and human beings. Specifically, I am investigating the biology of polymicrobial interactions in inflammatory bowel diseases caused by Brachyspira pilosicoli, a newly discovered pathogenic intestinal spirochete, enterohepatic Helicobacter and Campylobacter species of human and animals, and Lawsonia intracellularis, an obligate intracellular bacterium that causes proliferative enteropathy in non-human primates and animals.

Also, I am investigating the role of heterotypic immunity in protection against intestinal disease caused by group A rotaviruses, a major cause of diarrheal disease in human infants and animals. Current research addresses bacterial virulence factors and model development of intestinal injury and repair, phenotypic and genotypic bases of microbial pathogenesis, development of molecular methods for diagnosis of enteric diseases and control using subunit and recombinant vaccines.
The University of Nebraska, Great Plains Veterinary Educational Center serves as an educational resource for students in professional veterinary degree programs at Kansas State University and other colleges of veterinary medicine throughout the United States, and occasionally international institutions. Veterinary students during their fourth year elective clinical rotations are offered the opportunity to participate in a multi-faceted approach to food animal medicine, surgery and production management. Within a cooperative program with the U.S. Meat Animal Research Center, beef cattle and sheep production systems are utilized to offer experiences and clinical skill development to further train students in reproduction, nutrition, economics, health and disease, production management and clinical practicum situations. Although the contact with the livestock resources at U.S. MARC is limited, the research center staff veterinarian has been cooperative in student programs.

In addition, the first-year veterinary students from Kansas State University are offered a one-week introductory exposure to beef, dairy, swine, and sheep production systems and instructed in general clinical skills. Discussions relating and linked with food animal production, such as food safety and quality assurance, animal welfare and environmental issues, producer perspectives on global marketing, and other issues are openly provided. Also, students from UNL in the pre-veterinary club come to GPVEC on a one-day visit to tour the facilities and learn of the opportunities provided.

Continuing education programs for graduate veterinarians and allied specialists are provided in areas such as beef production management, computer record keeping and information systems, source verification and quality assurance, animal identification programs, and many other diverse areas. Extension services to veterinarians, producers, and allied industries are consistently requested and provided, in the form of meetings, conferences, and telecommunications.

Although limited due to staff and time commitments, applied research and studies continue to be explored in the multitude of beef production health and management areas encompassed in the teaching and extension programs.

The future at GPVEC should be exciting with new ventures in the veterinary education program between UNL and cooperative universities with colleges of veterinary medicine. A rekindling of the cooperative efforts and studies between GPVEC and the US MARC are necessary to bring a united effort and support of student programs. Expanded efforts in all aspects of the beef industry and veterinary profession can be provided with additional resources to develop education, research, and extension programs. Most importantly, the veterinary students need this resource for the development of applied clinical skills and practical knowledge. This will remain the priority.
Cataract is the major cause of blindness around the world. Age related cataract or senile cataract is the most common type of cataract. The normally transparent lens of the eye becomes cloudy in cataract. Oxidative stress which is induced by reactive oxygen species (ROS) has long been implicated in senile cataract formation. ROS molecules are generated in the lens either endogenously by enzyme systems or exogenously from the environment. ROS molecules produced through these processes in the lens are neutralized by antioxidants and ROS neutralizing enzyme systems in the lens. Even in the presence of these powerful antioxidants and ROS neutralizing enzyme systems, some ROS molecules get through these defense systems and oxidatively damage cellular molecules such as proteins, lipids and nucleic acids. Oxidation of lens proteins leads to lens opacification and cataract formation. Hence lens is also equipped with enzyme systems that can repair such oxidatively damaged proteins and other molecules. I have focused my research on the characterization of the repair systems in the lens.

1. **Functions of thioltransferase-1**
   Thioltransferase-1 is a thiol/disulfide exchange enzyme. It is located in cytosol and has dethiolation activity in the lens. It can repair oxidatively modified lens proteins using its dethiolation activity. In addition to that we have shown that thioltransferase-1 has ascorbic acid recycling ability. Human lens contains 2-3 times higher concentration of ascorbic acid as compared to other human tissues. Ascorbic acid functions as an antioxidant and its oxidation product dehydroascorbic acid is highly toxic and has been implicated in human cataract formation. Hence lens must have a mechanism to regenerate ascorbic acid. We have shown that thioltransferase is responsible for ascorbic acid recycling in human lens epithelial cells. We have also investigated the induction of thioltransferase-1, thioredoxin and thioredoxin reductase in pig lens under oxidative stress and found that all three enzymes are induced under the given oxidative stress conditions in an attempt to rescue the lens from the oxidative insult so that the clarity of the lens would not be affected by the given stress.

2. **Thioltransferase-1 knockout mice**
   Primary cultures of mouse lens epithelial cells obtained from wild type mouse and thioltransferase-1 knockout mouse are used to compare the sensitivity of the these two cell types to oxidant stress. We are comparing the oxidative damage caused by oxidants in these two cell types using parameters such as marker enzyme activities, glutathione level, cell viability and cell proliferation.

3. **Functions of thioltransferase-2**
   Thioltransferase-2 is the nuclear and mitochondrial isoform of thioltransferase-1. We are investigating the functions of this enzyme in nucleus and mitochondria. Thioltransferase-2 has dehydroascorbate reductase activity, ascorbate free radical reductase activity as well as peroxidase activity. Investigations are under way to elucidate how these functions of this enzyme are important to maintain the integrity of mitochondria and nucleus.
I am responsible for creating and coordinating veterinary medical education opportunities in feedyards. Through my extension appointment, I am responsible for conducting applied field research that relates to feedlot production management and beef safety. I am also responsible for disseminating production management information to the beef feedlot industry. Through my service commitment I provide a substantial portion of the veterinary medical service to the MARC feedlot. I also act as a consulting veterinarian to Nebraska feedlot veterinarians and other feedlot specialists. Through these contacts, I am able to provide unique educational opportunities to fourth-year veterinary students, veterinary technician students and animal science students.

The crux of my research involves management and production with an emphasis on creating or perfecting techniques that can be of direct benefit to the feedlot industry. I have a passionate interest in beef quality assurance (BQA) and a portion of my research focuses on developing and evaluating pre-harvest techniques that will help guarantee the wholesomeness of the beef supply in the United States. Developing and disseminating pre-harvest HACCP techniques for use in beef feedlots has become a major effort. I recognize the economic need for the beef cattle industry to present consumers with a consistently high quality product. I communicate this information to feedlot veterinarians, feedlot producers and potential consumers through my extension. This involves poster displays at trade shows, invited presentations and through GPVEC's Internet BQA home page. I always include BQA as a part of the focus of my consulting work. Food safety, including pre-harvest HACCP, residue avoidance and minimizing injection site blemishes is always a part of the feedlot teaching curricula at GPVEC.

Inter-departmental or Inter-institutional Cooperative Activities

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Diagnostic Service

Our AAVLD-accredited diagnostic bacteriology laboratory offers full service bacterial, mycological, and parasitological diagnostics. In addition, we have expanded our molecular diagnostic capabilities such that we now offer PCR and RFLP assays for detection, speciation and virulence typing of several bacterial pathogens. As a certified laboratory, we conduct the culture and serology testing for the state’s Johne’s program. Our in-house developed mycoplasma culture test has been implemented and is widely used by clientele. While offering these services, we are constantly striving to implement new tests both in diagnostic bacteriology and molecular diagnostics.

The laboratory is currently involved in collaborative research with industry, and also has research projects planned to optimize the methodology in DNA extraction for PCR, and to utilize our mycoplasma culture and PCR assay in a field study. Another area of interest is ‘infectious bovine keratoconjunctivitis’, a disease of cattle caused by *Moraxella* species. The work of a Master’s project is focusing on the characterization of virulence factors (in particular a putative RTX exotoxin) of *Moraxella* (subgenus *Moraxella*) *bovis* and *Moraxella* (subgenus *Branhamella*) *ovis*.

Research

We are involved in a large collaborative project with the goal of developing, validating and implementing methods for detection and control of *E. coli* and *Salmonella* in feedlots. The data obtained so far indicate that the novel methodology of testing on the pen level may provide a sensitive, reliable and practical means of identifying pens of cattle shedding *E. coli* and/or *Salmonella*. In addition, the developed methodology may aid in identifying potential points of intervention within a pen of cattle. Currently, we are in the process of validating these pen testing strategies in commercial feedlots. In our research feedlot, we have conducted a study to test the usefulness of an anti-*E. coli* O157:H7 vaccine and a direct fed microbial, both individually and together, in the reduction of the fecal shedding of O157:H7. The preliminary results are very encouraging.

We are also involved in the development and preliminary validation of a field test to test live animals for the presence of antimicrobial residues before they go to slaughter.
Statement of Current Research Activities

1. **a-Herpesvirus latency**

   Latency of a-herpesviruses is the focus of research in my laboratory. Bovine Herpes Virus 1 (BHV-1) and Herpes Simplex Virus 1 (HSV-1) are being used to study virus-host interactions. BHV-1 is a significant viral pathogen of cattle that can induce respiratory disease, abortion, or occasionally encephalitis. BHV-1 is also a causative agent of "Shipping Fever" or Bovine Respiratory Complex. As a consequence of the pathogenic potential of BHV-1, the cattle industry suffers more than $500,000,000/year in losses. HSV-1 causes a variety of clinical symptoms, is the leading cause of corneal blindness due to an infectious agent, and appears to be a cofactor in Alzheimer's disease. Approximately 99% of all human beings are infected with HSV-1. a-Herpesviruses infect epithelial cells of the upper respiratory tract or the genital tract. Extensive viral gene expression occurs, virus is shed, and clinical symptoms are apparent. Virus enters the peripheral nervous system, trigeminal ganglia or sacral ganglia, where it establishes a latent infection in neurons. Viral DNA can persist in a latent state for the lifetime of the infected host or periodically reactivate. Only one small region of the BHV-1 genome is transcriptionally active in latently infected neurons, the latency-related (LR) gene. HSV has a similar gene; the latency-associated transcript (LAT). A latent infection can be divided into 3 distinct stages: 1) establishment, 2) maintenance, and 3) reactivation of latent virus. Reactivation can cause recurrent disease and regardless of the clinical outcome promotes virion transmission. Thus, latency is crucial for pathogenesis and is required for virus transmission.

   LR gene products and LAT inhibit apoptosis (programmed cell death) in transiently transfect cells, and in trigeminal ganglia (TG) of infected calves or rabbits, respectively. Based on these studies, we hypothesize that LR gene products and LAT promote survival of infected neurons. Future studies will identify the mechanism by which LR gene products and LAT inhibit apoptosis.

2. **Regulation of productive infection by bICP0**

   Bovine herpesvirus 1 (BHV-1) is an important causative agent of "Shipping Fever", an upper respiratory tract disorder that costs the US cattle industry more than $500 million/year. Acute infection by BHV-1 results in conjunctivitis, pneumonia, genital disorders, abortions, and occasionally encephalitis. As discussed above, BHV-1 establishes latency in sensory neurons located in trigeminal ganglia, and also germinal centers within the tonsil. Periodically BHV-1 reactivates from latency, which is crucial for virus transmission in the field. In sharp contrast to latency in which viral gene expression is severely restricted, 75-80 viral genes are expressed during productive infection and reactivation from latency. The bICP0 protein activates expression of all viral genes, and thus stimulates acute infection and reactivation from latency. Our recent studies identified four separate domains in bICP0 that are necessary for activating transcription: 1) the zinc RING finger located between amino acids 13-51, 2) a large domain spanning amino acids 78-265, 3) sequences at or near amino acid 457, and 4) a nuclear localization signal located at the C-terminus. bICP0 also interacts with chromatin remodeling enzymes; histone deacetylase 1 (HDAC1) (116) and p300, a histone acetyltransferase (HAT). Functional studies demonstrated that bICP0 inhibits interferon (IFN)-induced transcription, and cooperates with p300 to activate viral transcription. Finally, a bICP0 null mutant was constructed that does not efficiently replicate or kill bovine cells, but this mutant strongly induces the IFN response. Our long-term goals are to delineate the mechanisms by which bICP0 stimulates viral gene expression, productive infection, and reactivation from latency.
Our research is focused on pathogenesis of bovine respiratory syncytial virus (BRSV) and bovine viral diarrhea virus (BVDV) infections in cattle. Immunity to BRSV infection is incomplete and reinfections occur. Protective host immune responses to vaccines or natural infections may be compromised by mutation of the surface glycoproteins. We are examining the roles of the BRSV surface attachment (G) and fusion (F) glycoproteins in pathogenesis and immunity. Genetic and antigenic heterogeneity, and structure of the BRSV G and F glycoprotein are being studied to determine the influence of those variables on survival of the virus in the host and on development of protective immunity in the host. Our studies involve use of recombinant BRSV glycoproteins expressed in insect cells using the baculovirus vector and developing of a cDNA BRSV F protein vaccine.

The overall goal of our BVDV research is to study the mechanisms involved in the pathogenesis of acute genotype 2 BVDV infections by studying virulence. We are examining the 5' untranslated region (5'UTR) of BVDV isolates for conserved nucleotide base substitutions in the internal ribosomal entry site (IRES) which are biologically significant. Translation studies using cDNA plasmid constructs of the 5' UTR of isolates from a panel of genotype 2 BVDV isolates are being used to study relationships between translational efficiency and virulence of individual isolates in experimental calf infection studies.

Since naturally-occurring pneumonia in cattle or neonatal calf diarrhea typically involves infection of the host with more than one infectious agent, we are also studying the interaction of BVDV with BRSV or bovine rotavirus in concurrent in vivo and in vitro infections.

Teaching responsibilities include serving as major advisor for graduate students, mentoring undergraduate students conducting thesis research projects, and as course instructor. I am the sole instructor for two courses, Principles and Prevention of Livestock Diseases and our departmental undergraduate capstone course: Integrated Principles and Prevention of Livestock Diseases. Each year, I have also contributed guest lectures in immunovirology or vaccinology courses.
Marjorie F. Lou, BS, MS, PhD
Professor

Biochemistry/Biomedical Sciences
Appointment: .90 FTE Rsch; .10 FTE Tchg

Main Focus: Biochemical Mechanism of Senile Cataract Formation

Our focus on the biochemical mechanism of age-related cataract formation is oxidative stress. We used hydrogen peroxide-induced cataract in organ culture condition as our model to study the progressive changes in morphology and intracellular redox potential in the lens. We demonstrated that lens opacification is associated with the increased protein insolubility and protein aggregation, resulting from lens protein oxidation by oxidative stress. We also showed that the thiol groups in lens proteins are oxidized by forming protein-thiol mixed disulfides first followed by protein protein disulfide formation, a condition that will lead to lens opacification. We studied the site of thiolation on lens proteins by using mass spectrometry and found a direct evidence that protein thiolation caused change in protein conformation, thus supporting our hypothesis that protein-thiol mixed disulfide formation plays an important role in cataractogenesis.

We discovered that the lens has an intrinsic repair enzyme systems, the thioltransferase/ GSH and thioredoxin/thioredoxin reductase/NADPH systems, which can repair the damaged lens proteins/enzymes and restore their biological functions. We cloned, sequenced and characterized these enzymes and found them to be extremely oxidant-resistant in the lens epithelium cells. The physiological function of the two repair systems is proposed to be oxidative stress defense enzymes by preventing the accumulation of oxidant induced protein-protein disulfide in the lens and to regulate the thiol/disulfide homeostasis so that the lens will not be permanently damaged by oxidative stress.

Redox Signaling in the Lens Epithelial Cells

We examine the physiological function of reactive oxygen species in promoting cell growth and differentiation in the lens. This is a new research direction, which requires a lot of knowledge in signal transduction and the redox biology combined. We are using a growth factor, PDGF, as a model to study the mechanism of the mitogenic action of PDGF in cell proliferation. We now have extensive data suggesting that a growth factor binding can trigger generation of reactive oxygen species (ROS) via the membrane enzyme NADPH oxidase. ROS is then used by the cells to inhibit phosphatases, so that phosphorylation (activation) of signaling components, such as the MAPK cascades, can be initiated. We are also working on the regulation of this redox signaling system and investigating several transcription factors in the nucleus that are associated with gene expression under such experimental conditions.

Cataract Models

Our effort is also to establish a cataract model relevant to humans. We have recently developed a thioltransferase knockou mouse model, which showed lens protein aggregation as the animal aged beyond 13 months old, while the age-matched wild type remained normal. Thus, this is a model very much mimicking human age-related cataract. We plan to use this model to study the benefit of using various antioxidants and examine their efficacy against protein aggregation, including using thioltransferase, which is lacking in the lens of these animals.
My research centers on pathogenesis of viral infections. In the last decade we have focused on a major viral agent that affects swine: Porcine Reproductive and Respiratory Syndrome Virus (PRRSV, an arterivirus, ssRNA+ genome). PRRSV currently causes the most economically significant disease of US swine stock. Our initial interest in this disease centered on the primary characterization of the cell tropism of this virus in vivo. We initially detected and characterized a novel tropism of PRRSV for male germ cells. Such a specialized tropism of PRRSV results in death of these cells by (in vivo) induction of apoptosis. This selectivity for testicular germ cells also explains the transmission of PRRSV via semen, one of the most important routes of dissemination of this agent. We have also further characterized the immunobiology of this virus in convalescent animals. Our research seems to indicate that, contrary to other known examples of RNA virus persistence, the persistent infection established by PRRSV is finite and seems to involve a low level of productive infection that progressively declines until complete viral clearance takes place. We found that during the period of viral persistence, extensive modulation of the homologous (PRRSV-specific) cell-mediated and humoral immune response takes place. We are particularly interested in the mechanisms responsible for establishment of protective immunity against PRRSV. There is an urgent need for improvement of the vaccines that are currently used against PRRSV. We have discovered that a major role for protection against infection and disease caused by PRRSV resides with a type of PRRSV-specific antibodies that has the ability to render PRRSV un-infectious (i.e. antibodies that neutralize PRRSV). The key to a better protection against PRRSV resides on the development of better and safer vaccines that would prevent infection and possess more genetic stability than the commercial attenuated vaccines currently in use. To that end, we are interested in: 1) characterization of the major immunogenic components of PRRSV, and 2) characterization of the genes responsible for the ability to produce disease (virulence) by PRRSV. Knowing the genetic basis of PRRSV virulence and attenuation should permit a more precise design of safer, more efficacious vaccines.

Diagnostic Service: As the director of diagnostic virology at the Veterinary Diagnostic Center, my main goal has been to expedite the diagnostic process through the implementation of rapid tests that are based on the direct detection of viral components or anti-viral antibodies in the clinical sample. I am particularly interested on the evaluation of the fitness and robustness of new commercial diagnostic serologic kits for PRRSV and for Foot-and-Mouth Disease Virus (FMDV). In the latter case, the differential (i.e. capable of distinguishing infected from vaccinated animals) kits for FMDV may be of cardinal importance to US Agriculture, in case any form of vaccination is considered as a viable rapid response against a possible outbreak of this disease in the US. Another major responsibility as diagnostic virologist is my maintaining an active diagnostic surveillance for Pseudorabies Virus (PRV), a very important herpesvirus that has been recently eradicated of domestic swine in the U.S. Our diagnostic virology lab serves as reference for other labs nationwide in relation to molecular detection of PRV in tissues of animals suspects of PRV infection.

Regarding teaching, I collaborate with team teaching of virology courses. Together with Dr. Charles Wood, I co-teach a course on Advanced Viral Pathogenesis and collaborate with a team teaching of Advanced Viral Immunology.
My research focuses on various aspects of viral genome transcription, replication, and virus assembly in cells infected with viruses. As model systems for these studies, we use vesicular stomatitis virus (VSV), a non-segmented negative-strand RNA virus, hepatitis C virus (HCV), a positive-strand RNA virus, and porcine reproductive and respiratory syndrome virus (PRRSV), another positive-strand RNA virus. VSV is a cattle pathogen but has been widely used as a paradigm for understanding of biology of this group of RNA viruses that include some of the most serious human pathogens. HCV is a significant human pathogen for which no effective antiviral therapy is currently available. PRRSV causes economically significant diseases in swine population.

In recent past, our research has been centered on the understanding the mechanism of VSV genome transcription and replication. We have generated plasmids encoding subgenomic replicons of VSV that when transfected into mammalian cells, faithfully reproduce the processes of transcription and replication that is normally observed in virus-infected cells. Using the system of reverse genetics that I developed several years ago, we have examined many different aspects of the mechanisms of this virus genome transcription and replication. We have proposed a model suggesting that nucleotide sequences present at the beginning and the end of each gene coding sequences of VSV contain regulatory signals that mediate synthesis of five individual mRNAs from the large viral genome in infected cells. In addition, in a separate model, we have proposed that differential phosphorylation of one of the key viral proteins (the phosphoprotein, P) regulates the transcription and replication functions of the viral RNA polymerase. Logical ongoing studies are directed at generating and characterizing mutant viruses with defects in the P protein so that it may be possible to create viruses with attenuated phenotypes for development of viral vaccines.

In the area of HCV, we are attempting to develop a system for replication of subgenomic replicons in transfected mammalian cells. These are extremely challenging studies, but if successful, will advance the field significantly. For these studies, we have generated a variety of HCV subgenomic replicons and are currently examining their ability to replicate in transfected cells. In addition, our studies are directed at generating infectious HCV from mammalian cells. Currently, attempts to develop antiviral therapy against this virus are hampered by the lack of a system to grow and propagate the virus in cultured cells.

With PRRSV, we have generated a full-length cDNA clone of the viral genome in a transcription vector. In vitro transcripts generated from the cDNA clone when transfected into MARC-145 cells resulted in production of infectious recombinant PRRSV from the cells. The recombinant PRRSV generated from the cDNA exhibited pathogenic properties similar to that of the parental virus. We are currently using this reverse genetic system to determine the virulence and attenuation determinants of PRRSV. Results from these studies will be significant in our attempt to develop safe and more efficacious vaccine to combat PRRS. Using infectious VSV cDNA clone, we are also generating recombinant VSVs containing PRRSV genes to examine cell-mediated and humoral immune response to the specific PRRSV proteins.
Douglas G. Rogers, BS, DVM, MS, PhD
Professor

Pathologist
Veterinary Diagnostic Center
Appointment: 1.0 FTE Diagnostic Service

My major responsibility within the Department of Veterinary and Biomedical Sciences and within the Veterinary Diagnostic Center is diagnostic veterinary medicine. As a diagnostic pathologist, the position requires the histopathologic examination of diseased tissues, performing necropsies, assimilation and evaluation of supportive laboratory data, reporting to referring veterinarians or animal owners, preparing the laboratory reports and researching pertinent scientific literature. My special interest is conducting field investigations relative to infectious disease of livestock. This position has afforded me several opportunities to identify “new” infectious diseases of livestock and also to identify “new trends” of “old diseases.” The ultimate goal of these investigations has been (and will be) to establish intra- and inter- institutional collaborative studies on the pathogenesis of infectious diseases of livestock. My teaching responsibilities include the training of graduate students/residents interested in diagnostic veterinary medicine, advising graduate students (as major advisor or committee member), conducting research on bacterial diseases of livestock.
Gary P. Rupp, DVM, MS, ACT Diplomate
Professor & Director

Theriogenology
Great Plains Veterinary Educational Center
Clay Center, Nebraska
Appointment: .50 FTE Tchg; .30 FTE Rsch;
.20 FTE Srvc

As Director of The University of Nebraska Great Plains Veterinary Educational Center I work with other Departmental faculty to provide instruction in clinical and applied areas of production management and specialized health care for veterinary students in the professional curriculum of the joint KSU/UNL program. This mission is accomplished through another important activity, which is providing health and production management services for the U. S. MARC livestock in concert with the Herd Health Veterinarian. The combination of duties provides an excellent opportunity for student experience in clinical veterinary medicine and livestock management.

An additional aspect of our Center is that of providing continuing education programs for graduate veterinarians. This activity requires working with a wide array of allied specialists in the diverse areas involved in the beef cattle industry. We are just finished providing the eighth Beef Cattle Production Management Series which increases our total participation to more than 140 veterinarians. They represent beef cattle practitioners from across the United States and Canada and also from other aspects of the animal health industry. During the past 3 years this educational series has evolved into an optional graduate program which usually leads to an MS degree through distance education but has contributed to several PhD programs as well. The Series is currently being taught by University from Animal Science, Agronomy, Agricultural Economics, Veterinary Science from the University of Nebraska and educators from Kansas State University, Iowa State University, the University of Missouri, Texas A&M University, as well as specialists from other beef industry perspectives.

Research by faculty involves projects conducted in cooperation with U. S. Meat Animal Scientists and with cooperating producer herds and private feed yards in Nebraska. Recent efforts have been associated with reproduction, antibiotic residues, and tracking calves through retained ownership from birth to processing. The development of biosecurity and quality assurance programs for beef producers, and work to prevent and control foodborne pathogens. Additional projects have been carried out in areas of neonatal health and production.

In the future the GPVEC program hopes to further expand the interaction of other colleges of veterinary medicine and related disciplines to broaden the teaching and industry exposure for graduate veterinarians and allied specialists to provide a broad and in-depth coverage of production, management, economic, and health related issues essential for providing service to progressive livestock producers.

Our faculty wish to continue improving our involvement in areas of clinically related research, extension, and veterinary service to MARC, Nebraska producers, and the entire livestock industry. This can best be accomplished through our cooperation and interactive participation in education, research, and service commitments. The benefits of distance education and other innovative multimedia technologies are gradually increasing general knowledge and will enhance our service to the livestock industry.
John A. Schmitz, DVM, PhD
Professor

Pathologist
Appointment: .45 FTE Tchng; .55 FTE Diag

Since July 2004, I assumed the position of Professor in the VBMS Department. Due to space limitations in VBS and VDC buildings, I occupied a temporary office in the Animal Sciences Building. My duties included participating in the diagnostic pathology rotation in the Veterinary Diagnostic Center and teaching two courses during Fall Semester 2004. I taught VBMS 101, Introduction to Animal Health Careers (1 cr) for the first time, taking this course over after the retirement of Dr. Schneider the course originator. I also taught VBMS 408, Functional Histology; thus, implementing a new schedule of teaching this course in the Fall rather than in the Spring Semester, as previously provided. This scheduling change reduces the number of core VBMS courses our undergraduate majors have to take during Spring Semester.

During this period, I initiated a draft of a research project on BVDV in cooperation with Dr. Gary Rupp and other members of the VBMS Department. It is expected that this project will be initiated in 2005. I also lead an initiative, with Dr. Rupp and others, to conduct a survey of Nebraska veterinarians to determine factors that influence decisions by veterinarians to live and practice in rural communities and to provide veterinary services for food animals. Identification of such factors may aid the Nebraska Veterinary Student Selection Committee in admitting students that are more likely to serve these communities and industries after they graduate from veterinary medical college. The survey was sent out to approximately 700 graduate veterinarians in Nebraska. It is anticipated this project will be completed sometime in 2005.
The goals of my research and extension programming are to contribute new knowledge and apply existing knowledge to solve animal and public health problems associated with dairy and beef production systems. I conduct research on, and communicate applications of, biosecurity and pathogen containment to control pathogens that affect dairy and beef cattle health and pre-harvest food safety.

My current research and extension efforts are directed towards animal production food safety related to *Escherichia coli* O157:H7 and *Salmonella* in feedlot cattle, evaluating herd-level diagnostic approaches for Johne’s disease and bovine viral diarrhea in dairy and beef cattle, and evaluating new production systems to prevent calf scours on Nebraska Sandhills ranches.
Greg A. Somerville, BS, MS, PhD
Assistant Professor

Infectious Disease Specialist/Microbiologist
Appointment: .90 FTE Rsch; .10 FTE Tchng

*S. aureus* and *S. epidermidis* are the two leading causes of nosocomial infections in the USA, resulting in dramatically increased morbidity and treatment costs. Additionally, *S. aureus* is a major cause of bovine mastitis, a disease costing the USA approximately $2 billion annually, due to reduced production, animal replacement costs, discarded milk, treatment costs, and veterinary fees. My research focuses on addressing how environmental conditions affect the bacterial metabolic status and, in turn, how the metabolic status affects staphylococcal virulence. This is particularly important in the era of “omics,” when genomics, proteomics, and high throughput mutagenesis screens consistently identify the genes of bacterial physiology and metabolism as being important, or essential, for pathogenesis. Currently, my lab is working on identifying the intermediary metabolism derived signals in *S. aureus* that facilitate the transition from a commensal state to a pathogenic state. The long-term goal of my research is the elucidation of mechanisms by which *Staphylococcus aureus* and *S. epidermidis* controls virulence factor production in response to metabolic and environmental stimuli. It is anticipated that by understanding the mechanisms of virulence regulation in response to environmental stimuli that vaccines can be developed that will attenuate the bacterial response to the host environment.
My appointment in the Nebraska Veterinary Diagnostic Center is to serve as the Director and as a Diagnostic Pathologist. The scholarly component involves making use of case materials. A regular funded congenital defects referral center was established and I was actively investigating Dwarfism in Angus cattle. I am working with the Angus and Hereford Associations to update their genetic disease control policies. Collaboration with Dr. Kelling on BVDV infections in calves is ongoing as is collaborative studies in West Nile virus infection in horses. Laboratory accessions continue to rise.

Major time commitment is toward providing administrative guidance to the Diagnostic Center and providing diagnostic and consultation services to the Nebraska livestock industry. I serve as a case coordinator on 1300-1400 investigations per year, which involve a multi-disciplinary approach to disease diagnosis. All cases culminate in a written report to the veterinarian and/or the animal owner, and often telephone consultations regarding disease management.
Arden R. Wohlers, BS, DVM
Extension Assistant Professor

Beef Cattle Health and Production Management  
Panhandle Research & Extension Center  
Scottsbluff, NE  
Appointment: .50 FTE Extension Services

My 0.50 FTE position includes veterinary education responsibilities at the UNL Panhandle Research and Extension Center. The principal goal for my position is to contribute to the viability and growth of the animal agriculture industries in western Nebraska, especially the beef cattle industry and public health. I am responsible for coordination and cooperation with faculty and staff located at PHREC and other research and extension centers, VBMS, GPVEC and other UNL units.

I am responsible for development, coordination and implementation of educational programs that are sensitive to the needs of animal owners, veterinary practitioners, extension personnel and wildlife managers. My programs relate to animal health and production management that is pertinent to industry.

I deal with one on one conferences concerning isolated disease or management problems on a daily basis. An emphasis is placed on biosecurity applications for animal production systems. Currently my focus programs are the IRM pen of 5 demonstration project, foreign animal disease and agroterrorism issues and the planning for a beef industry discussion group to be implemented in the future. I am involved in the study of veterinary needs of the future in rural Nebraska.
Objective: Identification of functional domain of bICP0

Bovine herpesvirus type 1 (BHV-1) is a family member of alphaherpesvirus and it shares a number of biological properties with herpes simplex virus type 1 (HSV-1). BHV-1 infection can cause conjunctivitis, pneumonia, genital disorders, abortions, occasionally encephalitis, and a complex upper respiratory infection referred to as 'shipping fever'. BHV-1 also establishes life-long latent infections in sensory ganglionic neurons and can be reactivated periodically upon stress or immunosuppression. During productive infection, BHV-1 gene expression is divided into three phases: immediate-early (IE) genes, early (E) genes, or late (L) genes. bICP0 is expressed at high levels throughout productive infection because it is translated from an IE (IE2.9) or E mRNA (E2.6), and accumulates in nuclei of infected cells. bICP0 is important for productive infection; it can activate all three classes of viral promoters. In transient transfection assays, bICP0 functions as a potent transactivator of viral promoters. bICP0 can also regulate cellular promoters. For example, bICP0 relieves mad/max mediated transcriptional repression through its association with histone deacetylase 1. bICP0 also inhibits the human interferon β promoter, in part, by sequestering the coactivator p300. These results indicate that bICP0 is the major viral regulatory protein. bICP0 contains a zinc Ring finger located near its amino-terminus, which is well conserved among all ICPO homologues encoded by alphaherpesvirinae subfamily members. The zinc Ring finger of bICP0 is important for transcriptional activation and productive infection. In this study, we demonstrate that the C-terminal amino acids spanning 607 to 676 contained nuclear localization signal (NSL). Deletion of this region altered the cellular localization of bICP0 and reduced its ability to activate the herpes simplex virus thymidine kinase (TK) promoter. A panel of bICP0 mutants generated by random transposon insertion revealed two additional domains, amino acids 78 to 256, and amino acids 457 to 470 that were necessary for efficient trans-activation. Insertion of transposon within amino acid 91W severely impaired the ability of bICP0 to be expressed stably in transiently transfected cells. This effect appeared to be proteosome independent. Insertion of transposons into the acidic domain of bICP0 had no effect on the transactivation activity or protein expression. Confocal microscopy revealed that none of the mutants appeared to alter the cellular localization. Taken together, these studies indicated that bICP0 had several functional domains: 1) the zinc Ring finger domain that stimulates productive infection and influences cell survival, 2) the C-terminal nuclear localization signal (NSL), 3) two independent transcriptional activation domains. Understanding the mechanism of how bICP0 regulates viral or cellular gene expression may lead to innovative antiviral strategies. For example, identification of bICP0 mutant virus strains that have reduced growth potential, but do not block IFN signaling could be a superior modified live vaccine.
As Manager for the Microscopy Research Core Facility, Center for Biotechnology, my main goal has been to establish and maintain the state-of-art microscopy imaging facility, which provides expertise and instrumentation to researchers within/outside UNL. I am also actively involved in research collaborations and in providing technical support for seeking research funding. One of the major research and service projects involves the use of immunochemical labeling and digital imaging technology to support an NIH-funded collaborative study of viral pathogenesis by a group of scientists from UNL, UNMC, and UNC. Microscopy imaging technologies we provide include: a) immunofluorescence microscopy using whole tissues or sections, b) multi-probe in situ hybridization, c) real-time imaging confocal microscopy (i.e., detection of GFP-tagged proteins in live cells in cultures), and d) transmission and scanning electron microscopy.

My research is focused on genetic and environmental effects on stress responsiveness in relation to age-related neurodegeneration using animal models. The goal of my research is to establish a mouse model of altered stress response in order to identify and characterize the genes/proteins associated with or affecting stress susceptibility and aging. One of the ongoing projects, in collaboration with Dr. MK Nielsen of Animal Sciences, is genetic selection of mouse lines with high and low responsiveness to stress, in order to establish a useful mouse model of stress-induced early aging and neurodegeneration. Molecular events associated with stress-induced abnormalities remain ambiguous despite scientific advancement, owing to the complexity of genetic and environmental interactions. Many experimental paradigms have been used to study the mechanisms of stress responses in animals, but to date there is no well-documented animal model generated from genetic selection for altered corticosterone response to stress to facilitate the study of stress-induced changes in gene expression with relation to behavioral abnormalities. We recently initiated genetic selection of two mouse lines for high and low stress responsiveness (SH and SL lines, respectively), using serum corticosterone as one of the key criteria. After completion of the selection process for the second generation, the SH mice displayed up to twice the level of serum corticosterone observed in the SL mice (with or without exposure to stress). The initial microarray using the SH/SL mouse brains revealed significant differences in expression of many genes between the stressed and control mice within the same line and between the two genotypes. Therefore, I hypothesize that the difference in stress responses between the SH and SL lines results from complex genetic alteration (mainly in differential gene expression), and in mechanisms of central response to stress that were applied throughout the genetic selection process. Major focuses of my research are 1) In vitro characterization of biochemical properties and functional integrity of primary cultured hippocampal neurons derived from the embryonic SH and SL mice; 2) Assessment of behavioral activity and cognitive performance and subsequent gene expression profiling in the SH and SL mice in response to stress; and 3) Gene expression profiling and behavioral/cognitive assessments in the SH and SL mice in response to chronic stress in relation to the aging process in order to identify age-related genes associated with high or low susceptibility to chronic stress. This research is expected to foster an increased understanding of the molecular and biochemical events associated with neuronal calcium/kinase signaling and with regulation of genetic and environmental interactions in the mechanisms of stress.
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<th>Name</th>
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<td>Ofelia Chacon-Barletta</td>
<td>Postdoctoral Research Associate</td>
<td>Raúl G. Barletta, University of Nebraska-Lincoln and G. Adams, Texas A&amp;M University</td>
<td>MSc – January 1995 – University of Antioquia, Colombia (Immunology)</td>
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<td>MD – July 1991 – University of Antioquia, Colombia (Physician and Surgeon, General Practice)</td>
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<td>PhD – December 2002 – Texas A&amp;M University, Texas (Microbiology)</td>
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<tr>
<td>Subash C. Das</td>
<td>Postdoctoral Research Associate</td>
<td>Asit K. Pattnaik</td>
<td>BSvC – September 1987 – College of Veterinary Science, Orissa, India (Veterinary Science &amp; A.H.)</td>
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<td>MVSc – 1991 – Ivro, Izatnager, U/P. India (Veterinary Immunology)</td>
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<td>PhD – 2000 – University of London, Surrey, U.K. (Veterinary Molecular Virology)</td>
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<tr>
<td>Shuanghui Liu</td>
<td>Senior Research Associate</td>
<td>Asit K. Pattnaik</td>
<td>BS - June 30, 1986 - Zhongshan Medical University, Guangzhou, China (Medical)</td>
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<td>MD - June 30, 1991 - Hunan Medical University, Hunan, China (Hepatology and Infectious Diseases)</td>
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<td>Weiping Peng</td>
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<td>Clinton J. Jones</td>
<td>BS - July 25, 1982 - Anhui Agricultural University - China (Sericulture)</td>
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<td>MS - December 26, 1986 - Anhui Agricultural University - China (Silkworm genetics and breeding)</td>
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<td>PhD - March 4, 2000 - Chinese Academy of Agricultural Sciences, China (Silkworm genetics and breeding)</td>
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<td>Yunquan Jiang</td>
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<td>Clinton J. Jones</td>
<td>BS - March 1, 1970 - People's Republic of China - Peking University (Biochemistry)</td>
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<td>Emil M. Berberov</td>
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<td>Rodney A. Moxley</td>
<td>MSc - October 7, 1987 - Sofia, Bulgaria - Sofia University (Zoology)</td>
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<td>PhD - April 14, 1993 - Moscow, Russia - Vavilov Institute of General Genetics (Genetics)</td>
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</tbody>
</table>
**Bonggoo Park**
*Title: Postdoctoral Research Associate*

- **Mentor:** Jeffrey D. Cirillo
- **Degree(s):**
  - BS - February 25, 1992 - Korea University, South Korea (Agricultural Chemistry)
  - PhD - December 10, 2001 - Oklahoma State University, Oklahoma (Biochemistry & Molecular Biology)

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**Mustapha Moulay Samrakandi**
*Title: Researcher*

- **Mentor:** Jeffrey D. Cirillo
- **Degree(s):**
  - BS - June 1985 - Marrakech, Morocco - Sahnoun College (Experimental Sciences)
  - MS - September, 1990 - France - University of Sciences Toulouse III (Biochemistry)
  - Post-Graduate Diploma - September 1991 - France - Polytechnic National Institute - Toulouse III (Phyto sanitary and Antiparasitic Agrochemistry)
  - PhD - February 1996 - France - University of Sciences Toulouse III (Microbiology)

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**Christina Topliff**
*Title: Postdoctoral Research Associate*

- **Mentor:** Clayton L. Kelling
- **Degree(s):**
  - BS - May 1985 - Kansas State University, Manhattan, KS (Veterinary Science)
  - MS - December 1995 - University of Nebraska-Lincoln, Lincoln, NE (Veterinary Science)
  - DVM - May 1987 - Kansas State University, Manhattan, KS
  - PhD - December 2004 - University of Nebraska-Lincoln, Lincoln, NE (Integrative Biomedical Sciences)

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**Amit Kumar Pandey**
*Title: Postdoctoral Research Associate*

- **Mentor:** Jeffrey D. Cirillo
- **Degree(s):**
  - BSVe - 1996 - Orissa University of Agriculture and Technology, Bhubaneswar, India (Veterinary Science)
  - MSc - 1999 - National Dairy Research Institute, Karnal, India (Animal Biotechnology)
  - PhD - 2003 - Indian Veterinary Research Institute, Bareilly, India (Animal Biotechnology)

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**Selvakumar Subbian**
*Title: Postdoctoral Research Associate*

- **Mentor:** Jeffrey D. Cirillo
- **Degree(s):**
  - BS - April 1993 - Bharathiyar University, Tamilnadu, India (Biochemistry)
  - MSc - April 1995 - University of Madras, Tamilnadu, India (Biomedical Genetics)
  - PhD - April 2003 - Tuberculosis Research Centre (The Tamilnadu Dr. MGR Medical University), Tamilnadu, India (Basic Medical Sciences)

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**Kuiyi Xing**
*Title: Senior Research Associate*

- **Mentor:** Marjorie F. Lou
- **Degree(s):**
  - BS - July 15, 1991 - Fudan University, Shangahi, People's Republic of China (Biochemistry)
  - PhD - December 20, 2002 - University of Nebraska-Lincoln (Biochemistry)
November 10, 2005

TO: IANR Faculty Involved in CASNR Instruction/Advising

FROM: Steve Waller
Dean

SUBJECT: Academic Appointment Summary

Enclosed is a summary of your calculated FTE for the 2004-2005 academic year (Fall 2004, Spring 2005, Summer 2005). This is a measure of effort, not quality of instruction or advising. The CIEQ, Peer Review and Student Outcomes Assessment provide opportunities to address quality. The documentation for the Academic Appointment is on the CASNR website at http://casnr.unl.edu/facstaff/forms.htm.

We have provided a format for the academic appointment summary that identifies the contributions of each category (Advising, Adjustments and Instruction) to the total calculated FTE. If you are on an academic year appointment, the calculated FTE has been adjusted. The budgeted FTE is taken from the 2004-2005 Departmental Budget Listing and will not reflect changes made after April 1, 2004. Mid-year adjustments in your budgeted FTE are considered during the evaluation process. Also enclosed is your historical summary for total calculated FTE. Please contact Associate Dean Jack Schinstock if you have any questions about the enclosures. Our goal is to provide this summary prior to your submission of your ARFA.

Although completing the Academic Appointment Information Sheet is time consuming and may appear more bureaucratic than necessary, it has proven to be very accurate College-wide. It allows you, your unit administrator and the College to make knowledgeable decisions regarding workload adjustment and resource allocation. As helpful as it is within the College, its benefit is even greater when campus administration is evaluating academic appointments across colleges.

CASNR is the only college with substantial quantitative documentation. Our process acknowledges important components of the academic appointment that cannot be measured by student credit hour production alone. Consequently, the data that you help us collect has greatly strengthened our position in discussing faculty load among the other colleges. For that I am grateful and appreciate your time and effort invested in helping us each year with this activity.


Academic Appointment History

cc: IANR Deans’ Council w/o encl.
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### Contract/Other Teaching Faculty

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**TOTALS**

| Calculated FTE | 300 | 274 | 203 | 429.1 | 120 |

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1 The CASNR Academic Appointment - Philosophy and Guidelines (Sept 2003)
2 Based on Fall 2006, Spring 2007, Summer 2007
3 Fiscal Year 2006-2007, Departmental Budget Listing.

02/14/2008
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# DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES

## 2005 ENROLLMENT

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UNDERGRADUATE ENROLLMENT

2005 Spring Semester Enrollment
Veterinary Science Major 67
Pre-Veterinary Medicine Major 3

Pre-Veterinary Student Peer Advisors

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Undergraduate Degrees Obtained

May 2005

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<td>Tyson Dinslage</td>
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<td>Nathan Heidbrink</td>
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August 2005

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December 2005

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<td>Heftric, David</td>
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<td>Pigsley, Becky</td>
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<td>Rath, Fatima</td>
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<td>Rowan, Jennifer</td>
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<td>Smith, Eliza</td>
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<td>Tolstedt, Calvin</td>
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<td>Stahl, Matthew</td>
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<td>Torpy, Rebecca</td>
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<td>Sund, Patricia</td>
<td>2006</td>
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<td>Shauna Malchow</td>
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<td>Tolstedt, Calvin</td>
<td>2006</td>
<td>Abel, Jeramie</td>
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<td>Tuller, Eric</td>
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<td>Bottger, Jeffrey</td>
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<td>England, Shauna</td>
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<td>Brian Stones</td>
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### Third Year Students

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<thead>
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<td>Backlund, Michelle</td>
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<td>Becher, Megan</td>
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<td>Haase, Melissa</td>
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<td>Koppold, Emily</td>
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<td>Creighton, Amanda</td>
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<td>Korus, Jeffrey</td>
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<td>Fellers, Kristen</td>
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<td>Lustgarten, Meghan</td>
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<td>Nebraska Residents That Graduated from Kansas State University</td>
<td>May, 2005</td>
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<td>Brandt, Aric</td>
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<td>Emmanuel, Sara</td>
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<td>Gladney, Jason</td>
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<td>Hauser, Donovan</td>
<td>Pohlman (McFee) Renee</td>
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<td>Hruby, Jennifer</td>
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<td>Johnson, Brad</td>
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<td>Jordan, Will</td>
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### UNL Students Attending Other Veterinary Colleges Other Than Kansas State University or Iowa State

<table>
<thead>
<tr>
<th>Name</th>
<th>Pre-Vet Curriculum Completed</th>
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<tbody>
<tr>
<td>Nathan Heidbrink</td>
<td>5/2005</td>
<td>Ohio State</td>
</tr>
<tr>
<td>Abby Obermiller</td>
<td>5/2005</td>
<td>Texas A&amp;M</td>
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</table>

#### Nebraska Residents Attending Iowa State University

<table>
<thead>
<tr>
<th>First Year Students</th>
<th>Class</th>
<th>Waples, Alison J</th>
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<tr>
<td>Assad, Katherine M</td>
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<td>Bierman, Merle J</td>
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<td>Dinslage Tyson G.</td>
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<td>Kopf, Kelli M.</td>
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<td>Kreifels, Tammy L.</td>
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<td>Meyer, Ashley E.</td>
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<td>Perez, Margarita M</td>
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<td>Petersen, George F.</td>
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<td>Pieper, Jason B.</td>
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<td>Reiman, Amber N.</td>
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<td>Reiter, Dawn M</td>
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<td>Schmidt, Megan E.</td>
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<td>Shemin, Angela K.</td>
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<td>Shultz, Mikaleh A.</td>
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<td>Smith, Rik R.</td>
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<td>Thiele, Melissa A.</td>
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<tr>
<td>MS Candidate /Advisor</td>
<td>Program</td>
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<tr>
<td>William Brockway</td>
<td>MS</td>
<td>Pleural strip lesions at slaughter and pneumonia in cattle</td>
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<tr>
<td>Harpreet Chahal BVSc., Punjab Ag University, India</td>
<td>MS</td>
<td>Alanine metabolism in mycobacteria</td>
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<tr>
<td>Ching Hsin Hsu BS, China (Fernando A. Osorio)</td>
<td>MS</td>
<td>Protective immunity to PRRSV</td>
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<tr>
<td>Rolland Kramer BS, DVM, UNL, Ohio State University</td>
<td>MS</td>
<td>Evaluation of ultrasound to determine Intramuscular fat at re-implant time and at Pre-harvest in beef cattle</td>
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<td>Namal Liyanage BA, University of Sri Lanka (Marjorie F. Lou)</td>
<td>MS</td>
<td>Oxidation damage repair enzymes: Thioredoxin And its regulation in the lens epithelial cells</td>
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<td>Yuko Mori BS, University of Nebraska-Lincoln (Clayton L. Kelling)</td>
<td>MS</td>
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<tr>
<td>Marilia Oliveira DVM, Brazil (Fernando A. Osorio)</td>
<td>MS</td>
<td>Evaluation of immunogenic subunits of PRRSV using viral vectors</td>
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<td>Gustavo Bretschneider DVM, University of Nacional de Buenos Aires MS, National Univ of Mar Del Plata, Argentina (Rodney A. Moxley)</td>
<td>PhD</td>
<td>Immune responses to <em>Escherichia coli</em> O157:H7 in cattle and role in protection</td>
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<tr>
<td>Kate Chen BA, MS, China (Marjorie Lou) (BioChem)</td>
<td>PhD</td>
<td>Investigating the initial sites of redox signaling in human lens epithelial cells</td>
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<td>Rohana Dassanayake DVM, University of Peradeniya, India MS, UNL (Gerald E. Duhamel)</td>
<td>PhD</td>
<td>Mechanism of <em>Brachypirepis pilosicoli</em> trafficking Inside macrophage</td>
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<tr>
<td>Harshdeep Dogra BVSc, PAU Ludhiana, India MVSc, CSKHPKV, Palampur, India (Raúl G. Barletta)</td>
<td>PhD</td>
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<td>Joseph Erume DVM, Makerere University, Uganda MS, University of London (Rodney A. Moxley)</td>
<td>PhD</td>
<td>Influence of enterotoxins and capsule on colonization of the porcine intestine by enterotoxigenic <em>Escherichia coli</em></td>
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<tr>
<td>Vicki Geiser BS, MS, University of Nebraska-Lincoln (Clinton J. Jones) (BioSci)</td>
<td>PhD</td>
<td>Regulation of productive infection by the bovine herpesvirus 1 encoded ICPO</td>
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<td>Jamie Hedgson</td>
<td>PhD</td>
<td>Characterization of comparative virulence of non-cytopathic variants of NADL bovine viral diarrhea virus with mutation in non-structural protein NS4B or Npro by experimental inoculation of calves</td>
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<td>Manirath Khounlotham</td>
<td>PhD</td>
<td>Molecular Analysis of Mycobacteria pathogenesis</td>
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<tr>
<td>Byung Kwon</td>
<td>PhD</td>
<td>Immunopathogenesis of porcine reproductive respiratory syndrome virus</td>
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<td>Florencia Meyer</td>
<td>PhD</td>
<td>Functional analysis of the bovine herpesvirus 1 (BHV-1) latency related gene</td>
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<td>Dhamnika Navarathne</td>
<td>PhD</td>
<td>Role of farnesol in the pathogenesis of Disseminated Candida albicans infection</td>
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<td>Debasis Nayak</td>
<td>PhD</td>
<td>Porcine reproductive and respiratory Syndrome virus replication and pathogenesis</td>
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<td>Sandra Perez</td>
<td>PhD</td>
<td>Bovine herpesvirus-1 induced pathogenesis</td>
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<td>Kazima Saira</td>
<td>PhD</td>
<td>Regulation of interferon production by Alpha-herpesviruses</td>
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<td>Yin Wang</td>
<td>PhD</td>
<td>Signal transduction: The mechanism for ROS generation in lens epithelial cells</td>
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<td>Yebei Zhu</td>
<td>PhD</td>
<td>Exploiting staphylococcal metabolism to prevent biofilm associated heart infections</td>
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DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES
2005 GRADUATE DEGREES OBTAINED

MS Degrees

May

Harpreet Kaur Chahal
“Role of L-Alanine Dehydrogenase and D-Alanine Racemase of Mycobacteria in D-Alanine Metabolism”
Advisor: Dr. Raúl G. Barletta

December

William Brockway
Non-Thesis
Advisor: Dr. Dickey D. Griffin

Namal P.M. Liyanage
“Thioredoxin and its Regulation by Thioredoxin Binding Protein-2 in the Lens”
(Advisor: Dr. Marjorie F. Lou)

Paul Nabity
“Genetic Variability of Moraxella bovis and Moraxella ovis Field isolates”
Advisor: Dr. Douglas G. Rogers

PhD Degrees

August

Rohana Dassanayke
“Comparative Structure Function Analysis of Enteric Campylobacter and Helicobacter Species Cytotoxic Distending Toxins”
Advisor: Dr. Gerald E. Duhamel
DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES
SEMINAR SERIES, 2005

VBMS 909 Seminars
Spring Semester, 2005

January 10 “Dissecting Bacterial Respiratory Pathogens”
Jeffrey Cidllo, Associate Professor, University of Nebraska-Lincoln

January 31 “Quantitative Epidemiology in FSIS: Examples From A Food Safety Fellow’s Perspective”
Alecia Larew-Naugles, USDA, Washington, DC

February 7 “Mycobacterial Pathogenesis: Lessons From Mycobacterium marinum and Mycobacterium leprae”
Lucia Barker, Assistant Professor University of Minnesota, Duluth, Minnesota

Mark Morrison, Associate Professor, Ohio State University, Columbus, Ohio

February 21 “Role of Bacterial and Host Immune Factors in the Development of Escherichia coli Attaching and Effacing Lesions in Weaned Pigs and Septicemia in Chickens”
John Fairbrother, Professor, University of Montreal, Canada

March 7 “Cdk5 Regulates Cell Adhesion and Migration in the Lens and Cornea”
Peggy Zelenka, PhD, Head National Eye Institute, Bethesda, Maryland

March 21 “GeneChips- Uses in Studying Staphylococcus aureus Pathogenesis”
Paul Dunman, Assistant Professor, University of Nebraska Medical Center, Omaha, Nebraska

March 28 “The Cytotoxic Distending Toxin B Subunit of Helicobacter hepaticus is a Nuclear Localizing Ca2+ -and Mg2+-Dependent Endonuclease”
Rohana Dassanyake, PhD Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

April 4 “Analysis of Alpha-herpesvirus Genes Expressed During Latency”
Clinton Jones, Professor, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

April 11 “Challenges and Prospects for Pre-harvest Intervention Strategies of Escherichia coli O157:H7 in Cattle”
Rodney Moxley, Professor and Interim Department Head, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

April 18 “Colonic Spirochetosis of Humans and Animals: A Polymicrobial Infection by Multiple Species of Brachyspira and Helicobacter”
Gerald Duhamel, Professor, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

April 25 “Tick-borne Relapsing Fever: From Dr. Livingstone to Montana”
Tom Schwan, Acting Chief and Senior Investigator, Laboratory of Human Bacterial Pathogenesis, Hamilton, Montana

VBMS 909 Seminar
Fall Semester, 2005

August 22 “Role of Attaching and Effacing (A/E) Proteins in Escherichia coli O157:H7 Intestinal Colonization of Adult Cattle”
Gustavo Bretschneider, PhD Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln
August 29 “Disruption of enterotoxin genes of enterotoxigenic E. coli by allelic exchange using λ Red-mediated recombineering”
Joseph Erume, PhD Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

September 12 “Characterization of virulence genes of a positive single stranded RNA virus (porcine reproductive and respiratory syndrome virus) using a reverse genetics approach”
Byungjoon Kwon, PhD Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

September 19 “Ultraviolet radiation effects on the eye”
Stefan Lofgren, MD, PhD, Visiting Post Doctoral Fellow

September 26 “Mapping virulence-associated regulatory networks in the flesh-eating bacterium Streptococcus pyogenes”
Dr. Michael Chaussee, Assistant Professor, University of South Dakota, Vermillion, South Dakota

October 3 “Host-pathogen interactions during mycobacterial infections”
Manirath Khounlotham, PhD Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

October 24 “Bovine herpesvirus neuropathogenesis and neuronal transport studies”
Dr. Shafiqul Chowdhury, Professor of Molecular Virology, Diagnostic Medicine/Pathobiology, Kansas State University, Manhattan, Kansas

November 7 “Characterization and immunogenicity of recombinant vesicular stomatitis virus as a viral vector expressing GP5 and M protein of porcine reproductive respiratory syndrome virus”
Marilia Oliveira, MS Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

November 14 “Genomic and post-genomic approaches to studying mycobacterium tuberculosis pathogenicity”
Dr. Issar Smith, Member, TB Center, The Public Health Research Institute, Newark, New Jersey

November 21 “Recruitment, retention and practice characteristics of Nebraska veterinarians”
Dr. John Schutz, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

November 28 “Comparative structure and function analysis of enteric campylobacter and helicobacter species cytolethal distending toxins”
Rohana Dassanayake, PhD Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

Special Departmental Seminars

February 28 “Studies on Viral Gene Expression and Vaccine Design Using Negative-Strand RNA Viruses”
Sabash Das, Candidate for Research Assistant Professor in the Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln

December 8 “Vaccines for Streptococcal Mastitis -- molecular disappointment with philosophical satisfaction”
Dr. David McVey, Candidate for Veterinary Diagnostic Microbiologist in the Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln
US Meat Animal Research Center In-House Seminars
Clay Center, Nebraska

February 18  "Cattle Germplasm Evaluation and Genetics Research"
Larry Cundiff

March 4  "Selection for Calving Ease and Plans for Marker Assisted Selection in Cattle"
Gary Bennett

March 18  "Genetics and Genomics Research in Sheep"
Kreg Keymaster

April 1  "Meats Research at MARC"
Tommy Wheeler

April 5  "Effects of Fetal Number and Position on Fetal Development in Cattle"
Dr. Sherrill Echternkamp

April 12  "Efficiency of Sperm Production in Boars"
Dr. Joe Ford

April 15  "Selection for Multiple Births in Cattle"
Sherrill Echternkamp

April 29  Tim Smith. "Cattle Genomics Research"

May 6  "Bioinformatics Research"
John Keele

May 20  "DECI"
Tom Jenkins and Charles Williams

June 3  "Nutrition Research at MARC"
Cal Ferrell

June 17  "Swine Genomics Research"
Brad Freking and Dan Nonneman

September 2  "Swine Genomics Research at MARC"
Gary Rohrer

September 30  "Swine Nutrition Research"
John Klinkit

October 7  "Animal Stress Research"
Jack Nienaber

October 12  "Preimplantation Embryonic and Placental Development in Livestock"
Dr. Jeremy Miles

October 14  "Viability of Escherichia coli O157:H7 in feces collected from finishing steers"
Dr. Jim Wells

October 21  "Animal Waste Research"
Vince Varel and Jack Nienaber

November 4  "Swine Reproduction Research"
Joe Ford and Jeff Vallet

November 18  "State of MARC"
Dr. Mohammad Koochmarie

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Faculty –
Gary P. Rupp, DVM, MS, Dip. ACT
D. Dee Griffin, DVM, MS
Roger W. Ellis, BS, DVM, MS

Staff –
Romona Dana
Debbie George
Steve Johnson
Karen Shuck

Graduate Students –
Jeff Ondrak, BS, DVM - MS Student
Thomas Reece, BS, DVM - MS Student

The general direction of the GPVEC in 2005 saw changes with a new agreement with Iowa State University (ISU) College of Veterinary Medicine. Although the major emphasis of the teaching program will be similar, the opportunity to enhance the teaching program and expand the training of professional students is a major part of planning. The final class of Nebraska veterinary students attending KSU will graduate in the spring of 2008 and students from KSU will attend electives through that time.

Some of the activities during the year included an AVMA Accreditation Site Visit at UNL and some of the members came to GPVEC to tour the facilities and become acquainted with the general training programs and meet with the faculty. Dean John Thompson, Associate Dean Don Draper and several other ISU faculty were in attendance with the group. We also had a visit from the New President of the University of Nebraska, Dr. James Milliken who was hosted by Vice Chancellor Owens and Assistant Vice Chancellor Allan Moeller.

An excellent group of veterinarians representing the eighth Beef Cattle Production Management Series (BCPMS) completed the last module in February and several participants plan to continue to work toward a distance masters degree program. As in the past, the BCPMS has been a very active group of practitioners and the number completing the requirements for certification was again very high. Participants represented nine states including: Nebraska, Kansas, Oklahoma, Texas, California, Connecticut, Missouri, Minnesota, and Florida.

The shortage of food animal veterinarians and graduates desiring rural practices is being addressed by a relatively new group known as the Academy of Rural Veterinarians (ARV). This group was formed by members of previous BCPMS marketing groups. The group of practitioners conceived the idea and have been instrumental in bringing it into existence nationally. This innovative group are positive forces in encouraging new graduates to consider rural practice following graduation. Their members have given presentations to students at the majority of veterinary colleges nationally. In cooperation with the ARV University of Nebraska GPVEC and KSU faculty were able to obtain a special CSREES Grant entitled “Stimulating the Development of Veterinarians to Serve Rural America and have determined guidelines to fund students in externships with ARV members and visit more veterinary colleges.

In addition to the regular student electives offered at GPVEC a group of ISU and Mississippi State University students completed a week long course, Exploration of Food Animal Production. Another group from the same colleges of veterinary medicine attended an advanced Beef Production course for a week in
November. It is anticipated that these groups will return twice each year during spring and fall semesters.

The cooperative program between the University of Nebraska and the U.S. Meat Animal Research Center (USMARC) continues to provide veterinary service for livestock while training veterinary students in clinical aspects of animal health. The GPVEC faculty and staff have also maintained hands on training activities with the Nebraska College of Technical Agriculture to provide hands-on activities for their veterinary technician students. A calving and lambing rotation was available over three weekends for interested students. In addition, one veterinary technician student completed an eight week externship with the GPVEC technician this spring.

RESEARCH

A new grant is being planned to develop a multi-state project aimed at the validation of pooled BVDV testing for herd status and moving toward controlling BVD in beef cattle herds. The grant project will be submitted in conjunction with Colorado, Iowa, Kansas, Missouri, and Nebraska veterinary scientists and the respective diagnostic laboratories. Although the prevalence of BVD in beef cattle herds appears to be relatively low, it is a constantly recurring problem with the sale and movement of PI animals (especially calves) that infect new herds. The possible development of pooled testing should encourage better disease surveillance in a larger number of beef herds and eventually reduce the number of infected calves reaching feedlots.

The project in conjunction with the GPE study at the USMARC involving observation of bulls in the Cycle 8 study will be nearly completed except for the parentage identification of offspring. This experimental project has been the major study for Dr. Roger Ellis in completing his M.S. Degree. He has finished a paper and will present it at the Society for Theriogenology Meeting and it will be published in Theriogenology Journal.

Dr. Griffin will complete data collection on his PHAST project this summer on a group of heifers. The Biosecurity Grant will be extended one final year in order to complete a survey of veterinarians and producers in the three states involved.

EXTENSION

Extension continues to be an important component of the GPVEC effort. Dr. Griffin has been very active in presenting a large number of programs across the state to livestock producers and has been a major leader in the BQA effort nationally. He continues to be a major resource for cattle feeders and veterinarians in Nebraska and has a national presence in working closely with other extension specialists.

The Higher Education training grant involving biosecurity on farms and ranches continues to support a number of programs for producers and veterinarians in the effort to reduce infectious disease exposure to livestock. Several presentations have been given by faculty members from GPVEC and many producers are becoming keenly interested in prevention of costly diseases in their herds.

The CowCalf5 Herd Records and Analysis Program is still being supported and because of the National Identification Program has gained prominence because of its versatility with many different EID systems. Steve Johnson is the primary support person and handles all updates and the help line. He has cooperated with all major EID companies and has made the program compatible with each of them. He has also been an excellent resource for cattlemen and veterinarians wanting CE and updates and has presented a large number of meetings statewide and to other states.
PUBLICATIONS


Table 1. Enrollments in Student Electives, 2005-2006

<table>
<thead>
<tr>
<th>Elective</th>
<th>Number Enrolled*</th>
<th>Universities represented (number of students)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine Reproduction</td>
<td>9</td>
<td>Kansas State University (9)</td>
</tr>
<tr>
<td>Bull Breeding Soundness</td>
<td>5</td>
<td>Kansas State University (5)</td>
</tr>
<tr>
<td>Calving</td>
<td>14</td>
<td>Kansas State University (14)</td>
</tr>
<tr>
<td>Clinical / Calving</td>
<td>12</td>
<td>Kansas State University (12)</td>
</tr>
<tr>
<td>Feedlot Production Management and Health Consulting</td>
<td>17</td>
<td>Kansas State University (9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Iowa State University (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Michigan State University (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Virginia-Maryland Regional College (1)</td>
</tr>
<tr>
<td>Pregnancy Examination</td>
<td>12</td>
<td>Kansas State University (12)</td>
</tr>
<tr>
<td>Exploration of Food Animal Production*</td>
<td>102</td>
<td>Kansas State University (102)</td>
</tr>
<tr>
<td>Lambing</td>
<td>5</td>
<td>Kansas State University (5)</td>
</tr>
<tr>
<td>VDPAM483 Beef Production</td>
<td>22</td>
<td>Iowa State University (17)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mississippi State University (5)</td>
</tr>
</tbody>
</table>

Total Enrollment                                   198

\*The College of Veterinary Medicine (CVM) at Kansas State University (KSU) operates on a May-to-May academic year, thus enrollment figures are reported for May 2005-May 2006.

\*Required rotation for KSU Sophomores.
Table 2. GPVEC Student Electives, 2005-2006
(All student electives are one week in length)

<table>
<thead>
<tr>
<th>Electives</th>
<th>Offered</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Clinical Practicum</td>
<td>32 weeks</td>
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</tr>
<tr>
<td>Bovine Reproduction</td>
<td>1 week</td>
<td>November</td>
</tr>
<tr>
<td>Bull Breeding Soundness</td>
<td>1 week</td>
<td>April</td>
</tr>
<tr>
<td>Calving</td>
<td>4 weeks</td>
<td>March</td>
</tr>
<tr>
<td>Clinical/Calving</td>
<td>4 weeks</td>
<td>March, April</td>
</tr>
<tr>
<td>Feedlot Management and Consulting</td>
<td>5 weeks</td>
<td>October, February</td>
</tr>
<tr>
<td>Pregnancy Examination</td>
<td>3 weeks</td>
<td>October</td>
</tr>
<tr>
<td>Exploration of Food Animal Production</td>
<td>4 weeks</td>
<td>May, August</td>
</tr>
<tr>
<td>Lambing</td>
<td>5 weeks</td>
<td>January, February, March,</td>
</tr>
<tr>
<td>Special Studies</td>
<td></td>
<td>Available Upon Request</td>
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Table 3. GPVEC Continuing Education Seminars 2005

<table>
<thead>
<tr>
<th>CowCalf® Herd Health Record System Software</th>
<th>Seminar Dates</th>
<th>No. of Participants</th>
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<tbody>
<tr>
<td></td>
<td>February 28, 2005</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>June 23-24, 2005</td>
<td>9</td>
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<table>
<thead>
<tr>
<th>Course Topics</th>
<th>Nutrition</th>
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<tbody>
<tr>
<td><strong>Cow/Calf Records Systems</strong></td>
<td>Range Cow Nutrition/Management</td>
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<tr>
<td>Cow/Calf Production/Performance</td>
<td>Beef Cattle Protein Requirements/Feedstuffs</td>
</tr>
<tr>
<td>Risk Management</td>
<td>Evaluating Forage Quality</td>
</tr>
<tr>
<td>Cow Efficiency</td>
<td>Basic Ration Formulation</td>
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<tr>
<td><strong>Decision Evaluator for the Cattle Industry (DECI)</strong></td>
<td>Replacement Heifer Nutrition</td>
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<tr>
<td><strong>Financial</strong></td>
<td>NRC-Nutrient Requirements and Rations</td>
</tr>
<tr>
<td>Economics/Finance/Accounting</td>
<td>By-Products Feeds and Feed Additives</td>
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<tr>
<td>Standardized Performance Analysis (SPA)</td>
<td>Stocker Nutrition/Management</td>
</tr>
<tr>
<td>Introduction to Tax Forms</td>
<td>Vitamins/Minerals/Feed Additives</td>
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<tr>
<td><strong>Computer Training</strong></td>
<td>Nutritional Considerations for Improving Efficiency</td>
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<tr>
<td>File Management</td>
<td>Feed Delivery Management</td>
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<tr>
<td>Internet Usage</td>
<td><strong>Biotechnology</strong></td>
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<tr>
<td>Windows Operating System</td>
<td>Integrating Biotechnology into Beef Production</td>
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<tr>
<td>MS Office/PowerPoint/Excel/Word</td>
<td>Bovine Genomics</td>
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<tr>
<td><strong>Epidemiology and Scientific Literacy</strong></td>
<td>Biotechnological Advances in Veterinary Diagnostics and Pharmaceutics</td>
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<tr>
<td>Epi-Info</td>
<td>Food Animal Transgenics and Cloning</td>
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<tr>
<td>Measuring Production and Disease</td>
<td><strong>Beef Cattle Breeding</strong></td>
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<tr>
<td>Disease Outbreak</td>
<td>Breed Differences</td>
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<tr>
<td>Diagnostic Testing</td>
<td>Crossbreeding and Composites</td>
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<tr>
<td>Risk Factor Analysis</td>
<td>Bull Selection</td>
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<tr>
<td><strong>Critical Evaluation of Vet Literature</strong></td>
<td>Value of Live and Carcass Traits of Cattle</td>
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<tr>
<td>Information Retrieval</td>
<td>Profitable Bull Selection</td>
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<tr>
<td><strong>Biostatistics</strong></td>
<td>Important Concepts of Beef Cattle Selection</td>
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<tr>
<td>Analysis of Variance</td>
<td>Evaluation of Maternal, Growth, and Carcass Characteristics of Diverse Breeds</td>
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<tr>
<td>Descriptive Statistics</td>
<td>Use of Heterosis and Breed Differences in Crossbreeding and Composite Breeds</td>
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<tr>
<td>Inferential Statistics</td>
<td>Selection for Calving Ease</td>
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<tr>
<td><strong>Clinical Trial Designs</strong></td>
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<tr>
<td><strong>Feedlot</strong></td>
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<td>Feedlot Production</td>
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<tr>
<td>Futures Marketing</td>
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<tr>
<td>Total Quality Management and Design</td>
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<tr>
<td>Feedlot Management and Design</td>
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<tr>
<td>Predicting Performance</td>
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<tr>
<td>Intro to Feedlot Environmental Control</td>
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<tr>
<td>Feedlot Break-even</td>
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<tr>
<td>Implant Strategies</td>
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<tr>
<td>Monitoring of Packing House</td>
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<tr>
<td><strong>Personal Development</strong></td>
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<tr>
<td>Communications Skills</td>
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<tr>
<td>Meyers-Briggs Test</td>
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Table 5. Beef Cattle Production Management Series - Participants

Series VIII, 2004 - 2005  
(June 2004 - February 2005)

<table>
<thead>
<tr>
<th></th>
<th>Participant</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>John Boucher</td>
<td>Dodge, Nebraska</td>
</tr>
<tr>
<td>2</td>
<td>Judy Bowmaster</td>
<td>Curtis, Nebraska</td>
</tr>
<tr>
<td>3</td>
<td>Bud Dinges</td>
<td>Richmond, Texas</td>
</tr>
<tr>
<td>4</td>
<td>Roger Ellis</td>
<td>Clay Center, Nebraska</td>
</tr>
<tr>
<td>5</td>
<td>Edgar Garrett</td>
<td>Manhattan, Kansas</td>
</tr>
<tr>
<td>6</td>
<td>John Gilliam</td>
<td>Stillwater, Oklahoma</td>
</tr>
<tr>
<td>7</td>
<td>John Groves</td>
<td>Eldon, Missouri</td>
</tr>
<tr>
<td>8</td>
<td>Scott Haskell</td>
<td>Chicago Park, California</td>
</tr>
<tr>
<td>9</td>
<td>Dennis Hermesch</td>
<td>Plymouth, Nebraska</td>
</tr>
<tr>
<td>10</td>
<td>Max Irsik</td>
<td>Gainesville, Florida</td>
</tr>
<tr>
<td>11</td>
<td>Rolland Kramer</td>
<td>Stapleton, Nebraska</td>
</tr>
<tr>
<td>12</td>
<td>Frederico Moreira</td>
<td>Waterford, Connecticut</td>
</tr>
<tr>
<td>13</td>
<td>Randall Norton</td>
<td>Utica, Kansas</td>
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<tr>
<td>14</td>
<td>Jeff Ondrak</td>
<td>Fairbury, Nebraska</td>
</tr>
<tr>
<td>15</td>
<td>Craig Payne</td>
<td>Sedalia, Missouri</td>
</tr>
<tr>
<td>16</td>
<td>Paul Ritter</td>
<td>Oakley, Kansas</td>
</tr>
<tr>
<td>17</td>
<td>Joe Roder</td>
<td>Canyon, Texas</td>
</tr>
<tr>
<td>18</td>
<td>John Rodgers</td>
<td>Fairmont, Minnesota</td>
</tr>
<tr>
<td>19</td>
<td>Brian Spitzer</td>
<td>Pratt, Kansas</td>
</tr>
<tr>
<td>20</td>
<td>Travis Van Anne</td>
<td>Gering, Nebraska</td>
</tr>
</tbody>
</table>

Nebraska  7  
Kansas  4  
Missouri  2  
Oklahoma  1  
Texas  2  
California  1  
Connecticut  1  
Minnesota  1  
Florida  1  

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Table 6. Beef Cattle Production Management Series - Mentors

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peter Chenoweth, BVSc, PhD</strong></td>
</tr>
<tr>
<td>Professor</td>
</tr>
<tr>
<td>Kansas State University</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Marilyn Corbin, DVM, MS, PhD</strong></td>
</tr>
<tr>
<td>Feedlot Consultant</td>
</tr>
<tr>
<td>Oakland, Nebraska</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Terry DeGroff, DVM</strong></td>
</tr>
<tr>
<td>Adjunct Professor &amp; Private Practitioner</td>
</tr>
<tr>
<td>Burwell, Nebraska</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Galen Erickson, MS, PhD</strong></td>
</tr>
<tr>
<td>Assistant Professor</td>
</tr>
<tr>
<td>University of Nebraska - Lincoln</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Dee Griffin, DVM, MS</strong></td>
</tr>
<tr>
<td>Professor</td>
</tr>
<tr>
<td>University of Nebraska - GPVEC</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Jim Gosey, MS, PhD</strong></td>
</tr>
<tr>
<td>Professor</td>
</tr>
<tr>
<td>University of Nebraska-Lincoln</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Eddie Hamilton, DVM, MAg</strong></td>
</tr>
<tr>
<td>Associate Professor</td>
</tr>
<tr>
<td>South Dakota State University</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Tom Jenkins, MS, PhD</strong></td>
</tr>
<tr>
<td>Research Animal Scientist</td>
</tr>
<tr>
<td>U.S. Meat Animal Research Center</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Steve Johnson, BA</strong></td>
</tr>
<tr>
<td>Computer Systems Manager/Analyst</td>
</tr>
<tr>
<td>University of Nebraska - GPVEC</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Jim Keen, DVM, PhD</strong></td>
</tr>
<tr>
<td>Veterinary Medical Officer</td>
</tr>
<tr>
<td>U.S. Meat Animal Research Center</td>
</tr>
</tbody>
</table>

**Peter Chenoweth, BVSc, PhD**
Professor
Kansas State University

**Marilyn Corbin, DVM, MS, PhD**
Feedlot Consultant
Oakland, Nebraska

**Terry DeGroff, DVM**
Adjunct Professor & Private Practitioner
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University of Nebraska - Lincoln

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Professor
University of Nebraska - GPVEC

**Jim Gosey, MS, PhD**
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University of Nebraska-Lincoln

**Eddie Hamilton, DVM, MAg**
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South Dakota State University

**Tom Jenkins, MS, PhD**
Research Animal Scientist
U.S. Meat Animal Research Center

**Steve Johnson, BA**
Computer Systems Manager/Analyst
University of Nebraska - GPVEC

**Jim Keen, DVM, PhD**
Veterinary Medical Officer
U.S. Meat Animal Research Center

Bob Larson, DVM, PhD
Assistant Professor
University of Missouri

Jim McGrann, DVM, MS
Extension Beef Economist
Texas A&M University

Gary Rupp, DVM, MS, ACT Dipl.
Professor and Director
University of Nebraska - GPVEC

Mike Sanderson, DVM, MS
Associate Professor
Kansas State University

Gary Sherman, MS, DVM, PhD
Staff Fellow
U.S. Food & Drug Administration

David Smith, DVM, PhD
Associate Professor
University of Nebraska-Lincoln

John Spitzer, MS, PhD
Professor
Clemson University
### Table 7. Beef Cattle Production Management Series - Guest Speakers

**Series VIII, 2004 - 2005**  
*(June 2004 - February 2005)*

<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarah Foglemen</td>
<td>Extension Agricultural Economist, Kansas State University</td>
</tr>
<tr>
<td>Janice Swanson, PhD</td>
<td>Professor, Kansas State University</td>
</tr>
<tr>
<td>Gary Bredensteiner, MS</td>
<td>Emeritus Extension Educator, University of Nebraska</td>
</tr>
<tr>
<td>Jim Kennedy, DVM, MS</td>
<td>Head, Rocky Ford Diagnostic Lab</td>
</tr>
<tr>
<td>Brett Andrews, DVM</td>
<td>Burwell Veterinary Hospital</td>
</tr>
<tr>
<td>Mark Thallman, MS, PhD</td>
<td>U.S. Meat Animal Research Center</td>
</tr>
<tr>
<td>Don Adams, MS, PhD</td>
<td>Ruminant Nutritionist, University of Nebraska - WCREC</td>
</tr>
<tr>
<td>Bob Sorensen, PhD</td>
<td>Agronomist, UNL Emeritus Professor</td>
</tr>
<tr>
<td>Lawrence Firkins, DVM, MS, MBA</td>
<td>University of Illinois</td>
</tr>
<tr>
<td>Darrell Mark, PhD</td>
<td>Ag Economist, University of Nebraska-Lincoln</td>
</tr>
<tr>
<td>Rick Koelsch, PhD</td>
<td>Associate Professor, University of Nebraska-Lincoln</td>
</tr>
<tr>
<td>Barry Dunn, PhD</td>
<td>Ag Economist, Texas A&amp;M University</td>
</tr>
<tr>
<td>Roger McKeown, LLB, PhD</td>
<td>University of Nebraska</td>
</tr>
<tr>
<td>Jess Hinrichs, DVM</td>
<td>Sutton Veterinary Clinic</td>
</tr>
<tr>
<td>Alan Janzen</td>
<td>Owner and Manager, Circle 5 Feedyard</td>
</tr>
<tr>
<td>Larry Cundiff, MS, PhD</td>
<td>Research Leader, Genetics &amp; Breeding, U.S. Meat Animal Research Center</td>
</tr>
<tr>
<td>Dale Blasi, PhD</td>
<td>Extension Specialist, Kansas State University</td>
</tr>
</tbody>
</table>
Most all of the department faculty are involved in some research activity, either as a project leader or as a contributor to a research group. Some faculty members have designated appointments in research. As a part of this appointment, they prepare research project descriptions, which are peer-reviewed through a process established by the Agricultural Research Division (ARD) and are assigned ARD research project numbers. Through an extension of the same process, some projects can be approved by the USDA Cooperative State Research Services for matching federal funds, including Hatch, Regional Research or Animal Health Research Formula Funds. As a matter of USDA policy, competitive research grants from the USDA are assigned separate ARD project numbers. Some research projects are assigned ARD numbers for administrative and budget management purposes, even though they are not specifically research projects, e.g., the Research Laboratories and Animal Care Facility (NEB 14-039) and the Nebraska Veterinary Diagnostic Laboratory System project (NEB 14-059). Research projects funded by the University of Nebraska-Lincoln, Center for Biotechnology, or other external sources are not required to go through the required ARD research project review process.

Faculty Research Interests

Barletta, Raúl G. Molecular genetic bases of bacterial pathogenesis and drug resistance, mycobacterial infections in cattle (Johne's disease) and human beings (tuberculosis, M. avium infections)

Brodersen, Bruce W. Pathogenesis of bovine viral diarrhea virus; diagnostic pathology

Doster, Alan R. Ultrastructural changes in the lung produced by bacteria, viruses and pneumotoxic compounds

Duhamel, Gerald E. Pathogenesis of enteric diseases caused by spirochetes and rotavirus; primarily Brachyspira pilosicoli and bovine rotavirus

Griffin, D. Dee Beef cattle production medicine, especially respiratory disease in feedlot cattle

Jones, Clinton J. Regulation of viral gene expression and persistent herpesvirus infections; mechanisms of chemical and viral carcinogenesis.

Kelling, Clayton L. Pathogenesis of viral diseases, primarily bovine respiratory syncytial virus and bovine viral diarrhea virus infections
<table>
<thead>
<tr>
<th>Name</th>
<th>Research Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lou, Marjorie F.</td>
<td>Biochemical mechanism of senile cataract formation: controls of cellular thiol/disulfide homeostasis</td>
</tr>
<tr>
<td>Moxley, Rodney A.</td>
<td>Pathogenesis and control of <em>Escherichia coli</em> infections in swine and cattle; on-farm control of <em>E. coli</em> 0157:H7 prevalence in beef cattle (food safety)</td>
</tr>
<tr>
<td>Osorio, Fernando A.</td>
<td>Pathogenesis of persistent viral infections including persistent reproductive and respiratory syndrome (PRRS) virus and herpesvirus latency; vesicular diseases</td>
</tr>
<tr>
<td>Rogers, Douglas G.</td>
<td>Pathogenesis of chlamydial infections in livestock</td>
</tr>
<tr>
<td>Rupp, Gary P.</td>
<td>Effect of production practices and management on beef cattle diseases and enterprise profitability</td>
</tr>
<tr>
<td>Smith, David R.</td>
<td>Food safety through study of on-farm prevalence and control of <em>E. coli</em> 0157:H7 in beef cattle; epidemiologic approaches to study of livestock diseases</td>
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<tr>
<td>Somerville, Greg A.</td>
<td>Metabolic and environmental regulation of staphylococcal pathogenesis. Redox-dependent regulation of virulence factor synthesis</td>
</tr>
<tr>
<td>Steffen, David J.</td>
<td>Diagnosis and characterization of genetic and congenital diseases of cattle</td>
</tr>
<tr>
<td>ARD Project #</td>
<td>Project Title and information</td>
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<td>---------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
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<tr>
<td>14-039</td>
<td>(0096920):SAES/NEB/STATE HATCH PROJECT: Research Laboratories and Animal Care Facility (DK Hardin)</td>
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<tr>
<td>14-130</td>
<td>(0199447):CSREES/NEB Animal Health; Regulation of the Latency-Reactivation Cycle by the Bovine Herpesvirus 1 (BHV-1) Latency Related (LR) Gene (C. Jones)</td>
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<td>14-131</td>
<td>(0199961):SAES/NEB Veterinary Field Disease Research Program (D. Smith)</td>
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<td>Project Title and Information</td>
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<tr>
<td>---------------</td>
<td>--------------------------------</td>
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<tr>
<td>14-134</td>
<td>(0201032): CSREES/NEB Influence of Enterotoxins on Virulence and Colonization of the Porcine Intestine by Escherichia coli (R. Moxley)</td>
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Biochemical Mechanism of cataract formation: Oxidative stress, thiol regulation and cataract models

Investigator

Marjorie F. Lou

Our focus on the biochemical mechanism of age-related cataract formation is oxidative stress. We used hydrogen peroxide-induced cataract in organ culture condition as our model to study the progressive changes in morphology and intracellular redox potential in the lens. We demonstrated that lens opacification is associated with the increased protein insolubility and protein aggregation, resulting from lens protein oxidation by oxidative stress. We also showed that the thiol groups in lens proteins are oxidized by forming protein-thiol mixed disulfides (protein thiolation) followed by protein protein disulfide formation, a condition that will lead to lens opacification. We discovered that this deleterious process could be reversed or delayed if cataract formation is at an early stage, such as removal of the oxidant. The most drastic recovery is the reversal of the thiolation of lens proteins. Therefore, we speculate that the lens must possess some repair systems that can protect it against pathological consequences. We have found two of such repair systems, one is the glutathione-dependent thioltransferase system, which is a cytosolic enzyme and can specifically dethiolate protein-s-s-glutathione. The other is the NADPH-dependent thioredoxin system, which in conjunction with thioredoxin reductase and NADPH can reduce protein-protein disulfides. We have cloned the thioltransferase gene and the thioredoxin gene, purified the recombinant enzyme/protein for their respective functional studies. Both enzyme/protein are very resistant to oxidation and have a characteristic, conserved sequence of CXXC at their active sites. Both systems are proven to have the ability to restore the activities/functions of other oxidation-inactivated enzymes/proteins using human lens epithelial cells pretreated with hydrogen peroxide as a model. Furthermore, genes for thioltransferase and thioredoxin have been shown to upregulate under oxidative stress conditions, a phenomenon of adaptive response by the cells to combat the stress.

A secondary function of thioltransferase has been confirmed to be an ascorbate-recycling enzyme, which is able to reduce the oxidized ascorbate, dehydroascorbate, to return to the reduced form of ascorbate. This is extremely important finding, as the lens is rich in ascorbate, which along with vitamin E, contributes to the protection of membrane lipids. Ascorbate is also needed for other metabolic functions of various enzymes. The oxidized ascorbate, if not reduce in time can form glycation products with lens proteins and lead to high molecular weight aggregates. The catalytic function of thioltransferase in recycling ascorbate is first evidence that an enzyme is involved in reducing dehydroascorbate, against the dogma of a nonenzymatic recycling process.

Lastly, the mitochondrial-specific TTase (Grx2), which we co-discovered recently with Dr. Gladyshev of Biochemistry Department, has been shown to present in the mitochondria of human lens epithelial cells. It possesses duel activities of dethiolase and dehydroascorbate reductase, similar to the cytosolic thioltransferase enzyme. We are pursuing the task of proven the physiological function of Grx2 in the mitochondria.
Research Project Significance/Impacts

Based on our research results, the concept of oxidative stress-induced cellular damage as one of the major factors for cataractogenesis continue to gain momentum and has escalated our scholarly standing in the eye field as well as outside of the lens research. One of such impact is the founding of the Redox Biology Center at UNL upon receiving the NIH award of 10 million dollar for the Cobra grant. My role of being one of the 5 senior advisors may have contributed to the success of the funding. The other impact is our discovery of the involvement of thioltransferase in the recycling of ascorbate. These results when reported at our annual national eye meeting last year, sent shocking wave to those scientists working in this area. A collaboration by the request from one of these scientists resulted in one manuscript just now completed. A third impact is my recognition and honor extended from Oxford University in England as a Leichfield Lecturer (2002-2003), and a subsequent invitation by the editor from the Oxford University to contribute a review article based on my work in this area for the series of Progress of Retina and Eye Diseases.

The role of reactive oxygen species (ROS) in maintaining the health of lens cells: The redox signaling Investigator

Marjorie F. Lou

We have been concentrating in the redox signaling this year after publishing three manuscripts describing the basic signaling pathways in the lens and how diabetic condition can alter the cell signaling. We have been very successful in demonstrating that reactive oxygen species, which may be harmful to the cells/tissues, but at low level (nanomolar range) can be stimulants for various cell functions, including cell proliferation, via signal transduction pathway. It has been discovered and reported in other tissues/cells that certain growth factors such as PDGF, EGF are functional mitogens because they can stimulate ROS generation endogenously upon binding with the receptors on the cell surface. We have demonstrated with confocal microscopy that fluorescein preloaded into live human lens epithelial cells can generate fluorescence upon PDGF stimulation. The generated fluorescence can be quenched by cells preloaded with catalase enzyme or antioxidants, confirming our speculation that the lens cells have an ability to produce ROS in situ. Additionally, we have shown that exogenous hydrogen peroxide can mimic PDGF and produce similar effect, including activation of a battery of cell signaling proteins, followed by gene expression and eventual cell proliferation. We also showed that the lens cells possesses the membrane-bound enzyme NADPH oxidase, which can generate superoxide ion upon stimulation by arachidonic acid or hydrogen peroxide.

Research Project Significance/Impacts

A new physiological function of reactive oxygen species is identified as redox signaling, which is a process to mediate the function of certain growth factors for cell function. This finding has raised tremendous interest in the lens community. We have definitely being regarded as the laboratory working in the leading edge of lens research.
This past year, the Animal Research Facility (ARF) has provided housing for 2,039 animals, by species as follows: 30 Blue Winged Teal Ducks; 15 goats; 48 cows; 6 Xenopus frogs; 1,404 mice; 441 pigs; 53 dogs; 40 hamsters and 2 rabbits.

The Animal Research Facility replaced, upgraded and purchased new equipment, such as feed storage barrels, transport carts, storage racks and animal restraint devices, including halters and snares. The Animal Research Facility also increased its rodent cages to a capacity of approximately 100% over the previous year by acquiring new rodent cages and supplies. The floors in rooms B-1, B-2, B-3, B-4, B-5 and G-6 were ressealed, making them more suitable for housing companion animals and small laboratory animals. Due to the increased use of the surgical suite for companion animal surgeries, the Animal Research Facility acquired a new isoflurane vaporizer, a large number of small animal surgical instruments, such as buck towels, drapes, incubation tubes, rebreather bags and medications suitable for use in small and companion animals.

The Animal Research Facilities completed the caulking around the floors in the surgery preparation room to ensure an adequate seal. The outside (non-brick portion) of the Animal Research Facility was repainted and the lettering on the outside doors was replaced with new stencils.

IMPACT STATEMENT

The Animal Research Facility staff contributed to a variety of research projects on animal diseases at UNL, by supporting many research projects for VBMS faculty members. The ARF staff also supported many investigators in other departments at UNL. The Animal Research Facility staff also supported projects for private industry, thereby, assisting in the development of new commercially available animal health care products. The Animal Research Facility is also providing some temporary housing for research animals from the Dental College while the Dental College animal housing is being upgraded/renovated. The Animal Research Facility also participates in public relations and educational ventures, including the Nebraska State Fair, Birthing Pavilion.

The Animal Research Facilities completed the caulking around the floors in the surgery preparation room to ensure an adequate seal. The outside (non-brick portion) of the Animal Research Facility was repainted and the lettering on the outside doors was replaced with new stencils.

The lab received 15,330 requests for diagnostic assistance from producers. Foreign animal diseases are included in the differentials and excluded based on laboratory examination or clinical data. We assist state health officials with monitoring programs for \textit{M. paratuberculosis}, avian influenza, Newcastle disease, classical swine fever, CWD and West Nile virus. A serologic survey of West Nile exposure and risk factors in dogs is in progress. Equine serologic response to West Nile was studied and a poster presented with the findings. Testing for BVDV PI status was performed on 178,000 calves. Positive animals are removed from production to prevent spread of virus. This is the third year of the CWD prevalence study in Nebraska and results should be summarized for publication next year. We continued to support a study of Johnes prevalence in Nebraska as a representation of prevalence in extensive beef cattle operation of the Great Plains and the monitoring program to reduce the incidence of Johnes disease. We investigated the prevalence or Neospora caninum in Nebraska deer and demonstrated that a deer coyote cycle may
exist with infection occasionally spilling into beef cattle populations. Prevalence in deer was estimated at 2-5%. Outbreaks of abortion related to Neosporosis were investigated and one herd with vaccine failure was investigated to characterize risk factors that may have contributed to the increased abortion in the face of vaccination. Dwarfism investigations continued and DNA samples were shared with ISU for genetic analysis. A putative site was found on chromosome 6 associated with the trait. A detailed investigation of Kochia and Rumex intoxication provided data on outcomes that will be useful to educate producers faced with similar exposure issues. Investigations into deaths of wildlife and zoo animals led to recognition of Tsukarmurekka Pulmonis as a new differential for granulomatous disease in zoo mammals. Health, reproductive status, and agricultural chemical exposure were accessed in river otters.

**IMPACT STATEMENT**

BVDV infections rate at 1% means over 1,700 persistently infected calves, the reservoir for virus were eliminated from production facilities. West Nile testing supported state wide monitoring and control programs and significant decreases in animal and human infections were reported in 2003. Studies in horses demonstrated the reduced utility of IgM serology in endemic regions. It appears IgM response is muted in clinical infections from vaccinated and previously exposed animals. Routine surveillance testing supports free movement of livestock products across state and national boundaries and identifies endemic diseases providing useful data for management and treatment of diseases that affect livestock profitability. The CWD and Johes surveys will provide base line statistically valid prevalence data for the state so that effectiveness of intervention can be measured. Identification of and publications describing, emerging diseases of domestic and wild animals aids those responsible for animal health in humane management of those resources.

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**Porcine Reproductive and Respiratory Syndrome (PRRS)**

F.A. Osorio

Using reverse genetics, we generated a series of chimeric viruses containing specific genomic sequences of an attenuated PRRSV vaccine strain (Prime Pac) within the genomic context of a highly virulent infectious clone (FL-12). Eight viable chimeric viruses, encompassing the entire genome of PRRSV (Prime Pac), have been obtained. Five of these chimeras include all the non-structural open reading frames (ORFs): Most virulence determinants clustered in the structural genes of PRRSV. Some non-structural regions of the PRRSV genome (NSP3-8) exhibited a marked role in virulence. Meanwhile, other non-structural regions (NSP1-3, NSP10-12) showed an intermediate attenuation phenotype, while other non-structural (NSP9) or structural (ORF2) regions of the PRRSV genome could be ruled out as important determinants of virulence. We further dissected the structural regions for a finer mapping of individual ORFs of the PRRSV genome and generated 5 more chimeric viruses representing the majority of each individual ORF, 3 through 7.

Three putative N-linked glycosylation sites (N34, N44, and N51) are located on the GP5 ectodomain, where a major neutralization epitope also exists. To determine which of these putative glycosylation sites are used in PRRSV life cycle and the role of the glycans moieties in induction of neutralizing antibodies, we generated a panel of GP5 mutants containing single and multiple amino acid substitutions at these sites. In serum neutralization assays, the mutant viruses exhibited enhanced sensitivity to neutralization by wt PRRSV-specific antibodies. Furthermore, inoculation of pigs with the mutant viruses induced significantly higher levels of neutralizing antibodies, against the mutant as well as the wt PRRSV, thus suggesting that the loss of glycan residues in the ectodomain of GP5 enhances both the sensitivity of these viruses in vitro neutralization as well as the immunogenicity of the nearby neutralization epitope. These results should have great significance for development of PRRSV vaccines of enhanced protective efficacy.

This study is aimed at identifying PRRSV B-cell linear epitopes that would be consistently recognized by the humoral immune response of naturally infected animals. To this end, 213 overlapping 15-mer synthetic peptides covering the whole amino acid sequence of a non-structural protein (nsp2) and all the structural proteins of a North American strain of PRRSV (NVSL97-7895) were used in a peptide-based enzyme-linked immunosorbent assay.
Interestingly, the Nsp2 was found to contain most linear epitopes when compared to the structural proteins. Analysis of the peptides spanning the amino acid sequence of all structural proteins of the NVSL97-7895 strain against convalescent sera (45dpi) revealed the presence of B-cell linear epitopes in all studied proteins. Despite a genetic diversity between different PRRSV genotypes (1), we found immunodominant epitopes in specific regions of the gp2, gp3, gp5 and M protein which has been previously demonstrated to be recognized by immune sera raised against an European strain of PRRSV.

**IMPACT STATEMENT**

The experiments dealing with reverse genetics using an infectious cDNA clone are significant to understand the virulence of PRRSV and its attenuation. Understanding the gene basis for the virulent phenotype of PRRSV is the basis for the development of new, safer, more rationally designed replicating vaccines. In addition, the identification of epitopes (small fragments) of PRRSV proteins that can be inactivated or eliminated from a live PRRSV may be the basis for the development of a marker vaccine. Along the same line, enhancement of the PRRSV-neutralizing antibody response by molecular modification of the PRRSV proteins is of high value for the development of more effective vaccines against PRRSV infections.

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**NEB 14-117**

*Role of A.E Proteins in *E. Coli* O157:H7 Intestinal Colonization of Adult Cattle*

R. A. Moxley

*Escherichia coli* O157:H7 is an important zoonotic pathogen, and prevention of infection in cattle has been proposed to reduce the risk of human disease. The outer membrane protein, intimin has been reported to enhance intestinal colonization of adult cattle; however, the importance of Tir (translocated intimin receptor) in this regard has not been addressed. Adult beef cattle (n=30, average age, 16 mo) were orally inoculated with one of 5 isogenic strains of *E. coli* O157:H7, including: (1) tir gene deletion mutant; (2) complemented mutant; (3) tir gene deletion mutant transformed with empty vector; (4) nalidixic acid resistant (NalR) parent; and (5) wild-type (WT). Prior to the first inoculation (C1), all cattle were seropositive by ELISA for antibodies to intimin, Tir, EspA, EspB and O157 LPS. Forty-two days after the first inoculation (42 DPC1), all animals were re-challenged (C2) with the NalR parent strain to test whether prior infection with a Tir+ strain had any effect on shedding. At 14 DPC1, the WT strain was shed in the feces at higher levels than the other challenge strains, whereas shedding of the complemented mutant and NalR parent strains was comparable to that of the tir gene deletion mutant strain. No increase in anti-Tir titer was detected following C1 with either the Tir- strains or NalR parent strain. In contrast to those inoculated at C1 with the WT and NalR strains, cattle inoculated with either the tir gene deletion mutant or complemented strains at C1 had an increase in the magnitude and duration of NalR bacterial excretion at 14 DPC2, although the difference was not statistically significant (P>0.05). Overall, C1 challenge with WT resulted in higher post-C1 anti-Tir and anti-O157 LPS titers compared to the complemented mutant and NalR parent strains, which resulted in low or no detectable anti-Tir immune response. These results suggest that serologically detectable responses to Tir are associated with the level of intestinal infection; however, more studies will be required to determine the relative importance of Tir for *E. coli* O157:H7 colonization of the adult bovine gastrointestinal tract.

**IMPACT STATEMENT**

The results of this study provide a basis for the development of effective pre-harvest intervention strategies for reduction of the prevalence of *E. coli* O157:H7 in feedlot cattle. Reduction of *E. coli* O157:H7 in cattle should result in reduced environmental and food-borne contamination with the organism, thereby reducing the incidence of infection in humans.
Pathobiology of Porcine Colonic Spirochetoins Caused by Brachyspira Pilosicoli

G. E. Duhamel

Brachyspira pilosicoli is a major cause of colonic spirochetosis, a polymicrobial inflammatory bowel disease that affects humans and a wide range of animal species. Five penicillin-binding proteins were identified among human and porcine B. pilosicoli strains. Cecal spirochetosis and typhlitis associated with B. pilosicoli was characterized in 7.5- to 18-week-old commercial turkeys for the first time. Enterobacterial Helicobacter species, including the prototype H. hepaticus, are emerging causes of intestinal diseases in humans and animals that produce a novel nuclease toxin, known as cytotoxic distending toxin (Cdt). A sensitive fluorometric assay was developed to assess the biochemical properties of the CdtB effector subunit. The Ca2+- and Mg2+-dependence and neutral properties of CdtB were similar to mammalian nucleases, but DNA hydrolysis by CdtB was approximately 100-fold less active and was considerably more resistant to inhibition by ZnCl2 and G-actin than mammalian nucleases. Similar to other gram-negative pathogens, the CdtB subunit of H. hepaticus localized to the nucleus and alone was sufficient for cellular intoxication. Comparative analysis of CdtB genes and toxins produced by C. jejuni, a major cause of food-borne diarrheal illnesses, C. hyointestinalis, an emerging cause of intestinal diseases in pigs and human beings, and C. coli commonly found in intestinal specimens obtained from pigs and other species provided new insights into the pathogenesis of intestinal disease associated with these pathogens and methods for improved detection. By contrast with a recent report suggesting high CdtB activity among C. coli isolated from pigs in Denmark, CdtB activity was not found among US porcine C. coli.

IMPACT STATEMENT

Identification of penicillin-binding proteins of B. pilosicoli provides a basis for development of improved control strategies for pathogenic intestinal spirochetes of humans and animals. Cecal spirochetosis caused by B. pilosicoli was characterized in commercial turkeys for the first time. Differences between the biochemical properties of Helicobacter CdtB and mammalian nucleases suggest that novel antitoxin control strategies can be developed. A novel Campylobacter cdtB gene encoding a highly toxic CdtB subunit was characterized among porcine and human C. hyointestinalis. Porcine C. coli are an unlikely source of toxigenic Campylobacter for humans.

Functional Genomic Analysis of Bovine Vial Diarrhea

R. O. Donis and C. L. Kelling

Bovine viral diarrhea virus (BVDV), a pestivirus, is a pathogen that is economically important to the cattle industry primarily because of its propensity to cause viremia resulting in fetal infection or immunosuppression. Effective, safe BVDV vaccines that induce protective immunity without causing fetal infection or immunosuppression are needed. Inhibition of cellular innate immunity by pestiviruses correlates with the presence of a nonstructural protein, at the 5 prime terminus of the open reading frame. This N-terminal protein (NPRO) is an autoproteinase. We hypothesized that BVDV virulence also correlates with the presence of NPRO. The objective of the present study was to characterize the influence of NPRO on BVDV virulence in calves. The virulence of a noncytopathic NADL BVDV with a functional N PRO [i-NADL del (ins)] was compared with the virulence of i-NADL del (ins) with a dysfunctional NPRO as a result of fusion with EGFP [i-NADL del (ins)-EGFP] by experimentally infecting dairy calves with each virus. Calves infected with i-NADL del (ins) developed elevated body temperatures, viremia, as well as marked lymphoid depletion and extensive deposition of BVDV antigen in lymphatic tissue. Calves infected with i-NADL del (ins)-EGFP developed low-level viremia, and mild lymphoid depletion with minimal BVDV antigen deposition in lymphatic tissues. These results provide evidence for a correlation of BVDV virulence with the presence of a functional NPRO. Studies are underway to assess host innate and adaptive immune
responses as well as the level of protective immunity afforded by vaccination of calves with this attenuated, noncytopathic BVDV mutant.

**IMPACT STATEMENT**

BVDV infections have a significant negative impact on animal well-being and profitability in the US cattle industry. BVDV vaccines are available to help control those infections; however, the vaccines do not provide complete protection. Our research on the molecular basis of virulence contributed to the understanding of mechanisms involved in BVDV infections and will facilitate research aimed at identifying safe, effective vaccine candidates.

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**Evolving Pathogens, Targeted Sequences and Strategies for Control of Bovine Respiratory Disease**

Clinton J. Jones

BHV-1 is a significant viral pathogen of cattle that can induce respiratory disease, abortion, or occasionally encephalitis. BHV-1 has also been frequently found in buffalo, which is a growing food animal source in the US. BHV-1 is also a causative agent of "Shipping Fever" or Bovine Respiratory Complex. As a consequence of the pathogenic potential of BHV-1, the cattle industry suffers more than $500,000,000/year in losses.

BHV-1 typically initiates infection in mucosal epithelial surfaces located in the eyes, nose, mouth, upper respiratory tract, or genital tract. Extensive viral gene expression occurs, virus is shed, and clinical symptoms are apparent. Virus then enters the peripheral nervous system, where it establishes a latent infection in sensory neurons. Viral DNA can persist in a latent state for the lifetime of the infected host or it can periodically reactivate. In contrast to the 70-80 viral genes expressed in epithelial cells, only one small region of the viral genome is transcriptionally active in latently infected neurons. This region is designated the latency related (LR) gene. LR-RNA is transcribed from the opposite strand of an immediate early gene (ICP0) that activates productive gene expression. A latent infection can be operationally divided into 3 distinct stages: 1) establishment, 2) maintenance, and 3) reactivation from latency. Latency is crucial for pathogenesis and virus transmission in nature.

**A. Accomplishments related to understanding the functions of the LR gene**

We have previously demonstrated that the LR gene encodes a protein that is expressed in sensory neurons and during productive infection. Site-directed mutagenesis indicated that ORF-2 expression is required for the latency-reactivation cycle of BHV-1 in cattle. The LR gene interferes with apoptosis, which promotes neuronal survival during the transition from acute infection to latency. The LR gene also appears to encode a small non-protein coding RNA that inhibits cell cycle progression, which may play an important role in restricting viral gene expression in sensory neurons. Finally, LR-RNA sequences or a small open reading frame appears to inhibit bICP0 expression (the gene that is anti-sense to the LR gene), and consequently can inhibit viral gene expression. We believe that the LR gene encodes multiple functions that cooperate to regulate latency. The dominant function is a protein encoded by ORF-2 that is absolutely required for the latency-reactivation cycle in cattle.

The LR gene also plays a role in the ability of BHV-1 to grow in the tonsils of infected calves. Although the LR mutant virus can persist in the tonsils of latently infected calves, it does not reactivate from latency. Studies that are in progress now are designed to compare viral gene expression in TG or tonsils of calves latently infected with wt BHV-1 or the LR mutant.

A small open reading frame was identified within the LR transcriptional promoter (ORF-E). A small transcript that encompasses ORF-E is expressed in trigeminal ganglia of latently infected calves. Studies designed to test
whether ORF-E encodes a protein are currently underway.

We are also performing a study with Pfizer to compare BHV-1 strains in aborted fetuses to strains used to vaccinate the respective herds. The strains from aborted fetuses came from Texas and Western Nebraska. Interestingly, these strains do not appear to be identical to the Pfizer's vaccine strains or to the Cooper strain we use in the lab.

The BHV-1 latency project is funded by a USDA grant that is entitled Regulation of the latency-reactivation cycle by the Bovine Herpesvirus 1 (BHV-1) Latency Related Gene (11-1-2003 to 10-30-2006), and a contract from Pfizer.

B. Analysis of the bICPO gene

bICPO is considered to be most important transcriptional regulatory gene of BHV-1 and as discussed above is antisense to the LR gene. In addition to regulating transcription, bICPO is toxic to cells, but does not appear to directly induce apoptosis. bICPO contains a C3HC4 zinc RING finger at its amino terminus. Other proteins that regulate transcription, oncogenesis, and growth also contain zinc ring fingers. Site-specific mutagenesis on the C3HC4 zinc RING finger revealed this domain is necessary for toxicity and eliminates transcriptional regulatory activity. Since bICPO does not specifically bind DNA, we have hypothesized that bICPO interacts with transcription factors. Earlier studies from my laboratory have demonstrated that bICPO interacts with histone deacetylase 1 (HDAC1). HDAC1 represses transcription because it removes acetyl groups from histones, thus making chromatin transcriptionally inactive. We have also determined that bICPO binds p300, a histone acetyltransferase that regulates transcription. We believe that the ability of bICPO to interact with HDAC1 and p300 promotes productive infection.

To begin to identify bICPO functional domains that are not part of the zinc RING finger, we developed a panel of transposon insertion mutants that span bICPO. A large domain spanning amino acids 78-256, and a separate domain that is at or near amino acid 457 was necessary for efficient trans-activation of a simple promoter. Transposon insertion at amino acid 91 impaired bICPO protein stability in transfected cells. Insertion of transposons into the acidic domain of bICPO had little or no effect on trans-activation of a simple promoter or protein expression suggesting this region does not play a major role in activating gene expression. Sequences near the C-terminus (amino acids 607-676) contain a functional nuclear localization signal (NLS). Collectively, our studies indicated that bICPO contains several important functional domains; 1) the zinc RING finger, 2) two separate domains that activate transcription, and 3) a C-terminal NLS that is also necessary for efficient trans-activation.

The bICPO studies are funded by a grant entitled Functional analysis of bICPO, a BHV-1 gene that is a promiscuous trans-activator (9/1/2002 to 8/30/2005). A renewal of this grant was recently funded by the USDA. The title of the renewal is Functional analysis of bICPO, a BHV-1 gene that is a promiscuous trans-activator (9/1/2005 to 8/30/2008).

Develop Pre-Harvest Version of the USDA-FSIS Fast Antibiotic Screening Test and Antibiotic Residue Avoidance Education

D. D. Griffin

The first objectives, to develop a live animal test equivalent to FAST by determining the minimum inhibitory concentration (MIC) of commonly used antimicrobials on Bacillus megaterium has been accomplished, validation of these results, testing of antibiotic spiked urine and in-vivo testing of 12 classes of antibiotics in cattle born in the spring of 2003 and 2004, and whose health histories were traced from birth to the farm of origin has been completed. Using cattle that can be traced from birth insures a complete analysis of health treatment records. Cattle with a history of antibiotic treatment were excluded. Minimum inhibitory concentrations (MIC) for 12 different antibiotics commonly used in the field, using the ATCC reference strain 9885 of B. megaterium will be determined and compared to the in vitro results. Originally 14 total antibiotics were included but due to FDA AMDUCA regulations two antibiotics from the class aminoglycosides (gentamicin, neomycin) had to be excluded because of prolonged
residue potential. The following antimicrobial groups were represented: aminocyclitols (spectinomycin), beta-lactams (penicillin G, ampicillin, ceftiofur), chloramphenicol derivatives (florfenicol), fluoroquinolones (enrofloxacin), lincosamides (lincomycin), macrolides (tilmicosin, tylosin), sulfonamides (sulfadimethoxine, sulfamethazine), and tetracyclines (oxytetracycline). A unique renal biopsy technique was developed which use a copotamy approach. A large three millimeter biopsy instrument was developed as the available commercial biopsy instrument did not retrieve a sufficient sample for HPLC analysis. All the sample were collected without apparent discomfort or harm to the cattle used in this project. The renal tissue samples are awaiting analysis.

The preliminary outline for the field instruction manual for use of the Pre-Harvest Antibiotic Screening Test has been developed and is being evaluated by 20 practicing beef feedlot veterinarians. These veterinarians are located in six states (Colorado, Iowa, Kansas, Nebraska, Oklahoma and Texas).

IMPACT STATEMENT

Presently there is not a pre-harvest antibiotic residue screening test available to mirror the new antibiotic screening test adopted by the USDA-FSIS 2000. This increases the risk of producers marketing an animal with violative residue, risks consumer confidence in the food supply of our nation and potentially impacts the economic sustainability and profitability of the United States beef industry. A pre-harvest antibiotic screening test that mirrors the USDA-FSIS FAST test will be developed. Disseminate the information to producers and veterinarians.

Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety

R. A. Moxley, G. E. Duhamel and D. R. Smith

**Escherichia coli** O157:H7 is an important zoonotic pathogen, and prevention of infection in cattle has been proposed to reduce the risk of human disease. A large-scale study of 140 pens of cattle from 19 commercial feedlots (n=20,556 head) was conducted in which cattle received two doses of vaccine, and the effects of vaccination on terminal rectal colonization and probability for pens to test positive for **E. coli** O157:H7 was determined. The pen-testing strategy consisted of culturing seven ropes per pen hung overnight from feedbunk neckrails, a correlate of fecal shedding prevalence. Vaccinated pens of cattle were 27% less likely to test ropes-positive than non-vaccinated pens. Other variables explaining the probability for pens to test ropes-positive were month of the year, region of the state, the number of cattle within the pen, and condition of the pen surface. Terminal rectum mucosal samples from 720 cattle in 21 pens (11 vaccinated, 10 not vaccinated) selected from 140 pens in the study were cultured. Vaccinated cattle were 76% less likely to be colonized in the terminal rectum compared to non-vaccinated cattle. We concluded that, in commercially fed cattle, the two-dose vaccine regimen reduced the probability of **E. coli** O157:H7 colonization of the terminal rectum, and reduced pen-level contamination. **B. pilaecoli** is a major cause of colonic spirochetosis, a polymicrobial inflammatory bowel disease that affects humans and a wide range of animal species. Five penicillin-binding proteins were identified among human and porcine **B. pilaecoli** strains. Spirochetes that were identified as **B. pilaecoli** were identified in 7.5- to 18-week-old commercial turkeys with colcal spirochetosis and typhilitis. **Enterohemorrhagic Helicobacter** species, including the prototype **H. hepaticus**, are emerging causes of intestinal diseases in humans and animals that produce a novel nuclease toxin, known as cytolytical distending toxin (Cdt). A sensitive fluorometric assay was developed to assess the biochemical properties of the CdB effector subunit. The Ca2+ and Mg2+ dependence and neutral properties of CdB were similar to mammalian nucleases, but DNA hydrolysis by CdB was approximately 100-fold less active and was considerably more resistant to inhibition by ZnCl2 and G-actin than mammalian nucleases. Similar to other gram negative pathogens, the CdB subunit of **H. hepaticus** localized to the nucleus and alone was sufficient for cellular intoxication. Comparative analysis of CdB genes and toxins produced by **C. jejuni**, a major cause of food-borne diarrheal illnesses, **C. hyointestinalis**, an emerging cause intestinal diseases in pigs and human beings, and **C. coli** commonly found in intestinal specimens obtained from pigs and other species provided new insights into the pathogenesis of intestinal disease associated with these pathogens and methods for improved detection. By contrast with a recent report suggesting high CdB activity among **C. coli**
isolated from pigs in Denmark, CdtB activity was not found among US porcine C. coli.

IMPACT STATEMENT

A large-scale clinical trial in commercial feedlots provided scientific evidence that vaccination with type III secreted proteins is an effective pre-harvest intervention strategy for the control of E. coli O157:H7 in feedlot cattle. Identification of penicillin-binding proteins of B. pilosicoli provides a basis for development of improved control strategies for pathogenic intestinal spirochetes of humans and animals. C. jejuni, caused by B. pilosicoli was characterized in commercial turkeys for the first time. Differences between the biochemical properties of Helicobacter CdtB and mammalian nucleases suggest that novel antitoxin control strategies can be developed. A novel Campylobacter cdtB gene encoding a highly toxic CdtB subunit was characterized among porcine and human C. jejuni. Porcine C. jejuni are an unlikely source of toxigenic Campylobacter for humans.

Pathogenesis of Bovine Viral Diarrhea Virus and Bovine Respiratory Syncytial Virus Infections

C. L. Kelling

Bovine respiratory disease complex (BRDC) has a major negative impact on profitability in the beef cattle industry. BRDC outbreaks are caused by interactions of multiple ubiquitous pathogens, such as bovine viral diarrhea virus (BVDV) and bovine respiratory syncytial virus in affected animals.

Vaccination against BVDV infection should protect against viremia and prevent dissemination of virus throughout the host following exposure, thus blocking infection of target cells of the reproductive and lymphatic systems and preventing fetal infection and immunosuppression, respectively. The objective of this study was to characterize the level of protection against systemic infection and disease from challenge exposure with NY-1 BVDV afforded by use of a modified-live, noncytopathic BVDV type 1 vaccine. Calves, 5-7 months old, were allotted to two groups, Group 1, not vaccinated (n = 5), and Group 2, vaccinated (n=5). Calves in group 2 were vaccinated subcutaneously on day 0 with BVDV 1 (WRL strain) in a combination vaccine containing other MLV vaccines. Calves in both groups were challenged intranasally on day 21 postvaccination with NY-1 BVDV. Rectal temperatures and clinical signs of disease were recorded daily. Total and differential white blood cell and platelet counts were performed. Histologic examination and immunohistochemical analysis were conducted postmortem to detect lesions and distribution of viral antigens, respectively. Vaccine virus replicated systemically in vaccinated calves as evident antemortem by transient decreased peripheral leukocyte and lymphocyte counts as well as evident postmortem by lymphoid depletion in Peyers patches and mesenteric lymph nodes. Post-challenge, nonvaccinated calves developed elevated body temperatures, respiratory tract disease signs, viremia, leukopenia, lymphopenia and thymic infection. In contrast, post-challenge, vaccinated calves did not exhibit fever nor signs of respiratory tract disease. Post-challenge with NY-1, vaccinated calves were protected against systemic replication of challenge virus since they did not develop reduced leukocyte counts and were protected against viremia and infection of target lymphoid cells.

IMPACT STATEMENT

The BRDC causes a significant negative impact on animal well-being and profitability in the U.S. cattle industry. BVDV infections are important causes of BRDC and vaccines are available to help control those infections; however, the vaccines do not provide complete protection. Our research contributed to the understanding of mechanisms involved in BVDV infections. This understanding is useful for developing effective intervention strategies to help control BRDC to enhance animal well-being and increase profitability.
The specific aims of this project are: 1) to field test the effect of vaccination and feeding direct-fed microbials for singular, additive or interactive effects on the prevalence of E. coli O157:H7 in feedlot cattle; and 2) to share our findings with cattle producers, veterinarians, food safety researchers, food safety policy makers, and other stakeholders through extension programming.

A phase III clinical trial was conducted to field test the effect of 1) vaccination, and 2) feeding a direct-fed microbial product on the prevalence of E. coli O157:H7 in commercial feedlot cattle. Feedlots were classified as either feeding or not feeding BovamineTM (Lactobacillus acidophilus and Propionibacterium freudenreichii) and pens of vaccinated and nonvaccinated cattle within feedlots were matched by time in a split plot design with the whole plot factor being Bovamine TM and the split plot factor being vaccination. Vaccine was given to cattle at initial processing and again at reimplanting. Each pen of cattle enrolled in the study was sampled for E. coli O157:H7 starting at least one week after the second dose of vaccine was given, and continued every three weeks for four test period samplings. Pens were sampled for O157 by hanging seven ROPES from the neckrail of the feedbunks where cattle could easily lick, chew, or rub on them. E. coli O157:H7 was isolated and identified by standard methods involving selective enrichment, immunomagnetic separation, agar plating, biochemical and immunological testing and PCR confirmation. The outcome was whether or not pens tested positive for E. coli O157:H7 using the ROPES device. Recovery of E. coli O157:H7 from at least one ROPES classified the pen as positive. The probability for pens of cattle to test ROPES-positive was modeled in a generalized estimation equations (GEE) model using the logit link function and accounting for clustering by matched pairs of pens within feedlot and repeated measures. We studied 140 pens of cattle (n=20,556 head) in 19 feedlots. Vaccinated pens of cattle were less likely to test ROPES-positive (OR=0.59, P=0.004). Other variables in the model were month of the year, region of the state, the number of cattle per pen, and pen surface condition. At harvest, terminal rectum mucosal cells (TRM) were collected from a sample of cattle from a proportion of vaccinated and unvaccinated pens to assess for colonization. The TRM were collected by scraping the mucosa of the terminal rectum 3-5 cm proximal to the rectoanal juncture. The probability to detect E. coli O157:H7 from TRM was modeled using a generalized linear mixed model (GLMM) with a logit link function and accounting for random effect of pen. 720 cattle were tested from within 21 pens of cattle (13 vaccinated, 10 not vaccinated). We observed a 75% lower probability for E. coli O157:H7 colonization at harvest among vaccinated cattle (OR=0.20; P=0.03). We concluded that the two-dose vaccine regimen reduced the probability of E. coli O157:H7 colonization of the terminal rectum in commercially fed cattle at harvest.

Impact Statement

These data suggest that vaccination reduced E. coli O157:H7 colonization of cattle and lowered the environmental burden of exposure. Therefore, this strategy may be promising for pre-harvest control of E. coli O157:H7 in commercially fed cattle. Extension programming will help veterinarians and cattle feeders become aware of how they can apply effective interventions to improve the safety of food.

Regulation of the Latency-Reactivation Cycle by the Bovine Herpesvirus 1 (BHV-1) Latency Related (LR) Gene

C. J. Jones and A. R. Doster

Bovine herpesvirus 1 (BHV-1) is an important pathogen of cattle that belongs to the α- herpesvirus subfamily.
Like other members of this subfamily, a latent infection is established in sensory neurons following acute infection. However, the virus can reactivate and spread to other cattle. Reactivation from latency is the mechanism by which the virus survives in nature, and is thus, an important property of pathogenesis. During a latent infection, one abundant viral transcript can be detected, the latency related RNA (LR-RNA). Plasmids expressing LR gene products enhance survival of monkey kidney cells (CV-1), neuronal like cells (neuro-2A), and human lung cells (IMR-90) after treatment with chemicals that induce apoptosis. We have developed a LR mutant does not express the LR protein encoded by ORF-2. This mutant grows well in tissue culture, but does not grow well in the eyes or tonsil during acute infection of calves. Furthermore, the LR gene mutant does not reactivate from latency indicating that the LR gene is important for the latency-reactivation cycle in calves. Immune infiltration into trigeminal ganglia (TG) occurs as a result of infection and it is believed this is important for regulating latency. Calves infected with the LR mutant contain enhanced immune infiltration and programmed cell death (apoptosis) in TG at the end of acute infection. In addition, the LR gene regulates interferon RNA expression in productively infected calves and cultured bovine cells suggesting this is the mechanism by which the LR gene regulates lymphocyte infiltration into TG.

IMPACT STATEMENT

BHV-1 is an important pathogen of cattle, which costs the cattle industry one-half billion dollars per year in the US. The ability of BHV-1 to infect lymphocytes is believed to enhance pathogenesis and virus transmission. We are trying to understand virus host interactions in the peripheral nervous system to facilitate production of a better vaccine.

Molecular Analysis of a Mycobacterium Paratuberculosis Colony-Morphology Attenuated Mutant

R. G. Barletta

Mycobacterium avium subsp. paratuberculosis (MAP) is the etiological agent of a severe gastroenteritis in ruminants, known as Johnes disease. In the United States alone, economic losses for the dairy industry are estimated to be over $1.0 billion per year. Survival within macrophages is a hallmark of MAP. Identification of genes responsible for MAP survival in macrophages is important to understand how this bacterium causes disease. This project is focused on the MAP mutant 4H2 that displays a colony morphology alteration and an attenuated phenotype in bovine macrophages. In this reporting period, we compared the phagocytosis of MAP wild type by freshly isolated bovine monocytes and a bovine macrophage cell line. Bovine monocytes exhibited a greater ability to phagocytose MAP (i.e. greater percentage of infected cells, and more bacilli per infected cell), than did a bovine macrophage cell line. Phagocytosis of MAP by monocytes, but not the cell line, was significantly enhanced by the addition of autologous serum. Following ingestion, the number of viable MAP cells in monocytes increased during the first 4 days and then declined between day 4 and day 8 after infection, as determined by a radiometric method. The numbers of MAP remained largely unchanged in the cell line during the same incubation period. The number of microscopically visible acid-fast bacilli increased with time in monocytes, but not in the macrophage cell line. These observations suggest that replication and inhibition of bacilli may both occur in monocytes. The difference in the ability of bovine monocytes and the macrophage cell line to ingest and restrain the intracellular growth of MAP provide valuable model systems for investigating various aspects of how MAP enters and persists within its preferred niche, the mononuclear phagocyte. Similar experiments with mutant 4 H2 are in progress. In addition, Southern blot and PCR analyses are consistent with the inactivation of MAP 1152. However, transposon insertions may have polar effects and thus, we are carrying complementation tests with all wild type genes in the region immediately downstream to the transposon insertion site including genes MAP1152-1153-1155 and 1156. Transformants will be verified and tested for survival in bovine macrophages.

IMPACT STATEMENT
Regulation of the Latency-Reactivation Cycle by the Bovine Herpesvirus 1 (BHV-1) Latency Related (LR) Gene

C. J. Jones

Bovine herpesvirus 1 (BHV-1) is an important pathogen of cattle that belongs to the α-herpesvirus subfamily. Like other members of this subfamily, a latent infection is established in sensory neurons following acute infection. However, the virus can reactivate and spread to other cattle. Reactivation from latency is the mechanism by which the virus survives in nature and is thus an important property of pathogenesis. During a latent infection, one abundant viral transcript can be detected, the latency related RNA (LR-RNA). Plasmids expressing LR gene products enhance survival of monkey kidney cells (CV-1), neuronal like cells (neuro-2A), and human lung cells (IMR-90) after treatment with chemicals that induce apoptosis. We have developed a LR mutant does not express the LR protein encoded by ORF-2. This mutant grows well in tissue culture, but does not grow well in the eyes or tonsil during acute infection of calves. Furthermore, the LR gene mutant does not reovate from latency indicating that the LR gene is important for the latency-reactivation cycle in calves. Immune infiltration into trigeminal ganglia (TG) occurs as a result of infection and it is believed this is important for regulating latency. Calves infected with the LR mutant contain enhanced immune infiltration and programmed cell death (apoptosis) in TG at the end of acute infection. In addition, the LR gene regulates interferon RNA expression in productively infected calves and cultured bovine cells studies suggest this is the mechanism by which the LR gene regulates lymphocyte infiltration into TG.

IMPACT STATEMENT

BHV-1 is an important pathogen of cattle, which costs the cattle industry one-half billion dollars year in the US. The ability of BHV-1 to infect lymphocytes is believed to enhance pathogenesis and virus transmission. We are trying to understand virus host interactions in the peripheral nervous system to facilitate production of a better vaccine.

Veterinary Field Disease Research Program

D. R. Smith

The Field Disease Research Program uses a team approach to solve problems of animal or human health related to livestock production systems. Current research is underway to 1) estimate the proportion of Nebraska beef cattle herds with Johne’s disease and identifying factors associated with Johne’s disease status; 2) use microscopic examination of immunohistochemistry-stained skin biopsies to detect and remove calves born persistently infected with BVDV from a commercial cow-calf ranch; 3) validate the use of serology among unvaccinated sentinel beef calves to detect evidence of BVDV exposure during the period when their dams are carrying fetuses susceptible to BVDV infection and subsequent development of the PI state.

Seventy-three cow-calf herds representing 20,865 cows were extensively tested for the presence of Johne’s disease using a serial testing strategy (ELISA serology followed by fecal culture confirmation of positives). Mean herd size was 286 head, ranging from 94-1,700 cows per herd. A total of 15,402 cows were tested following a pre-determined
sampling strategy. Johne’s disease was identified in 9 herds (12%). Factors significant as univariate risk factors for Johne’s disease positive herds were: 1) the presence of Johne’s disease suspect animals in the calving area, or 2) with pre-weaned calves, and 3) exposure of pre-weaned calves to manure contaminated water. Of these variables, the presence of Johne’s suspects in the calving area was most explanatory of the herd’s Johne’s disease status.

BVDV was eliminated from a 600 head cow-calf ranch by testing calves at birth using microscopic examination of immunohistochemistry-stain skin biopsies collected from the ear margin (ear-notch test) to detect calves born BVDV persistently infected (BVDV-PI). Calves ear-notch test-positive in 2003 were removed from the cow herd prior to the breeding season. No calves were born BVDV-PI in 2004 or 2005. Tests in previous years identified the presence of PI calves and BVDV transmission could be traced to breeding pastures where PI calves were present. BVDV serology from 10% of weaned calves from herds with and without BVDV are being evaluated for herd-level diagnostic value. Because of maternal antibodies, titers to BVDV are variable and age-dependent. Data analysis of this year’s serology results is still underway. Data were analyzed to identify the risk factors for neospora transmission in dairy cattle and the presence of virulence factors among *Moraxella ovis*. Papers were published describing the ecology of *E.coli O157:H7* and *Salmonella* in fed cattle populations.

**IMPACT STATEMENT**

Neospora, Johne’s disease, neonatal diarrhea and BVDV are economically important diseases of cattle. The results of these studies help veterinarians know how to diagnose a herd’s status for these diseases or to understand how their producer clients may risk exposure and further transmission of the agents of these diseases in their herds. Understanding the ecology of food safety pathogens in cattle environments is important to designing strategies for intervention.

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### NEB 14-132

**Examination of Attenuation and Virulence Determinants of Porcine Reproductive and Respiratory Syndrome Virus**

A. K. Pattnaik and F. A. Osorio

We have generated an infectious molecular clone (PP-18) from the Prime Pac attenuated vaccine strain of PRRSV. The viral genome is 15,520 nucleotides long excluding poly (A) tail which is the same length as the parental virus. The full-length cDNA clone was assembled in pBR322 after incorporating T7 RNA polymerase promoter. *In vitro* transcribed RNAs, when transfected into MARC-145 cells resulted in production of infectious virus. The rescued virus had the similar growth properties in both MARC-145 cells and porcine alveolar macrophages (PAMs) as the parental vaccine virus. The derivation of this infectious clone from the attenuated PRRSV vaccine strain should significantly facilitate ongoing molecular attenuation studies by providing an avirulent phenotypic background on which to evaluate the contribution that single wt PRRSV genes may have on virulence. We have also generated a series of chimeric viruses containing specific genomic sequences of an attenuated PRRSV vaccine strain (Prime Pac) within the genomic context of a highly virulent infectious clone (FL-12). Eight viable chimeras, encompassing the entire genome of Prime Pac, have been obtained. Clear-cut characterization of the chimeric viruses for virulence phenotype was obtained in vivo, upon inoculation of pregnant sows at day 90 of gestation. Most virulence determinants clustered in the structural genes of PRRSV. Some non-structural regions of the PRRSV genome (NSP3-8) exhibited a marked role in virulence. Meanwhile, other non- structural regions (NSP1-3, NSP10-12) showed an intermediate attenuation phenotype, while other non-structural (NSP9) or structural (ORF2) regions could be ruled out as important determinants of virulence. We further dissected the structural genes for a finer mapping and generated 5 chimeras representing the majority of each individual ORF, 3 through 7. The *in vitro* growth kinetics in both MARC-145 cells and PAM and *in vivo* characterization in pregnant sows are currently in process. This approach should allow us to narrow down the relative contribution of individual ORFs on attenuation of virulence of PRRSV, thus opening the avenue for precise mapping of the critical regions and residues within the individual gene.
products that are important for attenuation.

**IMPACT STATEMENT**

Porcine reproductive and respiratory syndrome (PRRS) in pigs is a complex disease responsible for significant economic losses to the swine industry. The virus, PRRSV in not well characterized and current vaccines are less efficacious. Using a reverse genetic approach, we attempt to understand the genetic determinants of PRRSV that are responsible for causing disease in infected pigs and how such information can be used for generation of safer and efficacious vaccine to combat PRRS.

**Analyses of Virulence and Attenuation Determinants of Porcine Reproductive and Respiratory Syndrome Virus Using Reverse Genetics Approach**

A. K. Pattnaik and F. A. Osorio

During the past year, we have been able to generate a series of chimeric viruses containing specific genomic sequences of an attenuated PRRSV vaccine strain (Prime Pac) within the genomic context of a highly virulent infectious clone (FL-12). Eight viable chimeras, encompassing the entire genome of Prime Pac, have been obtained. Five of the chimeras include all the non-structural open reading frames (ORFs): (1) 5'UTR and NSP1 and part of NSP2, (2) part of NSP2 and part of NSP3, (3) part of NSP3 to NSP8, (4) part of NSP9, and (5) part of NSP9 to NSP12 genes; while the remaining 3 chimeras include all the structural ORFs: (6) part of NSP12, ORF2 and part of ORF3, (7) ORF3 to 7 and 3'UTR, and (8) the entire region spanning all the structural genes and the 3'UTR. Clear-cut characterization of their virulence phenotype was obtained in vivo, upon inoculation of pregnant sows at day 90 of gestation. Most virulence determinants clustered in the structural genes of PRRSV. Some non-structural regions of the PRRSV genome (NSP3-8) exhibited a marked role in virulence. Meanwhile, other non-structural regions (NSP1-3, NSP10-12) showed an intermediate attenuation phenotype, while other non-structural (NSP9) or structural (ORF2) regions could be ruled out as important determinants of virulence. We further dissected the structural genes for a finer mapping and generated 5 chimeras representing the majority of each individual ORF, 3-7. The in vitro growth kinetics in both MARC-145 cells and PAM and in vivo characterization in pregnant sows are currently in process. This approach should allow us to narrow down the relative contribution of individual ORFs on attenuation of virulence of PRRSV, thus opening the avenue for precise mapping of the critical regions and residues within the individual gene products that are important for attenuation. To complement the experiments involving a virulent infectious clone (FL-12), we have also generated an infectious clone (PP-18) from this Prime Pac attenuated vaccine strain. The complete nucleotide sequence was determined and compared with parental vaccine virus. The viral genome is 15,520 nucleotides long excluding poly (A) tail which is the same length as the parental virus. A number of changes in nucleotide sequence were noted. A full-length cDNA clone was assembled in pBR322 after incorporating T7 RNA polymerase promoter. In vitro transcribed RNAs, when transfected into MARC-145 cells resulted in production of infectious virus. The rescued virus had the similar growth kinetics in both MARC-145 cells and porcine alveolar macrophages as the parental vaccine virus and could be differentiated from the other American type viruses by indirect fluorescent staining with specific Mabs (SDOW17 and SR30). The derivation of this infectious clone from the attenuated PRRSV vaccine strain should significantly facilitate ongoing molecular attenuation studies by providing an avirulent phenotypic background on which to evaluate the contribution that single wt PRRSV genes may have on virulence.

**IMPACT STATEMENT**

Porcine reproductive and respiratory syndrome virus (PRRSV) is responsible for significant economic losses to
the swine industry. The goal of the project is to gain knowledge about the determinants of virulence and attenuation of PRRSV, which will be important towards developing safer and more efficacious vaccine to combat the disease.

Influence of Enterotoxins on Virulence and Colonization of the Porcine Intestine by Escherichia coli

R. A. Moxley

Enterotoxigenic Escherichia coli (ETEC) is an important cause of diarrhea and death in human beings and animals. This study was conducted as a step towards understanding the biological roles of E. coli enterotoxins in intestinal colonization and pathogenesis of disease in piglets. The lambda Red-mediated recombinogenic system has been widely used for gene inactivation in yeasts and different pathogenic bacteria, but to our knowledge, not ETEC. This approach is simpler and more efficient than conventional methods of allelic exchange. In the study herein, this system was used or homologous recombination by two approaches, both plasmid based. In the first approach, amplification of an antibiotic insertion-inactivated enterotoxin gene in a plasmid vector with primers outflanking that gene was done, resulting in a linear PCR product containing the antibiotic gene outflanked on either side by enterotoxin gene nucleotides. In the second approach, enterotoxin genes were disrupted using PCR products from primers specifically targeting antibiotic markers, flanked on either side by short homologies to 5 primer ends of target genes. Conditions were identified that optimize use of the lambda Red system for recombineering in ETEC. Lambda Red and FLP recombinase helper plasmids were used with successful disruption of enterotoxin genes in ETEC. We examined the use of plasmid-derived short (60-bp) and long (>100-bp) PCR-generated homology products, both of which worked well. Recombinants were selected on respective antibiotics, PCR-analyzed and mutagenesis confirmed using Southern blots. The success of lambda Red-mediated recombination in ETEC depended on a number of factors, such as the orientation of the antibiotic marker in the recombination substrates, amount of PCR product, buffers used to make the bacteria electrocompetent, heat shock effects, electroporation conditions and exposure to UV, among others. Overall, we have optimized the lambda Red recombineering technology for use in ETEC, as demonstrated by the precise disruption of the estB and eltAB genes, results which encourage further use of this technology in studies aimed at the elucidation of gene function.

IMPACT STATEMENT

Methods for the inactivation of enterotoxin genes in Escherichia coli were optimized, which should facilitate studies aimed at the elucidation of gene function.

Tricarboxylic Acid Cycle Mediated Regulation of Staphylococcus Aureus Bovine Mastitis

Greg A. Somerville

Aconitase is a bifunctional protein having both an enzymatic and regulatory function. Inactivation of the aconitase gene in the human and animal pathogen, Staphylococcus aureus caused a significant reduction in the production of several virulence factors and enhanced long-term survival relative to the wild-type strain. The purpose of this project is to identify those genes that are affected by aconitase inactivation and to determine if those genes are affected by the loss of enzymatic activity or regulatory function. To accomplish this goal, we will employ DNA microarray technology using three tricarboxylic acid cycle mutants. Phase 1 of this project is to construct S. aureus
strains bearing mutations in either the isocitrate dehydrogenase gene or the citrate synthase gene. During the past
year, the plasmids necessary to inactivate these genes were constructed and the screening of putative mutants has
begun. We anticipate completion of the mutant construction by early next year. Phase 2 of the project is to analyze
the transcriptional profiles of the three tricarboxylic acid cycle mutants (isocitrate dehydrogenase, citrate synthase, and
aconitase) using DNA microarray technology in collaboration with the Department of Pathology and Microbiology at
the University of Nebraska Medical Center. We have completed the DNA microarray experiment for the aconitase
mutant strain and are awaiting the completion of the additional mutant strains before continuing the microarray
experiments. Upon completion of this project, it is anticipated that we will have identified new therapeutic targets to
combat S. aureus infections.

IMPACT STATEMENT

The bacterium Staphylococcus aureus poses major health risks and causes significant economic hardships in the dairy
and food industries. As an example, the economic impact of bovine mastitis to Nebraska per year is approximately
$13.4 million. The research contained within this proposal is designed to identify novel therapeutic targets in
Staphylococcus aureus, which will facilitate the development of new drugs to combat bovine mastitis.

Genetic Basis of Resistance to Food-Borne Bacterial Pathogens
G. Duhamel and J. Weber

Campylobacter jejuni and Escherichia coli are leading causes of food-borne bacterial infections in humans worldwide.
Conversely, Helicobacter hepaticus is a well-established cause of chronic hepatitis and liver cancer in susceptible mouse
strains. Cytotoxic distending toxin (CDT) is a newly discovered virulence factor consisting of a tri-peptide complex
of subunit A, B and C which is shared among these bacterial pathogens. The proposed mechanism of CDT toxicity
is consistent with that of heterodimeric AB2 bacterial toxins where subunits A and C bind to host cell membrane for
 cellular delivery of the toxic B subunit. The central hypothesis of this project is that subunits A and C of CDT bind to
 specific host tissue/cellular receptor(s) resulting in damage and illness. The objective of this project is to characterize
 the distribution of CDT-binding target tissues in susceptible pigs and susceptible and resistant inbred strains of mice.
 We have cloned, overproduced, and characterized the biochemical properties of H. hepaticus CdtB in details.
 Hexahistidine (His6)-tagged CDT subunits A, B, and C of H. hepaticus and B subunit of C. jejuni have been cloned
 and purified, and monospecific rabbit polyclonal hyperimmune sera have been produced against the B subunits of
each pathogen. Currently, His6-tagged A and C subunits of H. hepaticus have been cloned and purified for production
 of rabbit hyperimmune sera whereas over-expression and purification of His6-tagged A and C subunits of C. jejuni are
 in progress.

IMPACT STATEMENT

Identification of cellular targets and receptors for CDT will form the basis for implementation of genetic
selection of livestock resistant to these important food-borne bacterial pathogens, and basic understanding of disease
susceptibility and resistance to several important bacterial pathogens of humans and animals.

Functional Analysis of BICPO, the Major transcriptional regulatory Gene
of Bovine Herpesvirus 1 (BHV-1)

C. J. Jones

Bovine herpes virus 1 (BHV-1) can cause clinical symptoms in cattle and induce shipping fever, which costs the
industry more than $640 million per year. Current vaccines can be pathogenic to small calves, cause abortions, and do not prevent latency of wild-type virus. BHV-1 establishes latency, but can reactivate, in part, because the bICP0 protein activates viral gene expression: bICP0 can activate expression of all three classes of viral genes, is expressed throughout productive infection, and is thus considered to be the most important viral regulatory gene. We have demonstrated that a C3HC4 zinc finger near the amino terminus of bICP0 plays an important role in activating transcription and productive infection. Furthermore, bICP0 interacts with chromatin remodeling enzymes (histone deacetylase 1 (HDAC1) and a histone acetylase (p300)). Recent studies have demonstrated that bICP0 also inhibits interferon dependent transcription, suggesting that bICP0 regulates innate immune responses.

We have recently developed a mutant BHV-1 strain that does not grow efficiently. This mutant grows poorly and does not form well-defined plaques. The mutant virus establishes a persistent infection in cultured bovine cells. In summary, our studies suggest that bICP0 is crucial for productive infection.

IMPACT STATEMENT

BHV-1 is an important pathogen of cattle, which costs the cattle industry one-half billion dollars per year in the US. These studies will help us understand bICP0 function and its relationship to disease and may help the vaccine industry design modified live vaccines that induce immunity, do not cause disease in cattle, and do not reactivate from latency.

Use of a Green-Fluorescent Protein-Expressing Strain of Porcine reproductive and respiratory Syndrome virus for the Study of PRRSV Pathogene

Fernando A. Osorio and Asit K. Pattnaik

Using reverse genetics, we have developed a viable, i.e., infectious mutant Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) that contains the genetic information to produce green fluorescent protein (GFP). The GFP is a non-viral protein (obtained from jellyfish) that produces fluorescence when exposed to ultraviolet light. This recombinant PRRSV has the ability to infect target cells with the same level of efficiency and virulence as the parental PRRSV, while maintaining a steady level of expression of green fluorescent protein in the virus-infected cells and tissues. Therefore, this powerful imaging tool allows us now to easily and unequivocally track, identify and localize single virus-infected cells and tissues throughout the body of the pig; therefore, positioning us to address some fundamental, yet pending issues related to the way PRRSV causes disease in vivo. Using this recombinant PRRSV, we should be able to follow the sequential progression of the viral load throughout different target sites in the body during all the phases (acute & persistent) of infection, while looking at the complete phenotypic characterization of the infected cell in each case. We’d give special emphasis to the possible in vivo association of PRRSV with some specialized targets, such as dendritic cells, which are of fundamental importance for the establishment of the pig’s protective immune response against the PRRSV infection.

The anticipated results of this project consist of obtaining a better picture of how the PRRSV infection progresses throughout the body and how it affects certain cells that are key for protection against the infection and for elimination of this virus from the body.

IMPACT STATEMENT

Porcine reproductive and respiratory syndrome (PRRS) virus imposes devastating effects on swine health and productivity. In the U.S., PRRS virus causes approximately $560 million in losses each year. By comparison, annual losses in the U.S. to classical swine fever (eradicated from the US in 1978) and pseudorabies virus (eradicated from the US in 2004) were estimated at $364 million and $36 million, respectively prior to their eradication. The National Pork Board and the rest of swine industry are considering to initiate a regional/national eradication campaign. So far there is one country (Chile) that has initiated an official eradication campaign.
Stimulating the Development of Veterinarians to Serve Rural America

D. Dee Griffin

The grant for this project was funded September 14, 2005. The need for contact with the Academy of Rural Veterinarians has been made and the part-time secretarial staff has been arranged. The evaluation development was started and the first meeting of participants was held in conjunction with the Academy of Veterinary Consultant meeting, December 4 in Denver, Colorado.

IMPACT STATEMENT

Presently, there is national concern with the shortage of veterinarians to serve rural communities. This project is aimed to improve the visibility of opportunities for graduating veterinarians across the United States.
**DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES**

**2005 INTERNATIONAL ACTIVITIES**

- **Raúl G. Barletta**

  **Special International Contract**

  **Memorandum of Understanding:** Corporacion para Investigaciones Biologicas (CIB, Medellin, Colombia) and the Institute of Agriculture and Natural Resources (IANR), Cooperation in the field of Veterinary and Biomedical Sciences, May 2001-May 2007

  **Specific Project:** Mycobacterial drug targets. Corporacion para Investigaciones Biologicas (CIB, Medellin, Colombia). PIs: RG Barletta (UNL), J Robledo (CIB), O Chacon (UNL-CIB). Funded by NIH and USDA. PIs subcontracts and Colciencias (Colombian Federal Agency for Science); Approximately $150,000; 01-01-03/12-31-05

- **Marjorie F. Lou**

  Dr. Lou continues to be the Founder and organizer of the Asian Cataract Research Conference. She continues to organize the Biannual Conference that will be held in a major city in Asia. The 6th Conference will be held in Beijing, China, June 3-7, 2006, which Dr. Lou has been actively supervising the progress of the local organizers. For the same reason, she is actively promoting and sponsoring lens and cataract research programs in Asian countries, such as South Korea, Hong Kong, China, India, Pakistan and Singapore.

  Dr. Lou is an elected representative and she will direct, for North America, scientific programs for the Lens Section for The Annual European Eye and Vision Research Conference at Alicante, Spain, October 2001-2002. She has been re-elected to the same post for October 2003-2005.

  Dr. Lou was elected as Membership Committee Chairman for the International Society for Eye Research (ISER), 2004-2007.

  Dr. Lou continues to be Board of Trustees for the National Foundation for Eye Research since 1998.
Dr. Lou has been elected as Kwan-Biao Zhao Distinguished Professor at Zhejiang University for 2004-2007. She has been establishing various research programs in the Department of Ophthalmology, Sir Run Run Shaw Hospital, Zhejiang University School of Medicine, Hangzhou, China.

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**Fernando A. Osorio**

Dr. Fernando Osorio has been elected Chair, University of Nebraska-Lincoln, Advisory Committee, International Student Affairs, July 2002-June 2005.

Dr. Osorio continues to serve as an Advisor for the PRRSV Eradication Campaign in Chile.

Dr. Osorio serves on the International Veterinary Advisory Board, Pig Improvement Corporation, Ensminger International School on Swine Diseases in China, October 2005.
DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES
VETERINARY EXTENSION PROGRAM

Topics/Titles of Extension Program Emphases

Dicky Dee Griffin

**Pre-Harvest Food Safety**

The focus is education of production management influencers, both Extension Educators and Veterinarians on techniques that will build good production management practices into beef production. Special effort is made with Beef Quality Assurance (BQA) and antibiotic residue avoidance. The program also focuses on the financial assessment of production management changes.

**Biosecurity and Security in Beef Production Systems**

The focus is education of biosecurity and security principles applied appropriately to fit the needs of the beef production unit. The Hazard Analysis Critical Control Points (HACCP) system is used as the technique evaluation and design of the appropriate biosecurity and security system for each operation.

David R. Smith

Communicating the principles of biosecurity and pathogen containment; emphasizing diagnostics and the role of production-systems on transmission of pathogens and the resulting impact on dairy and beef cattle health and pre-harvest food safety. [Internet](http://vbms.unl.edu/extension.shtml)
Washington, June 24, 2005, the beef industry has had a major setback this year with the announcement of The Veterinary Laboratories Agency in Weybridge, England, confirming that a sample from an animal that was blocked from the food supply in November 2004, has tested positive for Bovine Spongiform Encephalopathy (BSE). However, the adverse effects of BSE on our markets and the continued squabble between the NCBA and RCALF has caused cattle producers to be extremely cautious. USDA scientists will work with international experts to thoughtfully develop a new protocol that includes performing dual confirmatory tests in the event of another "inconclusive" BSE screening test. Currently, nearly 1,000 animals per day are being tested as part of the BSE enhanced surveillance program.

In 2005, the first focus of my program will involve the support of the Nebraska Cattlemen (NC) and the National Cattlemen's Beef Association (NCBA) Beef Quality Assurance (BQA) training efforts. Objectives to reach this goal is to 1) work with the NC to implement the usage of the NC-BQA trainer and producer re-certification self-study materials and 2) continue to develop pre-harvest HACCP materials. I have accomplished the revision of the BQA Manual, including the Spanish version. I continue to host the National BQA Internet site and have made all our QA materials available to the state BQA programs. I also served on the NCBA National BQA Advisory Board and was a lead BQA trainer in Nebraska.

My second focus in my program will involve Pre-Harvest Antibiotic Residue Avoidance research. I have successfully completed the second-year of the three-year funded research project for development of a pre-harvest version of the USDA-FSIS FAST producer. The Objectives and Accomplishments included; completing the in vivo antibiotic sensitivities for 15 antibiotics commonly used in cattle and completed the renal biopsy technique development required for the second year research schedule. Accomplishments included; with the substantial increase in cattle prices the money initially budgeted for animal use was insufficient. A creative collaboration was made with the US-MARC and the research proceeded on time and under budget and 2) I developed a new technique for collecting a kidney biopsy using minimal surgical invasion.

My third focus in my program will involve Integrate the biosecurity teaching materials developed last year into my feedlot production management class. I will link biosecurity management with all other production management activities. Objectives to complete my goals will include link biosecurity management with all other production management activities. I will develop
a teaching CD that contains Biosecurity management templates that associated with major production management areas.

My last focus in my program will involve Career education and outreach to Nebraska high school students. I will work with the career education of Nebraska secondary education and undergraduate students and 2) assist Nebraska high school students in developing science projects. Objectives and are to work with at least one high school student science project, 2) host the UNL Pre-Veterinarian Club at GPVEC and 3) participate in at least one Career Day. This will impact and improve future educational choices and strengthen the bond between citizens in our state.

David R. Smith, DVM, PhD
Dairy and Beef Cattle Veterinarian

The essential focus of my extension and research programming is communicating and applying various principles of biosecurity and pathogen-containment, especially as they relate to protecting both cattle and public health. I have continued to emphasized population diagnostics and the role of animal production systems on transmission of cattle diseases and human food-borne pathogens.

I will continue to organize and moderate weekly meetings for discussions on current issues in livestock and public health related to animal production systems. These meetings will continue to foster collaborations and communications between faculty, regulatory veterinarians, public health officials and veterinarians. My goal is to formulate new research strategies and solve animal or human health problems related to livestock production. Keeping updated in the areas of bioterrorism preparedness, the use of antibiotics in animal agriculture, including field investigations in beef calf scours, *Salmonella* in a dairy and bovine viral diarrhea in Sandhills ranchers is critical to my extension mission.

My field research projects are underway to better understand biosecurity and the diagnosis in how to control bovine viral diarrhea virus and Johne’s disease in cow-calf operations and *Escherichia coli* O157:H7 and *Salmonella* in feedlot cattle. I will continue to conduct animal disease outbreak investigations on Nebraska cattle operations related to biocontainment of calf scours in the Sandhills Calving System, dairy productivity, health and mastitis.

I will contribute lectures on population medicine to graduate, professional, and undergraduate courses. I will continue to be active in 4HCCS Veterinary Science Curriculum development, Veterinary Science Design Team, Nebraska 4H Veterinary Science School Standards Curriculum, the Nebraska State Fair Birthing Pavilion and the Nebraska State Fair livestock drug testing.
OVERVIEW

- The NVDC consists of the diagnostic laboratory in Lincoln. The VDC is an AAVLD provisionally accredited full service diagnostic laboratory, whose emphasis is on food animal diagnostic services and disease surveillance with as a second area of emphasis in surgical pathology. The lab maintains basic services to the poultry industry, wildlife, zoo, pet and public health interests. The laboratory also strives to meet research needs of campus and private concerns in the state with laboratory support primarily in pathology, histology and microbiology research services. The Nebraska Veterinary Diagnostic Laboratory provides a full complement of necropsy, bacteriologic, histologic, immunohistochemical, molecular diagnostic, serologic, toxicologic, electronmicroscopic and traditional virologic services.

VISION

- The vision of the Nebraska Veterinary Diagnostic Center is to enhance the economic vitality and life quality for all Nebraskans by promoting healthy livestock and companion animals, enhancing the safety of animal-derived consumer products and protecting wildlife resources through disease control and enhancing and understanding of diseases.

MISSION

- The Diagnostic Laboratory’s mission is to assist veterinarians, their clients, and others responsible for animal and public health in the detection, prevention and understanding of animal diseases. Faculty and staff approach these tasks by providing accessible, accountable, timely and accurate diagnostic services and by sharing information generated through scholarly publications, meeting presentations, including direct communications.

OBJECTIVES

- Provide accessible, accountable, timely and accurate diagnostic, research and information services to veterinarians, animal owners, food producers and animal health industries.

- Provide proactive investigational support to enhance population approaches to, and efficiency of diagnostic testing.
• Implement modern current and updated biotechnology methods, where appropriate, into diagnostic services.

• Monitor and report the incidence and threat of animal diseases, as well as diseases that are transmissible from animals to humans.

• Share new information with colleagues through publication in a manner that respects the confidentiality of all clientele.

• Prioritize research activities, in applied areas, (epidemiology, diagnostic techniques and emerging diseases) and areas of current concern to Nebraska citizens.

• Improve communications and cooperation with extension, teaching and research programs throughout LANR.

• Maintain an affordable diagnostic testing program to assure sufficient case numbers in the support of disease surveillance functions with the support of international trade and have full access (tissues, field isolates etc.) to current research information and materials for accurate diagnostic testing and disease prevalence and trends.

• Improve communications with target clientele toward fulfilling their needs and providing services based on those needs.

• Communicate with clientele toward educating them on population approaches to diagnostics and current updated testing technologies.

• Assist in anyway with the National Surveillance Programs.

• Support advances in current and updated biomedical research through diagnostic services to reach a wider range of clientele in the community.
Since the upgrade of the HVAC system is now behind us, it has addressed the continual difficulties with temperature regulation in the labs and offices, humidity build up and the lack of capacity to install adequate numbers of chemical exhaust hoods to meet the current needs of the labs. The new HVAC system has improved the laboratory environment and the use of space heaters to operate temperature-sensitive assays in winter and we were enabled to install necessary safety hoods. This has allowed us the installation of additional exhausted work stations. A chemical hood was installed in room 145 and two histology grossing stations were installed in room 116, one fixed and one portable. A third station was relocated from necropsy into room 116. The reassigned space adds 230 square feet of lab space and 239 square feet of office space to that operation. Histology operations have been removed from the necropsy space. These changes have alleviated the immediate safety concerns caused by improper use of a biological safety cabinet for formalin fumes, using necropsy space for microbiology incubators and resultant increased traffic in necropsy. An office was removed from room 104 and renovations are scheduled to return that space to the original use as a clean side to the locker area.

The incinerator is a major problem area and it still burns below EPA standards for prion wastes. Prion positive tissues are currently sent out of state for confirmatory testing, which effectively leads to disposal of any positive materials. The need for replacement in the future of our incinerator is critical and anticipated and will be incorporated into the lab expansion requests.

In 2005, the purchase of critical equipment for VDC included an Ultrasonic Nebulizer (Cetac Tech, Inc.); Olympus IX71 Inverted Fluor Microscope (Hitchhiker Instruments, Inc.); PTC-0200 DNA Engine Thermal Cycler/ALD-1244 Dual 48/48-well Alpha Block (MJ Research); BACTEC MGIT 960 Mycobacterial Detection System (Becton Dickinson & Company); Ultralow -86°C Upright Freezer (Sanyo Scientific); ICS-900 ION Chromatography System, including automated sampler and consumables bundles (Dionex Corporation) and LEICA IPC-Modular Microscope, Projector and Camera (North Central Instruments). The purchase of this equipment has been a valuable asset to the diagnostic center to enable faculty and staff to conduct critical diagnostic services.

Staff turnover problems have dramatically diminished. Several factors have played a role. While base salaries have not improved, supportive faculty oversight adds to staff satisfaction, and professional development opportunities are available to reward efforts and create incentives for employees to stay longer. Engagement of staff in surveillance testing programs and as involved contributors to research has also increased retention. Intermediate staff level positions were created in each of the microbiology laboratories so that opportunities for advancement exists and to remunerate the increased contribution of our senior and most skilled technical personnel. Each of these sections has multiple Research Technician III entry-level positions, one technologist position and one supervisor position, in addition to the Laboratory Manager. This will allow the opportunity for advancement for better employees and the positions pay slightly better than an entry-level position, thus, improving retention. However, this does not solve office/service salaries, which still lag behind community levels, that needs to be addressed in the future.
Congratulations to Drs. Bruce W. Brodersen and Douglas G. Rogers who were nominees for the “Superior Academic Advising Award” from University of Nebraska-Lincoln, College of Agricultural Sciences and Natural Resources. Despite past and current personnel challenges that the diagnostic center has endured, we have across the board, dedicated faculty and staff who are doing an excellent job to assure good customer service/relations, and most importantly, accurate diagnostic testing in an overall pleasant working environment.

In conclusion, we are continuing our regular scheduled lab meetings, with minutes, throughout the year. Faculty have been engaged in extramurally funded research during 2005, one or more had referred publications. Diagnostic faculty were active in national and state meetings and several faculty were featured in the lay press related to their diagnostic and research achievements. Diagnostic Pathology and Toxicology faculty continue to engaged in undergraduate advising, pre-vet club advising, teaching and undergraduate teaching at a higher level than ever.

Specific activities of the NVDLS are summarized in the following tables.
Table 8. **Accessions by Species by Month** (January 2005 - December 2005)

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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>26</td>
<td>6</td>
<td>2</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>BCV, BVD &amp; Rotu, Elisa</td>
<td>101</td>
<td>350</td>
<td>280</td>
<td>250</td>
<td>101</td>
<td>89</td>
<td>24</td>
<td>40</td>
<td>49</td>
<td>41</td>
<td>30</td>
<td>40</td>
<td>1,395</td>
<td></td>
</tr>
<tr>
<td>Pseudorabies</td>
<td>785</td>
<td>739</td>
<td>874</td>
<td>635</td>
<td>721</td>
<td>313</td>
<td>432</td>
<td>532</td>
<td>535</td>
<td>300</td>
<td>368</td>
<td>228</td>
<td>6,762</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL for MONTH** | 29,236 | 33,226 | 40,114 | 38,627 | 31,747 | 26,236 | 22,434 | 25,639 | 25,907 | 28,291 | 29,652 | 34,858 | 368,398

*NEBRASKA VETERINARY DIAGNOSTIC LABORATORY*
Table 10. Number of Accessions, Previous Five Years**

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lincoln</td>
<td>14,463</td>
<td>16,298</td>
<td>15,330</td>
<td>14,485</td>
<td>14,904</td>
</tr>
<tr>
<td>North Platte</td>
<td>650</td>
<td>795</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scottsbluff</td>
<td>1,409</td>
<td>644</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Totals from 2000 through 2002 included totals from the North Platte and Scottsbluff Labs (The Scottsbluff lab was closed as of June 30, 2002, and the North Platte lab was closed as of December 30, 2002, due to budget reductions).

Table 11. Number of Laboratory Procedures Conducted, Previous Five Years

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lincoln</td>
<td>326,288</td>
<td>342,634</td>
<td>356,129</td>
<td>359,907</td>
<td>368,398</td>
</tr>
<tr>
<td>North Platte*</td>
<td>7,708</td>
<td>8,477</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scottsbluff*</td>
<td>16,452</td>
<td>6,276</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*North Platte and Scottsbluff totals include referral testing that was sent to the Lincoln laboratory (Also see note above in regard to closing of Scottsbluff and North Platte labs).
<table>
<thead>
<tr>
<th>Number of Days to Report</th>
<th>All Accessions % Reported (Cumulative %)</th>
<th>Normal Accessions % Reported (Cumulative %)</th>
<th>Pseudorabies Accessions % Reported (Cumulative %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Given  %  Sent  %</td>
<td>Given  %  Sent  %</td>
<td>Given  %  Sent  %</td>
</tr>
<tr>
<td>0</td>
<td>1.5  1.5  1.5</td>
<td>1.1  1.1  1.1</td>
<td>20.1  20.1  20.1</td>
</tr>
<tr>
<td>1</td>
<td>12.8 14.3 12.5</td>
<td>12.5 13.6 12.2</td>
<td>26.0 46.1 26.3</td>
</tr>
<tr>
<td>2</td>
<td>11.1 25.4 11.2</td>
<td>11.0 24.7 11.1</td>
<td>13.0 59.1 13.0</td>
</tr>
<tr>
<td>3</td>
<td>12.9 38.3 12.8</td>
<td>13.0 37.6 12.9</td>
<td>9.4 68.5 9.4</td>
</tr>
<tr>
<td>4</td>
<td>9.0 47.2 9.0</td>
<td>8.9 46.6 9.0</td>
<td>10.7 79.2 10.7</td>
</tr>
<tr>
<td>5</td>
<td>13.6 60.8 13.4</td>
<td>13.6 60.2 13.5</td>
<td>9.4 88.6 9.4</td>
</tr>
<tr>
<td>6</td>
<td>13.3 74.1 13.6</td>
<td>13.5 73.7 13.7</td>
<td>5.2 93.8 5.2</td>
</tr>
<tr>
<td>7</td>
<td>9.1 83.2 9.1</td>
<td>9.2 82.9 9.3</td>
<td>1.9 95.8 1.9</td>
</tr>
<tr>
<td>8</td>
<td>5.2 88.4 5.2</td>
<td>5.3 88.3 5.3</td>
<td>0.3 96.1 0.3</td>
</tr>
<tr>
<td>9</td>
<td>2.5 90.9 2.5</td>
<td>2.5 90.8 2.5</td>
<td>0.6 96.8 0.6</td>
</tr>
<tr>
<td>10</td>
<td>1.7 92.6 1.7</td>
<td>1.7 92.5 1.7</td>
<td>0.3 97.1 0.3</td>
</tr>
<tr>
<td>11-15</td>
<td>4.1 96.7 4.2</td>
<td>4.1 96.6 4.2</td>
<td>1.3 98.4 1.3</td>
</tr>
<tr>
<td>16-20</td>
<td>1.1 97.7 1.1</td>
<td>1.1 97.7 1.1</td>
<td>0.3 98.7 0.3</td>
</tr>
<tr>
<td>21-30</td>
<td>0.8 98.5 0.8</td>
<td>0.8 98.5 0.8</td>
<td>0.0 0.0 0.0</td>
</tr>
<tr>
<td>31-50</td>
<td>0.5 99.0 0.5</td>
<td>0.5 99.0 0.5</td>
<td>0.3 99.0 0.3</td>
</tr>
<tr>
<td>Over 50</td>
<td>1.0 100.0 1.0</td>
<td>1.0 100.0 1.0</td>
<td>1.0 100.0 1.0</td>
</tr>
</tbody>
</table>

NOTE: Weekends and holidays are included in this report. If a case is not called or FAXed out, it will have no record of a first report date. Research cases may or may not have a first and final report date.
Distribution of Accessions by State

NVDLS

January 2005 - December 2005
Distribution of Accessions by County - NVDLS

Fig. 2

January 2005 - December 2005
DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES
2005 GRANTS AND CONTRACTS PROGRAM

GRANTS AND CONTRACTS FUNDED IN 2005

A Mouse Model for Studying Candidiasis
Duhamel GE and KW Nickerson. 2005. Interdisciplinary Research, UNL Research Council, $20,000

Bovine Viral Diarrhea Virus in North American Alpaca Herds

Bovine Genetics Quality Assurance
Steffen DJ. 2005. National Association of Animal Breeders, $12,000

Bovine Viral Diarrhea Virus in North American Alpaca Herds; Prevalence and Implementation of Control Strategies

Chronic Wasting Disease Surveillance in Deer
Steffen DJ. 2005. Nebraska Game and Parks Commission, $132,000

Classic Swine Fever Surveillance Testing

Development and Validation of a System to Utilize Liquid Culture Media for Johne’s Disease Fecal Culturing in Nebraska
Steffen DJ. 2005. Nebraska Department of Agriculture, Johne’s Disease Program #18-05-121, $53,000

Effect of Vaccinating Against Type III Secretory Proteins of Escherichia coli O157:H7 on the Occurrence of E. coli O157:H7 on Hides Pre- and Post-Harvest

Experimental Evaluation of Efficacy of Commercially Available PRRSV Vaccines
Osorio FA. 2005. SYVA labs (Spain) $45,502
Functional Analysis of bICP0, a BHV-1 Gene that is a Promiscuous Trans-Activator
Griffin DD. 2005. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRI CGP), $350,000

Genetic Basis of Resistance to Food-Borne Bacterial Pathogens
Duhamel GE and JS Weber. 2005. Institute of Agriculture and Natural Resources (IANR), Interdisciplinary Research Program, United States Department of Agriculture (USDA), Cooperative States Research, Education, and Extension Service (CSREES), NEB 14-137, $40,000

Genetic Disease Research
Steffen DJ. 2005. American Simmental Association (ASA), $2,500

Helicobacter-Associated Colitis of Callitrichidae Kept in Zoo Exhibits
Duhamel GE, DL Armstrong, LJ Lowenstein, BA Rideout and DJ Steffen. 2005. Morris Animal Foundation, Project #D05Z00-007, $29,948

Helicobacter-Associated Colitis of Callitrichidae Kept in Zoo Exhibits

Herd Immunity - Vaccination Against E. coli O157:H7
Klopfenstein TJ, DR Smith, GE Erickson and RA Moxley. 2005. Nebraska Beef Council, $50,000

Johne's Disease Herd Testing
Steffen DJ. 2005. Nebraska Department of Agriculture, Johne's Disease Program, Project #18-05-107, $80,000

Polymicrobial Associations in Inflammatory Bowel Disease
Duhamel GE. 2005. National Institute of Health (NIH), National Institute of Allergy and Infectious Diseases (NIAID), $141,768

Proline Metabolism and Redox Homeostasis in Gastrointestinal Bacterial Diseases
Duhamel GE and DF Becker. 2005. University of Nebraska, Layman Award, $10,000

Rational Design of a New Generation of PRRSV Differential (Marker) Vaccines
Osorio FA and AK Pattnaik. 2005. National Pork Board, $150,000

Stability of the LR Mutant Virus in Calves
Griffin DD. 2005. Fort Dodge Animal Health, $60,000

Stimulating the Development of Veterinarians to Serve Rural America
Use of a Green-Fluorescent Protein-Expressing Strain of Porcine Reproductive and Respiratory Syndrome Virus for the Study of PRRSV Pathogenesis and In Vivo Tropism
Osorio FA and AK Pattnaik. 2005. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), Project #2005-01810, $129,600

West Nile Virus Testing
Steffen DJ. 2005. Nebraska Health and Human Services, West Nile Virus Surveillance Program, $15,000

COOPERATIVE EXTENSION DIVISION (CED) GRANT

Beef Feedlot Cowboy Training Modules
Levis DG, KP Anderson, M Stauffer, AR Wohlers, DD Griffin, DA Lienemann, GE Erickson, TL Mader, IG Rush and DR Smith. 2005. University of Nebraska-Lincoln, Cooperative Extension Division (CED), $6,000

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES (IANR) EQUIPMENT GRANT

Shared Microwave Digester
Carlson MP and DD Snow. 2005. Institute for Agriculture and Natural Resources, $12,000

INCOME GRANT

International Reference Laboratory for Spirochetal Colitis Research

STATE GRANT

Effects of CLA on Fat Metabolism in Mice
Fromm M, J Miner and AR Doster. 2005. University of Nebraska-Lincoln, Center for Biotechnology, Lincoln, Nebraska, $25,000

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES (IANR) TRAVEL GRANT

Annual Meeting of the American College of Veterinary Pathologists (ACVP)
GE Duhamel. 2005. Institute of Agriculture and Natural Resources (IANR), Research Travel Grant, Boston, MA, $500
UNDERGRADUATE PROGRAM GRANTS

Howard Hughes Medical Institute Fellowship for Summer Undergraduate Research
Duhamel GE. 2005. Nebraska Wesleyan University, Senior Undergraduate Project, $2,500

Influence of N-linked Glycans on Bovine Respiratory Syncytial Virus Attachment (G) Glycoprotein Expression
Kelling CL. 2005. University of Nebraska-Lincoln, Undergraduate Creative Activities and Research Experiences Program (UCARE). Undergraduate Student Research Program, Holly Samson, $2,500

Undergraduate Creative Activities and Research Experiences Program (UCARE)
Duhamel GE. 2005. Undergraduate Student Project, $4,000
ACTIVE GRANTS AND CONTRACTS CONTINUED 
FROM PREVIOUS YEARS

A Program to Ensure the Future Supply of Well Trained Rural Veterinarians to Provide 
Public Health, Homeland Security, Food Safety and Veterinary Services to Rural America 
DD Griffin, GP Rupp, AM O'Connor and LC Hollis. 2005. United States Department of 
Agriculture (USDA), Cooperative State Research, Education and Extension Service 
(CSREES), $124,810

Analyses of Virulence and Attenuation Determinants of Porcine Reproductive and 
Respiratory Syndrome Virus Using Reverse Genetics Approach 
National Research Initiative Competitive Grants Program (NRICGP), $320,000

Analysis of BHV-1 Present in Aborted Fetuses 
Jones, CJ. 2004-2006. Pfizer Animal Health, $60,000

Assessment of Health and Reproductive Status of River Otter in Nebraska 
Steffen DJ, Carlson MP and Rogers DG. 2003-2005. Nebraska Game and Park’s 
Commission, $12,400

Bovine Genetics Quality Assurance 

Competitive Exclusion as an E. coli O157:H7 Intervention Strategy (phase II study) 
Physiology Corp., $100,000

Effect of Vaccinating Against Type III Secretory Proteins of Escherichia coli O157:H7 on 
the Occurrence of E. coli O157:H7 on Hides Pre- and Post-Harvest 
National Cattlemen’s Beef Association, $42,525

Evaluation of Commercially Available Serologic Marker Systems for Foot and Mouth 
Disease 
Center Cobra Grant, $8,269,843

Functional Genomic Analysis of Bovine Viral Diarrhea Virus 
Donis R and CL Kelling. 2004. United States Department of Agriculture (USDA), National 
Research Initiative Grant (NRIG), $275,000
Functional Genomic Analysis of Mycobacterium Paratuberculosis
JP Bannantine (National Animal Disease Center); V Kapur (University of Minnesota); SJ Wells (University of Minnesota); RG Barletta and JR Stabel (National Animal Disease Center). 2003-2005. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRI CGP), $285,000

Functional Analysis of bICP0, a BHV-1 Gene that is a Promiscuous Trans-Activator
Jones CJ. 2002-2005. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRI CGP), $300,000

Identification and Characterization of PRRSV Immunogenic Subunits Using Viral Vectors
Pattnaik AK. 2004-2005. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRI CGP) (NC-229), $60,304

Induction of Protective Immunity Against Systemic BVDV1 and BVDV2 Infection
Kelling CL and DJ Steffen. 2005. Schering-Plough Animal Health, $144,000

Integrated Control and Elimination of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) in the U.S.: Viral Vectors to Assess PRRSV Immunogenic Subunits
M Murtaugh, FA Osorio, AK Pattnaik, S Chowdhury and C Gaignon. 2004-2005. National Research Initiative Competitive Grants Program (NRI CGP); United States Department of Agriculture (USDA), Integrative Program, $4.4 million/$21,917,000

Integrating Biosecurity Practices into Livestock Production Management on Farms and Ranches to Ensure a Sustainable and Wholesome Food Supply

Intervention Strategies to Reduce *Escherichia coli* O157:H7 in Beef Feedyards
Smith DR, Erickson GE, Moxley RA, Klopfenstein TJ and Hinkley S. 2006. United States Department of Agriculture (USDA), Cooperative State Research, Education and Extension Service (CSREES), National Integrated Food Safety Initiative, Cooperative Grants Program (CGP), $500,000

Johne's Integrated Program in Research, Education and Extension
V Kapur, et al. and RG Barletta. 2004-2006. United States Department of Agriculture (USDA), National Research Initiative Integrated Program (NRIIP), Johne's Disease Integrated Program (JDIP); UNL-Subcontract, $51,122

Johne's Disease Herd Testing
Steffen DJ. 2004-2005. Nebraska Department of Agriculture, $60,000

Measure Incidence of *E. coli* O157:H7 in Beef Cattle Vaccinated at Ranch or at Feedlot
Terry Klopfenstein, Galen Erickson, Rodney Moxley, David Smith and Susanne Hinkley. 2004-2005, Montana State University, $122,378
Molecular Analysis of a Mycobacterium Paratuberculosis Colony-morphology Attenuated Mutant

NBD Peptides in MPTP Mouse Model
K Pahan, Michael J Fox and Y Zhou. 2004-2006. Foundation for Parkinson’s Research, 3% effort

Nebraska Center for Viral Pathogenesis
Zhou Y and C Wood. 2005-2010. National Center for Research Resources (NCRR), National Institute of Health (NIH), Microscopy Core Facility Support, 5% effort

Protein-thiol Mixed Disulfides in Cataractogenesis

Rational Design of a New Generation of PRRSV Differential (Marker) Vaccines

Regulation of the Latency-Reactivation Cycle by the Bovine Herpesvirus 1 (BHV-1) Latency Related Gene
Jones, CJ. 2003-2006. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), $320,000

Role of Non-Structural Proteins in Pestivirus Assembly

Role of Hyaluronan Matrix in Prostate Cancer Progression

Scrapie Testing
Brodersen, BW. 2005. United States Department of Agriculture, competitive contract award for scrapie testing, 1,210 tests; 10,000/year

Sub-typing of PRRSV Isolates by Means of Measurement of Cross-Neutralization Reactions

Vaccination as an E. coli O157:H7 Intervention Strategy - (phase II study)
Validation of Test Methods Needed to Evaluate Intervention Strategies for *Escherichia coli O157:H7* Intestinal Colonization and Fecal Shedding in Feedlot Cattle


Viral Pathogens that Contribute to Respiratory Disease Complex in Cattle: Epidemiology of Persistent BVDV Infections

Brodersen BW. 2005-2006 United States Department of Agriculture (USDA), Agriculture Research Service (ARS), $25,000

Viral Pathogenesis

Jones, CJ. 2000-2005. National Institute of Health (NIH), Centers of Biomedical Research Excellence (COBRE), $10,400,000

Vitamin-Dependent Modifications of Histones


VSV RNA Transcription and Replication

Pattnaik, AK. 2001-2006. National Institute of Allergy and Infectious Diseases (NIAID), National Institute of Health (NIH), $1,454,920

INDUSTRY GRANTS

Porcine Reproductive and Respiratory Syndrome (PRRS): Methods of the Integrated Control, Prevention, and Elimination of PRRS in United States Swine Herds


GENERATED REVENUES

Income from International Reference Laboratories for Spirochetal Colitis Research

GE Duhamel. 1995-2005. Funds received through Universities, Industries and Practitioners, $25,240
GRANT PROPOSALS SUBMITTED IN 2005

A Nebraska Center for Bacterial Pathogenesis Research
   Somerville, GA. 2005. Nebraska Research Initiative, $240,000

A Exploiting Staphylococcal Metabolism to Prevent Biofilm Associated Heart Infections
   Somerville, GA. 2005. American Heart Association, Scientist Development Grant, $236,000

A Tricarboxylic acid Cycle-Dependent Environmental Regulation of Staphylococcus Epidermidis Polysaccharide Intercellular Adhesin Production
   Somerville, GA. 2005. University of Nebraska Foundation, Layman Award, $7,839

An Accurate Determination of the Proportion of Beef Cattle Herds with Johne’s Disease: Part II, Herd-level Sensitivity and True Prevalence
   Smith DR. 2005. United States Department of Agriculture (USDA), Veterinary Services, $213,667

Beef Feedlot Cowboy Training Modules
   Levis DG, Anderson KP, Stauffer M, Wohlers AR, Griffin DD, Lienemann DA, Erickson GE, Mader TL, Rush IG and Smith DR. 2006. University of Nebraska-Extension, $6,000

Causes of Human E. coli O157:H7 Illness From All Food and Non-Food Vectors
   Lehenbauer TW, Bradley KK, Smith DR and Morgan JB. 2005. American Meat Institute, $20,000

Characterization of the Role of Spiral Bacteria in Gastrointestinal Disease of California Sea Lions
   Duhamel GE and Frances MD Gulland. 2005. Oiled Wildlife Care Network, (not funded), $10,000

Does the HSV-1 Latency Associated Transcript (LAT) Encode a Protein?

Effect of Vaccinating Against Type III Secretory Proteins of Escherichia coli O157:H7 on the Occurrence of E. coli O157:H7 on Hides Pre- and Post-Harvest
   Klopfenstein TJ, Peterson RE, Smith DR, Erickson GE, Moxley RA and Hinkley S. National Cattlemen’s Beef Association, $42,525

Electroneedle Biosensor Platform for Bioagent Detection
Enhancement of Efficacy of PRRSV Vaccines by Altering the Glycosylation Pattern of Viral Glycoproteins
Pattnaik AK and FA Osorio. 2006. National Pork Board, $83,000

Functional Analysis of Small RNAs Encoded by the HSV-1 LAT Gene
Jones CJ. 2006-2011. National Institute of Health (NIH) $1,800,00

Functional Tissue Engineering of Articular Cartilage

Functional Genomics of Mycobacterium Paratuberculosis
Barletta RG, LE Bermudez (Oregon State University) and AM Talaat (University of Wisconsin). 2006-2008. United States Department of Agriculture (USDA, National Research Initiative Competitive Grants Program (NRCGP), $999,074

Herd Immunity -Vaccination Against E. coli O157:H7

Integrating Biosecurity Practices into Livestock Production Management on Farms and Ranches to Insure a Sustainable and Wholesome Food Supply
Rupp GP, DD Griffin AM O'Connor and PJ Chenoweth. 2002. United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES), $249,792

Johne's Integrated Program in Research, Education, and Extension
Kapur V (University of Minnesota) et al., RG Barletta. 2006-2007. United States Department of Agriculture, Johne's Disease Integrated Program (JDIP), National Research Initiative Integrated Program (NRIIP), $231,141

Mycobacterium avium subsp. Paratuberculosis Pathogenesis
Bermudez LE (Oregon State University) and RG Barletta. 2006-2008. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRCGP), Animal Protection; Animal Disease, $378,571/$159,574

Non-Antibiotic Small Molecule Therapeutics: Broad-Spectrum Non-Antibiotic Countermeasures for Bacterial Pathogens
Powers R, RG Barletta and J Takacs. Internal Pre-proposal. Department of Defense, in Progress

Program to Ensure the Future Supply of Well Trained Rural Veterinarians to Provide Public Health, Homeland Security, Food Safety, and Veterinary Services to Rural America
Rational Design of a New Generation of PRRSV Differential (Marker)
Osorio FA and AK Pattnaik. 2005. National Pork Board/Vaccines, $150,000

Reverse Genetics Approach to Functional Analyses of Bovine Respiratory Syncytial Virus Fusion Protein Glycosylation
Kelling CL, CL Toplff and DJ Steffen. 2005. United States Department of Agriculture (USDA), National Research Initiative (NRI), $345,570

Spontaneous *Brachyspira* and *Helicobacter* Colonic Infections in Captive Rhesus Macaques
Duhamel GE and Karol Sestak. 2005. Tulane National Primate Research Center, (not funded), $50,000

Universal Screen for Protein-Ligand Binding

Use of a Green-Fluorescent Protein-Expressing Strain of Porcine Reproductive and Respiratory Syndrome Virus for the Study of PRRSV Pathogenesis and *In Vivo* Tropism
Osorio FA and AK Pattnaik. 2005. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), $129,600

FOUNDATION GRANT

Bovine Viral Diarrhea Virus in North American Alpaca Herds
Kelling CL, Brodersen BW Smith DR and Steffen DJ. 2005. Alpaca Research Foundation, $23,400

Helicobacter-Associated Colitis of Callitrichidae Kept in Zoo
FIVE-YEAR RECORD OF GRANTS AND CONTRACTS

Prevalence of Bacterial Pathogens in Porcine Diarrhea Complex

A Novel Strategy to Test and Monitor Beef Feedlot Food-Safety Control Points

A Plan for Obtaining More Accurate and Specific Results on PRRSV Serological Tests When Using Commercial ELISAs

A New Approach to Control of Human Pathogenic Fungi: Investigation of Farnesol and Farnesol Analogs in a Mouse Model
Duhamel GE and KW Nickerson. 2001-2004. Tobacco Settlement Biomedical Research Enhancement Fund Research, Seed Grant Program, $45,000

An Accurate Determination of the Proportion of Beef Cattle with Johne’s Disease and the Factors Explaining Herd Status
Smith DR. 2003-2004. United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), VS Johne’s Disease Cooperative Agreement, $100,000

Analysis of Virulence and Attenuation Determinants of Porcine Reproductive and Respiratory Syndrome Virus Using Reverse Genetics Approach
Pattnaik AK. 2004-2007. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), $320,000

Analysis of Apoptosis and Pathogenesis by Bovine Herpesvirus 1 and bICP0

Analysis of Apoptosis and Pathogenesis by Bovine Herpesvirus 1 and bICPO
Jones CJ and AR Doster. 1998-2001. United States Department of Agriculture (USDA), National Research Initiative Competitive Grant Program (NRICGP), $178,338

Animal Model of Transmissible Neurofibromas
Schmale M and AK Pattnaik. 2002-2005. National Institutes of Health (NIH), $574,000

Challenge Model Evaluation of Direct and Indirect Exposure to Brachyspira pilosicoli and Interaction with Diet
Characterization of Group A Bovine Rotavirus Strain B641
Duhamel GE. 2002. ImmuCell, Portland, ME, $5,000

Cloning and Partial Sequencing of the 5'UTR of BVDV Isolates
Kelling CL. 2000. BioCor Animal Health Corp, $6,667

Competitive Exclusion as an E. coli O157:H7 Intervention Strategy, phase II study
Klopfenstein TJ, Smith DR, Moxley RA, Erickson and Hinkley S. 2004. Nutrition Physiology Corp, $100,000

Competitive Exclusion as an E. coli O157:H7 Intervention Strategy, phase II
Klopfenstein TJ, Smith DR, Moxley RA, Erickson and Hinkley S. 2003. Nutrition Physiology Corp, $50,000

Cross-Reactivity of Antibody Response to Genotype 1 and 2 BVDV Following Challenge Exposure of Vaccinated Calves
Kelling CL. 2000. Schering-Plough Animal Health Corp, $7,500

Distribution of Brachyspira pilosicoli Attachment Phenotypes Among Pigs of Three Breeds

Effect of Virus Infection on Cellular Glutathione Concentration
Brink DR, Matulka L, Kelling CL and Srikumaran S. 2002-2003. Institute of Agriculture and Natural Resources (IANR), Agriculture Research Division (ARD), Interdisciplinary Research Grant Proposal, $20,000

Effect of PRRSV on the Immune System During Acute and Persistent Infections
Osorio FA, F Zuckermann and AR Doster. 1999-2001. United States Department of Agriculture (USDA), National Research Initiative Competitive Grant Program (NRCGP), $150,000

Effect of Vaccinating Against Type III Secretory Proteins of Escherichia coli O157:H7 on the Occurrence of E. coli O157:H7

Efficacy of Valnemulin Hydrochloride Provided In-feed for the Control of Porcine Colonic Spirochetosis Utilizing a Brachyspira pilosicoli Challenge Model

Efficacy of Recombinant Bovine Adenovirus Expressing BVDV gp53 Gene Against Virulent BVDV Challenge
Epidemiological Aspects of Combining E. coli O157:H7 Control Programs and Feedlot Performance

Sargeant JM, MW Sanderson, GL Stokka, DD Griffin and RA Smith. 2000. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRCGP), $231,483

Evaluation of Intervention Strategies to Reduce the Prevalence of Fecal Shedding of E. coli O157:H7

Smith DR, Klopfenstein TJ, Moxley RA, Hungerford LL and Hinkley S. 2001-2002. Nebraska Beef Council, $100,000

Evaluation of a Competitive Exclusion Product to Reduce the Prevalence of Fecal Shedding of E. coli O157:H7


Field Research to Identify Risk factors for the Occurrence of Escherichia coli in Cattle Feedlots

Smith DR, Moxley RA and Klopfenstein TJ. 2001-2002. Alcohol Tax (LB1206) Appropriations Grant, $100,000

Genetic Elements Controlling Bovine Viral Diarrhea Virus Translation

Donis RO and CL Kelling. 1999. United States Department of Agriculture (USDA), National Research Initiative Grant (NRIG), $180,000

Gp96 as a Molecular Chaperone for Antigen Delivery in Viral Systems

Sankaranan S and CL Kelling. 2000. United States Department of Agriculture (USDA), National Research Initiative Grant (NRIG), $200,000

Group A Bovine Rotavirus: Characterization of Challenge Materials and Reference Strains


Herd Immunity -Vaccination Against E. coli O157:H7

Klopfenstein TJ, Smith DR, Erickson GE and Moxley RA. 2005. Nebraska Beef Council, $50,000

Identification and Characterization of Mycobacterium paratuberculosis Virulence Genes Expressed in vivo by Negative Selection

Shpigel NY, J Rosenshine, M Chaffer and RG Barletta. 2003-2004. United States Department of Agriculture (USDA), Binational Agricultural Research and Development Fund, $ 100,000
Identification and Characterization of Cellular Apoptosis-Induced Proteins by Proteomics and Protein Chip Technologies
Jones CJ. 2001-2003. University of Nebraska-Lincoln, Tobacco Settlement Biomedical Research Enhancement, Strategic Areas Research Grant, $198,750

Identification and Characterization of PRRSV Immunogenic Subunits Using Viral Vectors
Pattnaik, AK. 2004-2005. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), Multi-State Project NC-229, $60,004

Identification of Mycobacteria paratuberculosis Virulence Determinants
Barletta RG and CJ Czuprynski (University of Wisconsin). 1999-2002. United States Department of Agriculture (USDA), National Research Initiative Competitive Grant Program (NRICGP), Sustaining Animal Health and Well Being, $210,000

Immunochromatographic Strip Assays for Detection of Bovine Group A Rotaviruses and Coronavirus
Duhamel GE. 2002. Quel Lab Inc, $4,750

Improved Detection of Brachyspira (formerly Serpulina) by PCR
Duhamel GE. 1996-2000. Boehringer Ingelheim Vetmedica, Inc, $36,000

Inhibition of Apoptosis by the Bovine Herpesvirus 1 Latency Related Gene
Jones CJ and AR Doster. 2000-2003. United States Department of Agriculture (USDA), National Research Initiative Competitive Grant Program (NRICGP), $292,000

Inhibition of Apoptosis by the Bovine Herpesvirus 1 (BHV-1) Latency Related Gene Products
Jones CJ. 2000-2003. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), $292,000

Integrating Biosecurity Practices Into Livestock Production Management on Farms and Ranches to Ensure a Sustainable and Wholesome Food Supply

Intervention Strategies to Reduce Escherichia coli O157:H7 in Beef Feedyards
Smith DR, Erickson GE, Moxley RA, Klopfenstein TJ and Hinkley S. 2003-2006. United States Department of Agriculture (USDA), Cooperative State Research, Education, and Extension Service (CSREES), National Integrated Food Safety Initiative Cooperative Grant Program (NIFSCICGP), $500,000

Isolation and Characterization of Mycobacteriophages
Barletta RG. 2001-2002. California Pacific Medical Center Research Institute, Subcontract to Phage Therapeutics, Inc, Bothell, WA, $69,495
Laboratory Diagnostic Investigations of Enteric Bacterial Diseases of Grower Pigs

Limiting Starch in the Diet

Macrophage Cell-Lines for *in vitro* Propagation of Porcine Reproductive and Respiratory Syndrome Virus
Srikumaran S and AK Pattnaik. 2004. National Pork Board, $100,000

Measure Incidence of *E. coli* O157:H7 in Beef Cattle Vaccinated at Ranch or at Feedlot
Klopfenstein TJ, G Erickson, RA Moxley, DR Smith and S Hinkley. 2004-2005. Montana State University, $122,378

Minimum Inhibitory Concentration Susceptibility Tests of Swine Isolates of *Brachyspira pilosicoli*

Minimum Inhibitory Concentration Susceptibility Testing of Swine Isolates of *Brachyspira pilosicoli*

Molecular Characterization and Pathogenesis of *Francisella tularensis*
Duhamel GE. 2002-2004. University of Nebraska-Lincoln, University of Nebraska Medical Center, Research Collaboration Grant Program, $218,000

Molecular Characterization and Pathogenesis of *Francisella tularensis*
Meagher M, S Hinrich, P Fey, T Jerrell, P Iwen, A Benson, RG Barletta, JD Cirillo, GE Duhamel and M Griep. 2002-2003. University of Nebraska Medical Center (UNMC), University of Nebraska-Lincoln (UNL), Interdisciplinary Research, $100,000

*Mycobacterial Drug Resistance*
Barletta RG. 1995-2004. Research in Microbiology Immunology and Infectious Diseases Foundation, Medical Research Institute of San Francisco at California Pacific Medical Center, Kuzell Institute for Arthritis and Infectious Diseases, $4,500

Optimizing Collection and Transportation of *E. coli*

Plant Endophytic Bacteria
Vidaver AK and RG Barletta. 2001-2002. Kamterter, Inc. $36,000
Production and Characterization of Bovine Group A Rotavirus and Coronavirus Challenge Material in Gnotobiotic Calves

Production of Mouse x Porcine Neutralizing Antibodies Anti Porcine Reproductive and Respiratory Syndrome Virus

Production and Characterization of Group A Bovine Rotavirus Challenge Material in Gnotobiotic Calves
Duhamel GE. 2004. Novartis Animal Health, Inc, Vaccines, $6,000

Protective Immunity Against PRRSV Obtained by Passive Administration of Antibodies: Optimization of the Conditions

Protein-Thiol Mixed Disulfides in Cataractogenesis

Protein-Thiol Mixed Disulfides in Cataractogenesis

Rational Design of a New Generation of PRRSV Differential (Marker) Vaccines
Osorio FA and Pattnaik AK. 2005-2006. National Pork Board, $150,000

Rational Design of a New Generation of PRRSV Differential (Marker) Vaccines

Removal of Starch From the Diet

Replication of Genomic Analogs of HCV in Transfected Cells
Pattnaik, AK. 2001-2002. Eli Lilly and Co, $149,000

Role of Macrophages in the Pathogenesis of Porcine Colonic Spirochetosis
Duhamel GE and JD Cirillo. 2000-2004. United States Department of Agriculture (USDA), National Research Initiative Competitive Grant Program (NRI CGP), Animal Health and Well-Being, $240,000

Role of E. coli Heat-labile Enterotoxin-I in Diarrhea and Septicemia in Swine
Moxley RA and RG Barletta. 1998-2003. United States Department of Agriculture (USDA), National Research Initiative Competitive Grant Program (NRI CGP), Sustaining Animal Health and Well Being, $140,000
Role of PRRSV Specific Antibodies in Protective Immunity Against Porcine Reproductive and Respiratory Syndrome Virus Infections
Osorio, FA. 2002-2004. United States Department of Agriculture (USDA), National Research Initiative Competitive Grant Program (NRICGP), Sustaining Animal Health and Well Being, $200,000

Serum Neutralization of Group A Bovine Rotaviruses with G6 and G10 Genotypes

Targeting M. tuberculosis Alanine Ligase for Drug Design
Barletta RG. 2002-2004. National Institute of Health (NIH), $145,000

The Effect of Porcine Reproductive and Respiratory Syndrome Virus on the Immune System During Acute and Persistent Infections
Osorio FA. 1999-2002. United States Department of Agriculture (USDA), National Research Initiative Competitive Grant Program (NRICGP), Sustaining Animal Health and Well Being, $150,000

Train Junior Faculty in Establishing a Research Center for Redox Biology
Banerjee R and Lou MF. 2002-2007. Redox Biology Center Cobra Grant, National Institute of Health (NIH) $10 million

Up-Regulation of K+Channels in the Remodeled Ventricle
Rozanski GJ and MF Lou. 2000-2004. National Institute of Health (NIH), University of Nebraska Medical Center, $1,081,579

Use of a Green-Fluorescent Protein-Expressing Strain of Porcine Reproductive and Respiratory Syndrome Virus for the Study of PRRSV Pathogenesis and In Vivo Tropism
Osorio FA and Pattnaik AK. 2005-2006. United States Department of Agriculture (USDA), National Research Initiative Competitive Grants Program (NRICGP), $129,600

Use of Beneficial Plant-Microbe Interactions to Enhance Biomass Yield, and Economic Value and Sustainability of Agricultural Products
Vidaver AK, RG Barletta, PH Blum and TJ Klopfenstein. 2002-2003. University of Nebraska Lincoln, Strategic Research Cluster Grant, $10,000

Vaccination as an E. coli O157:H7 Intervention Strategy, phase II study

Vaccination as an E. coli O157:H7 Intervention Strategy, phase II
Klopfenstein TJ, Smith DR, Moxley RA, Erickson and Hinkley S. 2003. Nebraska Beef Council, $50,000
Validation of Test Methods Needed to Evaluate Intervention Strategies for *Escherichia coli O157:H7* Intestinal Colonization and Fecal Shedding in Feedlot Cattle

**Vitamin-Dependent Modifications of Histones**

**VSV RNA Transcription and Replication**
Pattanaik AK. 1991-2000. National Institutes of Health (NIH), $538,000

**VSV RNA Transcription and Replication**
Pattanaik AK. 2001-2006. National Institutes of Health (NIH), $1,495,688

**COMMODITY GRANTS**

**Bovine Genetics-Quality Assurance Research Program**

**Chronic Wasting Disease Surveillance in Deer**
Steffen DJ. 2002-2003. Nebraska Game and Parks Commission, $85,000

**Control of Johne’s Disease: Laboratory Enhancement**
Steffen DJ. 2003-2004. Nebraska Department of Agriculture, $25,000

**CWD Validation of the ELISA Assay for Use in White-Tailed Deer**
Steffen DJ. 2002-2003. Bio-Rad Reagents $60,600 (CWD test kits) Equipment plate reader and two ribolyzers $35,803; total value $100,803

**Evaluation of Automated Meat Recovery Systems**
Steffen DJ. 2003. Dr. Thipareddi, Department of Food Science and Technology, $7,430

**Evaluation of Anthrax Rapid Detection Kits**
Steffen DJ. 2003-2004. Nebraska Department of Agriculture, $475

**Genetic Disease Diagnosis and Consulting**

**Induction of Protective Immunity Against Systemic BVDV1 and BVDV2 Infection**
Kelling CL and Steffen DJ. 2003-2004. Schering-Plough Animal Health, $144,000

**Johne’s Disease Herd Testing**
Steffen DJ. 2003. Nebraska Department of Agriculture, $1,009
Pseudorabies Eradication and Control Testing
Steffen DJ. 2003. Nebraska Department of Agriculture, $22,994

Scrapie Program
Steffen DJ. 2002-2003. United States Department of Agriculture (USDA), $61,000

West Nile Surveillance
Steffen DJ. 2002-2004. Nebraska Department of Health Human Services, $58,320.63

West Nile Surveillance and Serologic Response in Horses
Steffen DJ. 2003-2004. Nebraska Department of Agriculture, $2,940

GENERATED REVENUES

Spirochetal Colitis Research
Duhamel GE. 2000-2005. International Reference Laboratory, University, Industry and Practitioners, $7,310

Monoclonal Antibodies

INDUSTRY

Efficacy of CarbadoxR for the Control and Treatment of Porcine Proliferative Enteropathy (PPE) Associated with a Natural Infection of Lawsonia intracellularis

Genetic Resistance to Porcine Reproductive and Respiratory Syndrome Virus (PRRSV)

EQUIPMENT GRANT

Optical Microscopy Station for Micromanipulation and Nanosynthesis
Doudin B and Duhamel GE. 2001. Nebraska University Foundation Grant Program, $186,000

TRAVEL GRANTS

Travel to American Association of Veterinary Laboratory Diagnosticians Meeting
Duhamel GE. 2001. Hershey, PA. Institute of Agriculture and Natural Resources (IANR), Research Travel Fund, $500
Travel to International Pig Veterinary Society Annual Meeting

Travel to Allen D. Leman Swine Conference

Travel to Facultat de Veterinaria, Universitat Autonoma de Barcelona, Bellaterra, Spain; Odense and Viborg, Denmark; Ekenäs and Stockholm, Sweden, and Saint Brieuc/Ploufragran, France
Duhamel GE. 2000. Novartis Animal Health, $5,000

Travel to Setna Pig Production Club, Lérida and Universidad Complutense de Madrid, Madrid and León University, León, Spain
Duhamel GE. 2000. Setna Nutrición SA, $3,500

ALLIED INDUSTRY GRANTS

BQA Training CD (BQA Train-the-Trainer Self-Study CDs)
Griffin DD, DM Grotelueschen and RA Smith. 2000. Boehringer, Butler, Fort Dodge, Grand Labs, Merial, Pharmacia-Upjohn, Schering-Plough, $7,000

GRANTS RELATED TO TEACHING (5 YEAR RECORD)

Summer Undergraduate Research, Support for Senior Undergraduate Projects
Duhamel, GE. 2002-2005. Nebraska Wesleyan University, Howard Hughes Medical Institute Fellowships for Undergraduate Student Projects, $20,000

Undergraduate Creative Activities and Research Experiences Program
Duhamel, GE. 2002-2005. University of Nebraska-Lincoln, $6,000
PATENTS IN 2005

D-alanine Racemase Mutants of Mycobacteria and Uses Therefore  
Barletta RG and O Chacon. U.S. Patent No. 6,929,799 B2, Granted August 16, 2005

Recombinant Mycobacteria Overexpressing D-alanine Ligase Gene and Uses Therefore  

Identification of Virulence Determinants  

A Method to Enhance the Immunogenicity of PRRSV GP5 Protein  
Pattnaik AK. Pending
2005 REFERRED PUBLICATIONS

A Viral Model for Corneal Scarring and Neovascularization Following Ocular Infection of Rabbit with a Herpes Simplex Virus Type 1 (HSV-1) Mutant

A Herpes Simplex Virus Type 1 Mutant Expressing A Baculovirus Inhibitor of Apoptosis Gene (cpIAP) in Place of LAT (Latency Associated Transcript) has a Wild Type Reactivation Phenotype in the Mouse

Analysis of a Bovine Herpesvirus 1 (BHV-1) Recombinant Virus that Does Not Express the bICP0 Protein

Association of Passive Transfer Levels with Health and Performance in Beef Calves

Biological Responses to PRRSV in Pigs of Two Genetic Populations to PRRSV

Biological Response to Porcine Respiratory and Reproductive Syndrome Virus in Pigs of Two Genetic Populations

Characterization of Cytolethal Distending Toxin of Campylobacter Species Isolated From Captive Macaque Monkeys

Characterization of Protection From Systemic Infection and Disease by Use of a Modified-Live Nocyttopathic Bovine Viral Diarrhea Virus Type 1 Vaccine in Experimentally Infected Calves
Characterization of Protection From Systemic Infection or Disease by use of a Modified-Live Non-Cytopathic Bovine Viral Diarrhea Virus Type 1 in Experimentally-Infected Calves

Considerations for Bovine Viral Diarrhea (BVD) Testing

Factors Associated with the Presence of Coliforms in the Feed and Water of Feedlot Cattle

Fertility of Yearling Bulls During Mating

Glutathione Reductase from Human Cataract Lenses Can Be Revived By Reducing Agents and by a Molecular Chaperone, α-crystallin

Identification of Functional Domains within the bICP0 Protein Encoded by Bovine Herpesvirus 1

Identification of Functional Domains Within the bICP0 Protein Encoded by Bovine Herpesvirus 1 (BHV-1)

In vitro and in vivo Translational Efficiencies of the 5' Untranslated Region from Eight Genotype 2 Bovine Viral Diarrhea Virus Field Isolates

Induction of Epithelial Cell and Macrophage Apoptotic Death by Helicobacter hepaticus Cytolethal Distending Toxin B
Dassanayake RP and GE Duhamel. 2005. Clinical and Diagnosis Laboratory Immunology, ARD Journal Series #14708

Induction of Thioreductase and Thioredoxin Thioredoxin Reductase Systems in Cultured Pig Lenses Under Oxidative Stress
Insulin Signaling is Necessary for Vitellogenesis in Drosophila Melanogaster Independent of the Roles of Juvenile Hormone and Ecdysteroids: Female Sterility of the Chico Insulin Signaling Mutation is Autonomous to the Ovary

Isolation and Characterization of PRRS Virus in Mexico

Opposing Effects of Bovine Papillomavirus Type 1 E6 and E7 Genes on Fas-Mediated Apoptosis

Penicillin-Binding Proteins in the Pathogenic Intestinal Spirochete Brachyspira pilosicoli

Phagocytosis and Intracellular Survival of Mycobacterium avium subsp. paratuberculosis in Bovine Monocytes and a Macrophage Cell Line

Redox Control of K+ Channel Remodeling in Rat Ventricle

Role of the Hypervariable Hinge Region of Phosphoprotein P of Vesicular Stomatitis Virus in Viral RNA Synthesis and Assembly of Infectious Virus Particles

Src Regulates the Activity of the Mammalian Formin Protein FHOD1

Staphylococcus aureus ClpC is Required Stress Resistance, Aconitase Activity, Growth Recovery and Death
Staphylococcus Epidermidis Polysaccharide Intercellular Adhesin Production Significantly Increases During Tricarboxylic Acid Cycle Stress

The Fungal Quorum Sensing Compound, Farnesol is a Virulence Factor in a Mouse Model of Disseminated Candidiasis

The Bovine Herpesvirus 1 (BHV-1) Gene Encoding Infected Cell Protein 0 (bICP0) can Inhibit Interferon Dependent Transcription in the Absence of Other Viral Genes

The Cytolethal Distending Toxin B Sub-Unit of Helicobacter hepaticus is a Ca2+- and Mg2+-Dependent Neutral Nuclease

The Locus Encompassing the Latency-Associated Transcript (LAT) of Herpes Simplex Virus Type 1 Interferes with and Delays Interferon Expression in Productively Infected Neuroblastoma Cells and Trigeminal Ganglia of Acutely Infected Mice

The Latency Related Gene Encoded by Bovine Herpesvirus 1 (BHV-1) Promotes Virus Growth and Reactivation from Latency in Tonsils of Infected Calves

The Herpes Simplex Virus Type 1 (HSV-1) Locus that Encodes the Latency-Associated Transcript (LAT) Enhances the Frequency of Encephalitis in Male BALB/C mice

The Mammalian Formin FHOD1 Interacts with the ERK MAP Kinase Pathway

The Herpes Simplex Virus Type 1 Locus that Encodes the Latency-Associated Transcript Enhances the Frequency of Encephalitis in Male BALB/c Mice
Use of Rope-Devices to Describe and Explain the Feedlot Ecology of *Escherichia coli* O157:H7 by Time and Place


Use of Rope-Devices to Describe and Explain the Feedlot Ecology of *Salmonella* by Time and Place

A Viral Model for Corneal Scarring and Neovascularization Following Ocular Infection of Rabbit with a Herpes Simplex Virus Type 1 (HSV-1) Mutant

A Herpes Simplex Virus Type 1 Mutant Expressing a Baculovirus Inhibitor of Apoptosis Gene (cpIAP) in Place of LAT (Latency Associated Transcript) has a Wild Type Reactivation Phenotype in the Mouse

Altered Gene Expression in Plants with Constitutive Expression of Mitochondrial Small Heat Shock Protein Suggests the Involvement of Retrograde Regulation in the Heat Stress Response

Analysis of a Bovine Herpesvirus 1 (BHV-1) Recombinant Virus that Does Not Express the bICP0 Protein

Brachyspira hyodysenteriae is Relatively more Prevalent than B. pilosicoli Among Commercial Pig Farms with Diarrhoea in Spain

Cecal Spirochetosis Caused by Brachyspira pilosicoli in Commercial Turkeys
Shivaprasad HL and Duhamel GE. 2005. Avian Diseases, in press, ARD Journal Series #14545

Development of Iuminescent M. avium subsp. Paratuberculosis for Rapid Screening of Vaccine Candidates in Mice
Diagnostic Survey of Bovine Abortion with Special Reference to Neospora caninum Infection: Importance, Repeated Abortion and Concurrent Infection in Aborted Fetuses in Southern Brazil

Enhanced Pathogenicity of Candida albicans Pre-Treated with Sub-Inhibitory Concentrations of Fluconazole in a Mouse Model of Disseminated Candidiasis

Herd-level risk factors for Neospora caninum seroprevalence in dairy farms in Southern Brazil

Identification of Functional Domains within the bICP0 Protein Encoded by Bovine Herpesvirus 1 (BHV-1)

Influence of Bovine Respiratory Syncytial Virus F Glycoprotein N-Linked Glycans on in vitro Expression and on Antibody Responses in BALB/c Mice

Insertion and Deletion Analyses Identify Regions of Nonstructural Protein 5A of Hepatitis C Virus that are Dispensable for Viral Genome Replication

Purification and Characterization of D-alanyl-D-alanine Ligase of Mycobacterium tuberculosis from Overexpressing Escherichia coli

The Locus Encompassing the Latency-Associated Transcript (LAT) of Herpes Simplex Virus Type 1 Interferes with and Delays Interferon Expression in Productively Infected Neuroblastoma Cells and Trigeminal Ganglia of Acutely Infected Mice
The Latency Related Gene Encoded by Bovine Herpesvirus 1 (BHV-1) Promotes Virus Growth and Reactivation from Latency in Tonsils of Infected Calves

The Bovine Herpesvirus 1 (BHV-1) Gene Encoding Infected Cell Protein 0 (bICP0) can Inhibit Interferon Dependent Transcription in the Absence of Other Viral Genes

The Herpes Simplex Virus Type 1 (HSV-1) Locus that Encodes the Latency-Associated Transcript (LAT) Enhances the Frequency of Encephalitis in Male Balb/C mice
ARTICLES SUBMITTED TO REFEREED JOURNALS IN 2005

A Herpes Simplex Virus Type 1 Mutant Expressing a Baculovirus Inhibitor of Apoptosis Gene (cp1AP) in Place of LAT (Latency Associated Transcript) has a Wild Type Reactivation Phenotype in the Mouse

A Viral Model for Corneal Scarring and Neovascularization Following Ocular Infection of Rabbit with a Herpes Simplex Virus Type 1 (HSV-1) Mutant

Analysis of a Bovine Herpesvirus 1 (BHV-1) Recombinant Virus That Does Not Express the bICP0 Protein

Characterization of Protection Against Systemic Infection and Disease from Experimental BVDV Type 2 Infection in Calves by Use of a Modified-Live Noncytopathic Bovine Viral Diarrhea Virus Type 1 Vaccine

Characterization of Cytolethal Distending Toxin of Campylobacter Species Isolated from Captive Macaque Monkeys

Considerations for Bovine Viral Diarrhea (BVD) Testing

Detection and Quantification of Bovine Viral Diarrhea Virus Using Real-Time Quantitative RT-PCR and Quantitative Competitive RT-PCR Assays

Development of Luminescent M. avium subsp. Paratuberculosis for Rapid Screening of Vaccine Candidates in Mice
Effects of *Moraxella (Branhamella)* Ovis Culture Filtrates on Bovine Erythrocytes, Peripheral Blood Mononuclear Cells and Corneal Epithelial Cells

Factors Associated with the Presence of Coliforms in the Feed and Water of Feedlot Cattle

Genetic Diversity of ORF-5 of Porcine Reproductive and Respiratory Virus Strains in Sonora, Mexico

Identification of Functional Domains Within the bICP0 Protein Encoded by Bovine Herpesvirus 1 (BHV-1)

Induction of Epithelial Cell and Macrophage Apoptotic Death by *Helicobacter hepaticus* Cytotoxic Distending Toxin B
Dassanayake RP and Duhamel GE. 2005. Clinical and Diagnosis Laboratory Immunology, ARD Journal Series #14708

Induction Expression of Antioxidant Genes by Thioredoxin in Human Lens Epithelial Cells

Influence of N-Linked Glycosylation of Porcine Reproductive and Respiratory Syndrome Virus GP5 on Virus Infectivity, Antigenicity, and Ability to Induce Neutralizing Antibodies

Influence of N-Linked Glycosylation of Porcine Reproductive and Respiratory Syndrome Virus GP5 on Virus Infectivity, Antigenicity, and Ability to Induce Neutralizing Antibodies

Insertion and Deletion Analyses Identify Regions of Nonstructural Protein 5A of Hepatitis C Virus that are Dispensable for Viral Genome Replication

Megakaryoblastic Leukemia in a Dog: Clinical Histopathologic, and Immunohistochemical Observations
Mitochondrial Thioltransferase or Glutaredoxin 2 has GSH-Dependent and Thioredoxin Reductase-Dependent Peroxidase Activities

Penicillin-Binding Proteins in the Pathogenic Intestinal Spirochete Brachyspira pilosicoli

Purification and Characterization of D-alanyl-D-alanine Ligase of Mycobacterium tuberculosis from Overexpressing Escherichia coli

Role of the Hypervariable Hinge Region of Phosphoprotein P of Vesicular Stomatitis Virus in Viral RNA Synthesis and Assembly of Infectious Virus Particles

Serologic Survey of Select Infectious Diseases in Coyotes and Raccoons in Nebraska

Seroprevalence of Chlamydia Suis Antibodies in Swine in the Midwestern United States

The Distribution of Cystathionine- β-Synthase (CBS) in the Eye: Implication of the Presence of a Transsulfuration Pathway for Oxidative Defense

The Herpes Simplex Virus Type 1 (HSV-1) Locus that Encodes the Latency-Associated Transcript (LAT) Enhances the Frequency of Encephalitis in Male Balb/C Mice

The Fungal Quorum Sensing Compound, Farnesol is a Virulence Factor in a Mouse Model of Disseminated Candidiasis

The Latency Related Gene Encoded by Bovine Herpesvirus 1 (BHV-1) Promotes Virus Growth and Reactivation from Latency in Tonsils of Infected Calves
The Bovine Herpesvirus 1 (BHV-1) Gene Encoding Infected Cell Protein 0 (bICP0) Can Inhibit Interferon Dependent Transcription in the Absence of Other Viral Genes

The Locus Encompassing the Latency-Associated Transcript (LAT) of Herpes Simplex Virus Type 1 Interferes with and Delays Interferon Expression in Productively Infected Neuroblastoma Cells and Trigeminal Ganglia of Acutely Infected Mice

The Role of Arachidonic Acid in Platelet Derived Growth Factor Induced Signaling in the Lens Epithelial Cells

The Cytolethal Distending Toxin B Subunit of Helicobacter hepaticus is a Ca^{2+}- and Mg^{2+}-Dependent Neutral Nuclease

Transport of Viral Nucleocapsids in Cells Infected With Vesicular Stomatitis Virus Is Mediated by Microtubules

Very Low Ethanol Concentrations Affect Viability and Growth Recovery in Post-Stationary Staphylococcus aureus Populations
A Mutation in the Latency Related Gene of Bovine Herpesvirus 1 (BHV-1) Inhibits Expression of Proteins Encoded by ORF2 and Reading Frame C During Productive Infection


A Diagnostic Strategy to Determine the Shigatoxin Producing Escherichia coli O157 Status of Pens of Feedlot Cattle


A Mutation in the Latency-Related Gene of Bovine Herpesvirus 1 Reduces Establishment and Reactivation of Latency in Calves


A Highly Pathogenic Porcine Reproductive and Respiratory Syndrome Virus Generated from an Infectious cDNA Clone Retains the In Vivo Markers of Virulence and Transmissibility Characteristics of the Parental Strain


A Familial Multisystemic Disease in Gelbvieh Cattle


A Mutation in the Latency Related Gene of Bovine Herpesvirus 1 Leads to Impaired Ocular Shedding in Acutely Infected Calves


A Viral Model for Corneal Scarring and Neovascularization Following Ocular Infection of Rabbit with a Herpes Simplex Virus Type 1 (HSV-1) Mutant

A Diagnostic Implications of Antigen-Induced Interferon, Nitric Oxide, and Rumor Necrosis Factor Alpha Production by Peripheral Blood Mononuclear Cells From *Mycobacterium* bovis-Infected Cattle
Waters WR, MV Palmer, DL Whipple, MP Carlson and BJ Nonnecke. 2003. Clinical and Diagnostic Laboratory Immunology, 10(5):960-966

A Glycine-Rich BHV-5 gE-Specific Epitope Within the Ectodomain is Important for BHV-5 Neurovirulence

A Mutation in the Latency Related Gene of Bovine Herpesvirus 1 Reduces Establishment and Reactivation of Latency in Calves

A Novel Herpes Simplex Virus Type 1 (HSV 1) Transcript (AL RNA) Antisense to the 5’ End of LAT (latency associated transcript) Produces a Protein in Infected Rabbits

A Gene Capable of Inhibiting Apoptosis Can Substitute for the Herpes Simplex Virus Type 1 LAT Gene by Restoring Wild Type Reactivation Levels

Alteration of Leukocyte Populations in Calves Concurrently Infected with Bovine Respiratory Syncytial Virus and Bovine Viral Diarrhea Virus
Brodersen BW and CL Kelling. 1999. Viral Immunology, 12:323-334

An Apoptosis Differentiation Program in Human Polymorphonuclear Leukocytes Regulates Resolution of Inflammation

An Economic Risk Assessment of the Management of Pregnant Feedlot Heifers in the USA

An Evaluation of 3 Methods to Clean Feedlot Water Tanks
Analysis of Cyclins in Trigeminal Ganglia of Calves Infected with Bovine Herpesvirus-1

Analysis of Fumonisin B1-Induced Apoptosis

Analysis of Bovine Trigeminal Ganglia Following Infection with Bovine Herpesvirus 1

Analysis of Latency in Cattle After Inoculation with a Temperature Sensitive Mutant of Bovine Herpesvirus 1 (RLB106)

Analysis of HSV-1 and BHV-11 Latency
Jones CJ. 2003. Clinical Microbiology Reviews, 16:79-95

Analysis of Bovine Trigeminal Ganglia Following Infection with Bovine Herpesvirus 1

Anti-Capsular Antibodies Activate Killing of Escherichia coli O8:K87 by the Alternate Complement Pathway in Porcine Serum

Antigenicity of Mycobacterium paratuberculosis Superoxide Dismutase in Mice

Antineuro-Inflammatory Effect of NF-kappaB Essential Modifier-Binding Domain Peptides in the Adoptive Transfer Model of Experimental Allergic Encephalomyelitis

Application of the Genome Sequence to Address Concerns that Mycobacterium avium Subspecies Paratuberculosis is a Foodborne Pathogen
Association Between the 15 kDa Selenoprotein and UDP Glucose:Glycoprotein Glucosyltransferase in the Endoplasmic Reticulum of Mammalian Cells

B-Cell Epitopes in the Immunodominant p-34 Antigen of Mycobacterium avium subsp. Paratuberculosis

Behavior of Cattle Toward Devices to Detect Food Safety Pathogens

Bio-Security and Bio-Containment of BVDV

Biochemical Properties of Membrane-Associated Proteases of Brachyspira pilosicoli Isolated from Humans with Intestinal Disorders

Breeding Soundness Examination of North American Bison Bulls

Cell Sorting of Formalin-Treated Mycobacterium avium subsp. paratuberculosis Expressing GFP Fluorescence

Characterization of Cytolethal Distending Toxin of Campylobacter species Isolated From Captive Macaque Monkeys

Cloning and DNA Sequence Analysis of an Immunogenic Glucose/Galactose MglB Lipoprotein Homologue from Brachyspira pilosicoli, the Agent of Colonic Spirochctosis

Cloning, Expression and Characterization of Human Lens Thioredoxin
Cloning and Initial Characterization of an Alternatively Spliced Transcript Encoded by the Bovine Herpes Virus 1 Latency Related (LR) Gene

Colonic Spirochetosis of Colony-Raised Rhesus Macaques Associated with Brachyspira and Helicobacter

Comparative Virulence of Isolates of Bovine Viral Diarrhea Virus Type II in Experimentally Inoculated Six- to Nine-Month-Old Calves

Comparative Pathology and Pathogenesis of Naturally Acquired and Experimentally Induced Colonic Spirochaetosis

Comparison of Heat-Labile Enterotoxin and Heat-Stable Enterotoxin-b Expression to the Virulence of F4ac Enterotoxigenic Escherichia coli in Young Pigs

Construction and Immunogenicity of Recombinant Mycobacterium bovis BCG Expressing GP5 and M Protein of Porcine Reproductive Respiratory Syndrome Virus

Construction and Immunological Evaluation of M. bovis BCG Expressing GP5 and M protein of Porcine Reproductive Respiratory Syndrome Virus

Correlation of Acetate Catabolism and Growth Yield in Staphylococcus aureus: Implications for Host-Pathogen Interactions

Decreased Shedding of Escherichia coli O157:H7 by Cattle Following Vaccination with Type III Secreted Proteins
Detection of Bovine Viral Diarrhea Virus in Semen After Infection of Seronegative, Post Pubertal Bulls

Detection and Quantification of Bovine Respiratory Syncytial Virus Using Real-Time Quantitative RT-PCR and Quantitative Competitive RT-PCR Assays

Diabetes can Alter the Signal Transduction in the Lenses of Diabetic Rats and Humans

Diagnostic Survey of Bovine Abortion with Special Reference to Neospora caninum infection: Importance, Repeated Abortion and Concurrent Infection in Aborted Fetuses in Southern Brazil

Differences in Virulence Among Escherichia coli O157:H7 Strains Isolated from Human Disease Outbreaks and Healthy Cattle

Distribution and Biological Activity of Glycerophosphodiester Phosphodiesterase (GlpQ) Among Spirochetes of the Genus Borrelia

Duration of Infection and Proportion of Pigs Persistently Infected with Porcine Reproductive and Respiratory Syndrome Virus (PRRSV)

Ecological Relationships Between the Prevalence of Cattle Shedding Escherichia coli O157:H7 and Characteristics of the Cattle or Conditions of the Feedlot Pen

Effect of Lactobacillus Acidophilus Strain NP51 on Escherichia coli O157:H7 Fecal Shedding and Finishing Performance in Beef Feedlot Cattle
Effect of Infection with Bovine Viral Diarrhea Virus Alone, Rotavirus Alone, or Concurrent Infection with Both on Enteric Disease in Gnotobiotic Neonatal Calves

Effect of a Vaccine Product Containing Type III Secreted Proteins on the Probability of Escherichia coli O157:H7 Fecal Shedding and Mucosal Colonization in Feedlot Cattle

Effect of Culture Conditions on Escherichia coli O157:H7-Mediated Attaching-Effacing Lesions in a Bovine Large Intestinal Mucosal Explant Model

Effect of Infection with Bovine Viral Diarrhea Virus Alone, Bovine Rotavirus Alone, or Concurrent Infection with Both on Enteric Disease in Gnotobiotic Calves

Effects of Inorganic and Organic Copper Supplemented to First-Calf Cows on Cow Reproduction and Calf Health and Performance

Effects of Moraxella (Branhamella) Ovis Culture Filtrates on Bovine Erythrocytes, Mononuclear Cells and Corneal Epithelial Cells

Efficacy of Dose Regimen and Observation of Herd Immunity From a Vaccine Against Escherichia coli O157:H7 for Feedlot Cattle

Enteric Mucosal Antibodies to Escherichia coli O157:H7 in Adult Cattle

Epidemiologic Tools for Biosecurity and Biocontainment

Essential Role for the dsRNA-Dependent Protein Kinase, PKR, in Innate Immunity to Viral Infection
Establishment of a Microbiological Profile for an Air-Chilling Poultry Operation in the United States

Evidence for the Localization of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) Antigen and RNA in Ovarian Follicles in Gilts

Evidence of Localization of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) Antigen and RNA in Ovarian Follicles in Gilts

Evolution of Bovine Viral Diarrhea Virus Vaccines

Expression in Cell Culture of Plasmid DNA Encoding the Variants of G of Bovine Respiratory Syncytial Virus and Induction of Antibody Responses in BALB/c Mice

First Description of Porcine Colonic Spirochetosis Caused by Brachyspira pilosicoli in Iberian pigs From Spain

Formation of Retinal Pigment Epithelium in vitro by Transdifferentiation of Neural Retina Cells

Functional Genomics of Mycobacterium tuberculosis: Gene Inactivation and the Study of Pathogenesis, and Development of Vaccines and Antimicrobial Agents

Genome Diversity Among Regional Populations of Francisella tularensis Subspecies tularensis and Francisella tularensis Subspecies holarctica Isolated from the U.S.
Global Differential Gene Expression in Response to Growth Temperature Alteration in Group A Streptococcus

Glutathione Reductase from Human Cataract Lenses can be Revived by Reducing Agents and by a Molecular Chaperone, Alpha-Crystallin

Gradual Development of the Interferon-Gamma and Antibody Responses of Swine to Porcine Reproductive and Respiratory Syndrome Virus

Growth Characteristics of Bartonella henselae in a Novel Liquid Medium: Primary Isolation, Growth-Phase Dependent Phage Induction, and Metabolite Studies

Herd-Level Risk Factors for Neospora Caninum Seroprevalence in Dairy Farms in Southern Brazil

Herpesvirus 1 Can Infect CD4+ T Lymphocytes and Induce Programmed Cell Death During Acute Infection of Cattle

Herpesvirus 5 (BHV-5) Us9 Is Essential for BHV-5 Neuropathogenesis

Identification of a Novel Bovine Herpesvirus 1 Transcript Containing a Small Open Reading Frame that is Expressed in Trigeminal Aanglia of Latently Infected Cattle

Identification of Functional Domains within the bICP0 Protein Encoded by Bovine Herpesvirus 1 (BHV-1)

Identification of Neutralizing and Non-Neutralizing Epitopes in the Porcine Reproductive and Respiratory Syndrome Virus GP5 Ectodomain
Identification of a Novel Transcript Containing a Small Open Reading Frame that is Expressed During Latency, and is Antisense to the Latency Related Gene of Bovine Herpes Virus 1 (BHV-1)

Identification of Three Clusters of Canine Intestinal Spirochaetes by Biochemical and 16S rDNA Sequence Analysis

Identification and Expression of a Soybean Nodule-Enhanced PEP-Carboxylase Kinase Gene (NE-PpcK) that Shows Striking Up-/Down-Regulation in vivo

Identification of Herpes Simplex Virus Type 1 (HSV-1) Latency Associated Transcript (LAT) Sequences that Both Inhibit Apoptosis and Enhance the Spontaneous Reactivation Phenotype

Identification of Differentially Expressed Genes Following Treatment of Monkey Kidney Cells with the Mycotoxin Fumonisins B1
Zhang Y, CJ Jones and MB Dickman. 2001. Food and Chemical Toxicology, 39:45-53, ARD Journal Series #12826

Identification of a Secreted Superoxide Dismutase in Mycobacterium avium subsp. paratuberculosis

Identification of Porcine Intestinal Spirochetes by PCR-Restriction Fragment Length Polymorphism Analysis of Ribosomal DNA Encoding 23S rRNA

Identification of Common Subpopulations of Non-Sorbitol-Fermenting, β-Glucuronidase-Negative Escherichia coli O157:H7 From Bovine Production Environments and Human Clinical Samples
Identification of Common Sub-Populations of Non-Sorbitol-Fermenting β-Glucuronidase-Negative *Escherichia coli* O157:H7 from Bovine Production Environments and Human Clinical Samples

Ileocolitis Associated with Anaerobiospirillum in Cats

Immune Response of Pigs Inoculated with *Mycobacterium bovis* BCG Expressing a Truncated Form of GP5 and M Protein of Porcine Reproductive and Respiratory Syndrome Virus

Immunogenicity and Protective Efficacy of a gE, gG, and US2 Gene-Deleted Bovine Herpesvirus-1 (BHV-1) Vaccine

Immunohistochemistry Used as a Screening Method for Persistent Bovine Viral Diarrhea Virus Infection

Impact of Candidate Sire Number and Sire Relatedness on DNA Polymorphism-Based Measures of Exclusion Probability and Probability of Unambiguous Parentage

Improved Diagnosis of Porcine Proliferative Enteropathy Caused by *Lawsonia intracellularis* Using Polymerase Chain Reaction-Enzyme-Linked Oligosorbent Assay (PCR-ELOSA)

*In Vivo* and *In Vitro* Phosphorylation of Membrane and Soluble Forms of Soybean Nodule Sucrose Synthase (Nodulin-100)

*In vitro* Serial Passage of *Staphylococcus aureus*: Changes in Physiology, Virulence Factor Production, and *Agr* Nucleotide Sequence
In-situ Hybridization Detection of Bovine Respiratory Syncytial Virus in the Lung of Experimentally Infected Lambs

Incidence, Duration, and Prevalence of Escherichia coli O157:H7 Fecal Shedding by Feedlot Cattle During the Finishing Period

Induction of Thioredoxin/Thioredoxin Reductase Systems in Cultured Pig Lenses Under Oxidative Stress

Infected Cell Protein 0 Encoded by Bovine Herpesvirus 1 Can Activate Caspase 3 when Overexpressed in Transfected Cells

Infection of Cattle with a Bovine Herpesvirus 1 Strain that Contains a Mutation in the Latency-Related Gene Leads to Increased Apoptosis in Trigeminal Ganglia During the Transition From Acute Infection to Latency

Insertion and Deletion Analyses Identify Regions of Nonstructural Protein 5A of Hepatitis C Virus that are Dispensable for Viral Genome Replication

Intracellular Localization of the p35 Subunit of Murine IL-12

Isolation and Characterization of Endophytic Colonizing Bacteria from Agronomic Crops and Prairie Plants

Isotype-Specific Antibody Responses Against Escherichia coli O157:H7 Locus of Enterocyte Effacement Proteins in Adult Beef Cattle Following Experimental Infection
Bretschnider G, EM Berberov and RA Moxley. 2007. Veterinary Immunology and Immunopathology, 118:229-238

Johne's Disease, Inflammatory Bowel Disease and Mycobacterium paratuberculosis
Killing of *Mycobacterium avium* by a Mycobacteriophage Delivered by a Non-Virulent Mycobacterium: A Model for Phage Therapy of Intracellular Bacterial Pathogens

*Legionella pneumophila* Entry Gene *rtxA* is Involved in Virulence

Links between Tumor Necrosis Factor Related Apoptosis Inducing Ligand Mediated Human Neuronal Apoptosis and HIV-1 Associated Dementia

Mapping Herpes Simplex Virus Type 1 (HSV-1) LAT Sequences that Protect From Apoptosis Mediated by a Plasmid Expressing Caspase-8

Measurements of Fitness and Competition in Commensal *Escherichia coli* and *E. coli* O157:H7 Strains

Methods for Detecting the HSV-1 LAT Anti-Apoptosis Activity in Infected Tissue Culture Cells

Minimal Prophylactic Concentration of Dietary Zinc Compounds in a Mouse Model of Swine Dysentery

Molecular Cloning, Sequencing and Characterization of Bovine Transporter Associated with Antigen Processing

Mucin Biosynthesis: Bovine C2GnT-M Gene, Tissue-Specific Expression, and *Herpes Virus-4* Homologue
Mutations in the Genome of Porcine Reproductive and Respiratory Syndrome Virus Responsible for the Attenuation Phenotype


Mycobacterium avium subsp. paratuberculosis in Veterinary Medicine

Harris NB and RG Barletta. 2001. Clinical Microbiology Reviews, 14:489-512, ARD Journal Series #13141

Mycobacterium smegmatis D-alanine Racemase Mutants are not Dependent on D-alanine for Growth


Mycobacterium smegmatis L-alanine Dehydrogenase (Ald) is Required for Proficient Utilization of Alanine as a Sole Nitrogen Source and Sustained Anaerobic Growth


Non-Symbiotic Hemoglobins in Rice are Expressed During Germination and in Differentiating Cell Types


Outcome of Equids with Clinical Signs of West Nile Virus Infection and Factors Associated with Death


Paraclostridium Tenius in Captive Pronghorn Antelope (Antilocapra americana) in Nebraska


Passive Transfer of Virus Specific Antibodies Confers Protection against Reproductive Failure Induced by a Virulent Strain of Porcine Reproductive and Respiratory Syndrome Virus and Establishes Sterilizing Immunity


Penicillin-Binding Proteins in the Pathogenic Intestinal Spirochete Brachyspira pilosicoli


Persistence and Reactivation of Bovine Herpesvirus 1 in the Tonsils of Latently Infected Calves

Persistent Bovine Viral Diarrhea Virus Infection in Beef Herds

Perturbations in Homocysteine-Linked Redox Homeostasis in a Murine Model for Hyperhomocysteinemia

Phagocytosis and Intracellular Survival of Mycobacterium avium subsp. paratuberculosis in Bovine Monocytes and a Macrophage Cell Line

Phosphorylation of Vesicular Stomatitis Virus Phosphoprotein P is Indispensable for Virus Growth

Platelet Derived Growth Factor (PDGF) -Induced Redox Oxygen Species In the Lens Epithelial Cells: The Redox Signaling

Porcine Intestinal Epithelial Cell Lines as an in vitro Model for Studying Pathogenesis of Porcine Enterotoxigenic Escherichia coli
Koh SY, S George, V Brözel, RA Moxley, D Francis and RS Kaushik. 2008. Veterinary Microbiology, in press

Prevalence of Brachyspira Species Isolated From Diarrhoeic Pigs in Brazil

Primary Infection, Latency and Reactivation of Bovine Herpesvirus Type 5 (BHV-5) in the Bovine Nervous System

Progress Toward Characterization of the Group A Streptococcus Metagenome: Complete Genome Sequence of a Macrolide-Resistant Serotype M6 Strain

Staphylococcus aureus CbpC is Required Stress Resistance, Aconitase Activity, Growth Recovery and Death
Protection of Translation Initiation Factor eIF2 Phosphorylation Correlates with eIF2-Associated Glycoprotein p67 Levels and Requires the Lysine-Rich Domain I of p67

Quorum Sensing Control of Biofilm Factors in *Staphylococcus Epidermidis*

Redox Control of K+ Channel Remodeling in Rat Ventricle

Reduced Intestinal Colonization of Adult Beef Cattle by *Escherichia coli* O157:H7 Tir Deletion and Nalidixic Acid-Resistant Mutants Lacking Flagellar Expression
Bretschnieder G, EM Berberov and RA Moxley. 2007. Veterinary Microbiology, 125:381-386

Region of Herpes Simplex Virus Type 1 Latency-Associated Transcript Sufficient for Wild-Type Spontaneous Reactivation Promotes Cell Survival in Tissue Culture

Regulation of Caspase 8-and Caspase 9-Induced Apoptosis by the HSV-1 Latency Associated Transcript

Relative Importance of Heat-Labile Enterotoxin in the Causation of Severe Diarrheal Disease in the Gnotobiotic Piglet Model by a Strain of *Escherichia coli* that Produces Multiple Enterotoxins

Revival of Inactive Glyceraldehydes 3-Phosphate Dehydrogenase in Human Cataract Lenses by Reduction

Rgg Coordinates Virulence Factor Synthesis and Metabolism in *Streptococcus Pyogenes*

Ribozyme Termination of RNA Transcripts Down-Regulate Seed Fatty Acid Genes in Transgenic Soybean
Role of Neutralizing Antibodies in PRRSV Protective Immunity

Role of the Hypervariable Hinge Region of Phosphoprotein P of Vesicular Stomatitis Virus in Viral RNA Synthesis and Assembly of Infectious Virus Particles

Roles of Mycobacterium smegmatis D-alanine-Dalanine Ligase and D-alanine Racemase in the Mechanisms of Action and Resistance to the Peptidoglycan Inhibitor D-cycloserine

Septicemia Associated with Stenotrophomonas Maltophilia in a West African Dwarf Crocodile (Osteolaemus Tetraspis subsp. Tetraspis)

Serologic Survey of Select Infectious Diseases in Coyotes and Raccoons In Nebraska

Severe Disease in Calves Inoculated with a Genotype II Isolate of Bovine Viral Diarrhea (BVDV)

Significance of Heat-Stable and Heat-Labile Enterotoxins in Porcine Colibacillosis in an Additive Model for Pathogenicity Studies

Sodium Phenylacetate Inhibits the Adoptive Transfer of Experimental Allergic Encephalomyelitis in SJL/J Mice at Multiple Steps

Staphylococcus Aureus Aconitase Inactivation Unexpectedly Inhibits Post-Exponential Growth and Enhances Stationary Phase Survival

Staphylococcus epidermidis Polysaccharide Intercellular Adhesin Production Significantly Increases During Tricarboxylic Acid Cycle Stress
Stimulation of Bovine Herpesvirus 1 Productive Infection by the Adenovirus E1A Gene and the Cellular Transcription Factor E2F4

Synthesis and Deformylation of Staphylococcus aureus -Toxin are Linked to Tricarboxylic Acid Cycle Activity

Testing and Management Strategies for Effective Beef and Dairy Herd BVDV Biosecurity Programs

The Genome of Swinepox Virus

The Presence of a Transsulfuration Pathway in the Lens: A New Oxidative Stress Defense System

The Gene that Encodes the Herpes Simplex Virus Type 1 (HSV 1) Latency Associated Transcript (LAT) Influences the Accumulation of the Transcripts (Bcl-xL and Bcl-xS), that Encode Apoptotic Regulatory Proteins

The BHV-1 LR Gene's Ability to Restore the High Reactivation Phenotype to an HSV-1 LAT Null Mutant Appears to be Due to its Anti-Apoptosis Function

The Latency Related Gene Encoded by Bovine Herpesvirus 1 (BHV-1) Promotes Virus Growth and Reactivation from Latency in Tonsils of Infected Calves

The Cytolethal Distending Toxin B Subunit of Helicobacter hepaticus is a Ca^{2+} - and Mg^{2+} -Dependent Neutral Nuclease

166
The Immunogenicity of *Mycobacterium* paratuberculosis 85B Antigen  

The Latency Related (LR) Gene of Bovine Herpes Virus 1 (BHV-1) Can Inhibit the Ability of bICP0 to Activate Productive Infection  

The Latent Membrane Protein 1 of Epstein-Barr Virus Establishes an Antiviral State Via Induction of Interferon-Stimulated Genes  

The Latency Related Gene of Bovine Herpesvirus 1 Enhances Ocular Shedding in Acutely Infected Calves  

The Latency Related (LR) Gene Encoded by Bovine Herpesvirus 1 (Bm-1) Can Suppress Caspase 3 and Caspase 9 Cleavage During Productive Infection  

The Possible Physiological Function of Thioltransferase in Cells  

The Bovine Herpes Virus 1 Immediate Early Protein (bICP0) Associates with Histone Deacetylase 1 to Activate Transcription  

The Zinc Ring Finger of Bovine Herpes Virus 1 Encoded bICP0 is Necessary for Transcriptional Regulation and Infection  

The Locus Encompassing the Latency-Associated Transcript (LAT) of Herpes Simplex Virus Type 1 Interferes with and Delays Interferon Expression in Productively Infected Neuroblastoma Cells and Trigeminal Ganglia of Acutely Infected Mice  

Thioltransferase as an Ascorbate Recycling Enzyme in Human Lens Epithelial Cells  
Tibial Hemimelia Meningocele, and Abdominal Hernia in Shorthorn Cattle

Transmission of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) to Age-Matched Sentinel Pigs

Use of a Portable Real-time Reverse Transcriptase -Polymerase Chain Reaction Assay for Rapid Detection of Foot-and-Mouth Disease Virus

Use of Rope-Devices to Describe and Explain the Feedlot Ecology of Escherichia coli O157:H7 by Time and Place

Use of Rope-Devices to Describe and Explain the Feedlot Ecology of Salmonella by Time and Place
Smith DR, Moxley RA, Clowser SL, Folmer JD, Hinkley S, Erickson GE and Klopfenstein TJ. 2005. Foodborne Pathogens and Disease, 2(1)61-69, ARD Journal Series #14641

Vesicular Stomatitis Virus Infection and Neuropathogenesis in the Murine Model are Associated with Apoptosis

West Nile Virus Infection in Reindeer (Rangifer tarandus)
Characterization of a Novel Campylobacter Cytolethal Distending Toxin from Campylobacter hyointestinalis subsp. hyointestinalis Isolated from Humans and Pigs
Dassanayake RP, Stryker CJ, Johnson RK, Muraoka WT, Wesley IV and Duhamel GE. 2005. 3rd International Rushmore Conference on Enteric Diseases, Rapid City, South Dakota, September 29-October 1; poster

Chronic Enterocolitis of Rhesus Macaque: A Non-Human Primate Model of Inflammatory Bowel Disease
Sestak K, Borda J and Duhamel GE. 2005. Inflammatory Bowel Disease: Research Drives Clinics, Genetics, Barrier Function, Immunologic and Microbial Pathways. Muenster, Germany, September 2-3; poster

Construction of a Full-Length cDNA Infectious Clone of a European-like Type 1 PRRSV Isolated in the U.S.

Direct-Fed Microbial Products for Escherichia coli O157:H7 in Market Ready Feedlot Cattle

Mucosal Colonic Biopsies for Diagnosis of Sub-Clinical Colitis in Callitrichids Kept in a Zoo Collection

Spontaneous Colitis of Captive Tamarins Kept in a Semi-Natural Mixed Species Zoo Exhibit

The Cytolethal Distending Toxin B Subunit of Helicobacter hepaticus is a Nuclear Localizing Ca^{2+}- and Mg^{2+}-Dependent Endonuclease
Dassanayake RP, Griepe MA and Duhamel GE. 2005. 105th General Meeting of the American Society for Microbiology, Atlanta, Georgia, June 5-9, Abstract B-008, poster
Vaccination for *Escherichia coli* O157:H7 in Market Ready Feedlot Cattle

85TH ANNUAL MEETING CONFERENCE RESEARCH WORKERS IN ANIMAL DISEASES

The US Porcine *Campylobacter coli* are Negative for Cytolethal Distending Toxin Activity
Dassanayake RP, Stryker CJ, Johnson RK, Gebhart CJ, Post KW, Hinkley S, Muraoka WT, Wesley IV and Duhamel GE. 2005. 85th Annual Meeting Conference Research Workers in Animal Diseases, St. Louis, Missouri, December 4-6, P22, poster

The Cytolethal Distending Toxin B Sub-Unit of *Helicobacter hepaticus* Localizes to the Nucleus and is the Main Determinant for Intoxication of Eukaryotic Cells
Dassanayake RP and Duhamel GE. 2005. 85th Annual Meeting Conference Research Workers in Animal Diseases, St. Louis, Missouri, December 4-6, P52, poster
Mycobacterium Bovis Infection in Animals and Humans

Porcine Reproductive and Respiratory Syndrome Virus

Porcine Colonic Spirochetosis/Intestinal Spirochetosis

Viral Diseases of the Fetus
OTHER PUBLICATIONS-PUBLIC PRESS, LAY JOURNALS, ETC
2005

RG Barletta

In vivo and in vitro Characterization of Mycobacterium avium subsp. paratuberculosis (MAP) Mutants
A Livneh, L Golan, I Rosenshine, DK Zinniel, HK Chahal, O Chacon, RG Barletta and NY Shpigel. 2005. Submitted to the Proceeding of 8th International Colloquium on paratuberculosis

Development of Luminescent M. avium subsp. paratuberculosis for the Easy and Rapid Screening of Vaccine Candidates in Mice

GE Duhamel

Efficacy of Antimicrobial Agents for PCS Control
Duhamel GE. 2005. Pig Progress, Enteric Diseases Special III, p. 6-8

Understanding of Colitis in Swine Improved

In vitro and in vivo Efficacy of Antimicrobial Agents for Control of Porcine Colonic Spirochaetosis

GP Rupp

*Animal Identification and Cowherd Records - Bovine Health Watch, AgriLabs

DR Smith

Food Safety and Beef Cattle Production
The Prudent use of Antibiotics: An Important Food Safety Issue

Media Resources

• Nebraska Farmer on Preparing for Bioterrorism

• Channel 10/11 Television Interview Regarding Agroterrorism Preparedness

• CNN Television Interview Regarding Bioterrorism and the Potential to Poison Milk with Botulism Toxin

• Sandhill Calving System Featured in Articles in Drovers Journal, Beef Magazine

• UNL Research on E.coli O157:H7 Interventions Featured in Drovers Journal

FA Osorio

Antibody-Mediated Protection Against Porcine Reproductive and Respiratory Syndrome Virus (PRRSV)
Interactive Audiovisual prepared for National Pork Board, presented at the NPB PRRSV Stand at World Pork Expo, Des Moines IA, June 8-11, 2005

Y "Joe" Zhou

• Installed and learned a MetaMorph Imaging and Analysis Program
EXTENSION PUBLICATIONS IN 2005

Dicky D. Griffin

NebGuide: Safe Use of Animal Medications
Wohlers A, Griffin DD, Smith DR. 2005. University of Nebraska-Lincoln Extension, Lincoln, NE, USA

Gary P. Rupp

Biosecurity Handouts for Veterinarians and Livestock Producers
"Getting Started with Biosecurity"
"Biosecurity in Practice Series: Dairy Herds, Replacement Heifers, Beef Breeding Herds, Beef Feedlots, and Sheep Flocks"
Revised Compact Disc for Biosecurity

David R. Smith

Safe Use of Animal Medications

Michael P. Carlson

Blue-Green Algae Poisoning of Animals for Pet and Animal Owners
Carlson, Michael P. and David R. Smith. 2005. NebFact, in progress

Blue-Green Algae Poisoning of Animals
EXTENSION EARS REPORTS 2005

David R. Smith


A conference on the Sandhills Calving System was held Jan 4, 2005 in the Wagonhammer Center at the Gudmundsen Sandhills Laboratory in Whitman, NE. Seminar speakers included veterinarians from the university's Institute of Agriculture and Natural Resources, private industry and private practice, and several cattle ranchers who have tested the system. Forty-one cattle ranchers and veterinarians attended the program.

As a result of this meeting 5 percent of ranchers planned no changes; 20 percent planned to discuss calf scours with their veterinarian; 20 percent planned to discuss plans for implementing the Sandhills Calving System with their veterinarian or UNL Cooperative Extension; 45 percent planned to use the Sandhills Calving System in the future; and 55 percent said they probably use the Sandhills Calving System in their herds soon. This represents an important change in calving management practices.

Approval Date: 03/07/2005
Contact: David R. Smith (dsmith8@unl.edu)
Additional Team Members: Sharon Clowser, Bethany Sitz, Dale Grotelueschen Tim Knott Tom Noffsinger, Gail Nason and Harlow Hill

Multi-Site Satellite Beef Course

Summary: Fifteen sites across Nebraska hosted beef producers for the fifth annual UNL Extension Satellite Beef Shortcourse. During the five week course, 170 beef producers explored the subject of beef cow longevity, the factors that influence it and the economic implications of managing it. Producers learned that extending the productive life of a beef cow for just one year could provide a financial advantage of $25-$50. Those in attendance will be able to analyze their operations and incorporate knowledge presented in the areas of nutrition, genetics, animal health/biosecurity and financial management. Satellite video delivery with direct audio contact available via phone and fax was used. In addition, complimentary and related topics were presented by extension educators at host sites.

Impact: Post course evaluations indicated that 100% of participants would make changes in their operations intended to increase cow longevity, 100% of participants indicated that they were made more aware of the economic implications of cow longevity. Post program surveys showed that the average herd size of producers exceeded 200 head, with some sites having average herd size up to 400 head. This would indicate nearly two percent of the beef cow herd in Nebraska could be affected by the program.

Period: 2004-01-12 - 2004-02-16
Hours Taught: 15 Focus Area: Food Production & Natural Resource Systems
Number of Learners: 125
Livestock Disease Emergency Response Planning

Summary: Cuming County's status as one of the top livestock counties in Nebraska as well as one of the top in the nation prompted local leaders to begin making preparations to respond to potential threats to that segment of the agricultural industry. Considering that livestock represents 88 percent of the agricultural income in the county, a disease outbreak would be economically devastating. Cooperative Extension helped organize meetings with county leaders, producer groups, local emergency management, public health, law enforcement and veterinarians to discuss biosecurity preparedness. The goal was to provide an awareness to the issues and provide communication and create cooperation with the various groups.

Impact: As a result the groups have met to learn about the issues that would be important should an event occur and the livestock operations have all been identified and locations plotted on a map with references back to the plat map. The Public Health Department, Emergency Management and local responders have included the agriculture sector in their planning sessions. The group has hosted the Nebraska Department of Agriculture program "Agriculture Emergency Planning Session" to better understand the issues and prepare locally. Lt. Gov. Dave Heineman, who serves as director of Homeland Security in Nebraska, has been in the county and praised the efforts. He has said "The thing I was most impressed with was the coordination and cooperative effort they had toward biosecurity. Cooperative Extension was a key element of that." It was determined that there is a need to become more organized on the local level. Meetings were organized to include the groups that have been mentioned to provide awareness to the issues, open the communications and create cooperation. The livestock operations were identified by township then located on a large map. This will be used as a reference should a livestock disaster occur. The media has also been involved so the efforts are shared with the public.


Hours Taught: 15

Non IANR/CEHS Members: Dr. Ron Roland, DVM; Ginger Bailey, Steve Meister and Dr. Larry Williams

Focus Area: Food Production & Natural Resource Systems

Number of Learners: 40

Game Meat Safety Program

Summary: An in-service workshop was offered for UNL Extension educators on game meat safety because of concerns about game meat food safety and diseases associated with wild game.

Impact: Participants increased their knowledge of proper field dressing by 91%; understanding of diseased versus healthy animals by 90%; game meat processing by 84% and proper cooking techniques by 58%.


Hours Taught: 6

Non IANR/CEHS Members: Extension Specialist from Penn State - Kathy Cutter

Focus Area: Nutrition, Health and Food Safety

Number of Learners: 20
COMPUTER SOFTWARE, OTHER PUBLICATIONS OR MEDIA DEVELOPED IN 2005

Bruce W. Brodersen

*List owner for NEBVET-L
*List owner for NEB SWINEVETS

Dicky D. Griffin

Computer Software
*Educational Aides and Materials Developed
*Biosecurity Development Template CD - revised
*Improving the safety of subcutaneous injections in cattle. Video (funded by Nebraska Cattlemen's Association)
*The A4 S=s of Safety. (funded by Elanco, Inc)

Gerald E. Duhamel

Efficacy of Antimicrobial Agents for PCS Control
Duhamel GE. 2005. Pig Progress, Enteric Diseases Special III, p. 6-8

Understanding of Colitis in Swine Improved

In vitro and in vivo Efficacy of Antimicrobial Agents for Control of Porcine Colonic Spirochaetosis

Gary P. Rupp

*CowCalf5 - Further Updates and Program Enhancements
DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES
PRESENTATIONS FOR 2005

α-Herpesvirus Latency
Jones, CJ. 2005. Intercampus Virology Meeting, March

An Update on Ongoing PRRSV Immunobiology Research
Moxley RA. 2005. Presentation at the 46th Annual George A. Young Swine Health and Management Conference, South Sioux City, Nebraska, August 11

Analysis of α-Herpesvirus Genes that Regulate the Latency-Reactivation Cycle
Jones, CJ. 2005. Cold Spring Harbor Symposium; Analysis of early events during viral infection, September

Analysis of BHV-1 Genes Expressed in Sensory Neurons of Latently Infected Calves
Jones CJ. 2005. European Society of Veterinary Virology (symposium on herpesviruses), Ghent, Belgium, invited Symposium Lecture

Analysis of Genes Expressed During α-Herpesvirus Latency
Jones CJ. 2005. Kansas State University, Department of Pathobiology, September

Animal ID in Beef Herds
Rupp GP. 2005. Farmer/Rancher College, Clay Center, Nebraska, January

Annual Meeting of the Nebraska Veterinary Medical Association

Applying Population Dynamics to Disease Control
Smith DR. 2005 Spring Conference. Academy of Veterinary Consultants, Waikoloa Beach, HI, April 8

Assuring Beef Quality Strategies
Rupp GP. 2005. Nebraska Cattleman and Pfizer seminars, North Platte and Burwell Nebraska

Beef Quality Assurance
- Steffen DJ. 2005. Nebraska Agriculture Educators Conference, Scottsbluff, NE, January 21

Biosecurity and Profitability
- Steffen DJ. 2005. University of Nebraska-Lincoln Extension, Kimball, NE, November 16

Biosecurity and the Farm Visitor
- Smith DR. 2005. Montrose/Dell Rapids Veterinary Clinic Client Education Meeting, Dell Rapids, SD, January 27

Biotechnology: Food, Health and Environment Tracing Disease Genes in Animals
- Steffen DJ. 2005. Invited guest lecture/speaker Dr. Don Lee, March 28
Bovine Spongiform Encephalopathy
Steffen DJ. 2005. Scottsbluff Rotary Club, Scottsbluff, NE, January 11

Can Vaccination Reduce the Probability that Feedlot Cattle Shed Escherichia coli O157:H7?
Smith DR. 2005. Canadian Beef Cattle Stakeholders Meetings, Bioniche Life Sciences, Toronto, ON, Canada, April 27-28

Can Vaccination Reduce the Probability that Feedlot Cattle Shed Escherichia coli O157:H7?
Smith DR. 2005. Invited seminar, University of Guelph, Ontario Veterinary College, Guelph, Ontario, Canada, April 29

Can Vaccination Reduce the Probability that Feedlot Cattle Shed Escherichia coli O157:H7?
Smith DR. 2005. Canadian Beef Cattle Stakeholders Meeting, Bioniche Life Sciences, Calgary, AB, Canada, March 2-4

Can Vaccination Reduce the Probability that Feedlot Cattle Shed Escherichia coli O157:H7?
Smith DR. 2005. Beef Industry Food Safety Summit, Orlando, FL, April 19

Cecal Spirochetosis Caused by Brachyspira pilosicoli in Commercial Turkeys
Shivaprasad HL and Duhamel GE. 2005. 48th Annual Conference American Association Veterinary Laboratory Diagnosticians, Hershey, Pennsylvania, November 5-10, p. 109, oral presentation

Challenges and Prospects for Pre-Harvest Intervention Strategies for Escherichia coli O157:H7 in Cattle
Moxley RA. 2005. Kansas State University, College of Veterinary Medicine, Manhattan, KS, invited presentation

Challenges and Prospects for Pre-Harvest Intervention Strategies for Escherichia coli O157:H7 in Cattle
Moxley RA. 2005. Department of Veterinary and Biomedical Sciences Departmental Seminar, University of Nebraska-Lincoln, April 11

Characterization of a Novel Campylobacter Cytotoxic Distinguting Toxin from Campylobacter hyointestinalis subsp. hyointestinalis Isolated from Humans and Pigs
Dassanayake RP, Stryker CJ, Johnson RK, Muraoka WT, Wesley IV and Duhamel GE. 2005. 3rd International Rushmore Conference on Enteric Diseases, Rapid City, South Dakota, September 29/October 1, poster presentation

Chronic Enterocolitis of Rhesus Macaque: A Non-Human Primate Model of Inflammatory Bowel Disease
Sestak K, Borda J and Duhamel GE. 2005. Inflammatory Bowel Disease: Research Drives Clinics, Genetics, Barrier Function, Immunologic and Microbial Pathways, Muenster, Germany, September 2-3, poster presentation

Clinical Trial Testing the Effect of Vaccination or Direct-Fed Microbial Products on Colonization of E. coli O157:H7 at the Terminal Rectum of Cattle
Clinical Trial Testing the Effect of Vaccination and Direct-Fed Microbials on Prevalence of *E. coli* O157:H7 in Commercial Beef Feedlots


Cloning and Sequencing of Thioredoxin Binding Protein-2 (TBP-2) from Human Lens Epithelial Cells


Cloning and Sequencing of Thioredoxin Binding Protein-2 (TBP-2) from Human Lens Epithelial Cells


Colonic Spirochetosis of Humans and Animals: A Polymicrobial Infection by Multiple Species of *Brachyspira* and *Helicobacter*

Duhamel GE. 2005. Graduate Seminar Series, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln, Lincoln, Nebraska, April 18

Comparison of Bovine Viral Diarrhea Virus Replication Kinetics in vitro Using Quantitative, Real-Time Reverse Transcription Polymerase Chain Reaction

Mori Y, Topliff CL and Kehg CL. 2005. Nebraska Academy of Sciences

Connecting the Dots: Metabolism and Pathogenesis in *Staphylococci*

Somerville GA. 2005. Host: Cheryl Bailey, Midland Lutheran College, Fremont, NE

Connecting the Dots: Metabolism and Pathogenesis in *Staphylococci*

Somerville, GA. 2005. Host: Julie Soukup. Creighton University, Omaha, NE

Cows with BSE and People with Mad Perspectives

Smith DR and Mark D. 2005. Livestock Grazing Systems Seminar, University of Nebraska-Lincoln, October 3

Dangers of Animal Medicines

Steffen DJ. 2005. IRM Pen of 5 Winter Conference, Harrisburg, NE, January 27

Development of *Luminescent M. avium* subsp. paratuberculosis for the Easy and Rapid Screening of Vaccine Candidates in Mice

V Rosseels, V Roupie, D Zinniel, RG Barletta and K Huygen. 2005. 8th International Colloquium on Paratuberculosis, August 16

Diagnosis and Control of Johne’s Disease in Beef Cattle

Smith DR. 2005. Invited presentation at the University of Missouri, College of Veterinary Medicine, Columbia, MO, November 18

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Diagnostic Approaches to Congenital Defects and Constructing a Control Program

Diagnostic Approaches to Congenital Defects
Steffen DJ. 2005. The Iowa Veterinary Medical Association Annual Meeting, September 29, invited speaker

Diseases of Deer, Deer Safe Harvest and Meat Safety Seminar
Doster AR. 2005. University of Nebraska and Hall County Extension Services, Grand Island, NE, November 3

Diseases of Deer, Wild Game Meat Safety Satellite Seminar
Doster AR. 2005. University of Nebraska Cooperative Extension Service, Lincoln, NE, June 3, Satellite Conference in Eight States and Canada

Disruption of Enterotoxin Genes of Enterotoxigenic Escherichia coli by Allelic Exchange Using Lambda Red-Mediated Recombineering
Erume J, EM Berberov and RA Moxley. 2005. Third International Rushmore Conference on Enteric Diseases, Rapid City, SD, September 29/October 1, poster presentation

Disruption of Enterotoxin Genes of Enterotoxigenic Escherichia coli by Allelic Exchange Using Lambda Red-Mediated Recombineering
Erume J, EM Berberov and RA Moxley. 2005. Nebraska Symposium on Interdisciplinary Graduate Science Research, University of Nebraska-Lincoln, Lincoln, NE, September 27, oral presentation

Effect of Reactive Oxygen Species on Lens Function
Lou MF. 2005. The Ying and Yang Seminar at the Ophthalmology Department, TongRen Hospital, The Beijing Capital University Medical School, April 16, in Beijing, China

Effects of an Experimental Vaccine on Escherichia coli O157:H7 Prevalence in the Feces and Colonized at the Terminal Rectum in Beef Feedlot Cattle

Epizootic Diseases of Nebraska Wildlife
Doster AR. 2005. Nebraska Center for Virology, The George W Beadle Center, University of Nebraska-Lincoln, Lincoln, NE, January 7

Graduate Education in the United States of America
Lou MF. 2005. Seminar at TangDu Hospital of the 4th Military Medical University, July 5, Xian, China

H2O2 Stress Sensitivity in Cultured Primary Mouse Lens Epithelial Cells Derived from Wild Type and Thioltransferase Knockout Mice
H$_2$O$_2$ Stress Sensitivity in Cultured Primary Mouse Lens Epithelial Cells Derived from Wild Type and Thioltransferase Knockout Mice


Health and Carcass Quality

Steffen DJ. 2005. IRM Pen of 5 Wrap-up Conference, Chadron, NE, June 14

In vivo and in vitro Characterization of Mycobacterium avium subsp. paratuberculosis (MAP) Mutants

Livneh A, Golan L, Rosenshine I, Zinniel DK, Chahal HK, Chacon O, Barletta RG and Shpigel NY. 2005. 8th International Colloquium on Paratuberculosis, August 15

Influence of N-Glycans of the Attachment (G) Glycoprotein of Bovine Respiratory Syncytial Virus on Expression


Influence of N-Glycans of the Attachment (G) Glycoprotein of Bovine Respiratory Syncytial Virus on Expression


Introduction to Foreign Animal Disease

Steffen DJ. 2005. Wyo-braska Cattle Feeders, Gering, NE, March 22

Investigating the Initial Sites of Redox Signaling in Human Lens Epithelial Cells


Investigations on the Use of Antibodies for PRRSV Control

Moxley RA. 2005. Presentation at the IASA-IDEXX 1st International Conference Series, in Mexico (4 different locations throughout the country), October 25-28

Invited Speaker, South Dakota State University

Moxley RA. 2005. Brookings, SD, September

Is E. coli O157:H7 Vaccination of Cattle Effective?

Smith DR. 2005. Invited presentation at the Ontario Ministry of Agriculture, Food and Rural Affairs, Guelph, ON, Canada, November 14

Malignant Catarrhal Fever in Two Cattle Feedlots

Brodersen BW, Doster AR, Galeota J, Wohlers A, Sahara R and Van Anne TA. 2005. Summer Meeting of the Nebraska Veterinary Medical Association, June 21, pgs 123-124

Mitochondrial and Nuclear Isoform of Thioltransferase (Grx2) has Peroxidase Activity in Lens Epithelial Cells


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Mucosal Colonic Biopsies for Diagnosis of Sub-Clinical Colitis in Callitrichids Kept in a Zoo Collection

Multidrug-Resistant Salmonella: the Bovine Practitioner's Role in Public Health
Smith DR. 2005. National Conference on Ground Beef Contaminated with Multidrug-Resistant Salmonella, Including S. Typhimurium DT104: An Emerging Public Health Concern, Tufts University School of Veterinary Medicine, Grafton, MA, March 7-8

Network on Antimicrobial Resistance in Staphylococcus aureus (NARSA)
Somerville GA. 2005. Richmond, VA, attendee

Nuclear and Mitochondrial Isoform of Thioltransferase (Grx2) has Peroxidase Activity in Mouse Lens Epithelial Cells

Outbreak of Malignant Catarrhal Fever in Two Feedlots

Population-Based Strategies for Monitoring Food Safety Pathogens in Feedlot Cattle
Smith DR, Moxley RA, Klopfenstein TJ, Peterson RE and Erickson GE. 2005. Beef Industry Food Safety Council (BIFSCO), Orlando, FL, April 20

Preparing for a Livestock Disease Emergency
Smith DR. 2005. Southeast Nebraska Pork Producers, DeWitt, NE, November 8

Preparing for a Livestock Disease Emergency
Smith DR. 2005. Knox County Emergency Planners Meeting, Bloomfield, NE, September 29

Presentation to VBMS 101 Class on Introduction to VBMS Curriculum and Pointers for Academic Success
Steffen DJ. Fall 2005. Guest lecture/speaker

Presentation on the Veterinary Diagnostic Laboratory and Department Activities at the Winter and Summer NVMA Meetings
Steffen DJ. 2005. Guest speaker

Preventing Calf Scours with the Sandhills Calving System

Preventing Calf Scours with the Sandhills Calving System
Smith DR. 2005. University of Nebraska-Lincoln Extension, Holt County, O'Neill, NE, February 18
Preventing Calf Scours with the Sandhills Calving System  
Smith DR. 2005. Montrose /Dell Rapids Veterinary Clinic Client Education Meeting, Dell Rapids, SD, January 27

Preventing Calf Scours with the Sandhills Calving System  
Smith DR. 2005. University of Nebraska-Lincoln Gudmundsen Sandhills Laboratory, Whitman, NE, January 4

Preventing Calf Scours with the Sandhills Calving System  

Preventing Calf Scours with the Sandhills Calving System  
Smith DR. 2005. University of Nebraska-Lincoln Extension, Custer County, Broken Bow, NE, February 3

Prevention of Neonatal Calf Diarrhea in Beef Systems  
Smith DR. 2005. Invited presentation, University of Missouri College of Veterinary Medicine, Columbia, MO, November 18

Protecting Herd Health: Beef Cattle Biosecurity  
Smith DR. 2005. Montrose/Dell Rapids Veterinary Clinic Client Education Meeting, Dell Rapids, SD, January 27

Protecting Herd Health: BVDV Biosecurity and Biocontainment  
Smith DR. 2005. Montrose/Dell Rapids Veterinary Clinic Client Education Meeting, Dell Rapids, SD, January 27

PRRSV Immunological Issues  
Moxley RA. 2005. Presentation at the Modern Veterinary Products, Omaha, Nebraska, October 19

PRRSV New Vaccine Developments  
Moxley RA. 2005. Presentation at the Zhejiang University-Iowa State University Ensminger International School on Swine Diseases, Hangzhou, China, October 13-15

Reactive Oxygen Species: The Ying and Yang Effect on Lens Function  
Lou MF. 2005. Seminar at TangDu Hospital of the 4th Military Medical University, Xian, China, July 5

Redox Signaling in the Lens Epithelial Cells: Regulation of Mitogenic Action of Platelet Derived Growth Factor (PDGF)  
Lou MF. 2005. Seminar at the University of Nebraska-Lincoln, Redox Biology Summer Student Training Program, June 23

Regulation of Mitogenic Action of Platelet Derived Growth Factor (PDGF) on Cell Proliferation by Reactive Oxygen Species at Visual Function-Insights from the Revolution in Biology at the Molecular Level  
Lou MF. 2005. Tel Aviv, Israel, June 15-17
Reinsertion of Thioltransferase (TTase) Enzyme Reverses Oxidative Stress Sensitivity of Lens Epithelial Cells from TTase Knockout Mice

Responsibilities of a Zoo Veterinarian
Steffen DJ. 2005. Riverside Zoo Youth Group, Scottsbluff, NE, June 13

Reversible Regulation of Human Lens Low Molecular Weight Protein Tyrosine Phosphatase by Oxidation

Role of the Tir Protein in Escherichia coli O157:H7 Intestinal Colonization of Adult Cattle
Bretschneider G, EM Berberov and RA Moxley. 2005. Nebraska Symposium on Interdisciplinary Graduate Science Research, University of Nebraska-Lincoln, Lincoln, NE, September 27, poster presentation

Role of the Tir Protein in Escherichia coli O157:H7 Intestinal Colonization of Adult Cattle

Safe Use of Animal Medicines
Steffen DJ. 2005. Feedlot Roundtable, Grand Island, NE, February 15

Seminar presentations located in Tecumseh, Nebraska; Stockton, Kansas; Curtis, Nebraska and Winner and Parkston, South Dakota
Rupp GP. 2005. Invited speaker presentations

Serum Antibody Response by Horses to West Nile Virus and Equine Herpes Virus-1 Infections
Michele Pavelka, Bruce W Brodersen, David J Steffen and David R Smith. 2005. Winter Meeting of the Nebraska Veterinary Medical Association, January 25

Speaker, American Society for Microbiology
Moxley RA. 2005. Penn State University, State College, PA, June

Spontaneous Colitis of Captive Tamarins kept in a Semi-Natural Mixed Species Zoo Exhibit

Staphylococcal Metabolism and Life in a Biofilm
Somerville GA. 2005. University of South Dakota Medical School, Vermillion, SD

Staphylococcal Metabolism and Life in a Biofilm
Somerville GA. 2005. Gordon Conference on Staphylococcal Diseases, Providence, RI
*Staphylococcal* Metabolism and Life in a Biofilm
Somerville GA. 2005. Gram-positive pathogenesis Meeting, Omaha, NE, platform speaker

*Staphylococcal* Metabolism and Life in a Biofilm
Somerville GA. 2005. Gordon Conference on *Staphylococcal* Diseases, Providence, RI, invited speaker

*Staphylococcus* Epidermidis Polysaccharide Intercellular Adhesin Production Significantly Increases During Tricarboxylic Acid Cycle Stress
Somerville GA. 2005. Molecular Genetics of Bacteria and Phages, Madison, WI, platform speaker

The National Animal Identification Program, Records and Electronic Identification in the Beef Industry
Rupp GP. 2005. Guest speaker

The Search for Johne’s Disease in Nebraska
Smith DR. 2005. Montrose/Dell Rapids Veterinary Clinic Client Education Meeting, Dell Rapids, SD, January 27

The Proportion of Nebraska Beef Cattle Herds with Johne’s Disease and the Factors Explaining Herd Status
Smith DR, Schomer TJ, Hinkley S, Clowser S, Galeota JA, Weiss JC and Akin KJ. 2005. Nebraska Veterinary Medical Association Summer Meeting, June 21

The Presence of a Thioredoxin Binding Protein in the Lens: A Regulator of Thioredoxin Redox Function

The Role of p22phox in Reactive Oxygen Species Generation in Human Lens Epithelial Cells

The Nebraska Quality Milk Awards
Smith DR. 2005. Nebraska State Dairymen’s Association Annual Meeting, University of Nebraska-Lincoln, ARDC, Ithaca, NE, March 17

The Medicine of Populations
Smith DR. 2005. Nebraska University Pre-Veterinary Club, University of Nebraska-Lincoln, Lincoln, NE, April 13

The Future of *E. coli* O157:H7 Intervention in Live Cattle
Vaccination on the Ranch as an Intervention Strategy to Reduce the Probability of Detecting E. coli O157:H7 Associated with Commercial Feedlot Cattle
Peterson RE, JA Paterson, DR Smith, RA Moxley, TJ Klopfenstein, GE Erickson, WT Choat and S Hinkley. 2005. Western Section of the American Society of Animal Science, New Mexico State University, Las Cruces, NM, June 22-24, poster/abstract 83

Vaccination Against Type III Secreted Proteins as a Strategy to Control Escherichia coli in Cattle
Moxley RA. 2005. Third International Rushmore Conference: Strategies in the Prevention of Enteric Disease and Dissemination of Food-Borne Pathogens, Rapid City, SD, invited presentation, September 29/October 1

Vaccination on the Ranch as an Intervention Strategy to Reduce the Probability of Detecting E. coli O157:H7 Associated with Commercial Feedlot Cattle
Peterson RE, Paterson JA, Smith DR, Moxley RA, Klopfenstein TJ, Erickson GE, Choat WT and Hinkley S. 2005. Western Section of the American Society of Animal Science, New Mexico State University, Las Cruces, NM, poster/abstract 83, June 22-24

What We’ve Learned About Surveillance and Control of Escherichia coli O157:H7 in Feedlot Cattle

Why have a Tracking System?

NATIONAL

Cattle Management Impact on Food Safety
Griffin DD. 2005. NCBA, San Antonio, TX, February 3

Pre-Harvest Antibiotic Residue Testing
Griffin DD. 2005. FDA-CVM, Rockville, MD, March 3

Quality Assurance and Interface Between the Public and Private Sectors
Griffin DD. 2005. USDA-APHIS Veterinary Services Conference, Des Moines, IA and Texas, June 7

REGIONAL

Cattle Health 101: Understanding & Outcome YA Little About Vaccines, Immunity, Herd Health Programs, Lung Scoring to Estimate the Cost of BRD, Estimating the Value of Your Professional Recommendations, Antibiotic Selection
Griffin DD. 2005. Building Treatment PR, Oklahoma State University, College of Veterinary Medicine, Stillwater, OK, June 3

Value of the General Veterinary Practitioner ..., Antibiotic Selection and Use ..., Vaccination Programs for Cattle ..., Applied Biosecurity ..., Nutrition 101 for Veterinarians ....
Griffin DD. 2005. Auburn Veterinary Conference, Auburn, AL, April 7
STATE

Impact of Nutrition and Mineral Supplementation on Herd Health
Griffin DD. 2005. Iowa State University, Cow Calf Conference, Ames, IA, February 25

56th Annual American College of Veterinary Pathologists Meeting, Boston, Massachusetts

Spontaneous Colitis of Tamarins Kept in a Zoo Exhibit is Associated with Multiple Phylootypes of Enterohepatic Helicobacter Species
Duhamel GE, Mercado JA, Lu G, Stryker CJ, Steffen DJ and Armstrong DL. 2005. 56th Annual American College of Veterinary Pathologists Meeting, Boston, Massachusetts, December 3-7

85th Annual Meeting Conference Research Workers in Animal Diseases, St. Louis, Missouri

Characterization of Protection Against Replication of Bovine Viral Diarrhea Virus Type 2 in Calves with a Modified-Live Noncytopathic Bovine Viral Diarrhea Virus Type 1 Vaccine
Hunsaker BD, DJ Steffen, CL Topliff, KM Eskridge and CL Kelling. 2005. 85th Annual Meeting Conference of Research Workers in Animal Disease in St. Louis, MO

Characterization of the Influence of NPRO on the Virulence of Noncytopathic Bovine Viral Diarrhea Virus in Calves
Henningson JN, Steffen DJ, Topliff CL, Donis RO and Kelling CL. 2005. 85th Annual Meeting Conference of Research Workers in Animal Diseases, St. Louis, MO

Disruption of Enterotoxin Genes of Enterotoxigenic Escherichia coli by Allelic Exchange Using Lambda Red-Mediated Recombineering
Erume J, EM Berberov and RA Moxley. 2005. 85th Annual Meeting Conference Research Workers in Animal Diseases, St. Louis, MO, poster/abstract P46a, December 4-6

Influence of Mutations in the 5' Untranslated Region Internal Ribosomal Entry Site and the NPRO Coding Region on in vivo Translational Efficiencies of Bovine Viral Diarrhea Virus Genotype 2 Isolates
Topliff CL, Chon SK, Donis RO, Eskridge KM and Kelling CL. 2005. 85th Annual Meeting Conference of Research Workers in Animal Disease in St. Louis, MO

Role of the Tir Protein in Escherichia coli O157:H7 Intestinal Colonization of Adult Cattle

The Cytolethal Distending Toxin B Sub-Unit of Helicobacter hepaticus Localizes to the Nucleus and is the Main Determinant for Intoxication of Eukaryotic Cells
Dassanayake RP and Duhamel GE. 2005. 85th Annual Meeting Conference Research Workers in Animal Diseases, St. Louis, Missouri, P52, poster presentation, December 4-6

188
The US Porcine *Campylobacter coli* are Negative for Cytolethal Distending Toxin Activity
Dassanayake RP, Stryker CJ, Johnson RK, Gebhart CJ, Post KW, Hinkley S, Muraoka WT, Wesly IV and Duhamel GE. 2005. 85th Annual Meeting Conference Research Workers in Animal Diseases, St. Louis, Missouri, P22, poster presentation, December 4-6

**105th General Meeting of the American Society for Microbiology, Atlanta, Georgia**

**Development of Molecular Genetic Approaches to Study MAP Pathogenesis**
RG Barletta. 2005. 105th General Meeting of the American Society for Microbiology, Atlanta, Georgia, June 8

**Intracellular Trafficking of *Mycobacterium avium* subsp. paratuberculosis in Bovine Macrophages**
NB Harris, O Chacon, DK Zinniel, Y Zhou and RG Barletta. 2005. 105th General Meeting of the American Society for Microbiology, Atlanta, Georgia, June 8

**Purification of the D-Alanine Ligase of *Mycobacterium tuberculosis* from Overexpressing *Escherichia coli***
O Chacon, Z Feng, T Realpe, J Robledo, C Cassidy, J Sacchetti and RG Barletta. 2005. 105th General Meeting of the American Society for Microbiology, Atlanta, Georgia, June 8

**The Cytolethal Distending Toxin B Subunit of *Helicobacter hepaticus* is a Nuclear Localizing Ca²⁺- and Mg²⁺-Dependent Endonuclease**
Dassanayake RP, Griep MA and Duhamel GE. 2005. 105th General Meeting of the American Society for Microbiology, Atlanta, Georgia, abstract B-008/poster presentation, June 5-9

**38th Annual Convention of the American Association of Bovine Practitioners, Salt Lake City, UT**

**An Estimate of the Proportion of Beef Cattle Herds with *Mycobacterium avium* spp. paratuberculosis-Infected Cattle and Associated Risk Factors**
SELECTED COMMITTEE, EDITORIAL AND OTHER APPOINTMENTS

Radiation Safety Committee, University of Nebraska-Lincoln, March 2000-present
Graduate Committee, Member, August 2004-present
Peer Review Committee, Member, October 2005-present
Book Chair, Department of Veterinary and Biomedical Sciences, September 1997-present
Adjunct Professor, School of Biological Sciences, September 17, 1997-present
Member, Microbiology GREG, September 17, 1997-present
Member, Center for Redox Biology, University of Nebraska-Lincoln, 2002-present
Chair, Biomedical Sciences Group, LSIGRP (Life Sciences Interdisciplinary Graduate Recruitment Program)
Reviewer, Infection and Immunity
Reviewer, Journal of Clinical Microbiology
Department Head (Veterinary and Biomedical Sciences) Search Committee, Spring 2005-present
Ad-hoc Panel Member, NIH, Center for Scientific Review, AIDS-associated Opportunistic Infections and Cancer (AOIC) Study Section, July 2005-present

2005 Departmental Curriculum Committee
2004-2005 Ad Hoc BVD Committee for Academy of Veterinary Consultants
2004-2005 Committee for Immunohistochemistry Quality Control, American Association of Veterinary Laboratory Diagnosticians
2003-2004 Vice Chancellor's Task Force on the Nebraska Veterinary Student Contract
2004 Veterinary School Student Selection Committee, Chairman
Public Relations Committee, Nebraska Veterinary Medical Association, 2000-2005
Chair, George A. Young Swine Health and Management Conference, 2001-2005
Responsible for annual submission of cases to the Armed Forces Institute of Pathology for participation in the Wednesday Slide Conference.
Responsible for maintaining and continued updating of the collection of histopathology slides from the Armed Forces Institute of Pathology in Washington, DC

IANR Pesticide Advisory Committee, 1997 to present
CASNR Recruitment, Retention and Placement Committee, Aug 2003 - present
VBMS Curriculum Committee, Jan 2005 - present
NATIONAL

Submitted 10 questions to the ACVP Board Examination Committee for use in the 2005 ACVP examination in anatomical pathology
Review Committee, Journal of Swine Health and Production, Swine Diseases and Diagnostic Notes
Ad Hoc Reviewer, Canadian Journal of Veterinary Research
Ad Hoc Reviewer, Journal of Virological Methods

STATE

University Liaison Committee, Nebraska Veterinary Medical Association
Pseudorabies Advisory Committee: ex-official member
Student Mentor, Nebraska Pork Producers Association

UNIVERSITY

Dissertation reviewer for the 2006 University of Nebraska-Lincoln Folsom Distinguished Dissertation Award
ISU-UNL Veterinary School Liaison Committee
New Student Enrollment
CASNR Day 11/5/05

DEPARTMENTAL

UNL Pre-Vet Scholarship Selection Committee Chairman
NVMA State Fair Birthing Pavilion

OTHER ACCOMPLISHMENTS IN 2005

Permission to use a number of my photographs and photomicrographs were requested by the new editor (Dr. James Zachaty, College of Veterinary Medicine, University of Illinois) of Thompson’s Pathological Basis of Veterinary Disease. I gave the editor blanket authority to publish any of my photographs he needed for illustration purposes in the upcoming edition. He was particularly interested in obtaining gross and microscopic photographs of swine and cattle diseases.
- Associate Editor, Microbiology, Society for General Microbiology, United Kingdom, 2004-2009
- Panel Member, NIH, United States Department of Health and Human Services, Center for Scientific Review:
  - Special Emphasis Panel
    July 7-8, 2005, ZRG1 IDM-A 90S, Bacterial Pathogenesis
    October 20-21, 2005, ZRG1 IDM-A 90S, Bacterial Pathogenesis
- Panel Member, Natural Sciences and Engineering Research Council of Canada, Integrative Animal Biology Grant
  Selection Committee 2004-2007
- United States Food and Drug Administration, Center for Veterinary Medicine
- National Committee for Clinical Laboratory Standards (NCCLS), Veterinary Antimicrobial Susceptibility Testing
  (V-AST) Sub-committee, Advisor/Observer (2001-present)
- Bacteriology/Mycology Committee, Anaerobic Techniques Sub-committee, American Association of Veterinary Laboratory Diagnosticians, Member (1996-present)
- NC-1007 Technical Committee on Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety, Nebraska Agriculture Experiment Station, Co-representative (1988-present)
- Ad Hoc Reviewer, USDA, National Research Initiative, Functional Genomics of Agriculturally Important Organisms Program, Microbes Subsection
- Ad Hoc Reviewer for Peer-reviewed Scientific Journals
  - Journal of Clinical Microbiology
  - Anaerobe
  - Avian Pathology
- UNL Institutional Biosafety Committee, Member (1995-present)
- UNL Institutional Animal Care and Use Committee, Member (2000-present), Chair (2003-2004)
- UNL Search Committee, Clinical Veterinarian, Institutional Animal Care Program, Member (2005)
- UNL, Animal Research Facility Renovations Advisory Committee, Member (2005)
- UNL, Microbiology Initiative Steering Committee, Member (2001-present)
- UNL, Center for Biotechnology, Microscopy Core Facility Advisory Committee, Member (2002-present)
- IANR, Agricultural Research Division Advisory Council, Member (2002-05)
- Departmental Peer Review Committee, Chair (2005), Member (2002-2008)
- Department of Veterinary and Biomedical Sciences Head Search Committee, Member (2004-2005)
- Integrative Biomedical Sciences and Veterinary and Biomedical Sciences Graduate Committee Chair (2005-2008), Member (2003-2008)
- Departmental Undergraduate Research Coordinator (2004-2005)
- Veterinary Basic Science Glassware Cleaning and Sterilization Facility Supervisor (2001-present)
- National Cattlemen's Beef Association, Beef Quality and Safety Taskforce
- Academy of Veterinary Consultants, Chairman Standards of Practice Committee
- Reviewer for the American Journal of Veterinary Research
- Reviewer for the Journal of the American Veterinary Medical Association
- Reviewer for the American Association of Bovine Practitioner


- Currently serving on 11 Graduate Students PhD Supervisory Committees
- Assistant Director, Nebraska Center for Virology; November 2002-present
- Organized the annual Inter-campus Virology Meeting

Chair (2000,2001,2004), Member (1996-02, 2003-06), VBMS Peer Review Committee
Chair (2000,2001,2004), Member (1996-02, 2003-06), VBMS Promotion and Tenure Committee
Member (2004-07), IBMS Graduate Committee.
Member (1993-present), VBMS Curriculum Committee
Member (2003-05), CASNR Curriculum Committee
Member, Nebraska Center for Virology
Treasurer(2005-2006), Nebraska Chapter of Gamma Sigma Delta
Reviewer for American Journal of Veterinary Research, Vaccine, Virology, Journal of Virological Methods
ORGANIZER AND SESSION CHAIRMAN OF MEETINGS/CONFERENCES
- Co-chaired the session of Protection against cell death in the lens; and Panelist of the Panel Session at the ARVO, Fort Lauderdale, FL, May 1-5, 2005
- Co-chaired the Oxiation and Antioxidant at the US-Japan Cooperative Cataract Research Group Meeting, Oct 29-Nov 2, 2005, at Kona, Hawaii
- Organizer of the conference for the ACRC conference, Beijing, China, June 3-7, 2005

REVIEWER FOR MANUSCRIPTS IN 2005
- Molecular characterization of the cystine/glutamate exchanger (Xc) and the excitatory amino acid transporters (EAATs) in the rat lens by Lim J. et al. Investigation Ophthalmology Visual Science, 2005
- Calcium-Activated RAF/MEK/ERK Signaling Pathway Mediates p53-Dependent Apoptosis and is Abrogated by alpha-B-Crystallin through Inhibition of Ras Activation* by Li, D. W-C. et al., Molecular Cellular Biology, 2005
- Iodine restores lens glutathione level in selenite-induced cataracts of rat pups by Winkler et al., ophthalmologia, 2005
- Cumulative antioxidant defense against oxidative challenge in galactose induced cataractogenesis in Wistar rats, by Raju et al. Experimental Eye Research, 2005
- Calpain splice variant Up84 in human eyes. Ma, H. et al., Experimental Eye Research, 2005
- Protective effect of aspirin against dexamethason-induced cataract in cultured rat lens by Yan, H. et al., Ophthalmic Research, 2005

DEPARTMENTAL COMMITTEES
- Chairperson, Space Utilization Committee, 1998-present
- Graduate Student Committee Member for the Center for Biological Chemistry Program, 2001-2005

UNIVERSITY
- Appointed Member of the Women's Council, University of Nebraska System, 2004-2006

SCIENTIFIC COMMUNITY
- Organizer of the 6th Asian Cataract Research Conference, ACRC, Beijing, China, 2006
- Elected Member of the Board of Trustees for the National Foundation for Eye Research, 1998-present
- Elected North America Program Member for Lens Section, European Eye Research Meeting, 2001-2002, re-elected for 2003-2005
- Editorial Board, *Infection and Immunity*, American Society for Microbiology Press, 1-1-96/12-31-07, four consecutive three-year terms
- Ad hoc reviewer, *Microbiology*, 2004
- Ad hoc reviewer, *Journal of Veterinary Diagnostic Investigation*, 2004
- Ad hoc reviewer, USDA-CSREES-NRICGP, Area 44.0 Sustaining Animal Health and Well-Being, 2003
- Ad hoc reviewer, USDA-CSREES-NRICGP, Area 32.0 Food Safety, Ad hoc reviewer, 2003
- Ad hoc reviewer, University of Idaho, Research Grants Program, 2003
- Member, UNL Institutional Biosafety Committee, 1-27-03/12-31-05
- Member, Curriculum Committee, UNL Department of Veterinary & Biomedical Sciences, 9-1-02/present, Chair, 1-1-03/present
- Curriculum Committee, UNL, College of Agricultural Sciences and Natural Resources, Member, 8-1-01/7-31-03
- UNL Department of Veterinary & Biomedical Sciences, Peer Review Committee, Member & Chair, 10-1-02/7-1-04, appointment ended when became Interim Head
- CASNR Faculty Advisory Council, Member, 7-1-03/6-30-05
- Academic Senate, University of Nebraska-Lincoln, Member and Departmental Representative, 5-1-04/4-30-06
- Member, St. Elizabeth Regional Medical Center Research Council, 9-03/7-06
- Member, Agricultural Advisory Committee, Jeff Fortenberry, Candidate for U.S. Congress, 1st District, Nebraska, 2004
- Grant Review Panel Member, USDA, National Research Initiative Competitive Grants Program, Epidemiological Approaches for Food Safety, Area 32.1, 2004
- Member, Kansas State University College of Veterinary Medicine Admissions Committee for Nebraska Residents, 10-1-95/9-30-98
- Grant Review Panel Member, USDA, National Research Initiative Competitive Grants Program, Animal Health and Well-Being 44.0, 1998-1999
- UNL Agricultural Research Division Advisory Council, District 6 Representative, 7-1-96/6-30-99, Secretary 7-1-98/6-30-99
- UNL Institutional Animal Care and Use Committee, Member, 8-88/12-31-94, Chair 1-1-91/12-31-92
- UNL Institutional Research and Laboratory Animal Care Subcommittee, Member, 1989-91, 1992-1994
- Lincoln-Lancaster County Health Department Infectious Waste Task Force, Member, 1990-91
- George A. Young Swine Conference Planning Committee, Member, 1984-86; Member, 1987-88, Chair; 1990-91; Member, 7-1-95/6-30-96
- Nebraska SPF Health Advisory Committee, Member, 1985-1988
- UNL College of Agriculture Curriculum Committee, Member, 1988-1990
- UNL Department of Veterinary Science Peer Review Committee, Member, 1986-1988
- USDA-CSREES Regional (Multi-State) Research Technical Committee, Nebraska Station Representative: NC-62 Enteric Diseases of Swine, 10-1-83/9-30-97, NC-62 Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety, 10-1-97/9-30-02, Chair in 1996-97 and led the re-write for the 1997 renewal; NC-1007 Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety, 10-1-02/9-30-07
- International Veterinary Advisory Board, Pig Improvement Corporation, 2001- present


- Ad Hoc Reviewer for Virology, Journal of General Virology and Virus Research

- External Reviewer of promotion files for faculty at: Oklahoma State University, Cornell University and Iowa State University

- Nebraska Representative to the NC 229, PRRSV Research, Multi-State Project

- Ad hoc reviewer, Experimental Virology Study Section, NIH, October 2002

- Member, Special Study Section, Bio-terrorism and Emerging Viruses, NIH, July 2003

- Ad hoc reviewer, AIDS and Opportunistic Infections and Cancer Study Section, NIH, November 2005


- American Association of Veterinary Laboratory Diagnosticians Committee on Enteric Diseases

- Nebraska Veterinary Medical Association: Chair, Professional & Consumer Relations Committee

- Student Scholarship Committee

- University Liaison Committee

- Nebraska Livestock Emergency Disease Response System (LEDRS)

- Certified emergency responder

- Peer Review Committee 2004-2005

- Co-Advisor, UNL Pre-Veterinary Club

- Nebraska College of Technical Agriculture Advisory Committee

- South Central Cattleman, Board of Directors

- Journal of Theriogenology Ad Hoc Reviewer

- Nebraska Veterinary Student Selection Committee

- National Cattlemen's Beef Association - Production Research Committee
President, Epidemiology Specialty, American College of Veterinary Preventive Medicine, 2005-2007
- Panelist: USDA CSREES NRI Competitive Grants Program, 44.0 Animal Protection, Panel C, 2005
- Steering Committee. Alliance for Bovine Health, 2005
- Steering Committee on Antimicrobial Resistance, American Veterinary Medical Association, 2004-2005
- Food Safety Advisory Committee, American Veterinary Medical Association, 2005-2006
- Food Quality, Safety, and Security Committee, American Association of Bovine Practitioners, 2004-2005
- Co-manager, AABP-L listserv, American Association of Bovine Practitioners, 1999-present
  (1750+ subscribers from 60+ countries)
- Scientific program planning committee, American Association of Extension Veterinarians, 2005
- Board of Directors, Nebraska State Dairymen’s Association, 2000-present
- Nebraska Bureau of Animal Industry, Johne’s Disease Advisory Committee, 1998-present
- Search Committee, Department Head of the Department of Veterinary and Biomedical Sciences, University of Nebraska, 2003-2005
- Chair, Search Committee. Veterinary Epidemiologist, Department of Veterinary and Biomedical Sciences, University of Nebraska, 2003-present

AD HOC REVIEWER FOR

- Manuscripts
  - Antimicrobial Agents and Chemotherapy
  - Biotechnology and Bioengineering
  - Infection and Immunity
  - Journal of Bacteriology
  - Journal of Clinical Microbiology
  - Molecular Microbiology
  - Nature Reviews Microbiology

GRANTS

- National Science Foundation

COMMITTEES

- Life Sciences Interdisciplinary Graduate Recruitment Program Admissions Committee
- VBMS Graduate Education Committee
- Search Committee for Diagnostic Microbiologist

APPOINTMENTS AND AFFILIATIONS

- Department of Biochemistry, UNL
- Redox Biology Center, UNL
- Department of Pathology and Microbiology, UNMC
- Center for Bacterial Pathogenesis Research, UNMC
- Departmental Peer Review Committee, 1996 elected 2000; re-elected 2003-2006
- Social Committee 1997-2000
- VBMS Search Committees, Chair, Poultry Veterinarian Search Committee; Microbiologist Search Committee, 2002; Department Chair Search Committee, 2004-2005; Bacteriologist Search Committee, Chair, 2005

- Curriculum Committee 2003-present
- Curriculum Committee Chair 2005
- Ad Hoc Reviewer for Veterinary Pathology, 1995-present
- Associate Editor, Journal of Veterinary Diagnostic Investigations, 1996-present
- Publications Committee 1998-present, Chair 2001-2006, Program Committee 2000-present
- Director’s Committee 2000-present, Executive Board 2005-2008
DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES
ARTICLES REGARDING THE DEPARTMENT, 2005

“Students Help with Testing of Deer,” Scarlet, January 6, 2005, pg 1

“Sandhills calving system,” Drovers, February 2005, pg 13

“Scour Proofing: Preventive Approach Can Reduce Losses Due to Calf Scours,” Drovers, February 2005, pgs 24-25

“UNL Undergrads Experience Research Firsthand Working with Agricultural Scientists,” IANR News, April 15, 2005

“Identifying Feedlot Lameness, Part 1,” Bovine Veterinarian, pgs 4-12, May-June 2005

“Closed Border May Mean Less Money for Nebraska Cattle Producers in the Long Run,” IANR News, May 26, 2005

“Bug Experts Work Crime Scene for Insect Clues,” Universal Information Services, Inc., Daily News, Norfolk, NE, March 5, 2005

“Students help with sample testing,” Universal Information Services, Inc., Seward County Connection, Seward, NE,

“Swine Conference Addresses PRRS Management, Eradication,” IANR News, July 11, 2005

“Mitigating Feedlot Lameness,” Bovine Veterinarian, pgs. 14-20, July/August 2005


“The ear is a busy place,” Bovine Veterinarian, pg. 27, October 2005

“More Arrows in the Quiver;” Beef Industry Works to Expand the List of E. coli Interventions; pg 28, Drovers, October 2005

“Use Pharmacology to Select BRD Therapy,” Bovine Veterinarian, November-December 2005, pgs 4-9
Departmental Budget Summaries
Department of Veterinary and Biomedical Sciences

Table 13. Budget, Veterinary and Biomedical Sciences Department, Fiscal Year 2005

<table>
<thead>
<tr>
<th>FY Budget</th>
<th>FTE*</th>
<th>Personnel</th>
<th>Benefits</th>
<th>Operating</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching</td>
<td>8.78</td>
<td>491,142</td>
<td>117,633</td>
<td>94,021</td>
<td>702,796</td>
</tr>
<tr>
<td>Research</td>
<td>51.69</td>
<td>2,748,889</td>
<td>636,011</td>
<td>140,147</td>
<td>3,525,047</td>
</tr>
<tr>
<td>Extension</td>
<td>2.93</td>
<td>192,121</td>
<td>68,715</td>
<td>27,937</td>
<td>288,773</td>
</tr>
<tr>
<td>TOTAL</td>
<td>63.40</td>
<td>3,432,152</td>
<td>822,359</td>
<td>262,108</td>
<td>4,516,616</td>
</tr>
</tbody>
</table>

*Includes faculty and staff

Table 14. Summary of Other Income*

<table>
<thead>
<tr>
<th>Source of Income</th>
<th>Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Health Funds</td>
<td>95,000</td>
</tr>
<tr>
<td>Multi-State Research Funds</td>
<td>52,500</td>
</tr>
<tr>
<td>Tobacco Research Funds</td>
<td>30,000</td>
</tr>
<tr>
<td>Grants Received</td>
<td>2,080,711</td>
</tr>
<tr>
<td>Research Revolving Income</td>
<td>59,849</td>
</tr>
<tr>
<td>Teaching Revolving Income</td>
<td>77,014</td>
</tr>
<tr>
<td>Extension Revolving Income</td>
<td>12,462</td>
</tr>
<tr>
<td>Diagnostic Revolving Income</td>
<td>1,687,965</td>
</tr>
<tr>
<td>Biotechnology Support</td>
<td>-0-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>4,095,501</td>
</tr>
</tbody>
</table>

*Includes AOC funds
Table 15. Nebraska Veterinary Diagnostic Laboratory System Revolving Account Summary for FY 2005

<table>
<thead>
<tr>
<th>Income</th>
<th>Personnel Expense</th>
<th>Operating Expense</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,687,965</td>
<td>432,408</td>
<td>1,074,407</td>
<td>181,150</td>
</tr>
</tbody>
</table>

Table 16. Summary of Research Funds* Allocations to Veterinary and Biomedical Sciences Department by Agricultural Research Division for Fiscal Year 2005 and Comparison to Average for 20 IANR Administrative Units**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Veterinary &amp; Biom Sci</th>
<th>ARD Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty research FTE</td>
<td>9.20</td>
<td>6.87</td>
</tr>
<tr>
<td>Faculty salary, $/FTE</td>
<td>110,540</td>
<td>91,882</td>
</tr>
<tr>
<td>Manager/Prof employ., fte/FTE</td>
<td>0.42</td>
<td>0.68</td>
</tr>
<tr>
<td>Manager/Prof salary, $/FTE</td>
<td>16,840</td>
<td>25,697</td>
</tr>
<tr>
<td>Office/Service employ., fte/FTE</td>
<td>0.59</td>
<td>0.69</td>
</tr>
<tr>
<td>Office/Service salary, $/FTE</td>
<td>14,578</td>
<td>20,234</td>
</tr>
<tr>
<td>GRA stipends, $/FTE</td>
<td>23,854</td>
<td>15,571</td>
</tr>
<tr>
<td>Hourly employees wages, $/FTE</td>
<td>6,440</td>
<td>2,153</td>
</tr>
<tr>
<td>Fringe benefits, $/FTE</td>
<td>37,269</td>
<td>36,810</td>
</tr>
<tr>
<td>Operating, $/FTE</td>
<td>27,714</td>
<td>22,396</td>
</tr>
<tr>
<td>Total support, $/FTE</td>
<td>126,694</td>
<td>122,860</td>
</tr>
<tr>
<td>Total investment, $/FTE</td>
<td>237,234</td>
<td>214,743</td>
</tr>
</tbody>
</table>

* Summary includes State, Hatch, Federal Animal Health Research Formula Funds, (Section 1433) and USDA CSRS North Central Regional Research Funds. Does not include revolving, grant and contract funds or Veterinary Diagnostic Center or Great Plains Veterinary Educational Center budgets.

** Data compiled by IANR Agricultural Research Division.
Table 17. UNIT PERFORMANCE CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>FY 2004</th>
<th>Average of FY 2002-2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VBS</td>
<td>ARD Ave.</td>
</tr>
<tr>
<td>Total Approp. $/FTE$</td>
<td>234,836</td>
<td>210,420</td>
</tr>
<tr>
<td>Ref. Publications/FTE$</td>
<td>2.90</td>
<td>4.56</td>
</tr>
<tr>
<td>Theses/FTE$</td>
<td>1.45</td>
<td>1.23</td>
</tr>
<tr>
<td>Competitive Grant $/FTE</td>
<td>328,007</td>
<td>98,081</td>
</tr>
<tr>
<td>Total Grant $/FTE$</td>
<td>345,790</td>
<td>159,641</td>
</tr>
<tr>
<td>Total Grant $/Total Approp $</td>
<td>1.472</td>
<td>0.788</td>
</tr>
<tr>
<td>Compet. Grant Proposals/FTE</td>
<td>1.00</td>
<td>0.80</td>
</tr>
<tr>
<td>Total Grant Proposals/FTE</td>
<td>3.46</td>
<td>4.72</td>
</tr>
<tr>
<td>Total Resources, $/FTE</td>
<td>580,626</td>
<td>370,656</td>
</tr>
</tbody>
</table>

1 Data taken from ARD budgets, ARD Annual Reports and Summary of grants prepared by Office of Sponsored Programs.
2 Data reflects Unit appropriated budget plus RRF, McIntire Stennis, Animal Health and funds added to unit during fiscal year.
3 Publications included journal articles, book, book chapters and research bulletins.
4 Theses include MS theses and PhD dissertations.
5 Includes proposals to all funding agencies (federal and state agencies, commodity boards, UN Foundation, corporations and internal grant proposals).
Table 18. Research Grant and Contract Income During the Last Four Calendar Years Expressed on Dollars Per Research FTE Basis*

<table>
<thead>
<tr>
<th>Unit</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>Average 2001-2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Economics</td>
<td>12,903</td>
<td>19,490</td>
<td>14,906</td>
<td>11,901</td>
<td>14,800</td>
</tr>
<tr>
<td>Ag Leadership, Ed &amp; Communications</td>
<td>8,381</td>
<td>-0-</td>
<td>-0-</td>
<td>725</td>
<td>2,277</td>
</tr>
<tr>
<td>Agronomy &amp; Horticulture</td>
<td>166,655</td>
<td>103,434</td>
<td>181,844</td>
<td>164,078</td>
<td>154,003</td>
</tr>
<tr>
<td>Animal Science</td>
<td>139,655</td>
<td>114,218</td>
<td>61,979</td>
<td>98,619</td>
<td>103,618</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>292,905</td>
<td>462,158</td>
<td>541,412</td>
<td>751,099</td>
<td>511,894</td>
</tr>
<tr>
<td>Biological Systems Engineering</td>
<td>141,065</td>
<td>61,571</td>
<td>35,049</td>
<td>107,260</td>
<td>86,236</td>
</tr>
<tr>
<td>Entomology</td>
<td>123,257</td>
<td>133,919</td>
<td>151,858</td>
<td>63,361</td>
<td>118,099</td>
</tr>
<tr>
<td>Family &amp; Consumer Science</td>
<td>14,021</td>
<td>-0-</td>
<td>-0-</td>
<td>94,340</td>
<td>27,090</td>
</tr>
<tr>
<td>Food Science &amp; Technology</td>
<td>381,421</td>
<td>538,807</td>
<td>360,828</td>
<td>263,481</td>
<td>386,134</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>407,086</td>
<td>224,001</td>
<td>365,215</td>
<td>300,768</td>
<td>324,268</td>
</tr>
<tr>
<td>Northeast R&amp;E Center</td>
<td>54,760</td>
<td>49,595</td>
<td>91,443</td>
<td>90,853</td>
<td>71,663</td>
</tr>
<tr>
<td>Nutritional Science &amp; Dietetics</td>
<td>248,501</td>
<td>72,187</td>
<td>163,083</td>
<td>78,224</td>
<td>140,498</td>
</tr>
<tr>
<td>Panhandle R&amp;E Center</td>
<td>104,646</td>
<td>128,767</td>
<td>121,189</td>
<td>140,551</td>
<td>123,788</td>
</tr>
<tr>
<td>Plant Pathology</td>
<td>164,151</td>
<td>173,741</td>
<td>246,810</td>
<td>324,585</td>
<td>227,322</td>
</tr>
<tr>
<td>Statistics</td>
<td>1,101</td>
<td>63,515</td>
<td>22,532</td>
<td>17,358</td>
<td>26,127</td>
</tr>
<tr>
<td>Textiles, Clothing &amp; Design</td>
<td>127,103</td>
<td>67,578</td>
<td>319,636</td>
<td>-0-</td>
<td>128,579</td>
</tr>
<tr>
<td>Veterinary &amp; Biomedical Sciences</td>
<td>100,924</td>
<td>337,777</td>
<td>420,639</td>
<td>234,536</td>
<td>273,469</td>
</tr>
<tr>
<td>West Central R&amp;E Center</td>
<td>48,050</td>
<td>49,996</td>
<td>32,173</td>
<td>53,868</td>
<td>46,022</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>137,778</td>
<td>139,406</td>
<td>173,922</td>
<td>155,312</td>
<td>153,660</td>
</tr>
</tbody>
</table>

* Grants obtained by interdisciplinary center and the ARD Dean's office are not listed. These funds are largely expended by faculty in academic units. Therefore, the listing is not a completely accurate representation of all external funds available for faculty use.
### Table 19. RESOURCE AND PERFORMANCE TRENDS

**UNIT: VETERINARY & BIOMEDICAL SCIENCES**

*(INCLUDES GPVEC)*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Approp. $/FTE</td>
<td>147,671</td>
<td>156,233</td>
<td>197,394</td>
<td>194,459</td>
<td>211,145</td>
<td>281,495</td>
<td>239,044</td>
<td>189,151</td>
<td>184,216</td>
<td>195,222</td>
<td>204,596</td>
<td>224,097</td>
<td>234,836</td>
<td>237,234</td>
</tr>
<tr>
<td>Comp. Grant $/FTE</td>
<td>33,954</td>
<td>33,686</td>
<td>56,131</td>
<td>92,978</td>
<td>165,027</td>
<td>131,558</td>
<td>133,955</td>
<td>102,289</td>
<td>93,830</td>
<td>229,038</td>
<td>181,123</td>
<td>270,121</td>
<td>328,007</td>
<td></td>
</tr>
<tr>
<td>Total Grant $/FTE</td>
<td>64,891</td>
<td>54,003</td>
<td>94,388</td>
<td>164,400</td>
<td>250,806</td>
<td>241,423</td>
<td>229,064</td>
<td>133,224</td>
<td>160,688</td>
<td>265,037</td>
<td>232,717</td>
<td>342,892</td>
<td>345,790</td>
<td></td>
</tr>
<tr>
<td>Grant $/Approp. $</td>
<td>0.439</td>
<td>0.346</td>
<td>0.478</td>
<td>1.92</td>
<td>1.188</td>
<td>0.858</td>
<td>0.958</td>
<td>0.704</td>
<td>0.87</td>
<td>1.358</td>
<td>1.137</td>
<td>1.530</td>
<td>1.472</td>
<td></td>
</tr>
<tr>
<td>Total Resources, $/FTE</td>
<td>212,562</td>
<td>210,236</td>
<td>291,782</td>
<td>358,859</td>
<td>462,011</td>
<td>522,918</td>
<td>468,108</td>
<td>322,375</td>
<td>344,904</td>
<td>460,259</td>
<td>437,313</td>
<td>566,989</td>
<td>580,626</td>
<td></td>
</tr>
<tr>
<td>Ref. Pubs/FTE</td>
<td>2.52</td>
<td>2.44</td>
<td>3.18</td>
<td>2.56</td>
<td>2.29</td>
<td>2.56</td>
<td>3.45</td>
<td>2.58</td>
<td>1.19</td>
<td>3.48</td>
<td>1.60</td>
<td>3.98</td>
<td>2.90</td>
<td></td>
</tr>
<tr>
<td>Theses/FTE</td>
<td>0.11</td>
<td>1.34</td>
<td>0.93</td>
<td>1.28</td>
<td>1.35</td>
<td>2.20</td>
<td>1.44</td>
<td>0.90</td>
<td>0.92</td>
<td>0.37</td>
<td>0.66</td>
<td>1.18</td>
<td>1.45</td>
<td></td>
</tr>
<tr>
<td>Comp. Proposals/FTE</td>
<td>1.64</td>
<td>1.78</td>
<td>2.91</td>
<td>1.92</td>
<td>1.21</td>
<td>1.47</td>
<td>1.72</td>
<td>1.90</td>
<td>1.65</td>
<td>1.65</td>
<td>2.44</td>
<td>2.69</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

1/ Includes state and federal formula funds plus additional resources added to units on a nonrecurring basis. Does not include administrative "overhead," diagnostic laboratories, or general support of ARDC or interdisciplinary centers.

2/ Proposals submitted to federal agencies with competitive grant programs.

3/ All grant proposals including those submitted to commodity boards, industry and university internal grant competition.
Table 20. Nebraska Cash Receipts* from Farm Marketings by Commodity, 2004**
Total All Commodities = $11,779,728

<table>
<thead>
<tr>
<th>LIVESTOCK PRODUCTS</th>
<th></th>
<th>CROPS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodity</td>
<td>$ Value in Thousands</td>
<td>% of Total</td>
<td>Commodity</td>
</tr>
<tr>
<td>Livestock &amp; Products</td>
<td>7,338,183</td>
<td>62.3</td>
<td>Food Grains</td>
</tr>
<tr>
<td>Meat Animals</td>
<td>6,970,380</td>
<td>***</td>
<td>Rye</td>
</tr>
<tr>
<td>Cattle &amp; Calves</td>
<td>6,196,896</td>
<td>52.6</td>
<td>Wheat</td>
</tr>
<tr>
<td>Hogs</td>
<td>761,953</td>
<td>6.5</td>
<td>Millet, Proso</td>
</tr>
<tr>
<td>Sheep &amp; Lambs</td>
<td>11,531</td>
<td>0.1</td>
<td>Feed Crops</td>
</tr>
<tr>
<td>Dairy Products</td>
<td>168,480</td>
<td>1.4</td>
<td>Oats</td>
</tr>
<tr>
<td>Milk, Wholesale</td>
<td>168,480</td>
<td>***</td>
<td>Barley</td>
</tr>
<tr>
<td>Poultry &amp; Eggs</td>
<td>171,747</td>
<td>***</td>
<td>Corn</td>
</tr>
<tr>
<td>Broilers</td>
<td>11,430</td>
<td>0.1</td>
<td>Hay</td>
</tr>
<tr>
<td>Farm Chickens</td>
<td>17</td>
<td>0.0</td>
<td>Sorghum Grain</td>
</tr>
<tr>
<td>Chicken Eggs</td>
<td>138,863</td>
<td>1.2</td>
<td>Oil Crops</td>
</tr>
<tr>
<td>Other Poultry</td>
<td>970</td>
<td>***</td>
<td>Soybeans</td>
</tr>
<tr>
<td>Misc. Livestock</td>
<td>25,576</td>
<td>***</td>
<td>Sunflower</td>
</tr>
<tr>
<td>Honey</td>
<td>4,857</td>
<td>0.0</td>
<td>Vegetables</td>
</tr>
<tr>
<td>Wool</td>
<td>258</td>
<td>0.0</td>
<td>Dry Beans</td>
</tr>
<tr>
<td>Other Livestock</td>
<td>22,000</td>
<td>***</td>
<td>Potatoes, Fall</td>
</tr>
<tr>
<td>Crops</td>
<td>4,441,545</td>
<td>37.7</td>
<td>Other field Crops</td>
</tr>
<tr>
<td>Other Berries</td>
<td>140</td>
<td>0.0</td>
<td>Misc. Vegetables</td>
</tr>
<tr>
<td>Other Seeds</td>
<td>1,000</td>
<td>0.0</td>
<td>Greenhouse/nursery</td>
</tr>
<tr>
<td>Fruits &amp; Nuts</td>
<td>1,440</td>
<td>0.0</td>
<td>All Other Crops</td>
</tr>
<tr>
<td>Misc Fruits &amp; Nuts</td>
<td>1,300</td>
<td>0.0</td>
<td>Net Farm Income</td>
</tr>
<tr>
<td>Sugar Beets</td>
<td>36,420</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Other Field Crops</td>
<td>25,000</td>
<td>***</td>
<td></td>
</tr>
</tbody>
</table>

* Data from Nebraska Agricultural Statistics
** Most current data available
*** Data not available
Table 21. Nebraska Agriculture - Rank in Agribusiness Facts (April 2005)*,**

<table>
<thead>
<tr>
<th>Rank, Commodity and Date</th>
<th>Number</th>
<th>Units</th>
<th>% of US Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Commercial livestock slaughter, live weight, 2004</td>
<td>10,668,004,000</td>
<td>Pounds</td>
<td>15.5</td>
</tr>
<tr>
<td>1st Commercial red meat production, 2004</td>
<td>6,800,000,000</td>
<td>Pounds</td>
<td>15.0</td>
</tr>
<tr>
<td>1st Commercial cattle slaughter, live weight, 2004</td>
<td>8,822,989,000</td>
<td>Pounds</td>
<td>21.7</td>
</tr>
<tr>
<td>1st Great Northern bean production, 2004</td>
<td>827,000</td>
<td>Cwt.</td>
<td>87.0</td>
</tr>
<tr>
<td>2nd Commercial cattle slaughter, number, 2004</td>
<td>6,902,600</td>
<td>Head</td>
<td>21.1</td>
</tr>
<tr>
<td>2nd Light red kidney bean production, 2004</td>
<td>174,000</td>
<td>Cwt.</td>
<td>21.5</td>
</tr>
<tr>
<td>2nd Cash receipts from all meat animals, 2003</td>
<td>6,526,691,000</td>
<td>Dollars</td>
<td>11.6</td>
</tr>
<tr>
<td>2nd Cash receipts from cattle and calves, 2003</td>
<td>5,903,957,000</td>
<td>Dollars</td>
<td>13.1</td>
</tr>
<tr>
<td>2nd Pinto beans production, 2004</td>
<td>1,196,000</td>
<td>Cwt.</td>
<td>15.3</td>
</tr>
<tr>
<td>2nd All cattle on feed, January 1, 2005</td>
<td>2,470,000</td>
<td>Head</td>
<td>18.0</td>
</tr>
<tr>
<td>3rd Total value of all cattle and calves, January 1, 2005</td>
<td>5,778,500,000</td>
<td>Dollars</td>
<td>6.6</td>
</tr>
<tr>
<td>3rd All dry edible beans production, 2004</td>
<td>2,376,000</td>
<td>Cwt.</td>
<td>13.3</td>
</tr>
<tr>
<td>3rd Proso millet production, 2004</td>
<td>3,375,000</td>
<td>Bushels</td>
<td>22.4</td>
</tr>
<tr>
<td>3rd Cash receipts from all feed crops, 2003</td>
<td>2,211,529,000</td>
<td>Dollars</td>
<td>9.1</td>
</tr>
<tr>
<td>3rd Cash receipts from corn, 2003</td>
<td>2,040,658,000</td>
<td>Dollars</td>
<td>11.1</td>
</tr>
<tr>
<td>3rd Cash receipts from sorghum grain, 2003</td>
<td>48,277,000</td>
<td>Dollars</td>
<td>5.7</td>
</tr>
<tr>
<td>3rd Cash receipts from livestock and livestock products, 2003</td>
<td>6,867,368,000</td>
<td>Dollars</td>
<td>6.5</td>
</tr>
<tr>
<td>3rd Net farm income, 2003</td>
<td>3,227,861,000</td>
<td>Dollars</td>
<td>5.4</td>
</tr>
<tr>
<td>3rd All cattle and calves, January 1, 2005</td>
<td>6,550,000</td>
<td>Head</td>
<td>6.6</td>
</tr>
<tr>
<td>3rd Fed cattle marketed (1,000+ capacity lots), 2004</td>
<td>4,480,000</td>
<td>Head</td>
<td>20.1</td>
</tr>
<tr>
<td>3rd Corn for grain production, 2004</td>
<td>1,319,700,000</td>
<td>Bushels</td>
<td>11.2</td>
</tr>
<tr>
<td>3rd Sorghum for grain production, 2004</td>
<td>33,615,000</td>
<td>Bushels</td>
<td>7.4</td>
</tr>
<tr>
<td>4th Cash receipts from farm marketings, 2003</td>
<td>10,621,275,000</td>
<td>Dollars</td>
<td>5.0</td>
</tr>
<tr>
<td>4th Beef cows and heifers that have calved, January 1, 2005</td>
<td>1,909,000</td>
<td>Head</td>
<td>5.8</td>
</tr>
<tr>
<td>4th Land in farms and ranches, 2004</td>
<td>45,900,000</td>
<td>Acres</td>
<td>4.9</td>
</tr>
<tr>
<td>4th On-farm grain storage capacity, December 1, 2004</td>
<td>1,020,000,000</td>
<td>Bushels</td>
<td>9.1</td>
</tr>
<tr>
<td>4th Off-farm grain storage capacity, December 1, 2004</td>
<td>698,838,000</td>
<td>Bushels</td>
<td>8.2</td>
</tr>
<tr>
<td>5th Cash receipts from soybeans, 2003</td>
<td>1,089,591,000</td>
<td>Dollars</td>
<td>6.8</td>
</tr>
<tr>
<td>5th Cash receipts from all oil crops, 2003</td>
<td>1,095,798,000</td>
<td>Dollars</td>
<td>6.3</td>
</tr>
<tr>
<td>5th Calf crop, 2004</td>
<td>1,800,000</td>
<td>Head</td>
<td>4.8</td>
</tr>
<tr>
<td>6th Cash receipts from hogs and pigs, 2003</td>
<td>611,988,000</td>
<td>Dollars</td>
<td>5.8</td>
</tr>
<tr>
<td>6th Alfalfa hay production, 2004</td>
<td>4,438,000</td>
<td>Tons</td>
<td>5.9</td>
</tr>
<tr>
<td>Rank, Commodity and Date</td>
<td>Number</td>
<td>Units</td>
<td>% of US Total</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>----------</td>
<td>-----------</td>
<td>---------------</td>
</tr>
<tr>
<td>6th Value of principal crops produced, 2004</td>
<td>4,425,553,000</td>
<td>Dollars</td>
<td>4.3</td>
</tr>
<tr>
<td>6th Soybean production, 2004</td>
<td>220,875,000</td>
<td>Bushels</td>
<td>7.0</td>
</tr>
<tr>
<td>6th Pig crop, 2004</td>
<td>6,204,000</td>
<td>Head</td>
<td>6.1</td>
</tr>
<tr>
<td>6th Commercial hog slaughter, live weight, 2004</td>
<td>1,845,711,000</td>
<td>Pounds</td>
<td>6.7</td>
</tr>
<tr>
<td>6th Commercial hog slaughter, number, 2004</td>
<td>6,953,300</td>
<td>Head</td>
<td>6.7</td>
</tr>
<tr>
<td>6th Value of all hogs and pigs on farms, December 1, 2004</td>
<td>313,500,000</td>
<td>Dollars</td>
<td>5.1</td>
</tr>
<tr>
<td>7th All hay production, 2004</td>
<td>6,143,000</td>
<td>Tons</td>
<td>3.9</td>
</tr>
<tr>
<td>7th Winter wheat production, 2004</td>
<td>61,050,000</td>
<td>Bushels</td>
<td>4.1</td>
</tr>
<tr>
<td>7th All hogs and pigs, December 1, 2004</td>
<td>2,850,000</td>
<td>Head</td>
<td>4.7</td>
</tr>
<tr>
<td>7th Table eggs produced, 2004</td>
<td>3,174,000,000</td>
<td>Eggs</td>
<td>4.2</td>
</tr>
<tr>
<td>7th Sunflower production, 2004</td>
<td>52,150,000</td>
<td>Pounds</td>
<td>2.5</td>
</tr>
<tr>
<td>7th Harvested acreage, principle crops, 2004</td>
<td>18,261,000</td>
<td>Acres</td>
<td>6.0</td>
</tr>
<tr>
<td>7th Sugar beet production, 2004</td>
<td>1,050,000</td>
<td>Tons</td>
<td>3.5</td>
</tr>
<tr>
<td>8th Sorghum silage production, 2004</td>
<td>225,000</td>
<td>Tons</td>
<td>4.7</td>
</tr>
<tr>
<td>8th Cash receipts from crops, 2003</td>
<td>3,753,907,000</td>
<td>Dollars</td>
<td>3.5</td>
</tr>
<tr>
<td>8th Cash receipts from sugar beets, 2003</td>
<td>30,400,000</td>
<td>Dollars</td>
<td>2.8</td>
</tr>
<tr>
<td>9th Oat production, 2004</td>
<td>3,740,000</td>
<td>Bushels</td>
<td>3.2</td>
</tr>
<tr>
<td>10th Corn silage production, 2004</td>
<td>3,795,000</td>
<td>Tons</td>
<td>3.5</td>
</tr>
<tr>
<td>10th All wheat production, 2004</td>
<td>61,050,000</td>
<td>Bushels</td>
<td>2.8</td>
</tr>
<tr>
<td>10th Cash receipts from wheat, 2003</td>
<td>224,846,000</td>
<td>Dollars</td>
<td>3.3</td>
</tr>
<tr>
<td>10th Honey production, 2004</td>
<td>4,539,000</td>
<td>Pounds</td>
<td>2.5</td>
</tr>
<tr>
<td>11th All potato production, 2004</td>
<td>9,288,000</td>
<td>Cwt.</td>
<td>2.0</td>
</tr>
<tr>
<td>12th Cash receipts from all food grains, 2003</td>
<td>233,764,000</td>
<td>Dollars</td>
<td>2.9</td>
</tr>
<tr>
<td>12th All chickens, December 1, 2004</td>
<td>13,972,000</td>
<td>Head</td>
<td>3.1</td>
</tr>
<tr>
<td>13th Cash receipts from hay, 2003</td>
<td>118,499,000</td>
<td>Dollars</td>
<td>2.7</td>
</tr>
<tr>
<td>14th Cash receipts from potatoes, 2003</td>
<td>47,885,000</td>
<td>Dollars</td>
<td>1.9</td>
</tr>
<tr>
<td>14th Cash receipts from chicken eggs, 2003</td>
<td>139,368,000</td>
<td>Dollars</td>
<td>2.6</td>
</tr>
<tr>
<td>14th Value of all chickens on hand, December 1, 2004</td>
<td>26,547,000</td>
<td>Dollars</td>
<td>2.4</td>
</tr>
<tr>
<td>15th Other hay (excludes alfalfa) production, 2004</td>
<td>1,705,000</td>
<td>Tons</td>
<td>2.1</td>
</tr>
<tr>
<td>15th Wool production, 2004</td>
<td>600,000</td>
<td>Pounds</td>
<td>1.6</td>
</tr>
<tr>
<td>18th All sheep and lambs, January 1, 2005</td>
<td>97,000</td>
<td>Heads</td>
<td>1.6</td>
</tr>
<tr>
<td>18th Value of wool production, 2004</td>
<td>258,000</td>
<td>Dollars</td>
<td>0.9</td>
</tr>
<tr>
<td>Rank, Commodity and Date</td>
<td>Number</td>
<td>Units</td>
<td>% of US Total</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------</td>
<td>-------</td>
<td>---------------</td>
</tr>
<tr>
<td>18th Number of farms, 2004</td>
<td>48,300</td>
<td>Farms</td>
<td>2.3</td>
</tr>
<tr>
<td>26th Barley production, 2004</td>
<td>162,000</td>
<td>Bushels</td>
<td>0.1</td>
</tr>
</tbody>
</table>

*Data from USDA/NASS, Lincoln, NE; **/Most current data available
Appendix

The 46th Annual George A. Young Swine Health and Management Conference

August 11, 2005

Conference Location
Marina Inn
Fourth & B' Street
South Sioux City, NE
The 46th Annual
George A. Young
Swine Health and
Management Conference
August 11, 2005

“Achieving the Best of
Production Through Knowledge”

MARINA INN
Fourth & B Streets
South Sioux City, Nebraska 68776

- Swine Industry Economics
- Swine Diseases
- Production and Management Strategies

Sponsors
University of Nebraska-Lincoln
Institute of Agriculture and Natural Resources
Nebraska Cooperative Extension
Department of Veterinary and Biomedical Sciences

INTRODUCTION

Pork producers, large animal and swine practitioners, faculty in
the animal and veterinary sciences, and industry representatives will
benefit from this update of research and industry developments as
they relate to modern swine production and technology.

The George A. Young Swine Conference has a long-standing tradi-
tion of providing up-to-date information on developments in research
and production techniques as they relate to today's swine industry.
Industry experts have come to respect this conference as their annual
opportunity to communicate with colleagues, and to interact with
others throughout the spectrum of swine research and production.

GUEST PARTICIPANTS
Dr. Scott Dee — Associate Professor, Department of Veterinary
Population Medicine, University of Minnesota
Dr. Locke Karriker — Assistant Professor, Department of Veterinary
Diagnostics and Production Animal Medicine, Iowa State
University
Dr. Dale Polson — Senior Manager, Technical Resources, Boehringer
Ingelhein Veterinary, Inc.
Dr. Eric Neumann — Director of Swine Health Information and
Research, National Pork Board
Dr. Joel Nerem — Veterinarian, Christensen Family Farms, Sleepy
Eye, Minnesota

INSTITUTE OF AGRICULTURE AND
NATURAL RESOURCES (IANR) AND
UNIVERSITY OF NEBRASKA

PROGRAM PARTICIPANTS
Dr. Bruce Brodersen — Associate Professor, Dept. of Veterinary and
Biomedical Sciences, Veterinary Diagnostic Center, University of
Nebraska: Lincoln, Nebraska
Dr. Rodger Johnson — Professor, Animal Science Department,
University of Nebraska, Lincoln, Nebraska
Dr. Fernando Osorio — Professor, Department of Veterinary and
Biomedical Sciences, University of Nebraska; Lincoln, Nebraska

PROGRAM COMMITTEE
Bruce Brodersen, Chair
Sharon Clower, Conference Coordinator
Ron Brodersen, Whole Hog Health Center
Mike Brumm, University of Nebraska Hatchet Agricultural Laboratory
Tom Buelt, Pfizer Animal Health
Larry Germer, Gage County Extension Educator
David Hansen, Producer
Phil Hardenburger, Crest Veterinary Clinic
Jeff Hua, Boehringer Ingelhein Vetmedica, Inc.
Jim Unwin, Red Barn Veterinary Clinic

The Conference has been approved for 5 1/2 hours of
Nebraska Veterinary Continuing Education credits.

8:00 am Registration (with coffee and rolls)
8:25 Welcome — Dr. Bruce Brodersen, Conference Chair
8:30-9:30 “The Science Behind PRRS Transmission and
Biosecurity” — Dr. Scott Dee
9:30-10:15 “PRRS Eradication: Depopulation and Roll-
over Techniques” — Dr. Locke Karriker
10:15-10:30 BREAK
10:30-11:15 “An Update on Ongoing PRRSV
Immunobiology Research” —
Dr. Fernando Osorio
11:15-12:00 “Update on Coordinated Industry Efforts to
Fund PRRS Education and Research” —
Dr. Eric Neumann
12:00 pm LUNCH
1:00-2:00 “Genetics of Disease Resistance: PRRS as a
Model” — Dr. Rodger Johnson
2:00-2:45 “PRRS Eradication: Personal Experiences
with PRRS Biosecurity, Monitoring, and
Surveillance” — Dr. Joel Nerem
2:45-3:30 “Assessment of PRRS Risk for Swine
Production Sites: Methods & Applications in
Health Management” — Dr. Dale Polson
The Science Behind PRRS Transmission:

Dr. George Locke Karriker

The purpose of the presentation will be to illustrate the steps required for successful application of data. Bioinformatics and computational methods will be used to examine the processes with regards to PRRS.

The presentation will provide an overview of the PRRS virus and its role in the transmission of the disease. Understanding the role of the virus will help in the development of vaccines and treatments to control the disease. The presentation will also discuss the role of the National Pork Board PRRS Bioinformatics Network in providing resources and support to the research community.

Participants will be able to engage in discussions of the role of the PRRS virus in the transmission of the disease. The presentation will be followed by a Q&A session to address any questions from the audience.