2000

Department of Veterinary and Biomedical Sciences: 2000 Annual Report

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DEPARTMENT OF VETERINARY AND BIOMEDICAL SCIENCES

VBMS 2000
Annual Report

UNIVERSITY OF NEBRASKA-LINCOLN
INSTITUTE OF AGRICULTURAL AND NATURAL RESOURCES
Veterinary and Biomedical Sciences

2000 Annual Report

Teaching, Research, Extension, Scholarly Service and Diagnostic

January 1, 2000 - December 31, 2000

Institute of Agriculture and Natural Resources
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

Panhandle Veterinary Diagnostic Lab
Mitchell, NE

West Central Research & Extension Center, North Platte, NE
State of Nebraska

Panhandle Research & Extension Center
West Central Research & Extension Center
Great Plains Veterinary Educational Center
UNL Veterinary Diagnostic Center
# Table of Contents

**Foreword, 2000** ................................................................. i
  John A. Schmitz, Professor and Department Head

**Veterinary and Biomedical Sciences Personnel** ......................................................... 6
  **Faculty** ........................................................................ 6
  VBMS Postdoctoral Research Associates ......................................................... 7-8
  Emeriti Faculty ........................................................................ 9
  Adjunct and Courtesy Faculty ........................................................... 9

  **Departmental Staff** ............................................................ 9
  Department Office ....................................................................... 9
  Animal Research Facility ............................................................... 10

  **Virology Labs** ..................................................................... 10
  Donis, Ruben ............................................................................ 10
  Jones, Clinton ........................................................................... 10
  Kelling, Clayton ......................................................................... 10
  Osorio, Fernando ......................................................................... 10

  **Immunology Lab** ................................................................. 11
  Srikumaran, Subramaniam .............................................................. 11

  **Microbiology Labs** .............................................................. 11
  Barletta, Raúl ............................................................................. 11
  Cirillo, Jeffrey ........................................................................... 11
  Duhamel, Gerald ......................................................................... 11
  Moxley, Rodney ........................................................................... 11

  **Cataract and Oxidative Stress Research** ................................................ 11
  Lou, Marjorie ............................................................................. 11

  **Electron Microscopy Lab** ....................................................... 12
  Bargar, Tom .............................................................................. 12

  **Glassware Preparation Lab** ..................................................... 12
  Lou, Marjorie ............................................................................. 12

  **Pre-Veterinary Advising Center** ................................................ 12
  Schneider, Norman ..................................................................... 12

  **Nebraska Veterinary Diagnostic Laboratory System** ......................... 12
  VDC Office ................................................................................ 12
Committee Assignments

- Peer Review Committee
- Graduate Committee
- Safety Committee
- Seminar Chairman
- George A. Young Swine Conference Planning Committee
- Department Curriculum Committee
- Nebraska Veterinary Student Admission Committee
- Departmental Computer Support Designee and Liaison to IANR Computing
- CASNR Curriculum Committee (Veterinary and Biomedical Sciences; Biochemistry and Food Science and Technology Departments)
- Pre-Veterinary Club Advisor
- ARD Advisory Council (District 6 – Biometry; Forestry, Fisheries and Wildlife; and Veterinary and Biomedical Sciences Departments)
- CASNR Faculty Advisory Council
- UNL Academic Senate
- Institutional Animal Care and Use Committee
- ARDC Oversight Committee
- ARDC Veterinary and Biomedical Sciences Cattle Herd
- MSIA Graduate Committee
- IANR Policy for Promotion and Tenure Committee
- IANR Pesticide Advisory Committee
- UNL Radiation Safety Committee
Honors, Awards and Recognitions ........................................... 17-18
Service Awards ........................................................................ 19

Faculty Profiles ........................................................................ 20
Raúl G. Barletta ................................................................. 20
Bruce W. Brodersen ............................................................... 21
Jeffrey D. Cirillo .................................................................... 22
Grant Dewel ................................................................................ 23
Ruben O. Donis ........................................................................ 24
Alan R. Doster ........................................................................... 25
Gerald E. Duhamel ................................................................. 26
Steve M. Ensley ......................................................................... 27
D. Dee Griffin ............................................................................ 28
Dale M. Grotelueschen ........................................................... 29
Susanne Finkley ......................................................................... 30
Laura L. Hungerford ............................................................... 31
Clinton J. Jones ......................................................................... 32
Clayton L. Kelling .................................................................... 33
Marjorie F. Lou .......................................................................... 34
Rodney A. Moxley ...................................................................... 35
Fernando A. Osorio .................................................................... 36
Douglas G. Rogers ..................................................................... 37
Gary P. Rupp .............................................................................. 38
Norman R. Schneider ............................................................... 39
Gary B. Sherman ......................................................................... 40
David R. Smith ........................................................................... 41
David J. Steffen .......................................................................... 42
Subramaniam Srikumaran .......................................................... 43
Ventzislav Vassilev ................................................................... 44
Eva A. Wallner-Pendleton .......................................................... 45
Robert W. Wills ......................................................................... 46
Yange Zhang ............................................................................... 47
Y. Joe Zhou ................................................................................ 48

Teaching Program ..................................................................... 49
Undergraduate Program ............................................................. 49
  Pre-Veterinary Student Peer Advisors ........................................ 49
  Undergraduate Degrees Obtained ............................................. 49
  Undergraduate Enrollment by Major ........................................ 50
    Spring and Fall Semesters ..................................................... 50
  Dean's List, Spring and Fall Semesters .................................... 50
    Nebraska Residents Admitted into KSU (August 2000) ............. 51
    UNL Students Entering Other Veterinary Colleges (August 2000) 52

Graduate Program ..................................................................... 53
  Graduate Students Advised by VBMS Faculty .......................... 53-55
  Graduate Degrees Obtained in 2000 ........................................ 55
  Veterinary and Biomedical Sciences Department Courses .......... 56-57
Enrollment in Department-Taught Courses
Spring, Summer and Fall Semesters 2000 ............................................. 58
Veterinary and Biomedical Science - Seminars
VBMS 909 - Spring Semester 2000 ...................................................... 59-60
VBMS 909 - Fall Semester 2000 ....................................................... 60-61
Other Departmental Seminars ......................................................... 61-62
US Meat Animal Research Center (MARC) Seminars .............................. 62-63
Other Seminars .................................................................................. 63-68
UNL - Center for Biotechnology Seminar Series -
Spring 2000 ...................................................................................... 63-64
Fall 2000 ........................................................................................... 64-65
AOC Comparative Pathobiology Seminars -
BIOS 915Z, Spring 2000 ..................................................................... 66
Center for Biological Chemistry Seminar Series -
Spring 2000 ...................................................................................... 66-67
Fall 2000 ........................................................................................... 67-68

Great Plains Veterinary Educational Center (GPVEC) ......................... 69
Overview - Gary P. Rupp, Professor and Director ................................. 69-70
Enrollments in Student Electives, 2000-2001 ........................................ 71
GPVEC Student Electives, 2000-2001 .................................................. 72
GPVEC Continuing Education Seminars 2000 ..................................... 72
Beef Cattle Production Management Series 2000 .................................. 73
Beef Cattle Production Management Series Participants
Series VI, 1999-2000 (December 1999 - October 2000) ....................... 74
Beef Cattle Production Management Series Mentors
Series VI, 1999-2000 (December 1999 - October 2000) ....................... 75

Research Program .............................................................................. 76
Faculty Research Interests ..................................................................... 76-77
VBMS Agricultural Research Division (ARD) Research Projects .......... 78-79
Research Projects - Progress Summaries .............................................. 80
NEB 14-009 (R. Moxley & G. Duhamel) ............................................. 80
NEB 14-014 (S. Srikumaran) ............................................................... 80-81
NEB 14-039 (J. Schmitz) ................................................................. 81
NEB 14-059 (J. Schmitz and D. Steffen) ............................................. 81-82
NEB 14-091 (S. Srikumaran) .............................................................. 82
NEB 14-093 (C. Kelling) ................................................................. 83
NEB 14-094 (R. Donis) ............................................................... 83-84
NEB 14-095 (R. Wills) ............................................................... 84
NEB 14-096 (C. Jones) ............................................................... 85
NEB 14-097 (C. Jones) ............................................................... 85-86
NEB 14-098 (G. Rupp and D. Griffin) ........................................... 86
NEB 14-100 (C. Jones and A. Doster) .............................................. 86-87
NEB 14-101 (R. Moxley and R. Barletta) .......................................... 87
NEB 14-102 (D. Smith) ............................................................... 88
NEB 14-103 (J. Cirillo) ............................................................... 88-89
NEB 14-104 (R. Barletta) .............................................................. 89
Extension Program ............................................ 93
Topics/Titles of Extension Program Emphases .............................. 93-94
   Steve M. Ensley .............................................. 93
   D. Dee Griffin ............................................... 93
   Dale M. Grotelueschen ......................................... 93
   Norman R. Schneider ........................................... 93
   David R. Smith ................................................ 94
   Eva A. Wallner-Pendleton ....................................... 94
   Robert W. Wills ................................................ 94

Extension Faculty Programs ........................................... 95
   D. Dee Griffin ............................................... 95
   Steve M. Ensley .............................................. 96
   Dale M. Grotelueschen ......................................... 96
   Norman R. Schneider ........................................... 96-97
   David R. Smith ................................................ 97
   Eva A. Wallner-Pendleton ....................................... 97
   Robert W. Wills ................................................ 97-98

Nebraska Veterinary and Diagnostic Laboratory Systems .................. 99
Overview .......................................................... 99-100
   Accessions by Species by Month - Nebraska Veterinary Diagnostic
       Laboratory System (January 2000 - December 2000) ....................... 101
   Accessions by Species by Month - Lincoln
       (January 2000 - December 2000) ........................................ 102
   Accessions by Species by Month - North Platte
       (January 2000 - December 2000) ........................................ 103
   Accessions by species by Month - Scottsbluff
       (January 2000 - December 2000) ........................................ 104
   Summary of Laboratory Procedures - Nebraska Veterinary Diagnostic
       Laboratory System (January 2000 - December 2000) ....................... 105-108
   Number of Accessions, Previous Five Years .................................... 109
   Number of Laboratory Procedures Conducted, Previous Five Years ........... 109
   Lag Time Report - Veterinary Diagnostic Center
       (January 1, 2000 - December 31, 2000) ................................ 110
       Distribution of Accessions by County - NVDLS
           (January 2000 - December 2000) .................................... 111
       Distribution of Accessions by State - NVDLS
           (January 2000 - December 2000) .................................... 112

Grants and Contracts Funded or Active in 2000 ............................ 113
   Active Grants Funded in 2000 ....................................... 113
Patents by VBMS Faculty in 2000 ............................................................. 127-128

Publications by VBMS Faculty in 2000 ..................................................... 129
- Refereed Publications, Year 2000 ....................................................... 129-130
- Referred Journal Articles in Press or Accepted in 2000 ...................... 130-132
- Articles Submitted to Refereed Journals in 2000 ................................ 132-133
- Books and Book Chapters in 2000 .................................................... 133-134
- Research Reports .............................................................................. 134-135
- Extension Publications in 2000 ......................................................... 135
- Computer Software, Other Publications or Media Developed .............. 136

Presentations by VBMS Faculty in 2000 ..................................................... 137
- Presentations .................................................................................... 137-143
- Public Press, Lay Journals, Etc. ......................................................... 143-144

Articles Regarding the Department in 2000 ............................................... 145

Selected Committees, Editorial and Other Appointments of VBMS Faculty .... 146-152

Departmental Budget Summaries ............................................................... 153
- Budget, Veterinary and Biomedical Sciences Department -
  Fiscal Year 2000 ............................................................................ 153
- Summary of Other Income - Fiscal Year 2000 .................................. 153
- Nebraska Veterinary Diagnostic Laboratory System Revolving Account
  Summary for Fiscal Year 1999/2000? ............................................. 154
- Summary of Research Funds Allocations to Veterinary and Biomedical
  Sciences Department by Agricultural Research Division for Fiscal
  Year 2000 and Comparison to Average for 20 IANR Administrative
  Units .............................................................................................. 155
- Veterinary and Biomedical Sciences Unit Performance Characteristics 156
- Research Grant and Contract Income During the Last Four Calendar
  Years Expressed on Dollars Per Research FTE Basis ...................... 158

Nebraska Agricultural Statistics, 1999 ....................................................... 159
- Nebraska Cash Receipts from Farm Marketings by Commodity .......... 159
- Nebraska - 1999/2000 Rank in Agriculture ................................... 160-161

Appendix .............................................................................................. 162
- 41st Annual George A. Young Swine Health and Management Conference 163-164
- Western Nebraska Beef Quality and Value ................................... 165-166
List of Tables

Table 1. Nebraska Residents Admitted into the Kansas State University College of Veterinary Medicine Students, August 2000 (UNL/KSU Cooperative Agreement for Veterinary Medical Education) ....................................................... 51

Table 2. UNL Students Entering Other Veterinary Colleges Other Than Kansas State University in August 2000 .......................................................... 52

Table 3. Veterinary and Biomedical Sciences Department Courses ........................................ 56-57

Table 4. Enrollment in Department-Taught Courses ................................................................. 58

Table 5. Enrollments of Student Electives, 2000-2001 .............................................................. 71

Table 6. GPVEC Student Electives, 2000-2001 ...................................................................... 72

Table 7. GPVEC Continuing Education Seminars 2000 CowCalf5 Herd Health Record System Software ........................................................................ 72

Table 8. Beef Cattle Production Management Series 2000 (December 1999 - October 2000) .......................................................... 73


Table 11. VBMS Agricultural Research Division (ARD) Research Projects .......................... 78-79

Table 12. Accessions by Species by Month (January 2000 - December 2000) Nebraska Veterinary Diagnostic Laboratory System .................. 101

Table 13. Accessions by Species by Month (January 2000 - December 2000) Lincoln .................. 102

Table 14. Accessions by Species by Month (January 2000 - December 2000) North Platte ........ 103

Table 15. Accessions by Species by Month (January 2000 - December 2000) Scottsbluff .......... 104

Table 16. Summary of Laboratory Procedures (January 2000 - December 2000) Nebraska Veterinary Diagnostic Laboratory System 105-108
Table 17. Number of Accessions, Previous Five Years .......... 109
Table 18. Number of Laboratory Procedures Conducted, Previous Five Years .......... 109
Table 19. Lab Time Report - Veterinary Diagnostic Center
(January 1, 2000 - December 31, 2000) .......... 110
Table 20. Departmental Budget Summaries
Budget, Veterinary and Biomedical Sciences Department
Fiscal Year 2000 .......... 153
Table 21. Summary of Other Income .......... 153
Table 22. Nebraska Veterinary Diagnostic Laboratory System Revolving Account
Summary for Fiscal Year 1999 .......... 154
Table 23. Summary of Research Funds allocations to Veterinary and Biomedical
Sciences Department by Agricultural Research Division for FY 2000
and Comparison to Average for 20 IANR Administrative Units .......... 155
Table 24. Veterinary and Biomedical Sciences Unit Performance Characteristics .......... 156
Table 26. Research Grant and Contract Income During the Last Four Calendar
Years Expressed on Dollars Per Research FTE Basis .......... 158
Table 27. Nebraska Agricultural Statistics, 1999 .......... 159
Nebraska Cash Receipts from Farm Marketings by
Commodity (1999) .......... 159
Table 28. Nebraska - 1999/2000 Rank in Agriculture .......... 160-161

List of Figures

Figure 1. Distribution of Accessions by County - NVDLS
(January 2000 - December 2000) .......... 111
Figure 2. Distribution of Accessions by State - NVDLS
(January 2000 - December 2000) .......... 112
Some of the most significant milestones for the Department in year 2000 included the following:

- Approval of Option III MS degree track program for the Master of Science in Veterinary Science degree as a Distance Education track. Several students have applied for admission and plans to complete the program, in conjunction with the Beef Cattle Production Management Series certificate program, taught by the Great Plains Veterinary Education Center (GPVEC).

- The Clinical Core Rotation taught by the faculty in the GPVEC for the veterinary medical students in the College of Veterinary Medicine (CVM) at Kansas State University (KSU) was changed. Henceforth, it will be taught during the summer following completion of year-one of the KSU CVM curriculum, with approximately 25 students enrolled in each of four one-week blocks. However, there will be a two-year transition period during which CVM students in the third- and fourth-year at KSU will continue taking the traditional year-around one-week Clinical Core block. Thus, GPVEC duplicated its teaching effort in year 2000 by teaching the Clinical Core rotation to both fourth-year and second-year students. Likewise, dual instruction of this rotation will be required in 2001.

- Data received from the Dean and Director of the IANR Agricultural Research Division in June 2000 revealed that the VBMS Department obtained $161,627 in external grants and contracts, per research FTE in calendar year 1999. This placed the Department fourth among the twenty IANR administrative units in the level of extramural support. Likewise, the Department ranked fourth among the IANR units for the years, 1996-1999, with an average of $181,512 per research FTE. Two especially large grants received by Departmental faculty in year 2000 included a three-year USDA grant of $953,735 on the prevalence of E. coli 0157:H7 in beef feedlots with Dr. Smith as the Principal Investigator, and other co-investigators in the VBMS and Animal Science Departments. Dr. Jones headed one of four major projects in a five-year NIH COBRE grant totaling $10,400,000 for establishing a UNL Virology Center. The external grants and contract data for calendar year 2000 will be included in the 2001 VBMS Annual Report, along with the data for FY 2001 Departmental budget.

- One new Departmental course was approved - VBMS 966 Advanced Viral Pathogenesis (BIOS 966), with Drs Fernando Osorio and Charles Wood as co-instructors.
Faculty

Barletta, Raúl G.,** BS, MS, PhD ........................................... Associate Professor
Brodersen, Bruce W., BS, DVM, MS, PhD ............................... Research Assistant Professor
Cirillo, Jeffrey D., BA, PhD, MS ............................................ Assistant Professor
Dewell, Grant A., M.S., D.V.M., B.S. ................................. Clinical Veterinarian
Donis, Ruben O.,** MV, PhD ...........................................
Doster, Alan R.,** DVM, MS, PhD, ACVP ......................... Professor
Duhamel, Gerald E.,** BS, DVM, PhD, ACVP ...................... Professor
Ensley, Steve M.,' BS, DVM, MS, PhD ............................... Assistant Professor
Gray, Jeffrey T.,' BS, MS, PhD .......................................... Assistant Professor
Griffin, D. Dec.,** BS, DVM, MS ...................................... Professor
Grofelschesen, Dale M.,** DVM, MS ................................. Professor
Hinkley, Susanne* DVM, MS, PhD ................................. Research Assistant Professor
Hungerford, Laura L., B.S., D.V.M., PhH., Ph.D. ................. Associate 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
Osorio, Fernando A.,** MV, MS, PhD, ACVM .................... Professor
Rogers, Douglas G.,** BS, DVM, MS, PhD ......................... Associate Professor
Rupp, Gary P.,** DVM, MS ............................................ Professor
Schmitz, John A.,** DVM, PhD, ACVP .............................. Professor and Head
Schneider, Norman R.,** BS, DVM, MSc, ABVT .................. Associate Professor
Sherman, Gary B., B.S., M.S., B.V.M., D.V.M., Ph.D. .......... Assistant Professor
Smith, David R.,* BS, DVM, PhD, ACVPM, ABVP .............. Assistant Professor
Srikumaran, Subramaniam,** BVSc, MS, PhD ...................... Professor
Steffen, David J.,* BS, DVM, PhD, ABVP ......................... Associate Professor
Vassilev, Ventzislav* BS, PhD ........................................ Research Assistant Professor
Zhang, Yange* BS, MS, PhD ........................................ Research Assistant Professor
Zhou, Joe Y.*, BSc, PhD ............................................. Research Assistant Professor
Wallner-Pendleton, Eva A.*, DVM, MS, ACVP ..................... Associate Professor
Wills, Robert W.,* BS, MS, DVM, PhD ............................ Assistant Professor

---

1 Appointment Began in 2000
2 Appointment Ended in 2000
*Graduate Faculty Member
**Graduate Faculty Fellow

-6-
### VBMS Postdoctoral Research Associates

<table>
<thead>
<tr>
<th>Name</th>
<th>Place of Birth</th>
<th>Degree(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parmod K. Mehta</td>
<td>Nangal (Panjab) India</td>
<td>BSc (Hons) - April 30, 1981 - Chandigarh, India - Panjab University (Microbiology)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MSc (Hons) - February 28, 1983 - Chandigarh, India - Panjab University (Microbiology)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PhD - June 5, 1989 - Chandigarh, India - Panjab University (Immunology)</td>
</tr>
<tr>
<td>Mustapha Moulay Samarakandi</td>
<td>Morocco</td>
<td>BS - June 1985 - Marrakech, Morocco - Sahnoun College (Experimental Sciences)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MS - September, 1990 - France - University of Sciences Toulouse III (Biochemistry)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-Graduate Diploma - September 1991 - France - Polytechnic National Institute - Toulouse III (PhytoSanitary and Antiparasitic Agrochemistry)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PhD - February 1996 - France - University of Sciences Toulouse III (Microbiology)</td>
</tr>
<tr>
<td>Delin Liang</td>
<td>Putian, People’s Republic of China</td>
<td>BS - July 1, 1989 - People’s Republic of China - Fujian Agricultural University (Plant Protection)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MSc - July 1, 1992 - People’s Republic of China - Beijing Agricultural University (Plant Pathology)</td>
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<tr>
<td></td>
<td></td>
<td>PhD - July 1, 1995 - People’s Republic of China - Institute of Microbiology, Chinese Academy of Sciences (Virology)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MSc - July, 1992 - U.P./India - A.M.U. Aligarh, India (Biotechnology)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PhD - March, 2000 - New Delhi, India - All India Institute of Medical Sciences (Virology)</td>
</tr>
<tr>
<td>Svidana P. Yegorova</td>
<td>Ukraine</td>
<td>BS - May 30, 1985 - Keiv State University, Kiev, Ukraine (Biophysics)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MS - June 15, 1987 - Kiev State University, Keiv Ukraine (Molecular Biology)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PhD - May 18, 1999 - Institute of Molecular Biology and Genetics, NASU, Keiv, Ukraine (Molecular Biology)</td>
</tr>
<tr>
<td>Guillermo Roberto Risatti</td>
<td>Rio Cuarto, Province of Cordoba, Argentina</td>
<td>MSc - December 18, 1994 - University of Nebraska-Lincoln, Lincoln, NE (Virology)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PhD - April 27, 2000 - University of Nebraska Medical Center, (MSIA-VBMS Graduate Program) Lincoln, NE (Virology)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DVM - May 12, 1987 - Universidad Nacional De Rio Cuarto, Rio Cuarto, Cordoba,</td>
</tr>
<tr>
<td>Name</td>
<td>Place of Birth</td>
<td>Degree(s)</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Yunquan Jiang</td>
<td>WuXi City, Jiangsu Province - People's Republic of China</td>
<td>BS - March 1, 1970 - People's Republic of China - Peking University (Biochemistry)</td>
</tr>
<tr>
<td>Kostyantyn Krysan</td>
<td>Ukraine</td>
<td>BS - May 25, 1993 - Ukraine - Kyiv University (Molecular Biology)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MS - June 24, 1995 - Ukraine - Kyiv University [Molecular Biology (Autonomously replicating elements in mammalian genomes)]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PhD - May 21, 1999 - Ukraine - Institute of Molecular Biology and Genetics NASU [Molecular Biology (Genomic re-arrangements in mammalian early development)]</td>
</tr>
<tr>
<td>Emil M. Berberov</td>
<td>Sofia, Bulgaria</td>
<td>MSc - October 7, 1987 - Sofia, Bulgaria - Sofia University (Zoology)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PhD - April 14, 1993 - Moscow, Russia - Vavilov Institute of General Genetics (Genetics)</td>
</tr>
</tbody>
</table>
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
Hudson, Donald, BS, 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

Adjunct and Courtesy Faculty

Anderson, Gary A.,** BS, MS, DVM, PhD ........................................ Adjunct Associate Professor
Blecha, Frank,** BS, MS, PhD ........................................ Adjunct Professor
Campos, Manuel,** DVM, MS, PhD ........................................ Adjunct Professor
Clemens, Edgar,** BS, MS, PhD, Medical Certificate ........................................ Courtesy Professor
DeGroff, Terry, DVM ........................................ Courtesy Instructor
Dewey, Catherine,* DVM, MS, PhD ........................................ Adjunct Associate Professor
Hesse, Richard,** BA, MS, PhD ........................................ Adjunct Assistant Professor
Kador, Peter,* BA, PhD ........................................ Adjunct Professor
Kennedy, James, BS, DVM ........................................ Courtesy Instructor
Laegreid, William, BS, MS, DVM, PhD ........................................ Adjunct Associate Professor
Lechtenberg, Kelly F.,* BS, DVM, PhD ........................................ Adjunct Assistant Professor
Loskutoff, Nadia, BS, MS, PhD ........................................ Adjunct Associate Professor
Perino, Louis,** BS, DVM, PhD ........................................ Adjunct Associate Professor
Petro, Thomas,** BS, MA, PhD ........................................ Courtesy Professor
Ridley, Robert, AB, MS, PhD, DVM ........................................ Adjunct Professor
Rock, Daniel,** BSE, PhD ........................................ Adjunct Professor
Ross, Gary, BS, DVM ........................................ Adjunct Assistant Professor
Solheim, Joyce C., BS, MA, PhD ........................................ Courtesy Assistant 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

Departmental Staff

Department Office

Albrecht, Roxann ........................................ Accounting Clerk III
Dimitrova, Desislava ........................................ Student Worker
Gellatly, Rene ........................................ VBI Business Center Manager
Haahr, Patricia ........................................ Accounting Clerk II
Johnson, Lilo ........................................ Clerical Assistant III
Martinez, Patsy ........................................ Staff Secretary III
Animal Research Facility

- Clowser, Blaine, BS ........................................... Animal Operations Manager
- Arnold, Bradford ..................................................... Student Worker
- Bergman, Benjamin ............................................. Research Technician II
- Heroin, Jamie .......................................................... Student Worker
- Haman, Nathan .......................................................... Student Worker
- Hams, Caleb ............................................................. Student Worker
- Haahr, Dylan ............................................................ Student Worker
- Kunike, Paul ............................................................. Student Worker
- Lytle, Kandy ............................................................. Research Technician II
- Martin, Jeremy .......................................................... Student Worker
- Mills, Ginger ............................................................ Research Technician III
- Powers, Rochelle ........................................................ Student Worker
- Robertson, Darin ........................................................ Student Worker
- Thiele, Kevin ............................................................ Student Worker
- Tucker, Steve ............................................................ Research Technician II
- Vasa, Katie ............................................................. Student Worker

Virology Labs

- Donis, Ruben, MV, PhD ........................................... Associate Professor
- Ansari, Israrul H., BS, MS, PhD ................................. Research Associate
- Fernandez-Sainz, Ignacio .......................................... MS Student
- Gill, Laura ............................................................... PhD Graduate Student
- Li, Xiaoli ................................................................. PhD Student
- Li-Mei, Chen ............................................................. Visiting Scholar
- Liang, Delin ............................................................. Research Associate
- Risatti, Guillermo, DVM, MS ................................. PhD Student/Postdoctoral Fellow

- Jones, Clinton, PhD .................................................. Professor
- Geiser, Vicki, BS ....................................................... MS Student
- Henderson, Gail, MS ................................................ Research Technologist I
- Inman, Melissa, DVM, MS ......................................... PhD Student
- Jiang, Yunquan, BS ................................................ Research Associate
- Lovato, Luciane, MSc ............................................... PhD Student
- Matthew, Bruce ....................................................... Student Worker
- Winkler, Maria Teresa, DVM, MS ............................. PhD Student

- Kelling, Clayton, DVM, PhD ...................................... Professor
- Brady, Ryan ............................................................. MS Student
- Topliff, Christina, BS, DVM ........................................ PhD Student

- Osorio, Fernando MV, PhD ....................................... Professor
- Bastos, Reginaldo ...................................................... PhD Student
- Galeota-Wheeler, Judi, BS ......................................... Lab Manager
- Kim, In-Kyung ........................................................ MS Student
- Lopez, Osvaldo, PhD ................................................ Visiting Scientist
### Immunology Lab

- Srikumaran, Subramaniam, BVSc, PhD ............................... Professor
- Ambagala, Aruna Priya, BVSc., MS ................................. PhD Student
- Muralidhar, Deshpande .................................................. PhD Student
- Navaratnam, Manjula ..................................................... MS Student

### Microbiology Labs

- Barletta, Raúl, PhD ................................................... Associate Professor
- Caceres, Nancy, Licentiate, MS, PhD ............................... PhD Student/Postdoctoral Fellow
- Feng, Zhengyu, BS ..................................................... PhD Student
- Harris, Beth, MS ......................................................... Lab Manager & PhD Student
- Joor, Cheryl ................................................................. Student Worker
- Xiofei, Liu, BS ............................................................... PhD Student
- Zinniel, Denise, BS ...................................................... Research Technician III

- Cirillo, Jeffrey D., BA, PhD, MS ....................................... Assistant Professor
- Cirillo, Suat, BS, MS ...................................................... Researcher
- El-Etr, Sahar, BS, MS ..................................................... PhD Student
- Erdmann, Nathan .......................................................... Student Worker
- Jannati, Fatemeh .......................................................... Student Worker
- Mehta, Parmod, BSc, MSc, PhD ....................................... Postdoctoral Research Associate
- Ridenour, Dennis, BS ..................................................... MS Student
- Samra, Mustapha, BSc, MSc, PhD .................................... Postdoctoral Research Associate
- Wilberding, Justin ........................................................ Student Worker
- Yan, Ling, BS, MS .......................................................... PhD Student

- Duhamel, Gerald, DVM, PhD .......................................... Professor
- Okernba, Jean de Dieu, DVM, MS .................................. PhD Student
- Stryker, Cynthia .......................................................... Research Technician III

- Moxley, Rodney, DVM, PhD .......................................... Professor
- Baehler, Angela, BS ..................................................... MS Student
- Bailey, Doreen ............................................................ Research Technician III
- Berberov, Emil, PhD ..................................................... Research Associate
- Chacón, Ofelia .............................................................. Researcher
- Clark, Nicole ............................................................... MS Student
- Dondlinger, John .......................................................... Student Worker
- Schaeffer, Bill .............................................................. Student Worker

### Cataract and Oxidative Stress Research

- Lou, Marjorie, PhD ....................................................... Professor
- Krysan, Kostyantyn, PhD .............................................. Research Associate
- Liu, Xiao-Li, MD, PhD .................................................. Research Associate
- Xing, Kuiyi, BA ............................................................ PhD Student
- Zatechka, Steve, BS, MS ................................................. PhD Student
Electron Microscopy Lab

- Bargar, Tom, MS ........................................... Electron Microscopy Technologist

Glassware Preparation Lab

- Lou, Marjorie, PhD ........................................... Faculty Supervisor
  Rajagopal, Janaki ........................................... Lab Assistant II
  Xie, Liping .................................................. Lab Assistant II

Pre-Veterinary Advising Center

- Schneider, Norman, DVM, MSc ............................. Advisor
  Brandt, Aric .................................................... Peer Advisor
  Irwin, Katherine ............................................... Peer Advisor
  Strongin, Sara ............................................... Peer Advisor
  Waechter, Lindsay ............................................ Peer Advisor
  Wames, Cynthia .............................................. Senior Peer Advisor

Nebraska Veterinary Diagnostic Laboratory System

- John A. Schmitz, DVM, PhD .................................. Executive Director
  Grotelueschen, Dale, DVM, MS ............................ Director, Panhandle Diagnostic Lab
  Ensley, Steve 1 .............................................. Director, West Central Veterinary Science Lab
  Steffen, David DVM, PhD ................................. Director, VDC Lincoln

VDC Office

- Steffen, David J. ................................................ VDC Director
  Ellis, Roxane, BS ............................................ Information Systems Analyst
  Henning, Donna ............................................. Clerical Assistant II
  Laird, Brenda ................................................. Staff Secretary II
  Seelmeyer, Mavis .......................................... Staff Secretary III

VDC Avian

- Wallner-Pendleton, Eva, DVM, MS .......................... Avian Veterinarian

VDC Bacteriology

- Gray, Jeffrey 2, BS, MS, PhD ............................... Faculty Supervisor, Bacteriologist
  Cerny, Hank, DVM ............................................. Diagnostic Microbiology Supervisor
  Fluckey, Rebecca, BS ......................................... Research Technician III
  Luhman, William 1, BS ....................................... Research Technician III
  Nabity, Paul 1, BS ........................................... Research Technician III
  Perez, Margarita 2, BS ....................................... Research Technician III
  Rolfes, Chad, BS .............................................. MS Student
  Skavdahl, Elizabeth .......................................... Student Worker
  Srikumaran, Pushpa, BVSc ................................. Research Technician III
VDC Glassware Preparation Lab

- Heyer, Mary ........................................................ Lab Assistant II

VDC Histology

- Doster, Alan, DVM, PhD ........................................ Faculty Supervisor
- Bradband, Scott .................................................. Student Worker
- Eitzman, Allison .................................................. Student Worker
- Johns, LaVonne, AFIP .......................................... Histotechnician III
- Kruse, Jill ......................................................... Student Worker
- Olmscheid, Robin, AFIP ....................................... Laboratory Supervisor
- Shipman, Tammy ................................................ Student Worker

VDC Necropsy

- Doster, Alan, DVM, PhD ........................................ Faculty Supervisor
- Claussen, Pat ...................................................... Research Technician II
- Daniels, Holly ..................................................... Student Worker
- Greenquist, Matt .................................................. Student Worker
- Kava, Amy .......................................................... Student Worker
- McIntire, Patrick ................................................ Student Worker
- Shipman, Tammy ................................................ Student Worker
- Stahl, Matthew ................................................... Student Worker

VDC Pathology

- Doster, Alan, DVM, PhD ........................................ Pathologist
- Brodersen, Bruce ................................................. Research Assistant Professor
- Claussen, Pat ...................................................... Pathology Assistant, Research Technician II
- Rogers, Douglas, DVM, PhD ................................ Mammalian/Fish Pathologist
- Steffen, David, DVM, PhD ...................................... Pathologist
- Wallner-Pendleton, Eva, DVM, MS ......................... Avian Pathologist

VDC Toxicology

- Schneider, Norman R., DVM, Msc .......................... Faculty Supervisor, Toxicologist
- Bargar, Tom, MS ................................................ Electron Microscopy Technologist
- Carlson, Michael, BS, MS, PhD ............................ Analytical Chemist
- Horn, Amber ...................................................... Student Worker
- Rajurkar, Sanju, BS, MS, AAS ............................... Research Technician II

VDC Virology

- Osorio, Fernando, MV, MS, PhD ............................ Faculty Supervisor, Virologist
- Blank, Bev, BS ..................................................... Research Technician III
- Eie, Shirley, BS .................................................. Research Technician III
- Gray, Melisse, DVM ............................................. Virology/Serology Lab Manager
- Powell, Leon, BA ............................................... Research Technician III

-13-
Panhandle Veterinary Diagnostic Laboratory, Mitchell, NE

Panhandle Research and Extension Center (Scottsbluff, Nebraska)

<table>
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<tr>
<th>Name</th>
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<tr>
<td>Grotehuschen, Dale, DVM, MS</td>
<td>Laboratory Director and Extension Veterinarian</td>
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<tr>
<td>Harimon, Elnora</td>
<td>Receptionist/Staff Secretary II</td>
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<tr>
<td>Morrill, Connie, AS</td>
<td>Research Technician I</td>
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<td>Nielsen, Kathy, MS</td>
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West Central Veterinary Science Laboratory, North Platte, NE

West Central Research and Extension Center (North Platte, Nebraska)

<table>
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<tr>
<th>Name</th>
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<tr>
<td>Ensley, Steve</td>
<td>Director, Pathologist and Extension Veterinarian</td>
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<tr>
<td>Calhoun, Marcia, AA</td>
<td>Research Technician II</td>
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<tr>
<td>Christiansen, Karen</td>
<td>Administrative Technician</td>
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<tr>
<td>Current, Leonard, AA</td>
<td>Research Technician II</td>
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<td>Heil, Ellen</td>
<td>Staff Secretary II</td>
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Great Plains Veterinary Educational Center (Clay Center, Nebraska)

<table>
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<th>Name</th>
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<tbody>
<tr>
<td>Rupp, Gary P., DVM, MS</td>
<td>Director &amp; Professor</td>
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<tr>
<td>Brogden, Scott A.</td>
<td>Student Worker (Computer)</td>
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<tr>
<td>Buhman, Marilyn J., BS, MS, DVM</td>
<td>PhD Student</td>
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<tr>
<td>Dana, Ramona M.</td>
<td>Custodian</td>
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<td>Dewell, Grant A., DVM, MS</td>
<td>Clinical Veterinarian</td>
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<tr>
<td>Dewell, Renee D., DVM</td>
<td>MS Student</td>
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<td>George, Debbie A.</td>
<td>Staff Assistant</td>
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<tr>
<td>Griffin, Dee D., DVM, MS</td>
<td>Beef Cattle Extension Feedlot Veterinarian</td>
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<tr>
<td>Hungerford, Laura L., DVM, MPH, PhD</td>
<td>Epidemiologist</td>
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<tr>
<td>Johnson, Steve E., BA</td>
<td>Computer Systems Manager/Analyst</td>
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<td>Kauk, Lori L.</td>
<td>Staff Secretary II</td>
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<td>Reiter, Rachel A.</td>
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<td>Sherman, Gary B., DVM, MS, PhD</td>
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<td>Heilman, David F., BS</td>
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<td>McKown, Richard D.</td>
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<td>Shuck, Karen K.</td>
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<td>Sonderup, Kelly S.</td>
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<td>Warden, Neil A.</td>
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ARDC - Agriculture Research and Development Center (Ithaca, Nebraska)

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<td>Bergman, Benjamin</td>
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### 2000-2001 Committee Assignments

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<td><strong>Peer Review Committee</strong></td>
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<td>Clayton Kelling (Chair, 00-01)</td>
<td>July, 1999</td>
<td>June, 2002</td>
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<td>Gary Rupp</td>
<td>July, 1999</td>
<td>June, 2002</td>
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<td>Laura Hungerford</td>
<td>July, 1999</td>
<td>June, 2002</td>
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<tr>
<td>David Steffen</td>
<td>October, 2000</td>
<td>September, 2003</td>
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<tr>
<td>S. Srikumaran</td>
<td>November, 2000</td>
<td>October, 2003</td>
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<tr>
<td>Gary Sherman - Non-voting member</td>
<td>October, 2000</td>
<td>September, 2001</td>
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<td><strong>Graduate Committee</strong></td>
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<td>Fernando Osorio, Chair</td>
<td>September, 2000</td>
<td>August, 2004</td>
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<tr>
<td>Lee Johnson, Secretarial Support</td>
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<tr>
<td>Gerald Duhamel</td>
<td>October, 1999</td>
<td>July, 2002</td>
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<td>Laura Hungerford</td>
<td>October, 1999</td>
<td>July, 2002</td>
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<td>S. Srikumaran</td>
<td>October, 1999</td>
<td>July, 2002</td>
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<tr>
<td>J. Grillo</td>
<td>December, 1998</td>
<td>December, 2001</td>
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<td><strong>Safety Committee</strong></td>
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<tr>
<td>Raúl Barletta (Chair, VBS)</td>
<td>September, 1999</td>
<td>August, 2002</td>
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<td>Donna Henning (Secretarial Support/VDC)</td>
<td>July 1, 1996</td>
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<td>Robin Olmsheid (VDC)</td>
<td>September, 1998</td>
<td>August, 2001</td>
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<td>Blaine Clowser (ARF)</td>
<td>September, 2000</td>
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<td>Doreen Bailey</td>
<td>September, 2000</td>
<td>August, 2003</td>
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<td>Douglas Rogers (VDC)</td>
<td>September, 1999</td>
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<tr>
<td><strong>Seminar, Chairman</strong></td>
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<td>John Schnitz</td>
<td>July 1, 1989</td>
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<td><strong>George A. Young Swine Conference Planning Committee</strong></td>
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<td>Bruce Brodersen (Chair)</td>
<td>August, 2000</td>
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<td>Sharon Clowser (Conference Coordinator)</td>
<td>November, 2000</td>
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<td>John Waddell</td>
<td>September 1, 2000</td>
<td>August 31, 2001</td>
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<td>Phil Hardenburger</td>
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<td>Don Levis</td>
<td>September 1, 2000</td>
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<td>Tom Buelt</td>
<td>September 1, 2000</td>
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<td>Dave Ellis</td>
<td>September 1, 2000</td>
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<td>Joy Philippii</td>
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<td>Larry Germer</td>
<td>September 1, 2000</td>
<td>August 31, 2001</td>
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<td><strong>Department Curriculum Committee</strong></td>
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<td>Norm Schneider (Chair)</td>
<td>August, 1997</td>
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<td>September, 2000</td>
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<td>Clayton Kelling</td>
<td>September, 2000</td>
<td>August, 2002</td>
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<td>Rodney Moxley</td>
<td>September, 2000</td>
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<td>S. Srikumaran</td>
<td>September, 2000</td>
<td>August, 2003</td>
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<td><strong>Nebraska Veterinary Student Admission Committee</strong></td>
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<td>December, 1998</td>
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<td>Mavis Seelmeeyer (UNL Secretarial Coordinator)</td>
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<td>Barb Perry (KSU Secretarial Coordinator)</td>
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<td>Laura Hungerford (NU/GPVEC)</td>
<td>December, 2000</td>
<td>April, 2003</td>
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<tr>
<td>Arden Wohlers (Vet Practitioner)</td>
<td>November, 2000</td>
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<td>Robyn Vision (Vet Practitioner)</td>
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<td>April, 2001</td>
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<td>Howard Erickson (KSU)</td>
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<td>Roxane Ellis</td>
<td>1990</td>
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<td>CASNR Curriculum Committee (Veterinary and Biomedical Sciences; Biochemistry; and Food Science and Technology Departments)</td>
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<td>Rodney Moxley</td>
<td>August, 1999</td>
<td>July, 2001</td>
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<td>Pre-Veterinary Club Advisor</td>
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<td>ARD Advisory Council (District 6 — Biometry; Forestry, Fisheries and Wildlife; and Veterinary and Biomedical Sciences Departments)</td>
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<td>Blair Siegfried (Entomology)</td>
<td>July, 1999</td>
<td>June 30, 2002</td>
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<td>CASNR Faculty Advisory Council</td>
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<td>Norman Schneider</td>
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<td>UNL Academic Senate</td>
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<td>Douglas Rogers</td>
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<td>Institutional Animal Care and Use Committee</td>
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<td>December, 2002</td>
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<td>ARDC Oversight Committee</td>
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<td>David Steffen</td>
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<td>ARDC Veterinary and Biomedical Sciences Cattle Herd</td>
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<td>David Steffen, Faculty Supervisor</td>
<td>1997</td>
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<td>MSIA Graduate Committee</td>
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<td>Jeffrey Guillo</td>
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<td>IANR Policy for Promotion and Tenure Committee</td>
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<td>IANR Pesticide Advisory Committee</td>
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<td>Mike Carlson</td>
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<td>UNL Radiation Safety Committee</td>
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</table>
Honors, Awards and Recognitions
Department of Veterinary and Biomedical Sciences

Best Seminar Award, VBMS Department, 1999-2000 Academic Year

Gary Stevens - MS Program
Steve Zatechka - PhD Program

Bukey Memorial Fellowship, UNL Dean of Graduate Studies
Aruna Ambagala

UNL Center for Biotechnology, Milton E. Mohr Graduate Fellowship
Aruna Ambagala
Melissa A. Inman

UNL Center for Biotechnology, Milton E. Mohr Undergraduate Scholarship
Katherine E. Irwin

Conference of Research Workers in Animal Diseases
Aruna Ambagala - Best graduate student poster presentation, Immunology

Honors Student Research Award, IANR Agricultural Research Division
Nathan Erdmann - Jeffrey Cirillo, Advisor

Widaman Trust Distinguished Graduate Assistant Award, UN Foundation
Marilyn J. Buhman
Sahar H. El-Etr

Office of the Dean of Graduate Studies Major Fellowship
Zhengyu Feng

Pfizer, Inc. Animal Health Research Award, Midwest Student Biomedical Research Forum
Douglas S. Zatechka, Jr.
Susan Ann Smith Mills Award, VBMS Department

Melissa Inman

Student Assistantship in Research and Scholarship (STARS)
Office of the Dean of Graduate Studies

Spring Younts - Summer funding for the student research

Charles Yount Scholarship, UN Foundation

Amber Horn - Undergraduate scholarship award for UNL student(s) admitted to a DVM accredited college of veterinary medicine

Undergraduate Creative Activity and Research Experience (UCARE) Grant,
Office of the Senior Vice Chancellor for Academic Affairs

Katie Vasa - Robert. Wills, advisor
Nathan Erdmann - Jeffrey Cirillo, advisor
Cesar T. Delgado - Ruben Donis, advisor

University of Nebraska-Lincoln - Annual All-University Honors Convocation

Desislava Bojdarova Dimitrova - VBMS Department Student Worker. In recognition of high scholastic achievement

GEM Scholar Assistantship From Nebraska EPSCOR, UNL

Tim J. Smith - Undergraduate student in the laboratory of Dr. Fernando Osorio

IANR Outstanding Employee Award for Office/Service Staff - Institute of Agriculture and Natural Resources

Mavis Seelmeyer, Staff Secretary III, Veterinary Diagnostic Center

IANR Dinsdale Family Faculty Award

Jeffrey Cirillo - Outstanding teaching, research, and outreach

President’s Award, Nebraska’s Veterinary Medical Association

D. Dee Griffin - In recognition for special contributions to the NVMA
Certificate of Recognition for Contributions to Students, College of Agricultural Sciences and Natural Resources, Teaching Council/Parents Association

**Norman R. Schneider** - Recognition by parents for special contributions to student welfare. Dr. Schneider has received this recognition for the past 10 years

**Continuous Appointment (Tenure) Granted**

David J. Steffen, effective July 1, 2000

**Gamma Sigma Delta Honor Society of Agriculture, UNL Chapter**

Dale Grotelueschen, Honored for excellence in Extension

**Honored by Nebraska Veterinary Medical Association**

Dale Grotelueschen, For contributing outstanding service to the advancement of veterinary medicine in all aspects of the profession

---

**Service Awards**

<table>
<thead>
<tr>
<th>Years</th>
<th>Name</th>
<th>Position and Laboratory</th>
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<tr>
<td>20</td>
<td>Michael Carlson</td>
<td>Analytical Chemist, Toxicology Laboratory, VDC</td>
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<tr>
<td>15</td>
<td>Dale Grotelueschen</td>
<td>Extension and Diagnostic Veterinarian, Panhandle Veterinary Diagnostic Laboratory</td>
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<td>Pushpanayaki Srikumaran</td>
<td>Research Technician III, Bacteriology Laboratory, VDC</td>
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<td>10</td>
<td>Beverly Blank</td>
<td>Research Technician III Virology Laboratory, VDC</td>
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<td>Gail Henderson</td>
<td>Research Tech I, Virology/Research Laboratory, VBS</td>
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<td></td>
<td>David Steffen</td>
<td>Pathologist and Director, Veterinary Diagnostic Center</td>
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**Honorary Doctorate of Science, University of Nebraska-Lincoln**

Charles Mebus, DVM, MS, PhD. Granted at UNL December 2000 Commencement. Dr. Mebus was a former VBMS Department faculty member who discovered the bovine intestinal rota- and coronaviruses
The main focus of my laboratory is the study of mycobacterial pathogens including Mycobacterium paratuberculosis and M. avium. M. paratuberculosis is the causative agent of Johne's disease, a wasting chronic enteritis affecting all ruminants. M. avium is the agent of tuberculosis in birds and a major opportunistic pathogen in immunocompromised individuals. Since M. paratuberculosis and M. avium are slow growing and highly homologous, studies on one organism are readily applicable to the other. Furthermore, this research may be also relevant to the understanding of the diseases caused by other mycobacterial pathogens (M. bovis; M. tuberculosis). 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. Additional interests include research projects on Escherichia coli pathogenesis and plant endophytic colonizing bacteria pursued in collaboration with other laboratories at UNL.

We have developed a genetic system for M. avium and M. paratuberculosis that includes phage infection, plasmid transformation, and transposon mutagenesis. Future plans will focus on the identification, isolation, and characterization of attenuated mutants. These mutants will be tested in a recently developed mouse model of paratuberculosis. We have also made progress in the analysis of M. paratuberculosis secreted and cellular immunogenic proteins. We have cloned and sequenced the genes for the superoxide dismutase and alkyl hydroperoxidase. Gene inactivation and functional studies are in progress. 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.

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. Future studies will focus on the biochemical and genetic characterization of the D-alanine racemase enzyme and its gene from M. avium and M. tuberculosis.

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 developed the syllabus for VBMS 951 which was recently modified for team-teaching with newly hired faculty with expertise in the area (Dr. J.D. Cirillo). In addition, the syllabus for the new introductory course VBMS 424/824 was developed with Dr. Cirillo. I have also supported the teaching of VBMS 441/841 Pathogenic Microbiology from 1992 to 1998. I advised six MS and one Ph.D. 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 fewer wild and or exotic and aquatic species. Additionally, when the Avian Pathologist is absent, I direct testing of avian submissions.

I have no formal research FTE, but I am conducting projects which are directed at investigating diseases of cattle and swine. Currently my projects are: investigation into the pathogenesis of postweaning multisystemic wasting syndrome (funded by the National Pork Producers Council and Intervet), verification of an immunohistochemical test for bovine viral diarrhea virus on formalin-fixed paraffin-embedded skin biopsies, and epidemiologic investigation of the risk factors associated with lameness of feedlot cattle.
Our laboratory is interested in the pathogenesis of bacterial lung infections, such as tuberculosis 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. These studies should contribute to our understanding of host-pathogen interactions at the molecular and cellular level. We hope that through a better understanding of the mechanisms by which these organisms cause disease we can prevent some, if not all, of these infections in the future. In our current studies we have compared the invasive ability of bacteria grown under standard laboratory conditions to bacteria grown in Acanthamoeba castellanii, one of the protozoan species that serves as a natural host for L. pneumophila. Amoebae-grown L. pneumophila were found to be 2-4 logs more invasive for epithelial cells and 1-2 logs more invasive for macrophages and A. castellanii. Comparison of agar- and amoebae-grown L. pneumophila by light and electron microscopy demonstrated dramatic differences in the morphology and structure of the bacteria. Analyses of protein expression in the two strains of bacteria suggest that these phenotypic differences may be due to the expression of new membrane proteins in amoebae-grown L. pneumophila. In addition, the amoebae-grown bacteria were found to enter macrophages via a coiling phagocytic mechanism at a higher frequency than agar-grown bacteria. This mechanism of entry was shown to be distinct from complement mediated uptake and enhance intracellular viability of the bacteria after entry.

Mycobacterial research in our laboratory focuses on the mechanisms of entry and survival in eukaryotic cells. We carry out the majority of these studies on the rapid-growing mycobacteria Mycobacterium marinum due to its ease of use, rapid growth, high frequency of homologous recombination and genetic relatedness to M. bovis and M. tuberculosis. In addition, we will characterize factors that affect invasion of host cells by Mycobacterium bovis M. tuberculosis, M. avium, and other pathogenic mycobacteria. M. marinum is the most closely related mycobacteria to M. bovis and M. tuberculosis at the genetic level and thus, should provide a useful model system for investigation of these diseases. In addition, M. marinum is the causative agent of serious marine-associated skin lesions in humans and has a dramatic economic impact on the aquaculture industry throughout the world. Use of a fast-growing pathogenic mycobacteria has allowed more rapid progress in our mycobacterial virulence studies than would be possible using other mycobacterial species. Our current studies using these organisms have resulted in the determination of novel growth conditions that dramatically effect the virulence of mycobacteria. These effects upon virulence were seen in both the ability of mycobacteria to enter host cells as well as their ability to cause infections in animal models. We are currently using this information to determine the specific genes involved in invasion and virulence in animals using molecular techniques. My main teaching responsibilities include the development 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.
I am responsible for arranging the weekly clinical practicum for fourth year veterinary students and coordinating teaching activities with veterinary services at the USDA's Meat Animal Research Center (MARC). I also provide veterinary service to MARC primarily within the cow-calf section. A portion of my teaching time is devoted to special electives for veterinary students. These electives focus on production management principals instead of clinical skills.

My research focuses on economic considerations of beef cattle production. One area that I focus on is financial analysis by providing Standard Performance Analysis for an ongoing ARD project. Through this effort I provide financial information for the research project and for the commercial operations that are participating with us. Another area of interest is in determining the production and economic cost of disease incidents for suckling beef calves. This will provide veterinarians and producers with valuable information for establishing herd health programs.

Inter-departmental or Inter-institutional Cooperative Activities

<table>
<thead>
<tr>
<th>Cooperator</th>
<th>Cooperative Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSU, Other Colleges of Veterinary Medicine</td>
<td>Electives</td>
</tr>
<tr>
<td>Industry representatives and Academicians</td>
<td>Continuing Education Seminars</td>
</tr>
<tr>
<td>MARC Scientists</td>
<td>Research Projects</td>
</tr>
<tr>
<td>Norman R. Schneider</td>
<td>ExpoVision</td>
</tr>
</tbody>
</table>
Area of Expertise: Virologist: Animal RNA virus molecular biology, infectious diseases

The molecular basis of virulence and host range in animal viruses. The problem of host range is analyzed in an influenza virus model and the molecular basis of cytopathology and tissue tropism in two related flaviviruses; Bovine Viral Diarrhea virus (BVDV) and human hepatitis C virus. Phenotypic properties such as host cell-imposed restrictions to virus replication or activation of pro-apoptotic pathways are determined by host-parasite macromolecular interactions. Such interactions are identified and characterized by biochemical, genetic and functional approaches. Genome-wide expression profiling of infected cells is yielding insights into the cellular genes involved in these processes. The regulatory signals emerging from these interactions are studied by detailed analyses of nuclear and cytoplasmic changes in infected cells. We are now utilizing infectious clones of these viruses to re-design viral genomes, and "ask the mutant virus" to assess the role of specific molecular interactions in host range and pathogenesis.My lab is staffed by one research technologist (Johnson), four postdoctoral fellows (Vassilev, Perez, Chon, Liang) and three students (Risatti, Li, Hoff). Two students (Fernandez, Gil) and one Postdoc (Ansari) will join in the Fall, whereas one student will graduate (Hoff). Our work is being carried out with financial support from the USDA NRI CRGO, the NIAID, National Institutes of Health, the Center for Biotechnology at UNL, the Institute of Agriculture and Natural Resources at UNL and Pfizer Animal Health.
I serve as a diagnostic pathologist in the VDC and rotate necropsy duty on a regular basis with the 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. I am responsible for overseeing the Electron Microscopy Techniques course taught in the Department. 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. Our pathology residency program has been discontinued due to funding.

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. 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 intestinal infection by spirochete bacteria including *Serpulina pilosicoli*, *Serpulina hyodysenteriae*, and other pathogenic intestinal spirochetes, *Lawsonia intracellularis* an obligate intracellular bacterium that causes proliferative enteropathy in non-human primates and animals, and group A rotaviruses, a major cause of diarrheal disease in animals and human infants. Current research addresses bacterial virulence factors and model development of intestinal injury and repair, phenotypic and genotypic bases of microbial diversity, diagnosis of enteric diseases using nucleic acid-based methods, and subunit and recombinant vaccine development.
My responsibilities include directing the diagnostic laboratory at the West Central Research and Extension Center in North Platte. The responsibilities of this laboratory are to maintain cooperative interaction with the diagnostic laboratories at Scottsbluff and Lincoln and to serve the interests of the livestock producers in west central Nebraska. Concerns of current interest are presented daily to the diagnostic laboratory either through the general public or veterinary practitioners. I participate in the field investigation unit. This unit completes on site investigation of difficult diagnostic cases throughout the state.

Interaction with veterinary practitioners through the diagnostic laboratory provides opportunity for extension service. I also provide veterinary extension service to west central Nebraska. Extension and outreach keep the livestock producers of west central Nebraska up to date of current changes.

I am responsible for the herd health program at the University of Nebraska’s Gundmanson Sandhills Laboratory (GSL) at Whitman. The GSL is a working sandhills ranch that is comprised of over 12,000 acres and 600 cattle. Animal science, entomology, range management, hydrology and veterinary science are just a few of the disciplines represented by the current research at GSL.

Veterinary toxicology and sustainable agriculture are related to my research interests. The relationship of drinking water quality to the performance of food producing animals has been the focus of my research. Water quality is of interest to all Nebraskans whether they are directly involved in agriculture or not.
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.

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</tr>
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<td>Advanced Undergraduate Feedlot Health Management</td>
</tr>
<tr>
<td>T.J. DeGroff (Practitioner, Burwell, NE)</td>
<td>Undergraduate Feedlot Health Training Students</td>
</tr>
<tr>
<td>MARC Scientists</td>
<td>Research Projects</td>
</tr>
<tr>
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<td>ExpoVision and High School Careers Workshop</td>
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Combined extension and diagnostic responsibilities provide unique opportunities for education, service and research. Frequent interaction with veterinary practitioners, livestock producers, associated industries, and the public provides important perspective to efforts. This fosters open exchange of ideas as well as opportunities to implement new programs with clientele groups. Specific examples include: educational programming with resulting herd-based Johne's disease testing, focused investigations for persistent BVD virus infections and feedlot personnel workshops.

Sustainability and profitability of livestock enterprises are critical targets for meat production. Integrated Resource Management (IRM) provides opportunity to provide economic-based animal health information. The IRM Retained Ownership Demonstration is an example. Also, working closely with veterinarians and animal owners enhances efficiency and value of diagnostic testing.

Veterinary medicine is an important contributor to the livestock industry. Increased interdisciplinary effort is required to solve problems and address new issues. Beef Quality Assurance efforts have shown positive impact for the beef industry. Diagnostic investigation efforts with veterinary practitioners that involve nutritionists are effective as well as are educational efforts including economists, nutritionists and others.
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. While offering these services, we are striving to develop, validate and introduce new tests both in diagnostic bacteriology and molecular diagnostics. We have implemented and are further implementing quality control programs. We are also looking to improve the marketing of our services.

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 Branhamella) bovis and Moraxella (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.
Veterinary epidemiologic research provides a means to use Nature's experiments to study the complicated animal health and production problems which trouble animal agriculture and natural resource management. However, the complexity of these problems demands close attention to research study design, collaborative involvement from experts in other disciplines, intensive computer management and analysis of data, and awareness of new techniques and methods for population-based research. I have four areas of emphasis, all based on similar quantitative epidemiologic approaches and methods:

1) A collaborative GPVEC research project to identify factors which decrease animal productivity and health in real-world beef production systems and to determine the value of production/health information for producer decision-making. We are collecting health, condition, productivity, economic, genetic, and carcass data in partnership with 5 veterinary practitioners and commercial herds which retain data from conception through slaughter.

2) Collaborative projects with faculty from UNL, Kansas State University, and USMARC to identify diagnostic tools, risk factors, spatial patterns, and interventions to decrease E. coli O157:H7 and Salmonella shedding in beef cattle.

3) Epidemiologic field research on emerging health problems in Nebraska cattle. One study determined factors underlying an increase in outbreaks of cattle lice. This led to new recommendations for use of anthelmintics in the High Plains. An interdisciplinary team is working with several commercial feedyards to identify factors which may decrease heat stress mortality in Nebraska cattle.

4) Several collaborative projects to identify patterns of disease, infection, and contamination in wildlife which impact human and domestic animal health or the survival of endangered species. We are studying: seroprevalence and spatial patterns of Toxoplasma, Neospora, Leptospira, E. coli, Ebrlichia, Borrelia, encephalitis viruses, canine distemper virus (CDV), and intestinal parasites in raccoons and deer; CDV seroconversion in zoo cats; a computer simulation model of rabies, linking a dynamic epidemic model to geospatial disease spread; and examination of spatial patterns of global mortality in amphibians.

I also teach veterinary and graduate students, practicing veterinarians, and cattle producers. This includes veterinary rotations; training seminars for producers; 3 graduate courses; and coordinating teaching epidemiology in the Beef Cattle Production Management Series. I am also developing our distance education program. This includes an initial program outline for an M.S.; recruiting students; adapting existing courses; and developing new ones. We are also designing a distance beef production medicine curriculum for veterinary students in collaboration with 6 other universities.
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 virus transmission. In essence, latency is crucial for pathogenesis and is required for virus transmission.

LR gene products inhibit apoptosis (programmed cell death) in transiently transfect cells. My laboratory has also demonstrated that LAT inhibits apoptosis in TG of infected rabbits and transiently transfected cells. In contrast, a viral regulatory gene (ICP0 and ICP4) is toxic to transiently transfected cells. Consequently, 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. Fumonisins B1

Fumonisins is a toxin that is released from Fusarium moniliforme, a plant fungus. Fusarium moniliforme-commonly infects corn and is present in healthy plants as well as plants suffering from stalk rot disease. Fumonisins are frequently detected healthy and diseased corn in the US as well as other parts of the world. Our studies have focused on how this chemical induces apoptosis and prevents normal cells, but not cancer cells, from growing. In many ways, these studies have complemented out herpesvirus projects. If extramural funds are obtained, these studies will expand.
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.
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, thioltransferase, which can repair the damaged lens proteins/enzymes and restore their biological functions. We cloned, sequenced and characterized the enzyme and found it to be extremely oxidant-resistant in the lens epithelium cells. Its physiological function is proposed to be an oxidative stress defense enzyme 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.

Signal Transduction in the Diabetic Lens

We use the streptozotocin-induced diabetic rat as our model to study the extralenticular stimulus that can effect the modulation of cellular signals in the lens epithelial cells. We have previously found that diabetic condition induces stimulated phosphoinositide cycle, a signal transduction system in the lens. The diabetic condition apparently causes the vitreous to accumulate unusually high level of growth factors, such as bFGF, from the leaky retinal vascular, which affect the normal cellular proliferation and differentiation process in the lens and may cause an abrupt lens opacification. We discovered that vitreous from diabetic rat eye can stimulate MAPkinase, but inhibit PI3kinase in the lens epithelial layers. We are using both the in vivo diabetic rat model and porcine lens cultured under hyperglycemic condition as the ex vivo model. Currently, we are studying the effect of aldose reductase inhibitors, which are proven to prevent diabetic complications in the eye, on signal transductions in the lens of diabetic rats.

Cataract Models

Our effort is also to establish a cataract model relevant to humans. Because of the epidemiological finding that cigarette smoking is associated with nuclear cataract in humans. We used nicotine and cigarette smoke condensate to induce cataract in vitro. Both conditions can induce a prominent cataract within a few days in the organ culture. Efforts are now concentrating on the mechanism of such cataract formation.
My research involves two main areas, the pathogenesis of enterotoxigenic *Escherichia coli* (ETEC) in swine and preharvest food safety on *E. coli* O157:H7. My research on ETEC in swine is focused on the identification of virulence factors that mediate secondary septicemia. We are currently studying the roles of mediate including α-hemolysin (HlyA), cryptic hemolysin (SheA), polysaccharide capsule (K87), and heat-labile enterotoxin (LT-I). My research on *E. coli* O157:H7 mainly involves the roles of virulence factors that gastrointestinal colonization of cattle, especially outer membrane and secreted proteins.

My teaching responsibilities involve the instruction of BIOS/VBMS 441/841, Pathogenic Microbiology), serving as major advisor for graduate students and serving as a member of graduate committees.
My research centers on pathogenesis of viral infections. Due to the significance of the subject for U.S. animal agriculture, we have focused on two major viral agents that affect swine: Pseudorabies Virus (a herpesvirus) and the newly emerged Porcine Reproductive and Respiratory Syndrome Virus (PRRSV, an arterivirus, ssRNA+ genome).

In the area of PRRSV (which currently causes the most economically significant infectious disease of US swine stocks) we are focusing on the primary characterization of the cell tropism of this virus in vivo. We have 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 and also explains the transmission of PRRSV via semen. We have also further characterized the immunobiology of persistence 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 are finding that during the period of viral persistence, extensive modulation of the homologous (PRRSV-specific) cell-mediated and humoral immune response takes place.

In the area of Pseudorabies Virus (PRV), the imminent eradication of this virus from US domestic swine stock dictates that our major current emphasis be based on development and maintenance of optimal molecular diagnostic tools to monitor pockets of infected animals that may remain in the field. In this respect, our laboratory contributes to provide national reference for the US. In addition, our most current research on PRV pathogenesis has centered on the phenomenon of latency and its significance for the perpetuation of the viral infection in nature. We have found that attenuated strains of PRV (which are commonly used for vaccination against the acute form of the disease) can interfere with wild-type PRV latency by a mechanism of interference that may involve physical occupation of the cell target for latency (sensory neurons) by the preceding attenuated strain. The logical continuation of this research involves the characterization of this phenomenon at the single-cell level, by procedures that lead to de-aggregation from ganglia, sorting of neurons and the study of viral genes and their expression in single neurons.

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.

Regarding teaching, I am planning to teach, jointly with Dr C. Wood-School of Biological Sciences-, a graduate course entitled Advanced Viral Pathogenesis. This course will be offered in the Fall semester of 2000.
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.
I have faculty and administrative responsibilities and work closely with other faculty in teaching, research, and service areas. The teaching program in the professional curriculum is our primary mission and revolves around clinical and special elective rotations for senior veterinary students. The teaching program is a part of the professional clinical core rotation requirements for KSU but also provides elective rotations for interested students from KSU and other veterinary colleges. Our faculty provide individual animal and herd service for the U.S. MARC livestock in cooperation with the Herd Health Veterinarian and incorporate this activity into the teaching program.

Another continuing education program has involved working with graduate veterinarians in diverse areas of beef cattle production and management. We are currently providing the sixth series of the Beef Cattle Production Management which increases our total participants to over 100 veterinarians over the past seven years. The Series is taught by a diverse group of university and industry specialists.

Our current research interest is with a number of cooperating producer owned herds in Nebraska that retain ownership of calves from birth to processing. This will provide production cycle information and through the use of the SPA program will also provide financial information relative to unit cost of production. Our faculty as well as a number of other scientists are cooperating in this project. One initial area of interest was related to immunoglobulin in newborn calves and the focus has now expanded to the use of DNA microsatellite markers in sire identification and how these factors relate to measures of production.

Future goals of the GPVEC include improving the teaching program to provide more in depth and advanced coverage of production, management, economic, and health related issues essential for graduate veterinarians of the next century. We hope to accomplish this goal by concentrating on students during their entire veterinary curriculum as opposed to a part of the final year of studies. We also hope to expand and improve the areas of clinically related research by our faculty and improve the veterinary service to the U.S. MARC. Finally, we hope to advance knowledge to practicing veterinarians and students utilizing distance education with the long term goal of improving producer knowledge and sustainability.
The toxicology laboratory provides analytical support for all diagnostic toxicology services. I also have served as co-associate referee for nitrate and nitrite, AOAC International (Veterinary Analytical Toxicology). Research conducted emphasized the characterization of pharmacokinetics and pathophysiology of nitrate/nitrite in the pregnant beef cow. Teaching activities include advising all preveterinary students and involvement in student recruitment and retention, undergraduate course and curricula development and revision for Departmental majors, faculty advisor for two student organizations, plus teaching in the University Foundations Program, CASNR-required integrative studies course and Department undergraduate courses. Extension activities involve support of 4-H Youth Development through summer workshops, experiential learning programs and the Nebraska State Fair; leadership development is emphasized through LeaderShape Nebraska and BSA Exploring; and student recruitment/retention is also a primary area of focus.
My laboratory has two main areas of research emphasis; 1) ungulate gonadotropin gene and hormonal structure-function relationships, and 2) Sire influence on beef cattle production efficiency.

Gonadotropins are a subclass of biochemically related glycoprotein fertility hormones that play key roles in the regulation of mammalian reproduction. There are three gonadotropins. Luteinizing hormone (LH) and follicle-stimulating hormone (FSH) are produced by the pituitary gland of all mammals and regulate sperm and egg production within the gonads, whereas the third gonadotropin, chorionic gonadotropin (CG), is produced by placental tissue (in some species) and plays a role in recognizing and/or maintaining the pregnant state. The main objective of our gonadotropin research program is to delineate the molecular bases for biopotency modulation and differential receptor binding specificity of ungulate LH and FSH. Presently, gene constructs encoding wild-type (native) porcine, bovine and equine subunit sequences, and strategically mutated variants of these subunit sequences, are being engineered and transfected into eucaryotic cells in culture. Using proven recombinant (rec-) protein expression technologies, we will purify and comparatively evaluate the biological properties of these rec-gonadotropins in homologous in vitro LH and FSH bioassays. Through this research, we anticipate that we will be able to define which amino acid sequence elements dictate receptor-binding specificity and modulate biopotency. Our longer-term goal is to use this information to develop ungulate-specific “designer” rec-gonadotropins that will enhance our ability to control reproductive cycles, treat certain reproductive disorders, and enhance reproductive efficiency.

Our beef cattle production research program seeks to identify production parameters that can be positively influenced by determining which bulls sire which calves in extensive multi-sire beef cattle breeding systems. The majority of commercial beef production operations in the US employ multi-sire breeding paradigms. Our working hypothesis is that not knowing which bulls sire which calves impedes the rate of improvement in herd production efficiency. Our experimental approach is to use state-of-the-art genotyping technologies to assign unambiguous sire parentage in several commercial herds. By comparing parentage information with birth rates and calf performance and health data we expect to be able to rank bull performance relative to specific production outcomes and develop indices of bull performance that take into account combinations of bull performance outcomes, on a ranch-specific basis. Using this information to select elite sires, or alternatively to cull inferior sires, we postulate that rates of improvement in beef production efficiencies can be significantly enhanced. The ultimate goal of this research is to produce validated guidelines for appropriate use of sire parentage information to enhance the profitability and growth potential of commercial and private cattle operations, and to provide consumers with more consistent and higher quality beef products.
The goals of my research and extension programing are to contribute new knowledge and apply existing knowledge to solve problems related to the dairy and beef industries, veterinarians engaged in dairy and beef practice, and associated public health issues. In the next 5 years I will conduct research on, and communicate the principles of, biosecurity and pathogen containment with an emphasis on diagnostics and the role of production-systems on transmission of 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.

I also moderate a weekly meeting of UNL faculty and staff, state and federal regulatory veterinarians, public health officials and others interested in solving animal and public health problems related to animal production systems.
The long term goals of my laboratory are to understand the host-pathogen interactions with the objective of preventing the disease process. We are using bovine herpesvirus 1 (BHV-1) and Pasteurella haemolytica as the model systems. BHV-1 is an important primary etiological agent, and P. haemolytica the most common secondary bacterial pathogen, of bovine respiratory disease complex, which costs over $500 million to the cattle industry of the United States.

The ability of BHV-1 to undergo latent infection, and induce immuno-suppression presents major difficulties in controlling this infection. Although the currently used modified live virus (MLV) vaccines help to control the clinical disease, they do not help to eliminate the viral infection since the vaccine strains also undergo latency, with subsequent reactivation and shedding of the virus. Furthermore, studies in our laboratory have determined that the vaccine strains, like the wild-type virus, down-regulate the expression of major histocompatibility complex (MHC) class I molecules on bovine cells. Down-regulation of class I molecules by BHV-1 would compromise the development of cytotoxic T lymphocytes (CTLs) against not only BHV-1, but also other viruses. Hence our laboratory is investigating the alternatives for MLV vaccines. In one facet of this project, we are characterizing the down-regulation of class I molecules by BHV-1. Our studies have determined that one or more of the immediate-early proteins is/are responsible for the down-regulation of class I molecules. Our immediate objective is to identify the IE protein(s) responsible for this effect. If this protein(s) turns out to be non-essential for viral replication, a deletion mutant lacking the gene(s) encoding this protein(s) could be tested as a vaccine candidate. Our studies have further determined that interference with the transport of peptides from the cytosol into the endoplasmic reticulum is one of the mechanisms by which BHV-1 down-regulates the expression of class I molecules. Our future studies would be directed towards the detection of any additional mechanisms of down-regulation of class I molecules by BHV-1. In addition to expanding our understanding of the pathogenesis of BHV-1, these studies should help in further elucidation of the molecular events involved in the intricate antigen processing and presentation by class I molecules.

Epitope-based vaccines represent another alternative to the MLV vaccines. Although several neutralizing antibody epitopes of BHV-1 have been identified, not a single CTL epitope has been identified. Hence another facet of this project is directed towards the identification of CTL epitopes of BHV-1, using the allele-specific peptide motifs. We already have tested the feasibility of this approach in the mouse system by identifying three BHV-1 epitopes based on the ASPM of the Kd molecules. In the bovine system, we have identified the ASPM of BoLA-A11, a bovine class I allele expressed in over 25% of milk and beef breeds. Future studies will be addressed towards mapping the CTL epitopes of BHV-1 restricted by BoLA-A11. Other alternatives that are investigated in our laboratory are DNA immunization, and the use of heat shock proteins as adjuvants to direct the CTL peptide epitopes to the class I antigen presentation pathway. The project on P. haemolytica involves the identification of the cellular receptor for the leukotoxin which is an important virulence factor of this organism. Our studies have determined that the leukotoxin binds the $\beta_2$ integrins on bovine leukocytes. Future studies will be directed towards the confirmation of $\beta_2$ integrins as the cellular receptors of the leukotoxin, and elucidation of the role of the subunits of $\beta_2$ integrins in leukotoxin binding, and mapping the domains involved in this interaction. These studies should help to understand the pathogenesis of this disease, and pave the way for developing means to prevent the leukotoxin binding of the leukocytes.
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 which has been successful. A regular funded congenital defects referral center was established. Collaborative research in infectious diseases is ongoing with Dr. Kelling regarding BVDV type 2 and combined BVDV and rotavirus infections. Collaborative research on Marfans syndrome with University of Nebraska Medical Center is also ongoing. Many new syndromes in cattle are being described as a result of the congenital disease program.

Major time commitment is toward providing administrative guidance to the Diagnostic Center and providing diagnostic and consultive services to the Nebraska livestock industry. I serve as an age coordinator on 1300-1400 investigations per year, which involve a multidisciplinary 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.
Our major research interests are in the pathogenesis of the RNA positive strand viruses. Specifically, we are pursuing investigations into bovine viral diarrhea virus (BVDV), which is a bovine pestivirus and hepatitis C virus (HCV), related to BVDV human hepacivirus. To define the molecular bases of cytopathology and facilitate the study of BVDV biology including viral virulence and tropism in vitro we are using reverse genetic analyses of a full-length cDNA copy of NADL strain of BVDV that we developed. Our primary research goal is to obtain a better understanding of the phenotypic properties such as host-cell-imposed restrictions to viral replication or activation of pro-apoptotic pathways that are determined by host-parasite macromolecular interactions.

We are interested in engineering of attenuating mutations leading to development of novel live vaccines. We have developed a full-length constructs based on nuclear transcription of BVDV cDNA controlled by Pol II promoter, that could be the basis for of a live DNA vaccine against BVDV. Consequently, it may be possible to use BVDV as a vector to express foreign proteins for immunization purposes. Currently, we are developing a bicistronic full-length BVDV constructs expressing selectable markers. These constructs would provide a background for evaluation of BVDV vectors for foreign gene expression and delivery. Another line of research is related to the development of subgenomic replicons of BVDV and their use in experiments addressing precise mapping of proteins, motifs, and RNA cis-signals directly involved in RNA replication.

The construction of HCV-BVDV chimeric viruses, which is underway in our lab, may provide avenues to overcome research limitations resulting from the inability of HCV to replicate in cell cultures. These chimeric approaches could lead to understanding of in vitro host range in pestiviruses and hepatitis C viruses. Both systems provide a means to further our understanding of the pathogenesis of pestiviral-induced diseases.
Dr. Pendleton is one of two Poultry Extension Specialists at UNL, and the sole avian veterinarian in Nebraska. Her extension and diagnostic responsibilities revolve around preventive medicine activities for Nebraska’s poultry and turkey flocks including approximately 2 million turkeys, 5 million broilers, and 12 million laying hens. This was accomplished through providing veterinary consultation and extension education. Upgrades and expansion at the Norbest turkey processing plant in Gibbon, NE are underway and Dr. Pendleton committed efforts toward increasing turkey production in Nebraska to increase the supply needed to utilize these renovated facilities. Dr. Pendleton continued her research on food safety through her cooperation on a research grant focused on characterization of microbial pathogen contamination in broilers processed via a new air-chilling process, in comparison to those processed by the traditional ice water chilling method.

Dr. Pendleton also provided diagnostic laboratory support through the Veterinary Diagnostic Center and conducted field/flock investigation on health problems in a number of layer flocks, including the hatchery supplying several layer operations in Nebraska.
The swine industry continues to undergo rapid change in Nebraska. There is great economic pressure for producers to adopt the most efficient methods of producing pork. Many of my extension efforts for both veterinarians and producers have been directed towards efficient production through improved swine herd health. Specific areas of emphasis have been porcine reproductive and respiratory disease (PRRS), controlling disease through the exploitation of our understanding of disease ecology, and disposal of mortalities through composting.

Food safety remains a high priority of the swine industry. The future success of the United States pork industry is closely tied to meeting the quality standards of both domestic and global markets. Helping the swine industry meet these demands continues to be a focus area for my extension programming. Promoting and providing Pork Quality Assurance (PQA) education programs has been and will continue to be an extension priority. I participated in a collaborative project with other extension faculty, industry representatives, and the Nebraska State Veterinarian, Department of Agriculture to develop educational and reference materials to be used by veterinarians and extension educators. The resources included an extensive collection of preharvest food safety information and a video to educate producers highlighting their role in providing safe and wholesome food products to the consumer.

Access to information is essential to both the practice of veterinary medicine and livestock production. Development of resources accessible via the Internet will continue to be a focus of my extension programming.

Porcine reproductive and respiratory syndrome virus (PRRSV) causes a potentially devastating disease in swine herds. Understanding the ecology of PRRSV is imperative in the development of successful prevention programs. My research program has focused on the ecology of PRRSV, particularly its transmission and persistency. Future research will continue to focus on the epidemiology of PRRSV in order to develop insight into disease ecology and modeling. A second area of research will be to understand the epidemiology of preharvest food safety. Applied research will be pursued to identify and develop good management practices that promote preharvest food safety.
1. Functional analysis of the bICP0 encoded by bovine herpes virus

Bovine herpes virus 1 (BHV-1) is an important viral pathogen of cattle. Infection of BHV-1 can cause conjunctivitis, pneumonia, genital disorders, abortions and upper respiratory infection referred to as “shipping fever.” Infection of permissive cells with BHV-1 leads to rapid cell death. Viral gene expression is temporally regulated in three distinct phases: immediate early (IE), early (E) or late (L). bICP0 is encoded by IE transcription unit 1 (IEtu1). bICP0 activates its own expression as well as E and L transcription units, but represses the other two IE proteins bICP4 and bICP22 promoter activity. This bICP0 is considered as the major viral regulatory protein. bICP0 does not bind DNA and is believed to be a functional homologue of the HSV-1 IE protein ICP0. The only well-conserved domain in the two proteins is a C3HC4 zinc ring finger located near the N terminus of both proteins. Mutational analysis has demonstrated the importance of the HSV-1 ICP0 zinc ring finger domain and such domains are believed to be involved in protein-protein interactions.

My research has focused on the characterization of the functional domains of bICP0. In transiently transfected cells, bICP0 is toxic, but does not appear to directly induce apoptosis. The C-terminal sequences in the last 320 amino acids of bICP0 mediated subcellular localization. Mutagenesis analysis indicated that the zinc ring finger domain of bICP0 was important for transcriptional activation of TATA box containing promoter. In vivo, bICP0 interacted with multiple basal transcriptional factors to activate transcription. bICP0 also interacted with the histone deacetylase 1 (HDAC1), which resulted in inhibiting Mad dependent transcriptional repression. Future studies will focus on whether bICP0 is involved in chromatin remodeling by affecting the acetylation of histones.

2. Fumonisins

Fumonisin B1 (FB1) is a mycotoxin produced by the phytopathogenic fungus Fusarium moniliforme, structurally resembles sphingoid bases. FB1 perturbs sphingolipid synthesis by inhibiting the activity of ceramide synthase. Ingestion of FB1 causes equine leukoencephalomalacia and porcine pulmonary edema. It is also carcinogenic to rodents and associated with certain human cancers. Since the fungus is a common inhabitant of both healthy and diseased cereal grains, this toxin maybe an important health threat. Our studies showed that FB1 treatment of CV-1 cells altered cell cycle related proteins expression and led to cell cycle arrest and apoptosis. We also used a PCR-based subtraction approach to identify nine genes which showed high similarity (>90%) to known mammalian genes. Those genes are involved in diverse signal transduction pathways. The ability of FB1 to alter gene expression may be necessary for its carcinogenic and toxic effects. Future studies will establish the association of FB1 toxicity with the altered gene expression.
As the Manager of Microscopy Research Core Facility of Center for Biotechnology, my main goal has been to establish and maintain the state-of-art microscopy imaging facility, which provides instrumentation and expertise to researchers within and 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 immunohistochemical 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) single/double/triple labeling 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, such as apolipoprotein-deficient mice - an animal model related Alzheimer's disease research. In addition to genetic factors, chronic stress plays an important role in age-related neurodegenerative disease. Progressive disruption of both the neuroendocrine and immune systems has been correlated with the age-associated pathogenesis in humans and in animal models. Mechanisms responsible for abnormal neuroendocrine activities in response to stress are still far from clear. Dysfunction of the central regulation of stress response and disruption of the CNS neurochemical pathways may be a direct consequence of the decreased neuronal plasticity and progression of central neuronal apoptosis and degeneration. We have shown that the abnormalities found in chronically stressed mice lacking apolipoprotein E correlate to the alterations of the functional integrity of the HPA axis. We will use different animal models to examine the effects of chronic stress and aging on central neurochemical activities in relation to altered serum concentration of steroids. This research will provide a new perspective on the neurobiological and neurochemical regulation of stress response and stress adaptation mechanisms.

With regards to teaching and training, I am planning to offer some graduate courses or special topics related to advanced biological imaging techniques, such as immunohistochemistry and microscopy, fall semester of 2001. I am also planning to organize special workshops related to live cell imaging and multiple-labeling immunofluorescence microscopy.
Teaching Program
Department of Veterinary and Biomedical Sciences

Undergraduate Program

Undergraduate Student Faculty Advisor: Dr. Norman Schneider

Pre-Veterinary Student Peer Advisors

Spring, 2000
Megan Becher
Aric Brandt
Katherine Irwin
Sara Strongin

Fall, 2000
Megan Becher
Aric Brandt
Katherine Irwin
Sara Strongin

Undergraduate Degrees Obtained

May, 2000 Graduates

Name       Major
Ryan P. Brady Veterinary Science, BMS Option*
Alana L. Cent Veterinary Science, BMS Option
Holly A. Daniels Veterinary Science, BMS Option
Amber M. Horn Veterinary Science, BMS Option
Selena K. Kirsch Veterinary Science, BMS Option
Paul Nathan Loe Veterinary Science, BMS Option
Michele K. Parde Veterinary Science, BMS Option
Shannon L. Rock Veterinary Science, BMS Option
Katie L. Roth Veterinary Science, BMS Option
Cynthia A. Warne Veterinary Science, BMS Option

August, 2000 Graduates

Name       Major/Section
Emily S. Garrison Veterinary Technologist
Julie B. Grosch Veterinary Sciences, VM Option

December, 2000 Graduates

Name       Major/Section
Jill L. Brester Veterinary Sciences, BMS Option
Todd Owen Dunbar Veterinary Technologist
Brandi A. Stopak Veterinary Sciences, BMS Option

*Biomedical Sciences Option, **Veterinary Medicine Option
Undergraduate Enrollment by Major

<table>
<thead>
<tr>
<th>Major</th>
<th>Spring Semester, 2000</th>
<th>Fall Semester, 2000</th>
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<tbody>
<tr>
<td></td>
<td>Enrollment</td>
<td>Major</td>
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<tr>
<td>Veterinary Science</td>
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<tr>
<td>Pre-Veterinary Medicine</td>
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<td>Pre-Veterinary Medicine</td>
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<tr>
<td>Veterinary Technologist</td>
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<td>Veterinary Technologist</td>
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Dean’s List

Spring Semester

**Veterinary Science Major**
- Katherine Irwin
- Brad Johnson
- Megan Becher
- Meghan Landen
- Kathleen Molt
- Travis Nienhueser
- Lee Pako
- Sara Strongin
- Tara Swanson
- Kevin Thiele

Pre-Veterinary Major
- Amanada Willers
- Sonja Cooper
- Meghan Galloway
- Christopher Hobza
- Sue Weatherwax

Fall Semester

**Veterinary Sciences Major**
- Michelle Backlund
- Megan Becher
- Stephanie Beran
- Lacey Bloedron
- Benjamin Britten
- Matthew Bruce
- Kathryn Cavanah
- Angie Cunningham
- Amanda Gall
- Justin Gdanitz
- Erica Hartmann
- Davis Heftie
- Kristina Holt
- Katherine Irwin
- Lynn Jerovsky

**Veterinary Technologist Major**
- Brad Johnson
- William Karlin
- Elizabeth Kilzer Cody
- Kristen
- Travis Nienhueser
- Abby Obermiller
- Lee Panko
- Becky Pigsley
- Trisha Rucker
- Brett Scheiding
- Mikaleh Schultz
- Elizabeth Skavdahl
- Robert Smith
- Maria Sonderegger
- Lindsey Stevens
- Sara Strongin
- Kevin Thiele
- Leann Wright

**Pre-Veterinary Major**
- Yuko Mori
- Katie Robertson
- Christopher Hobza
- Christina Riesdorff
Table 1. Nebraska Residents Admitted into the KSU College of Veterinary Medicine Students
(University of Nebraska - Kansas State University Cooperative Agreement for Veterinary Medical Education)

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Pre-Veterinary Curriculum Completed at</th>
</tr>
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<tbody>
<tr>
<td>Beerenstrauch, Mark</td>
<td>UN-Keamey</td>
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<tr>
<td>Buhr, Peter</td>
<td>UNL, UNO</td>
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<tr>
<td>Cent, Alana</td>
<td>UNL</td>
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<tr>
<td>Church, Ryan</td>
<td>UNL</td>
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<tr>
<td>Friese, Jennifer</td>
<td>UNL</td>
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<tr>
<td>Furman, Thomas</td>
<td>UNL, Western NE Community College</td>
</tr>
<tr>
<td>Gladney, Jason</td>
<td>UN-Keamey, Central CC, Hastings College</td>
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<tr>
<td>Grapes, Cynthia</td>
<td>UNL, UN-Keamey</td>
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<tr>
<td>Hastings, Christy</td>
<td>Chadron State College</td>
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<tr>
<td>Horn, Amber</td>
<td>UNL, Northeast Community College</td>
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<tr>
<td>Jones, Heather</td>
<td>South Dakota State University</td>
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<tr>
<td>Keener, Bobbi</td>
<td>Kansas State University, Western NE Community College</td>
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<td>Knudsen, Shelly</td>
<td>UNL, Central Community College, UN-Keamey</td>
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<td>Kurz, Lance</td>
<td>UNL, Peru State College</td>
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<td>Landen, Meghan</td>
<td>UNL, UNO</td>
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<tr>
<td>Lovelace, Karen</td>
<td>Vanderbilt University, UNO</td>
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<tr>
<td>Lubbe, Catherine</td>
<td>UN-Keamey, Central Community College, UNO, UNL</td>
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<tr>
<td>McGrath, Erin</td>
<td>UNO, UNL</td>
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<tr>
<td>McInteer, Patrick</td>
<td>UNL, Peru State University</td>
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<tr>
<td>Placke, Keith</td>
<td>UNL</td>
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<tr>
<td>Sarver, Joellen</td>
<td>Hastings College</td>
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<tr>
<td>Schandu, Katherine</td>
<td>Drake University, UNL</td>
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<tr>
<td>Schnell, Roy</td>
<td>Chadron State College, Western NE Community College, UNL, UN-Keamey, Central Community College</td>
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<td>Skavdahl, Joseph</td>
<td>UNL</td>
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<tr>
<td>Tipton, Tad</td>
<td>University of Wyoming</td>
</tr>
<tr>
<td>Warnes, Cynthia</td>
<td>UNL</td>
</tr>
<tr>
<td>Wright, Lynde</td>
<td>UNL, Emporia State University, University of Kansas, Johnson County College</td>
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Table 2. UNL Students Entering Other Veterinary Colleges Other Than Kansas State University in August 2000

<table>
<thead>
<tr>
<th>Name</th>
<th>Pre-Vet Curriculum Completed</th>
<th>Admitted to</th>
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<tbody>
<tr>
<td>Savannah Cole</td>
<td>UNL, elsewhere</td>
<td>University of Missouri</td>
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</table>
## Graduate Program

### Graduate Students Advised by VBMS Faculty

<table>
<thead>
<tr>
<th>MS Candidate (Advisor)</th>
<th>Degree(s) (Country)</th>
<th>Research Project Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>◦ Angela Bachler (R. Moxley)</td>
<td>BS (US)</td>
<td>Development of an intestinal organ culture model for the study of <em>Escherichia coli</em> O157:H7 infection in cattle.</td>
</tr>
<tr>
<td>◦ Ryan Brady (C. Kelling)</td>
<td>BS (US)</td>
<td>Immune responses to recombinant attachment protein of bovine respiratory syncytial virus</td>
</tr>
<tr>
<td>◦ Henry Cerny (J. Gray)</td>
<td>BS, DVM (US)</td>
<td>Evaluations of new and pathogenesis as causative agents of infectious bovine keratoconjunctivitis</td>
</tr>
<tr>
<td>◦ Nicole McGee (R. Moxley) (US)</td>
<td>BS</td>
<td>Role of the <em>Escherichia coli</em> I87 capsule in serum and phagocyte resistance</td>
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<tr>
<td>◦ Rohanna Dassanayake (G. Duhamel)</td>
<td>BVSc (India)</td>
<td>Role of macrophages in the pathogenesis of porcine colonic spirochetosis</td>
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<tr>
<td>◦ Rene Dewell (L. Hungerford)</td>
<td>BS, DVM (US)</td>
<td>Failed and marginal passive transfer in beef calves: Health and economic effects</td>
</tr>
<tr>
<td>◦ Rebecca Fluckey (J. Gray)</td>
<td>BS (US)</td>
<td><em>In Vitro</em> virulence analysis of multi-drug resistant <em>Salmonella</em></td>
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<tr>
<td>◦ Vicki Geiser (C. Jones) (US)</td>
<td>BS</td>
<td>Analysis of the effects of the BHV-1 LR gene on productive infection. (BioSci graduate program)</td>
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<tr>
<td>◦ In-Kyung Kim (F. Osorio)</td>
<td>DVM (Korea)</td>
<td>Immune response to PRRSV virus</td>
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<td>◦ Dennis Ridenour (J. Grillo)</td>
<td>BS (US)</td>
<td>Entry mechanisms of <em>Legionella pneumophila</em></td>
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<tr>
<td>◦ Chad Rolfes (J. Gray)</td>
<td>BS (US)</td>
<td>Detection and characterization of <em>E. coli</em> and salmonella in the feedlot environment</td>
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<tr>
<td>◦ Ignacio Fernandez-Sainz (R. Donis)</td>
<td>DVM (Argentina)</td>
<td>Evaluation of attenuated mutant bovine viral diarrhea viruses in pregnant sheep</td>
</tr>
<tr>
<td>◦ Jovanny, Zaboleta (R. Barletta)</td>
<td>BS, MS (Columbia)</td>
<td>Analysis of mycobacterium para tuberculosis virulence determinants</td>
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<tr>
<td>◦ Zager, Shellene (R. Donis)</td>
<td>BS (US)</td>
<td>Functional and genetic analyses of thermosensitive mutants of BVDV</td>
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<tr>
<td>PhD Candidate (Advisor)</td>
<td>Degree(s) (Country)</td>
<td>Research Project Title</td>
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<tr>
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<tr>
<td>♦ Aruna Ambagla (S. Sri)</td>
<td>BVSc (Sri Lanka)</td>
<td>Down-regulation of MHC class I expression by bovine herpesvirus 1</td>
</tr>
<tr>
<td>♦ Marilyn Buhman (L. Hungerford)</td>
<td>BS, DVM, MS (US)</td>
<td>Risk assessment of pulmonary lesions in fed cattle and evaluation of risk factor based health management strategies</td>
</tr>
<tr>
<td>♦ Muralidhar Deshpande (S. Sri)</td>
<td>BVSc, MVSc (India)</td>
<td>Cell mediated immune response to bovine viral diarrhea virus</td>
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<tr>
<td>♦ Sahar El-Etr (J. Cirillo)</td>
<td>BSc, MS (Egypt)</td>
<td>Entry of <em>Mycobacteria</em> into host cells</td>
</tr>
<tr>
<td>♦ Zhengyu Feng (R. Badetta)</td>
<td>BS (China)</td>
<td>Molecular genetic analysis of resistance in D-cycloserine <em>Mycobacteria</em></td>
</tr>
<tr>
<td>♦ Laura Gil (R. Donis)</td>
<td>DVM, MS (Brazil)</td>
<td>Studies on the permissiveness and responses of bovine cells to BVDV infection</td>
</tr>
<tr>
<td>♦ Beth Harris (R. Badetta)</td>
<td>BS, MS (US)</td>
<td><em>Mycobacterium paratuberculosis</em> virulence determinants</td>
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<tr>
<td>♦ Melissa Inman (C. Jones)</td>
<td>BS, MS (US)</td>
<td>Bovine herpesvirus latency</td>
</tr>
<tr>
<td>♦ Xiaoli Li (R. Donis)</td>
<td>BS, MS (China)</td>
<td>Interactions among the bovine viral diarrhea virus nonstructural proteins (BioSci graduate program)</td>
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<tr>
<td>♦ Aimin Liu (M. Lou)</td>
<td>BS, MS (China)</td>
<td>Regulation of thiols in the eye lens</td>
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<td>♦ Xiaofei Liu (R. Badetta)</td>
<td>BS (China)</td>
<td><em>Mycobacterium paratuberculosis</em> virulence determinants</td>
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<tr>
<td>♦ Luciane Lovata (C. Jones)</td>
<td>DVM, MS (Brazil)</td>
<td>Non-structural proteins of porcine reproductive and respiratory syndrome (PPRS) virus (BioSci graduate program)</td>
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<tr>
<td>♦ Jean De Dieu Okemba (G. Duhamel)</td>
<td>DVM, MS (Congo)</td>
<td>Role of group A rotavirus P proteins in induction of heterotypic immunity</td>
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<tr>
<td>♦ Guillermo Risatti (R. Donis)</td>
<td>DVM, MS (Argentina)</td>
<td>Bovine viral diarrhea virus in vitro studies on virus-host cell interactions</td>
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<tr>
<td>♦ Christina Topliff (C. Kelling)</td>
<td>BS, DVM (US)</td>
<td>Bovine viral diarrhea virus (BVDV) virulence determinants</td>
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<tr>
<td>♦ Kuiyi Xing (M. Lou)</td>
<td>BA (China)</td>
<td>Effect of $\text{H}_2\text{O}_2$ to human lens epithelial cells</td>
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Graduate Degrees Obtained in 2000

♦ Ling Yan (J. Cirillo)  
  BS, MS (China)  
  Cell biology of legionella pneumophila infections (BioSci graduate program)

♦ Spring Younts (L. Hungerford)  
  BA, BS, MS (US)  
  Development of methods to measure and monitor food-borne pathogens in feedlot cattle

♦ Steve Zateckha (M. Lou)  
  BS, MS (US)  
  Effect of extralenticular mitogens to lens signal transduction in normal and diabetic rats

♦ MS Degree - Veterinary Sciences

† Navaratnam Manjula  
  May 2000 Graduation  
  "Gp96 as an adjuvant for induction of cytotoxic T-lymphocytes against Bovine Herpesvirus-1"  
  Advisor: S. Srikumaran  
  Position following graduation: Research Associate Genstar Therapeutics, San Diego, CA

♦ PhD Degrees - Medical Sciences Interdepartmental Area

† M. Teresa Winkler  
  May 2000 Graduation  
  "Analysis of Bovine Herpesvirus 1 Host Interactions"  
  Advisor: C. Jones  
  Positions following graduation: Postdoc, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences, Research Scientist, Schering-Plough Animal Health, Elkhorn, NE

† Guillermo Risatti  
  August 2000 Graduation  
  "Bovine Viral Diarrhea Virus In Vitro Studies on Virus-Host Cell Interactions"  
  Advisor: R. Donis  
  Position following graduation: Postdoc, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences
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<tr>
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<th>Credit Hours, Semester</th>
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<td>Principles and Prevention of Livestock Diseases</td>
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<td>Integrated Principles and Prevention of Livestock Diseases</td>
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<td>VBMS 406</td>
<td>Veterinary Entomology (Animal Science; Entomology; Forestry; Fisheries and Wildlife 405/805)</td>
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<td>General Pharmacology and Toxicology</td>
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<td>VBMS 452</td>
<td>Introduction to Molecular Virology and Viral Pathogenesis</td>
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<td>VBMS 488</td>
<td>Exploitation of Production Medicine</td>
<td>2 cr, III - Lec 2</td>
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<td>VBMS 496</td>
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<td>VBMS 499H</td>
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<td>Introduction to Mechanisms of Disease</td>
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<td>Computer-aided Sequence Analysis Primer</td>
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<td>Concepts in Experimental Immunology (BioSci 948)</td>
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<td>Advanced Molecular Infectious Disease</td>
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<td>Signal Transduction (BioSci 964)</td>
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<td>Advanced Viral Pathogenesis (BioSci 966)</td>
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<td>Research on Selected Problems in Veterinary Science</td>
<td>1-10 cr, I, II</td>
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<tr>
<td>VBMS 998</td>
<td>Special Topics in Veterinary Science</td>
<td>1-10 cr, I, II</td>
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### Table 4. Enrollment in Department-Taught Courses

#### Spring, Semester, 2000

<table>
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#### First Five-Week Summer Session, 2000

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<th>Cr Hrs</th>
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#### Second Five-Week Summer Session, 2000

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<th>Cr Hrs</th>
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#### Fall Semester, 2000

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<td>Gen Pharmacology &amp; Toxicology</td>
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# VBMS 909 Seminars

## Spring Semester, 2000

<table>
<thead>
<tr>
<th>Date</th>
<th>Presenter</th>
<th>Topic</th>
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<tbody>
<tr>
<td>January 10</td>
<td>Dr. Evelyn Dean-Nystrøm, National Animal Disease Center, Ames, IA (D. Rogers)</td>
<td>&quot;Animal Models of <em>Escherichia coli</em> O157:H7 Infection&quot;</td>
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<tr>
<td>January 17</td>
<td>Holiday - Martin Luther King's Birthday</td>
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<tr>
<td>January 24</td>
<td>Angela Bachler, BS, MS Graduate Student Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln, (R. Moxley)</td>
<td>&quot;<em>Escherichia coli</em> O157:H7 Mediated Attaching-Effacing Lesions in Large Intestinal Mucosal Explants from Adult Cattle&quot;</td>
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<tr>
<td>February 7</td>
<td>Dr. Bradley Jones, Assistant Professor, University of Iowa, College of Medicine, Department of Microbiology, (J. Cirillo)</td>
<td>&quot;Identification of Factors that Modulate the Salmonella Invasive Phenotype&quot;</td>
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<tr>
<td>February 14</td>
<td>Kuiyi Xing, BS, PhD Graduate Student Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln (M. Lou)</td>
<td>&quot;Cloning, Expression of Human Lens Thioredoxinase Gene and Its Physiological Benefit for Overexpressing it in HLE B3 Cells&quot;</td>
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<tr>
<td>February 21</td>
<td>Dr. Vadim Gladyshev, Assistant Professor, University of Nebraska-Lincoln, Biochemistry Department, (M. Lou)</td>
<td>&quot;Selenocysteine: the 21st amino acid in protein&quot;</td>
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<td>February 28</td>
<td>Dr. J. Alan Diehl, Assistant Professor, University of Nebraska Medical Center, Eppley Institute for Cancer and Allied Diseases, Omaha, NE (C. Jones)</td>
<td>&quot;Integration of Signal Transduction Pathways and the Cell Cycle Through Cyclin D1&quot;</td>
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<td>March 6</td>
<td>Sahar El-Etr, BSc, MS, PhD Graduate Student Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln (J. Cirillo)</td>
<td>&quot;Entry of Mycobacteria&quot;</td>
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<td>March 13</td>
<td><strong>Spring Break</strong></td>
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<td>March 20</td>
<td>Ling Yan, BS, MS, PhD Graduate Student Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln (J. Cirillo)</td>
<td>&quot;Interaction of Legionella pneumophila with host cells&quot;</td>
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<td>March 27</td>
<td>Xiaoli Li, BS, MS, PhD Graduate Student Candidate, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln (R. Donis)</td>
<td>&quot;Interaction between Flaviviridae non structural genes with host factors&quot;</td>
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<td>April 3</td>
<td>Dr. Andrew Benson, Assistant Professor, University of Nebraska-Lincoln, Department of Food Science and Technology (J. Cirillo)</td>
<td>&quot;Comparative Genomics of E. coli O157:H7 Subpopulations&quot;</td>
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<tr>
<td>April 10</td>
<td>Yange Zhang, Research Assistant Professor, Department of Veterinary and Biomedical Sciences, University of Nebraska-Lincoln (C. Jones)</td>
<td>&quot;Functional analysis of bovine herpes virus type 1 immediate-early protein ICPo induced cytotoxicity and transcriptional activation activity&quot;</td>
</tr>
</tbody>
</table>

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-59-
April 17  Dr. John Neil, MDI Research Unit, National Animal Disease Center, Ames, IA (C. Jones)  
"Examination of the Induction of Apoptosis in Virus Infected Cells"

April 24  Dr. Tom Casey, National Animal Disease Center, United States Department of Agriculture (D. Rogers)  
"Real-time Detection of Fecal contamination on Carcasses"

April 29  Classes End

**VBMS 909 Seminar  Fall Semester, 2000**

**August 3**  Xiaoli Li, BS, Master Thesis Defense, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (R. Donis)  
"Pestivirus and Hepacivirus Viral-Host Interactions"

**August 21**  Diane Keeler, Quality Assurance Associate, Legal Division, Pfizer Animal Health, Lincoln, NE (D. Steffen)  
"Maintaining Integrity of Research Data: An Introduction to GLP’s and Quality Assurance"

**August 28**  Dr. John D. Clements, Professor and Chair, Tulane University School of Medicine, Department of Microbiology and Immunology, New Orleans, LA (J. Cirillo)  
"Bacterial Enterotoxins as Mucosa Adjuvants-The Good, The Bad, and The Ugly"

**September 4**  Labor Day - Holiday

**September 11**  Chad Roles, BS, Graduate Student Masters Candidate, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (J. Gray)  
"Development of a Culture Technique for Recovering E. coli O157:H7 and Salmonella spp. from the feedlot environment"

**September 18**  Rebecca Fluckey, BS, Graduate Student Masters Candidate, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (J. Gray)  
"An In vitro Virulence Analysis of Clinical Isolates of Multi-Drug Salmonella typhimurium"

**September 25**  Christina Topliff, DVM, MS, Graduate Student PhD Candidate, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (C. Kelling)  
"Analysis of the 5' Untranslated Region of High and Low Virulence Genotype 2 Bovine Viral Diarrhea Virus Isolates"

**October 2**  D. Steve Zatewicz, BS, MS, Graduate Student PhD Candidate, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (M. Lou)  
"Effect of Aldos Reductase Inhibitor on the Lens Signal Transduction Cascades Under Diabetic Condition"

**October 9**  Luiz Bermudez, Professor, Kuzell Institute for Arthritis & Infectious Diseases, San Francisco, CA (J. Cirillo)  
"Entry and Survival within Macrophages: The Mycobacteria Approach"

-60-
October 23
Delin Liang, MS, PhD, Postdoctoral Fellow, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (R. Donis) “Bovine Viral Diarrhea Virus NS3 Interactions with Host Factors”

October 30
Israrul Ansari, Post Doctoral Fellow, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (R. Donis) “Mutational Analysis of Envelope Protein E0 & E1 of Bovine Viral Diarrhea Virus”

November 6
Ignacio Fernandez Sainz, DVM, MS Graduate Student Candidate, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (R. Donis) “Evaluation of Mutant Strains of Bovine Virus Diarrhea Virus (BVDV) in Pregnant Sheep”

November 13
CRWAD Meeting

November 20
Dennis Ridenour, MS Graduate Student Candidate, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (J. Cirillo) “A Novel Strategy for isolation of Genes Involved in the Entry of Legionella pneumophila into host cells”

November 27
Hank Ceply, DVM, MS Graduate Student Candidate, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences (J. Gray) “In vitro evaluation of putative virulence factors of Brachyspira suis clinical isolates”

December 4
Alison O’Brien, Professor and Chair, Uniformed Services University of the Health Sciences, Department of Microbiology & Immunology, Bethesda, MD (J. Cirillo) “Interactions of E. coli O157:H7 and Other Shiga Toxin-Producing E. coli with the Intestinal Environment”

December 9
Classes End

December 11
Final Exames

Other Departmental Seminars

January 28
John C Johnson, Candidate, Diagnostic and Extension Veterinarian, West Central Research and Extension Center, North Platte, NE “Efficacy of Nuflor (florfenicol) in the Treatment of Bovine Infectious pododermatitis”

February 14
Steve Ensley, Candidate, Diagnostic and Extension Veterinarian, West Central Research and Extension Center, North Platte, NE “Water Quality and Swine Production”

February 21
A. Lee Jones, Candidate, Diagnostic and Extension Veterinarian, West Central Research and Extension Center, North Platte, NE “Practical Applications of Reproductive Ultrasound in the Bovine”
April 6  You (Joe) Zhou, Research Assistant Professor, Manager, Microscopy Core Research Facility, Center for Biotechnology
Candidate, Academic Appointment within the Department, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences
“Advanced Bio-Imaging Technology - What It Can Do For Your Research”

June 6  Dr. Lisa K. Nolan, Candidate, Veterinary Diagnostic Microbiologist, University of Nebraska-Lincoln, Veterinary Diagnostic Center
“Studies of Bacterial Virulence and Antimicrobial-Resistance Mechanisms at North Dakota State University”

August 14  Dr. Ventzislav Vassilev, BS, PhD, Nominee for Research Assistant Professor, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences
“Reverse Genetics Systems to Study Bovine Viral Diarrhea Virus”

September 8  Susanne Hinkley, DVM, MS, PhD, Nominee for Research Assistant Professor, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences, Veterinary Diagnostic Center
“The Molecular Level - On Both Sides Of The Walkway”

October 12  Barb Morton, RN, Nurse Practitioner Director, The Cancer Resource Center
“Understanding Cancer: Supporting a Friend or Family Member With Cancer”, Sponsored by UNL Employee Assistance Program.

US Meat Animal Research Center (MARC) Seminars

January 7  Recent findings from E. coli research (Dr. Jim Keen)

January 21  Livestock waste management and environment results and plans (Dr. Jack Nienaber)

February 11  DECI (Dr. Tim Jenkins)

February 25  Nutrition results and plans (Dr. Cal Ferrell)

March 10  EST sequencing and SNP development—Where are we and where are we going?

March 24  Beef tenderness (Dr. Tom Wheeler)

April 7  Predictors and potential controllers of litter size (Dr. Jeff Vallet)

April 21  Identifying and using QTL’s in cattle (Dr. Eduardo Casas)

May 5  Identifying and using QTL’s in cattle (Dr. Eduardo Casas)

May 5  Practical use of environmental predictors in production of livestock (Dr. Tami Brown-Brandl)

November 17  MARC programs and awards presentation (Dr. Mohammad Koochmarale)

December 1  Beef cattle genomics: Where are we and where are we going? (Dr. Gary Bennett)
Other Seminars

UNL - Center for Biotechnology Seminar Series - Spring 2000

January 19  Dr. Jyoti Shah, Kansas State University, Division of Biology, Manhattan, KS
Host: Dr. Lori Allison
“Salicylic Acid Signaling during Plant Defense Response”

January 26  Dr. Andrew Bent, University of Wisconsin, Department of Plant Pathology,
Madison, WI
Host: Dr. Marty Dickman
“Molecular Genetic Dissection of Plant Disease Resistance”

February 2  Dr. Anthony Nappi, Loyola University-Chicago, Department of Biology
Host: Dr. David Stanley
“Cytotoxic Molecules in Insect Immunity”

February 9  Dr. Scott Tingey, DuPont Company, Newark, Delaware
Host: Dr. Sally Mackenzie
“Gene Discovery for Agricultural Technology: Tools and applications”

February 16 Dr. Fred Cohan, Professor and Chair, Wesleyan University, Department of Biology,
Middletown, Connecticut
Host: Dr. Larry Harshman
“The Origins of Bacterial Species”

February 23 Dr. David Roos, Professor of Biology-Goddard Laboratories, University of
Pennsylvania, Philadelphia, Pennsylvania
Host: Dr. Steve Schwartzbach
“Something Old, Something New, Something Borrowed, Something GREEN”

March 1 Dr. Ernest Bailey, University of Kentucky, Department of Veterinary Science,
Lexington, Kentucky
Host: Dr. Merlyn Nielsen
“Horse Genomics: Value and Application for the Horse Industry”

March 8 Dr. Neil Osheroff, Vanderbilt University School of Medicine, Department of
Biochemistry, Nashville, Tennessee
Host: Dr. Jim Van Etten
“The DNA Cleavage Reaction of Topoisomerase II: Dr. Jekyll or Mr. Hyde”

March 15 Spring Break

March 22 Dr. Allan M. Campbell, Stanford University, Department of Biological Sciences,
Stanford, California
Host: Dr. Andy Benson
“Compositional Biases in Microbial Genomes”
<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Institution</th>
<th>Host</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 29</td>
<td>Dr. Norma W. Andrews</td>
<td>Yale University, School of Medicine, Section of</td>
<td>Dr. Ruben Donis</td>
<td>“Lysosomes and trypanosomes: the regulation of exocytosis and cell invasion”</td>
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<tr>
<td></td>
<td>Dr. Barbara Solnier-Webb</td>
<td>University School of Medicine, Department of</td>
<td>Dr. Carolyn Price</td>
<td>“Trypanosome RNA editing: the most bizarre form of RNA processing known?”</td>
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<td></td>
<td></td>
<td>Biological Chemistry, Baltimore, Maryland</td>
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<td></td>
<td>Marla Berry</td>
<td>Harvard Medical School, Department of Biochemistry</td>
<td>Dr. Vadim Gladyshev</td>
<td>“Eukaryotic selenoprotein synthesis: new insights into mechanism and in vivo efficiency”</td>
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<td></td>
<td></td>
<td>and Molecular Pharmacology, Boston, Massachusetts</td>
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<tr>
<td>April 19</td>
<td>Seminar Postponed</td>
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<td></td>
<td>Dr. Amar J. S. Klar</td>
<td>National Cancer Institute, Frederick, Maryland</td>
<td>Dr. Kulvinder Gill</td>
<td>“Two independent imprinted events regulate fission yeast mating type switching and silencing”</td>
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**Center for Biotechnology Seminar Series - Fall 2000**

<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Institution</th>
<th>Host</th>
<th>Topic</th>
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<tbody>
<tr>
<td>September 6</td>
<td>Dr. Richard Myers</td>
<td>University of Miami School of Medicine, Miami,</td>
<td>Dr. Jim Van Etten</td>
<td>“2 chew or not 2 chew: Regulation of nucleases that initiate genetic recombination”</td>
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<td></td>
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<td>Florida</td>
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<td>September 13</td>
<td>Dr. Stephen Chang</td>
<td>Research Institute, San Diego, California</td>
<td>Dr. Charles Wood</td>
<td>“Adenovirus therapies for cancer: From gene replacement to replicating vectors”</td>
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<tr>
<td>September 20</td>
<td>Dr. George R. Bousfield</td>
<td>Wichita State University, Wichita, Kansas</td>
<td>Dr. Joe Ford</td>
<td>“Glycosylation of huma FSH isoforms- It’s more than just counting sialic acid”</td>
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<tr>
<td>September 27</td>
<td>Dr. Perry Cregan</td>
<td>USDA, Beltsville, Maryland</td>
<td>Dr. Jim Specht</td>
<td>“DNA markers, maps, and technologies for plant genome analysis”</td>
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<tr>
<td>October 4</td>
<td>Dr. Richard Kitchens</td>
<td>University of Texas Southwestern Medical Center,</td>
<td>Dr. Ted Pardy</td>
<td>“When host cells meet bacterial endotoxin: Mechanisms of host recognition, response, and control”</td>
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<td>Dallas, Texas</td>
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<tr>
<td>October 11</td>
<td>Dr. Bruce Christensen</td>
<td>University of Wisconsin, Madison, Wisconsin</td>
<td>Dr. David Stanley</td>
<td>“Better control of mosquito-borne diseases through better mosquitoes: Understanding how mosquitoes kill parasites they are supposed to transmit”</td>
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</table>
October 18  Dr. William E. Fry, Cornell University, Ithaca, New York
Host: Dr. Jim Partridge
“Agro-terrorism (‘biotech’ or ‘organic’) - lessons from the Irish Potato Famine Pathogen”

October 25  Dr. Bob B. Buchanan, University of California at Berkeley
Host: Dr. John Markwell
“Thioredoxin: The road from enzyme regulation to technology and products”

November 1  Dr. Robert Bambara, University of Rochester, Rochester, New York
Host: Dr. Mark Griep
“Role of flap endonuclease in mammalian DNA replication and repeat sequence expansion”

November 3  Dr. Phillip Kramer, National Institutes of Health, National Institute of Neurological Disorders and Stroke, Bethesda, Maryland (Special Seminar)
“Neuroimmunoendocrinology - reproduction and health”

November 8  Dr. Alan Jones, University of North Carolina, Chapel Hill, North Carolina
Host: Dr. Marty Dickman
“Regulation of programmed cell death during tracheary element formation by a novel ‘trigger’ protease”

November 10  Dr. Don Baldwin, Pioneer Hi-Bred Int’l Inc., Johnston, Iowa (Special Seminar)
“Transcript profiling of the maize defense response to a fungal pathogen and its toxin, a histone deacetylase inhibitor”

November 13  Dr. Michael V. Graves, University of Nebraska, Lincoln, NE (Special Seminar)
“Genetic analysis of complex carbohydrate synthesis by a large dsDNA virus”

November 15  Dr. Michael Stiles, University of Alberta, Edmonton, Alberta, Canada
Host: Drs. Bob Hurkins and Lloyd Bulleman
“Molecular biology of lactic acid bacteria: Management of bacteriocin production for food preservation and animal health”

November 29  Dr. Leonard Mindich, The Public Health Research Institute, New York, New York
Host: Dr. Anne Vidaver
“Reverse genetic approaches to elucidating the assembly and replication of phage Φ6, which has a segmented dsRNA genome”

December 6  Dr. Shawn Kaeppeler, University of Wisconsin, Madison, Wisconsin
Host: Dr. Don Lee
“DNA methylation and epigenetic inheritance in plants”

December 19  Professor Yi Zeng, Institute of Virology, Beijing China (Special Seminar)
“The etiological study on nasopharyngeal carcinoma and esophageal cancer”
AOC Comparative Pathobiology Seminars

BIOS 915Z - Spring 2000

January 14  Fernando Osorio, PhD, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences
"Immunopathogenesis of the Porcine Reproductive and Respiratory Syndrome Virus"

January 21  Dahn Clemens, University of Nebraska Medical Center, VA Medical Center
"Biological Consequences of Ethanol Metabolism"

January 26  Refer to Center for Biotechnology Seminar

February 2  Refer to Center for Biotechnology Seminar

February 11 Dr. George Miller, Yale University
"Gamma-herpesvirus Lytic Cycle Switches"

February 16 Refer to Center for Biotechnology Seminar

February 25 Dr. Clinton Jones, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences
"Virus Induced Neuronal Apoptosis is Blocked by Herpes Simplex Virus Latency-Associated Transcript"

March 3  Dr. Sandra Quakenbush, University of Kansas
"Walleye Dermal Sarcoma Virus: A new Model for Oncogenesis"

March 8  Refer to Center for Biotechnology Seminar

March 22 Refer to Center for Biotechnology Seminar

March 31 Dr. Joyce Solheim, University of Nebraska Medical Center, Eppley Institute
"Antigen Presentation by MHC Class I Molecules: Normal Mechanisms and Virus Interference"

April 7  Dr. Zhen Fang Fu, Kansas State University
"Rabies Pathogenesis: Myths and Facts"

April 14 Dr. Marie Hardwick, Johns Hopkins University
"Reversing the Functions of Apoptosis Regulators in Virus Infections and Neuronal Disease"

Center for Biological Chemistry Seminar

Spring 2000

January 25  Dr. Michel Oulette, University of Nebraska Medical Center, Eppley Institute
Host: Dr. Carolyn Price
"Absence of Cancer-Associated Changes in Human Fibroblasts Immortalized with Telomerase"
February 1  No Seminar

February 8  Dr. Carol Fierke, University of Michigan, Department of Chemistry
Host: Dr. Ruma Banerjee
"Zinc Metalloenzymes: Implications for Medicine and Industry"

February 15  Dr. Jean Smity, University of Nebraska-Lincoln, Department of Chemistry
Host: Dr. Ruma Banerjee
"Mass Spectrometry as a Tool for Determining Protein Primary Structure"

February 29  Dr. Ruben Donis, University of Nebraska-Lincoln, Department of Veterinary and Biomedical Sciences
Host: Dr. Vadim N. Gladyshev
"Genetic Analysis of the Internal Ribosome Entry Element of the BVDV Genome"

March 7  Dr. Richard H. Finnell, University of Nebraska Medical Center, Department of Cell Biology and Anatomy
Host: Ruma Banerjee
"Folate Transport Abnormalities-Implications for Birth Defects"

March 14  Spring Break

March 21  Dr. Dan Arp, Oregon State University, Department of Botany and Plant Pathology
Host: Dr. Robert V. Klucas
"A Gene to Genome Look at the Lifestyle of an Obligate Chemolithoautotrophic Ammonia-Oxidizing Bacterium, Nitrososmonas Europaea"

March 28  No Seminar

April 4  Dr. Gary Merrill, Oregon State University, Department of Biochemistry and Biophysics
Host: Dr. Vadim N. Gladyshev
"Rusty Brakes: Thioredoxin Control of Tumor Supresso"

April 11  Dr. Dorothy Shippen, Texas A&M University, Department of Biochemistry & Biophysics, Center for Genome Research, Faculty of Genetics
Host: Dr. Carolyn Price
"Telomere Maintenance in Plants"

April 18  Seminar postponed

April 25  Dr. Jeffrey Staub, Monsanto
Host: Dr. Lori A. Allison
"Potential Applications of Plastid Transformation Technology"

Center for Biological Chemistry Seminar

Fall 2000

September 5  Dr. Garth Powis, University of Arizona Cancer Center
Host: Dr. Vadim N. Gladyshev
"Redox control of cancer cell growth by thioredoxin"
September 19  Dr. Daniel Bush, University of Illinois at Urbana-Champaign, IL  
Host: Dr. Robert J. Spreitzer  
“Life without a heart: Biochemical and molecular analysis of plant sugar and amino acid transporters”

September 26  Dr. Victor L. Davidson, University of Mississippi Medical Center  
Host: Dr. Stephen W. Ragsdale  
“What controls rates of interprotein electron transfer reactions”

October 3  Dr. John Peters  
Host: Dr. Stephen W. Ragsdale  
“Structural and mechanistic studies on the Fe-only hydrogenase (Cp)”

October 24  Dr. Jon Beckwith, Harvard University  
Host: Dr. Vadim N. Gladyshev  
“Making, breaking and shuffling disulfide bonds”

October 31  Dr. Kenneth Cowan, University of Nebraska Medical Center  
Host: Dr. Vadim N. Gladyshev  
“Gene transfer into hematopoietic stem cells”

November 7  Dr. Dean Appling, University of Texas at Austin  
Host: Dr. Ruma Banerjee  
“One-carbon and methyl metabolism in saccharomyces”

November 14  Dr. Daniel Pomp, University of Nebraska-Lincoln  
Host: Dr. Ruma Banerjee  
“Quantitative genomics: Genetic dissection of complex traits in animal models”
The Great Plains Veterinary Educational Center (GPVEC) fulfills another component of the teaching program of the Department's teaching mission. In accordance with the Agreement between Kansas State University and the University of Nebraska Cooperative Program for Veterinary Medical Education, the GPVEC participates in teaching the large animal clinical curriculum for veterinary medical students enrolled in the College of Veterinary Medicine at Kansas State University. GPVEC faculty teach a required clinical rotation in the core curriculum for fourth-year veterinary medical students and a number of one-week electives in the KSU curriculum, which are offered on a seasonal basis related to the livestock production cycle. Veterinary medical students from other U.S. and Canadian veterinary colleges are accepted into the GPVEC clinical offerings on a space available basis, following enrollment of KSU students.

A major change in the professional KSU CVM curriculum has been moving the required clinical core rotation to the beginning of the sophomore year. This will require students to complete the GPVEC clinical week early in their training and return for other rotations on an elective basis only, as third or fourth year students. The new one week core clinical course, Exploration of Food Animal Production, will be taught over four weeks with 25 students each week (two weeks each in May and August). However, KSU CVM students in the current third and fourth year still need to complete the traditional year-round, one-week, small group GPVEC Clinical Core rotation. Although this requires some doubling of courses for three years, it will allow faculty more time for other activities after the change has been accomplished. It will also introduce clinical work earlier in the professional curriculum and encourage students interested in food animal careers to pursue additional learning activities prior to as well as during their senior year.

The GPVEC also provides continuing education for graduate veterinarians. The Beef Cattle Production Management Series (BCPMS) is an intense one-year certification program which encompasses multi-disciplinary training in areas important to the beef cattle industry. The Series is planned to be offered as a graduate course in addition to certification and can, therefore, become part of the graduate credits needed for a distance education Option III Master of Science in Veterinary Science. The course will be cross-listed with the Animal Science Department and several faculty from that Department are active in the teaching program and will serve on graduate committees. Profitability for livestock producers requires an integrated systems approach attending to the husbandry, management and economic inputs during planning and daily operation, as opposed to viewing each discipline in isolation. In order to effectively serve the beef cattle industry, veterinarians and allied...
specialists must coordinate the interaction of several important disciplines. Development of a working knowledge of these key inputs is essential in analysis, decision making and planning, as well as maintaining a cooperative input among specialists. Veterinarians and other specialists taking this course will not be traditional on-campus students, but rather will attend six three-day sessions at the GPVEC. These sessions will be the basis of interactive instruction, handout material, and assignments. Additional contact between modules will occur primarily via e-mail and the internet.

GPVEC faculty teach other courses and serve on a number of graduate student committees. Currently, two graduate students with teaching appointments are part of the faculty and are pursuing graduate degrees.

The GPVEC is located on the U.S. MARC grounds which provides excellent teaching resources for the training program. Faculty participate in providing veterinary services for the livestock in cooperation with the herd veterinarian, who, in return, participates in the teaching activities. Additional teaching and training are also available through cooperation with practicing veterinarians and beef producers throughout the state.

Faculty at the GPVEC have research and extension responsibilities. The research and extension program accomplishments are reported in the appropriate sections of this VBMS annual report.
Table 5. Enrollments in Student Electives, 2000-2001

<table>
<thead>
<tr>
<th>Elective</th>
<th>Number Enrolled</th>
<th>Universities represented (number of students)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Core/Elective†</td>
<td>107</td>
<td>Kansas State University (100)</td>
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<tr>
<td></td>
<td></td>
<td>Virginia-Maryland (1)</td>
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<tr>
<td></td>
<td></td>
<td>University of California-Davis (1)</td>
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<td></td>
<td></td>
<td>University of Pennsylvania (3)</td>
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<td>University of Illinois (1)</td>
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<td></td>
<td></td>
<td>University of Minnesota (1)</td>
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<tr>
<td>Beef Production/Financial Management</td>
<td>5</td>
<td>Kansas State University (3)</td>
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<td></td>
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<td>Oklahoma State (1)</td>
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<td></td>
<td></td>
<td>Washington State (1)</td>
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<td>Bovine Reproduction</td>
<td>7</td>
<td>Kansas State University (6)</td>
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<td></td>
<td></td>
<td>Virginia-Maryland (1)</td>
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<tr>
<td>Bull Breeding Soundness</td>
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<td>Kansas State University (2)</td>
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<td>Calving</td>
<td>18</td>
<td>Kansas State University (10)</td>
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<td>University of California-Davis (1)</td>
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<td>University of Illinois (2)</td>
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<td></td>
<td></td>
<td>University of Pennsylvania (3)</td>
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<td>Feedlot Production Management and Health Consulting</td>
<td>17</td>
<td>Kansas State University (15)</td>
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<td></td>
<td></td>
<td>Virginia-Maryland (1)</td>
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<tr>
<td></td>
<td></td>
<td>Iowa State University (1)</td>
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<tr>
<td>Lambing</td>
<td>5</td>
<td>Kansas State University (2)</td>
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<td>Auburn University (2)</td>
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<td></td>
<td></td>
<td>University of Illinois (1)</td>
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<td>Pregnancy Examination</td>
<td>10</td>
<td>Kansas State University (10)</td>
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<tr>
<td>Exploration of Food Animal Production‡</td>
<td>99</td>
<td>Kansas State University</td>
</tr>
</tbody>
</table>

Total Enrollment 270

*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 2000- May 2001.

† Offered as both a required rotation in the KSU CVM curriculum (GPVEC Clinical Core) for fourth-year veterinary medical students (VM-4) and as a one-week clinical elective for students from other veterinary medical students (VM-4).

‡ Required rotation for KSU Sophomores (will eventually replace the Clinical Core Rotation)
Table 6. GPVEC Student Electives, 2000-2001
(All student electives are held for one week)

<table>
<thead>
<tr>
<th>Course taught</th>
<th>Offered</th>
<th>Date</th>
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<tbody>
<tr>
<td>Clinical Core/Elective</td>
<td>36 weeks</td>
<td>Year-round</td>
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<tr>
<td>Beef Production and Financial Management</td>
<td>1 week</td>
<td>September</td>
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<tr>
<td>Bovine Reproduction</td>
<td>1 week</td>
<td>October/November</td>
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<tr>
<td>Bull Breeding Soundness</td>
<td>1 week</td>
<td>April</td>
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<tr>
<td>Calving</td>
<td>5 weeks</td>
<td>February, March</td>
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<tr>
<td>Feedlot Management and Consulting</td>
<td>5 weeks</td>
<td>February, October, November</td>
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<tr>
<td>Pregnancy Examination</td>
<td>3 weeks</td>
<td>September, October</td>
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<tr>
<td>Lambing</td>
<td>7 weeks</td>
<td>January, March, May</td>
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Table 7. GPVEC Continuing Education Seminars 2000

<table>
<thead>
<tr>
<th>CowCalf5 Herd Health Record System Software</th>
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<tr>
<td>Seminar Dates</td>
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<tr>
<td>February 10, 2000</td>
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<td>February 17, 2000</td>
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<tr>
<td>March 30, 2000</td>
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<tr>
<td>Total Enrollment</td>
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Table 8. Beef Cattle Production Management Series 2000*


<table>
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<th>Course Topics</th>
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<tr>
<td><strong>Financial</strong></td>
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<td>Communications Skills</td>
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| **Nutrition**                 |
| Range Cow Nutrition/Management |
| Beef Cattle Protein Requirements/Feedstuffs |
| Evaluating Forage Quality      |
| Basic Ration Formulation       |
| Replacement Heifer Nutrition   |
| NRC-Nutrient Requirements and Rations |
| By-Products Feeds and Feed Additives |
| Stocker Nutrition/Management   |
| Vitamins/Minerals/Feed Additives |
| Nutritional Considerations for Improving Efficiency |
| Feed Delivery Management       |
|                               |

| **Biotechnology**             |
| Integrating Biotechnology into Beef Production |
| Bovine Genomics               |
| Biotechnological Advances in Veterinary Diagnostics and Pharmaceutics |
| Food Animal Transgenics and Cloning |
|                               |

| **Beef Cattle Breeding**       |
| Breed Differences             |
| Crossbreeding and Composites  |
| Bull Selection                |
| Value of Live and Carcass Traits of Cattle |
| Profitable Bull Selection     |
| Important Concepts of Beef Cattle Selection |
| Evaluation of Maternal, Growth, and Carcass Characteristics of Diverse Breeds |
| Use of Heterosis and Breed Differences in Crossbreeding and Composite Breeds |
| Selection for Calving Ease    |
Table 9. Beef Cattle Production Management Series Participants

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<thead>
<tr>
<th></th>
<th>Name</th>
<th>Location</th>
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<tbody>
<tr>
<td>1.</td>
<td>Madlyn Buhman*</td>
<td>Clay Center, Nebraska</td>
</tr>
<tr>
<td>2.</td>
<td>Harvey Crumm</td>
<td>Fort Collins, Colorado</td>
</tr>
<tr>
<td>1.</td>
<td>Renee Dewell*</td>
<td>Clay Center, Nebraska</td>
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<tr>
<td>4.</td>
<td>Dale Grotelueschen*</td>
<td>Scottsbluff, Nebraska</td>
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<tr>
<td>5.</td>
<td>Kelly Heath*</td>
<td>Pierce, Nebraska</td>
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<tr>
<td>7.</td>
<td>Jess Hinrichs</td>
<td>Sutton, Nebraska</td>
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<tr>
<td>8.</td>
<td>Clint Kesterson*</td>
<td>Alliance, Nebraska</td>
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<td>9.</td>
<td>Phillip Kesterson*</td>
<td>Bridgeport, Nebraska</td>
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<tr>
<td>10.</td>
<td>Carter King*</td>
<td>Loveland, Colorado</td>
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<tr>
<td>11.</td>
<td>Jason Larsen*</td>
<td>Freeman, Colorado</td>
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<tr>
<td>12.</td>
<td>Steve McDonald*</td>
<td>Henrietta, Texas</td>
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<tr>
<td>13.</td>
<td>Eric Moore</td>
<td>Great Bend, Kansas</td>
</tr>
<tr>
<td>14.</td>
<td>Angie Nielsen*</td>
<td>Creighton, Nebraska</td>
</tr>
<tr>
<td>15.</td>
<td>Dan Nielsen*</td>
<td>St. Paul, Nebraska</td>
</tr>
<tr>
<td>17.</td>
<td>Rexanne Struve*</td>
<td>Manning, Iowa</td>
</tr>
<tr>
<td>18.</td>
<td>Matt Sullivan</td>
<td>Smith Center, Kansas</td>
</tr>
<tr>
<td>19.</td>
<td>Mike Wells*</td>
<td>Guthrie Center, Iowa</td>
</tr>
</tbody>
</table>

*Received Certificate of Completion, October 2000*
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peter Chenoweth, BVSc, PhD</td>
<td>Mentor &amp; Consultant</td>
<td>Kansas State University</td>
</tr>
<tr>
<td>Terry DeGroff, DVM</td>
<td>Adjunct Professor &amp; Private</td>
<td>Burwell, Nebraska</td>
</tr>
<tr>
<td>Grant Dewell, DVM, MS</td>
<td>Lecturer</td>
<td>University of Nebraska - GPVEC</td>
</tr>
<tr>
<td>Dee Griffin, DVM, MS</td>
<td>Professor</td>
<td>University of Nebraska - GPVEC</td>
</tr>
<tr>
<td>Eddie Hamilton, DVM, MAg</td>
<td>Associate Professor</td>
<td>South Dakota State University</td>
</tr>
<tr>
<td>Laura Hungerford, DVM, MPH,</td>
<td>Associate Professor</td>
<td>University of Nebraska - GPVEC</td>
</tr>
<tr>
<td>Steve Johnson, BA</td>
<td>Computer Systems Manager/Analyst</td>
<td>University of Nebraska - GPVEC</td>
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<tr>
<td>Jim Keen, DVM, PhD</td>
<td>Veterinary Medical Officer</td>
<td>U.S. Meat Animal Research Center</td>
</tr>
<tr>
<td>Todd Milton, MS, PhD</td>
<td>Assistant Professor</td>
<td>University of Nebraska-Lincoln</td>
</tr>
<tr>
<td>Louis Perino, DVM, PhD</td>
<td>Professor of Immunology, Health and Management</td>
<td>West Texas A&amp;M University</td>
</tr>
</tbody>
</table>
All Department faculty are involved in some research activity, either as project leaders or as contributors to research teams. 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 assigned ARD Research Project numbers. Through an extension of this same process, 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. Several projects are assigned ARD numbers for administrative and budget management purposes even though they are not specifically research projects, e.g., the Nebraska SPF Swine laboratory project (NEB 14-029) and the Nebraska Veterinary Diagnostic Laboratory System project (NEB 14-059). Research projects funded by the UNL Center for Biotechnology or other external sources are not required to go through the ARD Research Project review process.

FACULTY RESEARCH INTERESTS

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

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

**Cirillo, Jeffrey D.**
Molecular bases of pathogenesis of respiratory pathogens, primarily *Mycobacterium spp* and *Legionella pneumophila*

**Donis, Ruben O.**
Molecular biology of RNA viruses: replication and interactions with hosts; primarily bovine viral diarrhea virus and influenza virus

**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

**Grotelueschen, Dale M.**
Impact of production practices on disease characteristics and prevalence in beef cattle
<p>| +Hungerford, Laura L. | Epidemiological approaches to study of livestock diseases, zoonotic diseases, and wildlife diseases |
| +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 |
| +Lou, Marjorie F. | Biochemical mechanism of senile cataract formation: controls of cellular thiol/disulfide homeostasis |
| +Moxley, Rodney A. | 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) |
| +Osorio, Fernando A. | Pathogenesis of persistent viral infections including persistent reproductive and respiratory syndrome (PRRS) virus and herpesvirus latency; vesicular diseases |
| +Rogers, Douglas G. | Pathogenesis of chlamydial infections in livestock |
| +Rupp, Gary P. | Effect of production practices and management on beef cattle diseases and enterprise profitability |
| +Schneider, Norman R. | Pharmacokinetics and physiology of nitrate and nitrite in food animals |
| +Sherman, Gary B. | Ungulate gonadotropin gene and hormonal structure-function relationships and sire influence on beef cattle production efficiency |
| +Smith, David R. | 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 |
| +Srikumaran, Subramaniam | Pathogen-host cell interactions, alternatives to conventional vaccines and regulation of immune responses |
| +Steffen, David J. | Diagnosis and characterization of genetic and congenital diseases of cattle |
| +Wallner-Pendleton, Eva A. | Pathogenesis and control of avian diseases |
| +Wills, Robert W. | Epidemiology and ecology of swine diseases |</p>
<table>
<thead>
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<th>ARD Project #</th>
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<tr>
<td>14-009</td>
<td>CSRS/NEB: (0005609) Prevention and Control of Enteric Diseases of Swine (Moxley/Dufrene)</td>
<td>09/30/2002</td>
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<td>14-014</td>
<td>CSRS/NEB: (0060898) Bovine Respiratory Disease: Risk Factors, Pathogens, Diagnosis and Management (Nikumarat)</td>
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<td>14-039</td>
<td>SAES/NEB: (0096920) Research Laboratory and Animal Care Facility (Schmitz)</td>
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<td>STATE: Vet Diagnostic Lab System: Diagnostic Surveillance &amp; Disease Investigation in Nebraska Livestock &amp; Poultry (Schmitz/Doster/Johnson/Grotelueschen/Moxley)</td>
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<td>14-093</td>
<td>CSRS/NEB: (0172795) Bovine Respiratory Syncytial Virus Glycoprotein Interactions in a Homologous Host Cell Receptor (Kelling)</td>
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<td>14-094</td>
<td>CSRS/NEB: (0175076) Molecular Characterization of Animal RNA Viruses and Their Interactions with the Host (Donis)</td>
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<td>14-095</td>
<td>CSRS/NEB: (0175978) Interaction of Porcine Reproductive and Respiratory Syndrome Virus and Salmonella Choleraesuis (Wills)</td>
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<td>14-096</td>
<td>CSRS/NEB: (0175505) Functional Analysis of the BHV-1 Latency Related Gene (Jones)</td>
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<td>14-097</td>
<td>CRGO/NEB: (176992) Functional Analysis of Bovine Herpes Virus 1 Latency Related Gene Products (Jones)</td>
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<td>14-100</td>
<td>CRGO/NEB: (0181035) Analysis of Apoptosis and Pathogenesis by Bovine herpes Virus and bICPO (Jones/Doster)</td>
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<td>14-102</td>
<td>HATCH/CSRS/NEB: (0180678) Strategic Plan for an IANMR Disease Research Program at the Department of Veterinary &amp; Biomedical Sciences (Smith)</td>
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<td>14-103</td>
<td>ANIMAL HLTH/CSRS/NEBR: (0181124) Pathogenic Mechanisms of Bacterial Respiratory Pathogens (Cirillo)</td>
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<td>14-104</td>
<td>CRGO:NEB: (0182215) Identification of Mycobacterium paratuberculosis Virulence Determinants (Barletta)</td>
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<td>14-105</td>
<td>CRGO-NEB</td>
<td>(0182830) CIS-Effect of PRRSV on the Immune System During Acute and Persistent Infection (Osorio)</td>
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<td>14-107</td>
<td>CSRS-NEB</td>
<td>(0183912) Theoretical and Applied Molecular Biology of Porcine Gonadotropins (Sheehan)</td>
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<tr>
<td>14-108</td>
<td>CSRS-NEB</td>
<td>(0184662) Molecular Genetic Analysis of Mycobacterium Paratuberculosis and Related Mycobacterial Pathogens (Badetra)</td>
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<td>14-109</td>
<td>CSRS-HATCH</td>
<td>(0185064) Epidemiology of Escherichia Coli O157:H7 and Salmonella in Feedlot Beef Cattle (Smith)</td>
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Although swine dysentery (SD) generally causes a more severe colitis than porcine colonic spirochephalis (PCS), comparative histopathological assessment of colonic tissues from naturally-occurring cases stained by immunohistochemistry revealed overlapping changes between the two diseases and the need to identify etiological agent using species-specific methods. Comparison of the growth characteristics of human, porcine and canine Brachysira pilosioadi adapted to pre-reduced anaerobically-sterilized trypticase soy broth, heart infusion broth and a chemically defined medium revealed that the newly designed defined medium could support investigations into physiological mechanisms of B. pilosioadi pathogenesis. Assessment of the role of dietary factors in modulating B. pilosioadi infection and colitis revealed that diarrhea and infection are more persistent and colonic lesions are more severe and widespread in pigs with diet-induced colonic acidosis. Parenteral administration of a commercially-available inactivated monovalent group A rotavirus (G6P6[1]) vaccine to first calf beef heifers elicited a strong G6-specific response with a lower response to other RV serotypes.

Impact Statement: Pathological and microbiological investigations using naturally-occurring and experimentally-induced spirochetal colitis have improved our understanding of the pathogenesis of diseases caused by B. hyodysenteriae and B. pilosioadi. A newly developed chemically defined medium will help identify specific growth requirements and substrate utilization for growth of pathogenic intestinal spirochetes of humans and animals. A better understanding of the immune response elicited by vaccines against rotavirus in cattle has immediate practical application to development of improved vaccines for prevention of neonatal calf diarrhea.
that the leukotoxin of Pasteurella haemolytica binds to the beta 2 integrins on the bovine leukocytes.

**Impact Statement:** Development of strategies to induce CTL response against BHV-1 should lead to the development of more efficacious vaccines against this economically important pathogen.

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**Research laboratory and Animal Care Facility**

J.A. Schmitz  
NEB 14-039

The Animal Research Facility (ARF) performed 11 caesarean surgeries, including 8 conducted to produce gnotobiotic neonates (5 bovine, 3 porcine) and 3 to recover mid-term fetuses following embryo transfers to the dam as a method for studying a possible bovine genetic disease. The ARF provided housing for 1,561 research animals, including mice, gerbils, hamsters, rabbits, cats, dogs, sparrows, chickens, pigs, sheep and cattle. These animals were used for research projects of faculty in various UNL departments including Veterinary and Biomedical Sciences (VBMS), Food Science and Nutritional Sciences and Dietetics. Six commercial firms and commodity groups were involved in these animal research projects also. The Sewage Sterilization Plant was renovated and put into functional condition so that it could accommodate projects of biosecurity concern, including a project on E. coli 0157:H7.

**Impact Statement** - Research laboratory and infrastructure support, and research animal care was provided for 22 Nebraska Agricultural Research Division (ARD) research projects in the VBMS Department and multiple ARD projects in other Departments. The primary goal of the VBMS research projects is generation of new knowledge about infectious diseases of agricultural animals, with potential development of new or improved vaccines, or other intervention strategies, that will contribute to improved animal well being and reduced economic losses.

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**Veterinary Diagnostic Laboratory System: Diagnostic Surveillance and Disease Investigation in Nebraska Livestock and Poultry**

J A Schmitz, DJ Steffen, S Ensley, DM Grotelueschen, BW Brodersen, DG Rogers, S Hinkley, E Wallner-Pendleton, AR Doster & FA Osorio  
NEB 14-059

A convenient, cost-effective procedure for BVDV detection was developed. Persistently infected calves are a source of infection. Previous methods required calves to be greater than 8 weeks old. This procedure allows infected dairy calves to be removed when they are assembled for heifer development at 7-21 days of age. Infected beef calves can be removed before breeding season to prevent infertility of dams. More than 18,000 calves have been tested by the Vet Diagn Center and more than 200 infected calves have been removed from herds.

Pseudorabies virus was eradicated. All the diagnostic testing was performed in the Nebraska Diagnostic Center. Surveillance testing is active (>100,000) samples/ year. Nebraska is a national referral lab for diagnosis of single reactors to the serologic PRV test. This supports eradication in other states and protects Nebraska swine from reintroduction of the disease.

The PCR reaction was used to characterize E. coli O157H7 isolates in support of research. The molecular diagnostics lab allows us to characterize other E. coli isolates from livestock to determine if they are truly virulent and suitable candidates for autogenous vaccine development. The lab allows definitive diagnosis of zoonotic diseases (anthrax, leptospirosis). Mycoplasma bovis, an increasing cause of chronic respiratory disease in feedlots has been diagnosed using molecular techniques.

Tibial hemimelia in Shorthorn cattle was first recognized and characterized. This recessive trait was
being spread by artificial insemination. The disorder is now controllable. Type 1 procollagen alpha deficiency was discovered in Angus cattle. We characterized and eliminated the disease from the breed. The model was preserved for further research.

Chlamydia was experimentally demonstrated to cause enterocolitis in weaned pigs. The pathologic features were characterized. A for studying circovirus infections in pigs was developed. This virus causes a new wasting syndrome in Nebraska's pigs. A model for characterizing the effect of Circovirus and PRRS co-infections was studied. These dual infections are common in naturally occurring outbreaks.

A neosporosa abortion outbreak in Nebraska was investigated and data demonstrated many cattle develop protective immunity and culling seropositive cattle is not warranted. The diagnostic service processed, analyzed and reported in writing results on 12,573 animal disease investigations in all regions of the state. This involved more than 273,000 individual tests. This activity provides a direct benefit to the Nebraska Livestock industry by guiding disease detection, intervention, treatment and prevention programs. This diagnostic material is used for foreign and emerging disease surveillance and is the impetus for the research projects mentioned above. These activities all support Nebraska's 5 billion dollar livestock industry by promoting animal health and well being. Submission data suggest $148.9 million dollars of livestock were directly associated with animal disease outbreaks investigated.

• Molecular Characterization of MHC Class I Down-Regulation By Bovine Herpesvirus 1 •

S. Srikumaran, NEB 14-091

Cytotoxic T-lymphocytes (CTLs) are crucial for the defense against herpesviral infections. CTLs recognize viral peptides presented by the MHC class I molecules. Previous studies in our laboratory found that bovine herpesvirus 1 (BHV-1) down-regulates the expression of class I molecules as a means of evasion of host immune response. The objectives of this project are to identify the BHV-1 protein(s) that mediate(s) the down-regulation, and to elucidate the mechanism(s) by which BHV-1 causes this effect. Experiments with metabolic inhibitors, and the early onset of impairment, indicated that an immediate early or early protein(s) is/are responsible for the effect. Studies with an E2.6/2.9 null mutant implicated the E2.6 protein in the down-regulation. Slower replication kinetics of this mutant, however, prevents a definite determination of E2.6 as the protein involved in the down-regulation. Analysis of the transport of peptides from the cytosol to the endoplasmic reticulum revealed that BHV-1 interfered with the function of transporters associated with antigen processing as early as 2 hours post-infection, in a dose-dependent manner. Pulse chase experiments suggested that the synthesis and maturation of class I molecules were also impaired. Monitoring of steady state levels of mRNA indicated that the mRNA for class I and II molecules as well as two house keeping genes was down-regulated. Further studies identified a putative BHV-1 homologue of herpes simplex virus virion host shut-off gene.

Impact Statement: Elucidation of the mechanisms by which BHV-1 down-regulates the expression of class I molecules will lead to better understanding of the pathogenesis of the disease, which in turn should help in the control of the disease. Identification of the viral proteins responsible for the down-regulation should help in the development of vaccines better than the currently used ones.
• Bovine Respiratory Syncytial Virus Glycoprotein Interactions in a Homologous Host Cell Receptor System •

C. Kelling

Bovine respiratory disease (BRD) complex has a major economic impact on the beef industry from morbidity, mortality, and reduced efficiencies in beef production. Bovine respiratory syncytial virus (BRSV) and bovine viral diarrhea virus (BVDV) contribute to the BRD complex by causing lower respiratory tract infections and immunosuppression, respectively. We previously reported interaction between BRSV and BVDV during combined infections which resulted in more severe respiratory tract disease than that caused by single infections with either virus. We recently examined the 5' untranslated region (UTR) of four low and four high virulence genotype 2 (BVDV2) isolates. Sequence analysis of the 5' UTR from these isolates identified virulence markers consisting of two conserved nucleotide substitutions at position 219 and 278 in domain D of the 5' UTR internal ribosomal entry site (IRES). These nucleotide changes separated the high from low virulence isolates. Functional analyses of the role of the BVDV 5' UTR IRES elements of the eight BVDV2 isolates were conducted to determine the biological significance of the nucleotide changes that correlated with virulence. In vitro translation efficiencies using a bicistronic reporter system showed a distinct correlation between translational efficiency and virulence. These studies will help in the understanding of virulence mechanisms in the pathogenesis of acute BVDV2 infections.

Impact Statement: BRSV infections are a key component of the bovine respiratory disease complex which represents the most costly disease complex affecting cattle on feed. Host immune responses to BRSV are incomplete, reinfection is common and vaccines are not very effective. Our research to date has enabled us to study and understand immunological pathological mechanisms which are fundamental to developing effective vaccines to help reduce production losses.

• Molecular characterization of animal RNA viruses and their interactions with the host •

R. Donis

The beef and milk producers of Nebraska and elsewhere continue to endure losses due to bovine viral diarrhea virus (BVDV) infections. Rational design of effective control strategies requires knowledge of the biological properties of BVDV. To this end we are characterizing the molecular bases of the cytopathology caused by BVDV. In order to analyze BVDV-induced cytopathology in genetically identical genetic backgrounds, we have constructed an isogenic pair of the CP BVDV NADL by engineering a full-length cDNA clone. Northern analyses showed that RNA accumulation in cells infected with CP virus was up to 25 times higher than in cells infected with the isogenic NCP BVDV. No significant difference in growth kinetics and viral yields were observed between the CP BVDV and the isogenic NCP pair. These results implicate increased levels of RNA accumulation in CP BVDV infected cells, along with the production of NS3 as potential contributors to viral cytopathogenicity. These findings also provide a framework to analyze the signaling cascades that trigger apoptosis in CP BVDV infected cells.

Previous analyses of the internal ribosome entry site (IRES) of BVDV suggested that elements 3' to AUG366-368 influenced translation initiation. For example, removal of the Npro coding region (resulting in a relocated BVDV core protein-coding region immediately adjacent to the 3' of the AUG) reduced translation by 21%. To determine the importance of Npro and its coding region in IRES function we constructed bicistronic reporter plasmids with deletions, silent or coding mutations and in the encoding RNA. The loss in translation efficiency of a mutant expressing WT Npro encoded by an altered RNA sequence was three fold greater than that of the Npro deletion mutant. Since RNA sequence changes can be more detrimental for
IRES function than the absence of Npro we postulate that RNA structures located 3' of the AUG are the most important modulators of IRES activity. The function of Npro in virus replication was analyzed by construction of a BVDV genome lacking the respective Npro-encoding RNA sequences. The resulting BVDV-deltaNpro virus replicates to levels 6-fold below wildtype highlighting the critical importance of efficient translation initiation for virus replication. Work is in progress to determine the virulence of this virus in cattle.

Infectious transcripts from the full-length infectious clone of the NADL strain of BVDV were used to vaccinate cattle and sheep against BVDV. In vitro synthesized RNA delivered by microparticle bombardment with a Helios Gene Gun initiated replication of BVDV and consequently induced humoral immunity against type I BVDV (serum neutralization titers, SNT, > 212) and type II BVDV (SNT > 27). The RNA cartridges were found to be stable for at least 8 months upon storage. This is the first report on successful RNA vaccination of large ruminants.

**Impact Statement:** Reproductive, respiratory, and intestinal diseases caused by bovine viral diarrhea virus (BVDV) affects nearly every beef and dairy cattle producer in the U.S. The work reported here provides candidate attenuated strains for live vaccines and also a novel delivery method that circumvents the use of needles for vaccination. Effective vaccination could producers $25 to $30 per animal each year.

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**Interaction of Porcine Reproductive and Respiratory Syndrome Virus and Salmonella Choleraesuis**

Robert Wills

Mechanisms of transmission directly impacts the dynamics of virus transmission and clinical outcome in a herd. This study was designed to determine, through a systematic approach, how long pigs infected with porcine reproductive and respiratory syndrome virus (PRRSV) remain contagious to age-matched sentinel pigs. Two trials were conducted. In each trial, five pigs (principals) housed in one isolation room were inoculated with PRRSV. Four or 6 days after the principals were inoculated, a pair of seronegative sentinel pigs were placed in direct contact with the principal pigs. The sentinel pigs were removed from the principals' room after 2 weeks and moved to a separate isolation room and held for 2 more weeks to allow time for seroconversion. One week after the first pair of sentinel pigs was removed from the principals' room, two more sentinel pigs were placed in direct contact with the principals. After two weeks of exposure to the principals this pair of sentinels was also moved to an isolation room. This rotation was continued through 8 pairs of sentinel pigs. Isolation of virus or positive ELISA results in serum collected from sentinel pigs after exposure to the principals were considered as evidence that transmission had occurred between the principal and the sentinel pigs. The principal pigs were found to be contagious through day 60 or 62, but not after day 67 or 69. The trials were terminated before the principals returned to seronegative status. The principals remained seropositive for at least 14 weeks after they were last shown to be contagious.

**Impact Statement:** The results of this study provide guidelines for estimating the duration of time that infected pigs may be expected to transmit PRRSV to other pigs. This information is especially pertinent in the development of gilt acclimation programs and in herd virus-elimination programs. Until the effect of other factors that affect transmission are better understood it is dangerous to assume from a biosecurity point of view that the relatively short contagious period found in this study is typical of transmission between similar aged pigs.
•Functional Analysis of bovine herpes virus 1 latency related gene

C. Jones

Bovine herpesvirus 1 (BHV-1) is an important pathogen of cattle that belongs to the alpha-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). The latency related (LR) gene of bovine herpesvirus 1 (BHV-1) encodes a protein that interacts with cyclin dependent kinase 2 (cdk2) and inhibits S phase entry. In general, cell cycle inhibitors prevent apoptosis of terminally differentiated cells, including neurons. Conversely, cdk2, cdk3, and cdc2 can initiate apoptosis. Thus, we hypothesized that LR gene products inhibit apoptosis. Plasmids expressing LR gene products enhance survival of monkey kidney cells (CV-1) and human lung cells (IMR-90) after treatment with chemicals that induce apoptosis, C6-ceramide and fumonisin B1. Insertion of termination codons at the amino terminus of LR ORF2 or deletion of sequences that mediate splicing of the LR transcript abrogated the anti-apoptotic effect. In contrast to the LR gene, the BHV-1 ICP0 gene was toxic to cells. Trigeminal ganglionic neurons from cattle express G1 cyclins and S phase cyclins during acute infection. Cells in trigeminal ganglia (including neurons) of infected cattle exhibited a higher frequency of apoptosis relative to uninfected cattle, as judged by TUNEL assays. Since BHV-1 induces apoptosis, we hypothesize that LR gene products promote survival of post-mitotic neurons during acute infection or reactivation. We have developed LR mutants that do not express LR proteins. This mutant grows well in tissue culture, but does not grow well during acute infection of calves. Furthermore, the LR gene mutant does not cause the normal disease that is typically seen when calves are infected with wild type BHV-1. We hypothesize that the LR gene is an important pathogenic marker of BHV-1, which is consistent with our results from transient transfection assays.

Impact Statement: BHV-1 is an important pathogen of cattle, which costs the cattle industry $1/2 billion/year in the US. Infection leads to several serious upper respiratory infections and is an initiator of “Shipping Fever.”

•Functional Analysis of Bovine Herpes Virus 1 Latency Related Gene Products •

C. Jones

Bovine herpesvirus 1 (BHV-1) is an important pathogen of cattle that belongs to the alpha-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). The latency related (LR) gene of bovine herpesvirus 1 (BHV-1) encodes a protein that interacts with cyclin dependent kinase 2 (cdk2) and inhibits S phase entry. In general, cell cycle inhibitors prevent apoptosis of terminally differentiated cells, including neurons. Conversely, cdk2, cdk3, and cdc2 can initiate apoptosis. Thus, we hypothesized that LR gene products inhibit apoptosis. Plasmids expressing LR gene products enhance survival of monkey kidney cells (CV-1) and human lung cells (IMR-90) after treatment with chemicals that induce apoptosis, C6-ceramide and fumonisin B1. Insertion of termination codons at the amino terminus of LR ORF2 or deletion of sequences that mediate splicing of the LR transcript abrogated the anti-apoptotic effect. In contrast to the LR gene, the BHV-1 ICP0 gene was toxic to cells. Trigeminal ganglionic neurons from cattle express G1 cyclins and S phase cyclins during acute infection. Cells in trigeminal ganglia (including neurons) of infected cattle exhibited a higher frequency of
apoptosis relative to uninfected cattle, as judged by TUNEL assays. Since BHV-1 induces apoptosis, we hypothesize that LR gene products promote survival of post-mitotic neurons during acute infection or reactivation. We have developed LR mutants that do not express LR proteins. This mutant grows well in tissue culture, but does not grow well during acute infection of calves. Furthermore, the LR gene mutant does not cause the normal disease that is typically seen when calves are infected with wild type BHV-1. We hypothesize that the LR gene is an important pathogenic marker of BHV-1, which is consistent with our results from transient transfection assays.

Impact Statement: BHV-1 is an important pathogen of cattle, which costs the cattle industry $1/2 billion/year in the US. Infection leads to several serious upper respiratory infections and is an initiator of "Shipping Fever."

--Monitoring Individual Animal Performance to Evaluate Beef Cattle Production and Economics--

G. P. Rupp and D. D. Griffin

Lifetime performance is being followed on approximately 3000 calves per year for three years on five cow herds. Data from breeding through carcass will be available on a portion of the calves and following the third year, carcass information is expected to be completed for approximately 1800 head. A blood sample was collected following birth from a number of calves to determine the level of passive immunity shortly after calving. The serum titers of IgG indicated the ability of calves to rapidly absorb immunoglobulin after acquiring colostrum. A collateral project was initiated to determine the time of absorption in calves. The use of DNA microsatellite markers to identify individual sires of calves following the use of multi-sire natural breeding pastures has been underway for two years. This part of the study is expected to reveal important individual sire contributions to calf performance and assist in defining factors affecting reproductive efficiency in multi-sire breeding situations. Financial information necessary for completing the yearly Standard Performance Analysis is being collected to define production costs.

--Analysis of Apoptosis and Pathogenesis by Bovine Herpes Virus and BICPO--

C. Jones and A. Doster

Acute infection of cattle with bovine herpesvirus 1 (BHV-1) represses cell-mediated immunity, which consequently can lead to secondary bacterial infections. Since BHV-1 can induce apoptosis of cultured lymphocytes, we hypothesized these virus-host interactions occur in cattle. To test this hypothesis, we analyzed lymph nodes and peripheral blood mononuclear cells (PBMC) after calves were infected with BHV-1. In situ terminal deoxynucleotidyl transferase-mediated dUTP nick end-labeling (TUNEL) staining of lymphoid tissues (pharyngeal tonsil, cervical, retropharyngeal, and inguinal) was used to detect apoptotic cells. Calves infected with BHV-1 for 7 days revealed increased apoptotic cells near the corticomedullary junction in lymphoid follicles and in the subcapsular region. Increased frequency of apoptotic cells was also observed in the mucosal-associated lymphoid tissue (MALT), which line the trachea and turbinates. Immunohistochemistry of consecutive sections from pharyngeal tonsil revealed CD2+ T lymphocytes were positive for the BHV-1 envelope glycoprotein gD. The location of these CD2+ T lymphocytes in the germinal center suggested they were CD4+ T cells. In latently infected calves, viral DNA was consistently detected in germinal centers of lymph nodes and tonsil. This suggested lymphoid cells in the tonsil and lymph nodes were latently infected. Little or no viral gene expression was detected in this tissue, unless viral reactivation was initiated by dexamethasone. Taken together, these results indicate that BHV-1 can persist in
lymphoid cells in cattle, which we hypothesize promotes virus transmission and can induce immunosuppression.

**Impact Statement**: BHV-1 is an important pathogen of cattle, which costs the cattle industry $1/2 billion/year in the US. The ability of BHV-1 to infect lymphocytes is believed to enhance pathogenesis and virus transmission.

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**Role of E. Coli Heat-Labile Enterotoxin-I in Diarrhea and Septicemia in Swine**

R. A. Moxley and R. G. Barletta

Isogenic heat-labile enterotoxin (LT) deletion mutants (LT-) and complemented mutants (LT+) of porcine-origin enterotoxigenic Escherichia coli strain 2534-86 (serotype O157:K87:NM:K88ac) were constructed. Plasmid pMUN281 was constructed by removing a 910-bp SmaI-XbaI fragment (eltAB 171-1081) from pWD600 and replacing it with a 1240-bp kanamycin-resistance cassette (aphA) from pUC4K. This eltAB region containing the kanamycin-resistance cassette was cloned into the XbaI site of pCVD442 and transformed into E. coli S17-1 lambda pir to yield donor strain MUN283. Cultures of MUN283 and WAM2317 (nalidixic acid resistant mutant of 2534-86) were mated and subcultured overnight on Lucia-Bertani (LB) agar containing nalidixic acid and kanamycin (LB-NAL-KM). Kanamycin-resistant transconjugants with reduced LT activity by GM1 ELISA were selected for further study. Separate cultures of 15 different transconjugants were grown in LB broth without NaCl at 37 C with aeration. After an overnight incubation, cultures were diluted 1:10,000 to 1:100,000, plated on LB agar containing 5% sucrose, nalidixic acid, kanamycin, and no NaCl, and incubated overnight at 28 C. Plates were screened for LT-deletion mutants by colony blot hybridization by first probing with the aphA gene and then with the eltAB 171-1081 fragment. Colonies that hybridized with the aphA, but not the deletion site probe were streaked onto LB-NAL-KM-sucrose plates to confirm purity and appropriate antibiotic resistance patterns, then were tested by PCR using oligonucleotide primers 53 and 1327 outflanking the deleted region. Transconjugants that had undergone a single-crossover event were identified by the production of both a 1274-bp and a 1604-bp amplicon, whereas those that had undergone a double-crossover event were identified by the production of only the larger product. Two strains that produced only the 1604-bp product, designated MUN284 and MUN285, were further demonstrated by Southern blot analyses of HindIII and XbaI digests of their genomic DNA to be eltAB and aph probe positive and deletion site probe negative. Whereas periplasmic extracts of 2534-86 and WAM2317 contained marked LT activity as detected by GM1 ELISA and Y1 adrenal cell assay, no such activity was detected in periplasmic extracts of strains MUN284 and MUN285. For LT complementation, a PCR-amplified 1274-bp eltAB fragment from WAM2317 was cloned into pMMB66, generating pMUN287. This plasmid was transfected into MUN285, generating the complemented (LT+) mutant strain MUN287. By immunoblot analysis using rabbit anti-cholera toxin serum, periplasmic extracts of 2534-86, WAM2317, and MUN287 contained 28- and 12.8-kDa proteins corresponding to the A and B subunits of LT, respectively, whereas these proteins were absent from periplasmic extracts of MUN284 and MUN285. Studies comparing the pathogenicity of 2534-86, WAM2317, MUN285, and MUN287 in gnotobiotic piglets are in progress.

**Impact Statement**: Isogenic heat-labile enterotoxin (LT) deletion mutants and complemented mutants of a wild-type porcine-origin strain of enterotoxigenic E. coli were constructed. Studies comparing the pathogenicity of these isogenic mutants should provide a better understanding of how enterotoxigenic E. coli causes disease, through which more effective strategies for the prevention and treatment of enterotoxigenic and septicemic colibacillosis can be developed.
Strategic Plan for an IANMR Disease Research Program at the Department of Veterinary and Biomedical Sciences

D. Smith

The Field Disease Research Program uses a team approach to solve animal disease and public health problems related to methods of livestock production. Individuals with expertise in a variety of fields of livestock health meet each week to discuss animal disease and public health problems; from these discussions we implement applied research projects to help solve these problems. Current research focuses on validation of a testing strategy for bovine viral diarrhea virus, heat stress in feedlot cattle, modeling herd test performance for strategies to determine the Johne's disease status of cattle herds, modeling the predictive value of pre-purchase Johne's disease testing of adult cattle, and testing a calving pasture management system to prevent calf scours in the NE Sandhills region.

Impact Statement: The problems being researched are of economic importance to animal industries. Herd to herd spread of Johne's disease can be prevented if strategies to determine the Johne's disease infection status of herds use an appropriate sample size and serial testing methods, but we cannot prevent the introduction of Johne's disease by pre-purchase testing. Scours may be prevented in neonatal calves by modifying the calving system in Sandhills ranches.

Pathogenic Mechanisms of Bacterial Respiratory Pathogens

J. Cirillo

Respiratory pathogens are the number one cause of death in both domesticated animals and humans throughout the world. Respiratory problems, including bacterial infections, are the number one cause of mortality in cattle and calves leading to greater than 478 million dollars in economic loss in the U.S. Respiratory problems are also the number one cause of nursery deaths in swine. We have begun investigation of the causes of bacterial respiratory pathogens and the common molecular bases for pathogenesis. At present, we have identified more than 50 genes that are involved in virulence of respiratory pathogens and are in the process of constructing mutations in them. Careful characterization of the effects of different mutations on virulence has led to a better understanding of the mechanisms involved. Characterization of multiple strains of Legionella has demonstrated that there is a great deal of variability in the genomic organization and virulence of the strains used for laboratory studies.

These studies suggest that examination of the role of virulence genes in Legionella must take into account the strain used, requiring reexamination of many previous studies in the field. We have also identified a novel gene involved in the mechanism of entry in mycobacteria that appears to be present in all mycobacterial species and is likely to be a key component of pathogenesis in M. bovis and M. paratuberculosis. We have completed sequence and complementation analysis. Further studies are necessary to determine the host receptors involved. In addition, we have developed a novel model system for the study of the virulence mechanisms of fish pathogens. These studies are likely to have a significant impact on studies designed to better understand respiratory pathogens as well as important pathogens in aquaculture. Thus, we have made significant progress in our characterization of virulence determinants in respiratory pathogens and have been able to demonstrate that the determinants we have isolated play an important role in pathogenesis.

Impact Statement: Respiratory Infections in the cattle and swine industry lead to greater than 478 million dollars in economic loss in the U.S. Our laboratory has developed methods that are likely to be useful in the prevention and treatment of these infections. In addition, we have made significant progress in our
characterization of virulence determinants in respiratory pathogens and have been able to demonstrate that these factors play an important role in respiratory diseases in animals.

• Identification of mycobacterium paratuberculosis virulence determinants •

R. Barletta

Mycobacterium avium paratuberculosis, the etiologic agent of paratuberculosis (Johne's disease) in ruminants, causes an estimated $1.5 billion annual loss to the dairy industry alone. Few M. avium paratuberculosis virulence determinants have been characterized. This project seeks to identify the M. paratuberculosis genes encoding virulence determinants, to study their intracellular expression and to elucidate their role in pathogenesis by performing a detailed characterization of the interaction of M. avium paratuberculosis wild type and mutant strains with bovine macrophages. Cellular trafficking studies using the green fluorescent protein reporter gene indicated that wild type live M. paratuberculosis cells prevented phagosome-lysosome fusion in both primary bovine macrophages and in a bovine macrophage cell line. In other studies, using a fluoroquinolone selection strategy, about one hundred auxotrophic mutants were isolated. In addition, approximately fifty random mutants were studied. Microscopic evaluation of one of these mutants carrying an insertion in a gene homologous to the M. tuberculosis H37RV 2484c demonstrated reduced numbers of bacilli per infected cell as well as reduced replication by the BACTEC assay.

Impact Statement: Mycobacterium avium paratuberculosis, the etiologic agent of paratuberculosis (Johne's disease) in ruminants, causes an estimated $1.5 billion annual loss to the dairy industry alone. The characterization of M. avium paratuberculosis mutants that are unable to replicate and/or survive in bovine macrophages may define new virulence determinants that could be targets for the prevention, control and eventual eradication of Johne's disease.

• Cis-effect of PRRSV on the immune system during acute and persistent infection •

F. Osorio

We have studied the ability of Porcine Reproductive and Respiratory Syndrome Virus to establish persistent infection in pigs. So far, the main results of this research are: 1) the persistent infection established by PRRSV is limited in time and that the load of infectious virus progressively declines until this virus disappears completely from the body of the affected animals; 2) the infection by PRRSV appears to cause a suppression or modulation of humoral (neutralizing antibodies) and cellular components of the PRRSV-specific immune response.

During the last year we have concentrated on the following objective: 1) Is the observed delay in humoral neutralizing immune response of any consequence for the overall protection (or lack of thereof) against PRRSV?

For this objective, we plan to conduct a basic experiment of passive transfer of immunity from convalescent to naive animals by means of serum antibodies that specifically neutralize PRRSV, following a classical basic experiment of passive transfer of immunity. The model in which we would test protection is a PRRSV-naive pregnant gilt challenged at day 90 of gestation via the oro-nasal route.

Ten adults animals were used to prepare hyper-immune PRRSV-neutralizing sera through a series of repeated immunizations with different PRRSV strains. The animals were bled out and the immunoglobulin
(Ig) fraction was concentrated and purified, in order to constitute a master stock of SN PRRSV Igs. This master stock of PRRSV SN IgG contains 75 mg/ml of Igs and a SN end-point (FFA) of 1:256. The master stock was tested in two pregnant females, each of which received, at day 87th of gestation, 1.5 ml of the solution, via intraperitoneum. Twenty-four hours later a blood sample was drawn and the end-point for PRRSV SN activity was assessed to be, in both cases, 1:16.

This confirms the suitability of the master stock solution for the experiment of immuno-prophylaxis which is now the forthcoming step in this project.

**Impact Statement:** Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) is the most economically significant infectious disease of domestic swine in the U.S.

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**Theoretical and applied molecular biology of porcine gonadotropins**

G. Sherman

For reasons of confidentiality associated with potential patentability of nucleotide sequence information, methodologies and biomaterials stemming from these studies, "significant findings and accomplishments" are not described herein.

**Impact Statement:** The goal of this work is to exploit recombinant DNA and protein expression technologies to identify the discrete peptide domains and/or individual amino acids responsible for conferring luteotrophic versus follicular activity to porcine gonadotropin (fertility) hormones. It is anticipated that recombinant forms of porcine gonadotropins with novel and potentially useful pharmacologic properties will be produced. In turn, it is expected that these swine-specific hormono-pharmaceuticals will lead to improved methods of controlling fertility and treating infertility in US swine herds.

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**Molecular genetic analysis of mycobacterium paratuberculosis and related mycobacterial pathogens**

R. Barletta

The objectives of this project are to develop a selection strategy to identify M. paratuberculosis transposon mutants with reduced replication in bovine macrophages, to characterize attenuated mutants, to identify and characterize immunogenic M. paratuberculosis secreted and cellular proteins, and to identify drugs effective against M. paratuberculosis. During this period, the focus was on the analysis of M. paratuberculosis superoxide dismutase. Superoxide dismutase (SOD) (EC 1.15.1.1) catalyzes the dismutation of superoxide radicals. Our studies identified the M. paratuberculosis SOD as one of the predominant proteins in the total protein profile of M. paratuberculosis. Two-dimensional gel electrophoresis demonstrated that this SOD has a molecular weight of 23 kDa and a pI of 5.6. The sodA gene was cloned and sequenced. Sequence analysis demonstrated this protein to be manganese-cofactorsed. This enzyme consists of 207 amino acids and differs by a single amino acid from the SOD of Mycobacterium avium subsp. avium. Our finding that SOD is secreted by M. paratuberculosis suggests a potential role for this antigen in eliciting a cell-mediated protective immune response in the host.

**Impact Statement:** Mycobacterium avium paratuberculosis, the etiologic agent of paratuberculosis (Johne's disease) in ruminants, causes an estimated $1.5 billion annual loss to the dairy industry alone. Identification of M. paratuberculosis virulence determinants and secreted antigens may aid in the
development of a cellular or live attenuated vaccines.

- Epidemiology of escherichia coli o157:h7 and salmonella in feedlot beef cattle

D. Smith

All cattle from 29 feedlot pens from 5 Midwestern US feedyards were each studied once during a summer study period. Pen size ranged from 36 to 231 cattle. Feces were collected from the rectums of all cattle in each pen and feed and water samples were collected concurrently from the water-tank and feedbunk. E. coli O157:H7 was isolated from the feces of 719 of 3162 cattle tested (23%), including at least 1 animal from all 29 pens. The pen prevalence ranged from 0.7% to 79.8% (median 17.1%). Feedyards did not differ by pen prevalence; however, within each feedyard the pen prevalence varied widely (p<0.01). Pen prevalence was not associated with recovery of the agent from feed or water, temperature, pH, or cleanliness of water from the water tanks, pH of the feed, number of cattle, mean body weight, or number of days in the feedyard. Wet, muddy pen conditions were associated with higher pen prevalence than pens in normal condition (p=0.01). The prevalence of recovery of E. coli O157:H7 from feces collected from the rectums of all cattle in each pen was compared to recovery of the organism from pen-test devices that cattle could lick, rub, and chew, and a single composite sample of 20 fresh fecal pats from the pen surface. Pen size ranged from 36 to 231 (median 107) cattle. The percentage of cattle shedding detectable levels of the organism within a pen ranged from 0.7% to 79.8%. E. coli O157:H7 was recovered from at least one pen-test device from 15 pens and from the composite feces samples of 8 pens. The higher prevalence pens were more likely to have E. coli O157:H7 recovered from either the pen test devices (p=0.0002) or from the composite feces sample (p=0.001). Classification of the pens as low, medium or high prevalence, based on recovery of the organism from the pen-test device and composite feces, correlated with the percentage of cattle shedding E. coli O157:H7 in their feces (Spearman’s r=0.75, p<0.0001).

Impact statement: Strategies to control food safety pathogens in feedlot cattle may be more efficiently designed with new knowledge that E. coli O157:H7 is common to pens of feedlot cattle and that the pen environment may help explain the prevalence of cattle shedding the organism. The development of a method to accurately classify pens of cattle without the need to handle individual cattle enables large scale studies to identify risk factors for, and test potential interventions to reduce, the number of cattle leaving feedlots carrying E. coli O157:H7.

- Cis-acting elements in the replication of the bovine viral diarrhea virus genome

R. Donis

Infections with bovine viral diarrhea virus, alone or in combination with other agents, cause a variety of disease syndromes that result in large production losses in cattle. The most prominent damages stem from acute disease in young animals as well as reproductive failures in adult females. Improved control measures requires knowledge of the functions of the various BVDV genes and their products. The previous report on this project described the identification of the BVDV IRES element boundaries and the characterization of functionally relevant structural elements. Interestingly, this work led to the realization that the 3' boundary of the IRES extends beyond the initiator methionine codon (AUG codon 366-368). This finding was unexpected because all previously known IRES elements and translation control elements reside upstream of the AUG or in the 3' untranslated region. The second objective of this project entailed the identification, mapping and functional analysis of cis-acting elements directing plus-
strand RNA synthesis. Work from other laboratory demonstrated the importance of the elements located between position 1 and 75 of the BVDV genome for BVDV replication (Frolov et al. 1998). A subsequent report (Becher et al., 2000) confirmed and extended these findings. Rather than duplicating work from other laboratories we pursued the characterization of the novel IRES element located 3' of the AUG that we identified in the course of the work described in Objective 1. To define the role of the IRES element located downstream of the polyprotein translation start site (AUG366-368) we used two strategies: 1. Deletion of the Npro encoding region; and 2. Silent and coding changes of the Npro encoding region which alter the total secondary structure content of the region between nucleotides 376 and 440. Both bicistronic and monocistronic constructs were used to assess the impact of these mutant or deleted Npro coding regions on translation initiation efficiencies. Furthermore, an Npro deleted BVDV was generated from the infectious clone to show the importance of this region in the context of the replication of BVDV. The mutational analyses of the Npro region not only demonstrated the importance of the 366 to 440 region on IRES function, it also provided evidence of the structural requirements for its function. Non-paired RNA (Chon et al. manuscript in preparation).

These studies were extended by evaluating the replication of the Npro-deleted BVDV in cattle, corroborating the critical importance of RNA structures 3' of the AUG on pestivirus IRES function (Lai et al. 2000). The work performed so far attests to the importance of translational regulation in BVDV biology and its ability to replicate in cell cultures. These studies have shown that deletion of the Npro results in a dramatic reduction of the ability of BVDV to replicate in cultured cells. Additional studies are in progress to determine whether Npro deleted BVDV will lead to improved vaccine strains to control this disease in cattle.

**Impact Statement:** Apparent diseases and hidden losses caused by bovine viral diarrhea virus (BVDV) infections affect nearly every beef and dairy cattle producer in the U.S. The work reported here provides candidate attenuated strains for live vaccines and also a novel strategy to engineer improved disease prevention approaches. Effective vaccination could producers $25 to $30 per animal each year.
Veterinary Extension Program
Topics/Titles of Extension Program Emphases

**Steve Ensley**
- Drinking Water Quality and the Effects on Production Animals
- Micromineral Interactions in Production Animals
- West Central Research & Extension Center Action Plan:
  - Maintaining Competitive Nebraska Agriculture
  - Managing Natural Resources and Environmental Influences

**D. Dee Griffin**
- Develop educational programs and materials and conduct applied research for feedlot veterinarians, producers, and individuals in the feeding cattle industry of Nebraska and the nation. The focus of these activities are directed toward pre-harvest food safety, animal care and production economics.

**Dale Grotelueschen**
- Integrated Animal Systems Management
- Enhancing Safety in the Food chain
- Panhandle Research & Extension Center Action Plan: Increased Beef Cattle Profitability Through
- Marketing Method Assessment, Quality Improvement and Cost Reduction/Containment
  - Other Programs:
    - Integrated Resource Management
    - Quality Beef/Cattle Wellness Workshops
    - Practitioner and Beef Producer Seminars

**Norman Schneider**
- Superintendent, Veterinary Science Exhibits and Displays, 2000 Nebraska State Fair
- LeaderShape Nebraska 2000 Guest Panelist
- ExpoVisions '00
  - Coordinated first-ever Veterinary Medicine Learning Track
  - Veterinary Medicine: A Career of Choices
  - Diagnostic Toxicology in Veterinary Medicine: Here's Lookin' at You
- Career day programs for seven high school and extension groups
- Participant in Extension stored Grain Task Force
  - Department Newsletter articles on livestock water quality and forage quality
  - Media new release on mycotoxins in 2000 corn harvest
大卫·史密斯
- 农场食品安全，尤其是E. coli O157:H7
- 生物安全对畜牧业企业的安全，尤其是乔内氏病和牛病毒性腹泻

伊娃·沃尔纳-彭德尔顿
- 鸟群健康；火鸡、火鸡、和肉鸡种群在内布拉斯加州
- 水禽/火鸡疾病实验室诊断
- 食品安全
- 内布拉斯加州火鸡产量增加

罗伯特·威尔斯
- 猪肉质量保证计划
- PRRS 传播和控制
The economic environment for Nebraska feedlots presently is extremely difficult. This past winter severely affected gain and efficiency performance. Despite the low price of feed grain the wet pen conditions have pushed feedlot cost of gains are the highest in a decade. This added to the Foot and Mouth Disease scar has many Nebraska feedyard owners and managers very depressed. On brighter note, the per capita consumption of beef and beef exports continues to increase. Feedyard financial performance over the last half of the year will be much better, but the long-term economic outlook remains questionable for Nebraska agriculture. Intense economic pressures and a myriad of uncertain supply and demand indicators make Nebraska beef producers demand information tailored specifically for their situation and less eager to embrace some of the traditional extension themes. We spend more of our effort helping the specialist analyze production efficiency on specific operations. We have intensified our effort to help producers become more self reliant with information technologies. Food safety issues are increasing becoming a focus issue will all Nebraska beef producers.

The integration of teaching and applied field research in my extension activity with the veterinarians serving Nebraska beef operations continues to be successful. We are working very closely with four demonstration herds. The focus is to better understand how to improve sustainability through adjustment of production practices. The producers and our students have both benefited. Students have had an opportunity to work with real-world production and the beef producers of Nebraska enjoy getting to meet our students and learn more about the scope of NU's educational efforts.

The format of the feedlot employee training short courses we have taught for years has dramatically changed. The new format allows participants to obtain college credit for their efforts in the class and is delivered via the Internet. We are rapidly gaining an appreciation for problems encountered in distance education. However, we have built strong bonds with the citizens in our state and they continue to be very patient with problems associated with the inadequate phone line Internet infrastructure in Nebraska. We are also realizing a need for more basic computer education for new enrollees.

Pre-harvest beef quality assurance (BQA) and Pre-Harvest Hazard Analysis Critical Control Point (PH-HACCP) education programs development continues to receive my major effort. The partnership between the Nebraska Cattlemen, the Nebraska Beef Council, the Nebraska Veterinary Medical Association, the USDA-CSREES and Nebraska University's Extension Service has been very successful. Nebraska presently has more BQA certified trainers than any other state in the United States and we have the second highest number of certified producers. Over 70 percent of Nebraska's feedlot production and over 30 percent of Nebraska's cow-calf production is working under a certified BQA program. As well as traditional hard copy training materials, we have all training materials on a self-study CD patterned after the national integrated pest management training program. This past year we received financial support for producing 5,000 copies of the training CD and are presently working on a revised version. NU also serves as the sponsor for the National Beef Quality Assurance Home Page (http://www.bqa.org).
The focus of my extension program is veterinary toxicology and the relationship to animal health in Nebraska. Toxicology is a broad field encompassing animal health and the environment. Issues I have focused on involve water quality and the relationship there is to performance and health of production animals. A specific emphasis is manure management and the impact on surface and ground water quality. The focal issue is whether antimicrobial resistance will develop in organisms in the environment when they are exposed to antibiotics in manure.

Along with other extension veterinarians I am working on field research projects involving beef calf scours, Bovine Viral Diarrhea diagnosis and eradication, applying surveillance testing to Johne's disease diagnostic investigation, and herd record systems for large commercial beef cattle herds. I am the committee chair for biosecurity for the West Central Research & Extension Center and the Gundmundsen Sandhills Laboratory, an active member of the NVMA Food Safety Committee, a member of the University of Nebraska Institutional Animal Care and Use Committee and I am section head of the toxicology section of the Nebraska Veterinary Diagnostic Laboratory System.

Water quality in Nebraska continues to be a high priority. Working with Mike Cadson I have initiated a drinking water quality testing program for animal drinking water in Nebraska.

Improved animal health results in improved product quality as well as better cost competitiveness. Programs are presented to producers and veterinarians providing information to improve production medicine programs. Examples include discussions about risk factors affecting health of incoming feedlot cattle and risk factors affecting incidence of calf diarrhea. Educational programs as well as disease investigation expertise is provided.

Partnerships with industry organizations are critical for continued progress of Nebraska's beef industry. Beef Quality Assurance education is an important aspect of beef production for beef producers as well as veterinary practitioners. Topics include cattle handling, cattle facilities, animal welfare, carcass quality, dark cutters, bruising, injection site lesions, proper drug use and others. The IRM Pen of Five Retained Ownership Demonstration Project in western Nebraska provides valuable information to beef producers. Health information from these animals provides education about preconditioning programs, feedlot health, and economics of health events in the feedlot. A number of participants have initiated retained ownership feeding as part of their management program.

Biosecurity programs guarding against foreign animal diseases such as foot and mouth disease (FMD) and bovine spongiform encephalopathy (BSE) as well as domestic health issues that are important for food safety, animal health, and economic reasons are provided to the industry.

I have worked extensively with youth through preveterinary advising, recruitment and retention, and support of past and present CASNR activities. I have provided and coordinated major educational opportunities for youth participating in ExpoVisions '00 and Biology Careers Workshops '00. I served as the Veterinary Science Superintendent at the 2000 Nebraska State Fair. I continue to be involved in preparing radiotapes on veterinary medicine careers and current issues. I have continued my association with planning
and participating in LeaderShape Nebraska, part of a year-round national program for UNL students which emphasize leadership with ethics and integrity. I am an active member of the Public Relations Committee and Student Scholarship Committee of the Nebraska Veterinary Medical Association, and I continue to be directly involved in related efforts for student recruitment and other student activities. I still have a major role in youth development in my “off-duty” time as Explorer Advisor for Explorer Post 246, Wahoo, Nebraska, with related professional career exploration, leadership development, service and high adventure experiences. I am a Certified Nebraska Hunter Safety Instructor and continue to support the program.

» David Smith, DVM, PhD
Dairy and Beef Cattle Veterinarian

Communicating and applying the principles of biosecurity and pathogen-containment have become an important focus of my extension and research programming. I have emphasized population diagnostics and the role of animal production systems on transmission of cattle diseases and human food-borne pathogens. I plan and moderate meetings each week to discuss current issues in livestock and public health related to animal production systems. The meetings foster collaboration and communication between faculty, regulatory veterinarians, public health officials, veterinarians and to devise strategies to research and solve animal or human health problems related to livestock production. Field research projects are underway to better understand calf scour in Nebraska Sandhills cattle, bovine viral diarrhea virus and Johne’s disease population diagnostics, Escherichia coli O157:H7 in feedlot cattle. I also conducted animal disease outbreak investigations on NE cattle operations related to calf scour, dairy productivity and health and mastitis. I contribute as a mentor to the Beef Production Management Course at the Great Plains Veterinary Education Center. I worked with other extension veterinarians and the NE Bureau of Animal Industry to develop a FDA/USDA funded video and manual on animal production food safety entitled “Out of the gate with food safety.” The video and manual were distributed to veterinarians and extension educators throughout Nebraska.

» Eva Wallner-Pendleton, DVM, MS
Avian Veterinarian

Dr. Pendleton’s primary emphasis is directed toward health management for turkey, broiler and layer flocks in Nebraska. This was accomplished through providing veterinary consultation, extension education and laboratory diagnostic services. Upgrades and expansion at the Norbest turkey processing plant in Gibbon, NE are underway and Dr. Pendleton committed efforts toward increasing turkey production in Nebraska to increase the supply needed to utilize these renovated facilities. Dr. Pendleton continued her research on food safety through her cooperation on a research grant focused on characterization of microbial pathogen contamination in broilers processed via a new air-chilling process, in comparison to those processed by the traditional ice water chilling method. Dr. Pendleton also conducted field/flock investigation on health problems in a number of layer flocks, including the hatchery supplying these layer operations.

» Robert W. Wills, DVM, PhD
Swine Veterinarian

I have focused on swine health and food safety in my extension programs. Porcine reproductive and respiratory syndrome (PRRS) virus continues to be a major health concern of the swine industry. I presented information to producers and veterinarians on the disease through presentations and publications. PRRS was also a frequent topic for consultations both over the telephone and during farm visits. Another topic that has received increasing attention in the swine industry is the disposal of dead animals. The state government recently approved composting as a method of disposal of dead livestock. Consequently I have participated in extension programs and co-authored a NebGuide to meet the needs of producers for this issue.
Food safety continues to be a high priority in the swine and other livestock industries. I presented workshops on the Pork Quality Assurance Program to veterinarians and others interested in the pork industry. I served as co-chair of the organizational committee for the "Workshop on Epidemiological Methods and Approaches for Food Safety" held in Birmingham, AL in association with the US Animal Health Association and the American Association of Veterinary Laboratory Diagnosticians Annual Conference. The two-day workshop was well attended by scientists from all over the country.

As chair of the conference committee, I coordinated the George Young Swine Health and Management Conference. A variety of subjects from producer-owned pork processing plants to porcine respiratory disease complex were presented to producers, veterinarians, and allied industry representatives. The conference proceedings were well received and were distributed internationally.
OVERVIEW

The NVDLS consists of the Veterinary Diagnostic Center (VDC) in Lincoln, the West Central Veterinary Science Laboratory (WCVSL) in North Platte and the Panhandle Veterinary Diagnostic Laboratory (PVDL) in Scottsbluff-Mitchell. The VDC is a full-service diagnostic laboratory, while the WCVSL and PVDL are much smaller laboratories that have more limited testing capabilities on-site, and forward specimens to the VDC for specialized tests. Fee income from all three diagnostic laboratories goes into a central account which is used to supplement the operations of all three laboratories.

VISION

The vision of the Nebraska Veterinary Diagnostic Laboratory System is to enhance the economic vitality and life quality for all Nebraskans by promoting healthy livestock and companion animals and by enhancing the safety of animal derived consumer products.

MISSION

The Diagnostic Laboratories mission is to assist veterinarians, their clients, and others responsible for animal and public health in the detection, prevention and understanding of disease. The faculty and staff will approach this task by providing accessible, accountable, timely and accurate diagnostic services, and by sharing information generated through scholady publication, meeting presentations, and by direct communication.

OBJECTIVES

♦ To provide accessible, accountable, timely, and accurate diagnostic, research and information services to veterinarians, animal owners, food producers and animal health industries.
♦ To provide pro-active investigational support to enhance population approaches to, and efficiency of diagnostic testing.
♦ To implement modern biotechnology methods where appropriate into diagnostic service.
♦ To monitor and report the incidence and threat of animal diseases as well as diseases that are transmissible from animals to humans.
♦ To share new information with colleagues through publication in a manner that respects the confidentiality of clientele.
♦ To prioritize research activities, in applied areas, (epidemiology, diagnostic techniques, emerging diseases) and areas of current concern.
♦ To cooperate with extension, teaching and research programs of IANR.
♦ To maintain affordable diagnostic testing to assure sufficient case numbers that support disease surveillance functions and to maintain access to research materials (tissues, field isolates etc.) and current information on disease prevalence and trends.
♦ To enhance communication with target clientele toward accessing their needs and providing services based on those needs.
To communicate with clientele toward educating them on population approaches to diagnostics, current testing technologies and to implement a marketing plan.

The year of 2000 was marked by the beginning of significant service growth that extended into 2001. AAVLD accreditation was confirmed mid year and the report identified a few areas for improvement regarding our goal of approaching GLP standards. An audit function and a general coordinator of QA programs was recommended. Staff turnover during 2000 was high and with staffing shortages and training no staff resources were available to advance QA efforts. Staffing and space accommodations were considered adequate for current work load by the review team. The team noted that there was little or no space or staff for expansion of services. The toxicology section was carefully reviewed in house in 2000 and it appears that current space and equipment meets minimal essential service standards. Dr. Ensley in North Platte began acting as case coordinator on toxicology cases on a rotating basis with Dr. Schneider. Consolidation of analytical chemistry service on East Campus was discussed with campus administration and serious consideration is expected in 2001. Dr. Ensley also initiated nitrate test kits that were supplied to clinics throughout the state in response to the severe drought and perceived increased nitrate risks.

The activity in molecular diagnostics and immunohistochemistry along with external factors added to the case load in 2000. The molecular diagnostic position lost state support and a soft money staff position was created to fill the need in this emerging area of importance. The Electron Microscopy lab technician resigned and support for microscopy service in the department were diminished with more reliance on the core microscopy facility for expertise. Faculty grant funds budgeted to electron microscopy and the VDC funds were pooled to maintain minimal essential electron microscopy services on site.

The North Platte facility increased activity with the addition of a new faculty Dr. Steve Ensley with an extension and diagnostic appointment. Histopathology support will remain in Lincoln. An extension assistant position was added in North Platte to replace the bacteriology position cut previously. This position was filled in 2000.

The laboratory system was successful in its mission during 2000. Case load was increasing in nearly all areas. The fee schedule was updated and fees were increased in most areas along with a slight increase in the general accession fee. Regular lab meetings with minutes were held throughout the year. Staff training and increased service support limited activities in new test development. Staff supported research projects initiated by VDC faculty and Game and Parks Commission personnel.

Each of the laboratory faculty were engaged in extramurally funded research during 2000 and each had one or more referred publications. Faculty were active in national and state meetings and several faculty were frequently featured in the lay press related to their diagnostic and research achievements, foreign animal disease surveillance, BSE, and Pseudorabies. The laboratory faces many challenges, but sees many opportunities as well and with a competent and dedicated staff is positioned to continue its excellence in service into the year 2001. Specific activities are summarized in the following pages.
Table 12. **Accessions by Species by Month** (January 2000 - December 2000)

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<sup>2</sup> Includes serology for Bluetongue Virus, Bovine P3 Virus, Bovine Respiratory Syndrome Virus, Bovine Virus Diarrhea Virus, Feline Leukemia Virus, Feline Immunodeficiency Virus, Infectious Bovine Rhinotracheitis Virus, Porcine Parovirus and Transmissible Gastroenteritis Virus.

<sup>3</sup> Includes serology for Avian Influenza Virus, Hemorrhagic Ectodermal Virus, Mycoplasma gallisepticum, M. Malignum, M. Synoviae, and Salmonella pullorum.
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¹ Referral totals - samples forwarded to Lincoln
### Table 17. Number of Accessions, Previous Five Years

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### Table 18. Number of Laboratory Procedures Conducted, Previous Five Years

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<td>14,192</td>
<td>14,426</td>
<td>13,135</td>
<td>13,852</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>289,833</td>
<td>331,023</td>
<td>316,028</td>
<td>281,477</td>
<td>293,031</td>
</tr>
</tbody>
</table>

* North Platte and Scottsbluff totals include referral testing that was sent to the Lincoln laboratory.
### Table 19. LAG TIME REPORT
Veterinary Diagnostic Center
January 1, 2000 - December 31, 2000

<table>
<thead>
<tr>
<th>Number of Days to Report</th>
<th>Normal Accessions % Reported (Cumulative %)</th>
<th>Pseudorabies Accessions % Reported (Cumulative %)</th>
<th>All Accessions % Reported (Cumulative %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Given</td>
<td>%</td>
<td>Sent</td>
</tr>
<tr>
<td>0</td>
<td>6.6</td>
<td>6.6</td>
<td>6/1</td>
</tr>
<tr>
<td>1</td>
<td>22.2</td>
<td>28.8</td>
<td>20.3</td>
</tr>
<tr>
<td>2</td>
<td>19.4</td>
<td>48.1</td>
<td>17.1</td>
</tr>
<tr>
<td>3</td>
<td>16.3</td>
<td>64.5</td>
<td>14.4</td>
</tr>
<tr>
<td>4</td>
<td>10.2</td>
<td>74.6</td>
<td>10.9</td>
</tr>
<tr>
<td>5</td>
<td>8.6</td>
<td>83.2</td>
<td>9.9</td>
</tr>
<tr>
<td>6</td>
<td>5.7</td>
<td>88.9</td>
<td>7.2</td>
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<tr>
<td>7</td>
<td>4.1</td>
<td>93.0</td>
<td>5.5</td>
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<tr>
<td>8</td>
<td>1.4</td>
<td>94.4</td>
<td>1.9</td>
</tr>
<tr>
<td>9</td>
<td>0.5</td>
<td>94.9</td>
<td>0.8</td>
</tr>
<tr>
<td>10</td>
<td>0.5</td>
<td>95.5</td>
<td>0.7</td>
</tr>
<tr>
<td>11-15</td>
<td>1.9</td>
<td>97.4</td>
<td>2.7</td>
</tr>
<tr>
<td>16-20</td>
<td>0.7</td>
<td>98.1</td>
<td>0.7</td>
</tr>
<tr>
<td>21-30</td>
<td>0.8</td>
<td>99.0</td>
<td>0.8</td>
</tr>
<tr>
<td>31-50</td>
<td>0.4</td>
<td>99.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Over 60</td>
<td>0.6</td>
<td>100.0</td>
<td>0.6</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. Cases transferred from Scottsbluff or North Platte may or may not have first and final report dates recorded in Lincoln's database.
Distribution of Accessions by County - NVDLS

January 2000 - December 2000
Active Grants Funded in 2000

National Competitive Grant Programs

A novel strategy to test and monitor beef feedlot food-safety control points
10/1/00-9/30/03. USDA/CSREES/NRICGP (Area 32.1, Epidemiological Approaches for
Food Safety); $953,735; 11/1/00 - 10/31/03

Gp96 as a molecular chaperone for antigen delivery in viral systems
S. Srikumaran & Clayton Kelling. USDA NRICGP (00-02268), $200,000; September 00-
August 02

Inhibition of apoptosis by the Bovine Herpesvirus 1 Latency Related Gene Products
C. Jones, USDA, National Research Initiative Competitive Grants Program (2000-2003);
10/1/00-9/30/03, $292,000

NIH COBRE; Viral Pathogenesis
C. Jones, 10/2000-10/2005, $10,400,000. C. Jones will receive $168,000/year in direct costs
from this grant this year

Role of macrophages in the pathogenesis of porcine colonic spirochetosis
G.E. Duhamel (P.I.), J.D. Cirillo (co-P.I.), USDA, National Research Initiative, Competitive
Grant Program, Animal Health and Well-Being, $240,000, 2000-03

State and University

Enhancement of transplanted organ survival: identification of a virus protein that down-
modulates the incompatible molecules on the donor organs
S. Srikumaran & Joyce Solheim. UN-L Office of the Vice Chancellor for Research, NIH
Seed Money Grant Program, $66,740, July 00 - June 01

Pseudorabies Surveillance in Nebraska Swine
Doster, A.R., D.J. Steffen, L. Williams. USDA-APHIS-VS (00-9731-0017CA); $24,875, 9-
9/30/00

Commodity Agencies

Bovine Genetics Quality Assurance
PI: D Steffen, National Association of Animal Breeders, $12,000, 2000-2001

-113-
Influence of Removal of Starch from the Diet on Colonic pH and Acid-Resistant Escherichia coli
Nebraska Beef Council; $33,400; 5/1/00-9/30/01

Influence of Limiting Amount of Diet and Starch Content on Colonic pH and Acid-Resistant Escherichia coli
Nebraska Beef Council; $16,700; 5/1/00-9/30/00

Optimizing the collection and transportation of pen-test devices for monitoring Escherichia coli O157:H7 and Salmonella prevalence in cattle feedlot pens

Relationship of Distributions of Serological Responses to Occurrence of Respiratory Disease in Finisher Pigs
R. Wills, J. Gray, L. Hungerford, National Pork Producers Council, $25,000, 6/00-7/01

Removal of Starch From the Diet on Colonic pH and Acid Resistant E. coli

Testing of Probiotic Bacteria for the Elimination of Escherichia coli O157:H7 in Experimentally Infected Cattle
M. Brashears, R.A. Moxley; Midwest Advanced Food Manufacturing Alliance (MAFMA); $24,000; 10/1/00-9/30/01

Commercial Industry

An evaluation of the efficacy of valnemulin hydrochloride provided in-feed for the control of porcine colonic spirochetosis utilizing a Brachyspira pilosicoli challenge model

An accurate determination of the serologic status of single reactors to PRRSV commercial screening ELISA
Funded by Pig Improvement Corporation (PIC), November 2000, $10,000

BQA Training CD
D.D. Griffin, and D.M. Grotelueschen, and R. A Smith, Bohringer, Butler, Fort Dodge, Grand Labs, Merial, Pharmacia-Upjohn, Schering-Plough, $7,000, 2000

Cloning and partial sequencing of the 5'UTR of BVDV isolates

Cross-reactivity of antibody response to genotype 1 and 2 BVDV following challenge exposure of vaccinated calves
DNA-Based Beef Sire Identification in Multi-Sire Breeding Paradigms  
PI: G. B. Sherman; Co-Is: Dr. Gary Rupp, and Dr. Gary Ross, Private Donor: Helen K. Groves, Silverbrook Ranch, Baird, TX, $6,000, 1/27/00 to Unspecified

**Efficacy of recombinant bovine adenovirus expressing BVDV gp53 gene against virulent BVDV challenge**  
Kelling C.L. 2000, Schering-Plough Animal Health Corp., $50,736

**Efficacy of Recombinant FeLV Vaccines and a Conventional FeLV Combination Vaccine in Seronegative Kittens**  
J. Schmitz, Schering-Plough Animal Health. October - December 1999. $21,761

**Evaluation of New Adjuvant Formulation for Veterinary Vaccines**  

**Improved FarrowSure B**  
J.A. Schmitz, Pfizer Inc. Central Research. Study 3128C-60-99-200, $102,711, September 1999 - March 2000

**Investigation Into the Role of Concurrent Porcine Reproductive and Respiratory Syndrome Virus and Porcine Circovirus II in the Pathogenesis of Post-weaning Multisystemic Wasting Syndrome**  
BW Brodersen, Intervet $10,000; 2000

**Safety and Efficacy of a gene deleted Pasteurella Multocida vaccine in chickens**  
D Steffen, Jai Wei, Schering Plough Animal Health, $2,675, 2000

**Testing of Probiotic Bacteria for the Elimination of Escherichia coli O157:H7 in Experimentally Infected Cattle**  
M. Brashears, R.A. Moxley. Nutrition Physiology Corporation; $24,000; 1/24/00-2/1/01

**Grants and Contracts Funded in 2000 - PI at Other Universities**

**Epidemiological Aspects of Combining E. coli O157:H7 Control Programs and Feedlot Performance**  

**Multidisciplinary Evaluation of Fatal Feedlot ARDS**  
A. Woolums, L. Hawkins (Univ. Georgia), L. Hungerford. USDA/NRICGP, $230,000, 10/00-9/03

**Whole-genome sequencing and analysis of Lawsonia intracellularis**  
V. Kapur (P.I.), C.J. Gebhart (co-P.I.), G.E. Duhamel (co-P.I.), USDA, Initiative for Future Agriculture and Food Systems, $997,962, 2000-03
Up-regulation of K+ Channels in the Remodeled Ventricle
National Institute of Health (R01-EY10595); $1,081,579, 10/1/00-9/30/04
PI: George J. Rozanski; 12.2% ($132,231) for Marjorie F. Lou, CoPI; Purpose: Control mechanism of redox buffer glutathione on arrhythmias

U.S. Environmental Protection Agency, STAR Environmental Research Grants Competition, Veterinary Medical Teaching and Research Center

Use of the Salmonella type III secretion system for antigen delivery

Active Grants and Contracts, Funding Continued from Previous Years

A novel strategy to test and monitor beef feedlot food-safety control points
D.R. Smith, L.L. Hungerford, J.T. Gray, R.A. Moxley, T. Klopfenstein, C.T. Milton; 10/1/00-9/30/03. USDA/CSREES/NRICGP (Area 32.1, Epidemiological Approaches for Food Safety); $953,735; 11/1/00 - 10/31/03

A Novel Gene Knock-Out System Enabling Study of Dominant Genetic Disorders
PI: G. B. Sherman, Co-PIs: D. Bunick, and M.S. Wheeler, University of Illinois Critical Research Initiatives (CRI) Program, $165,000, 07/01/1996 to 06/30/2001 (extended)

An evaluation of the efficacy of valnemulin hydrochloride provided in-feed for the control of porcine colonic spirochetosis utilizing a Brachyspira pilosicoli challenge model

An accurate determination of the serologic status of single reactors to PRRSV commercial screening ELISA
Funded by Pig Improvement Corporation (PIC), November 2000, $10,000

Analysis of apoptosis and pathogenesis by bovine herpesvirus 1 and bICPO
Jones, C., A.R. Doster. USDA, National Research Initiative Competitive Grant Program (NRICGP); $178,338; 9/1/98-8/31/01

Analysis of Mycobacterial Virulence Determinants
Luiz Bermudez and Jeffrey D. Cirillo, 8/1/99-9/30/03, NIH/NIAID $1,632,215

Analysis of Bovine Herpesvirus 1 Latency Related Gene
C. Jones, USDA, National Research Initiative Competitive Grants Program (9702394) 9/97-9/2000, $248,452

Bovine Genetics Quality Assurance
PI: D Steffen, National Association of Animal Breeders, $12,000, 2000-2001
Bovine respiratory disease: risk factors, pathogens, diagnosis and management
S. Srikumaran, NC-107 Regional Research Funds, USDA; Amount determined annually ($9,000 for 2000); 00/96-9/01

BQA Training CD
D.D. Griffin, and D.M. Grotelueschen, and R. A Smith, Bohringer, Butler, Fort Dodge, Grand Labs, Merial, Pharmacia-Upjohn, Schering-Plough, $7,000

Challenge Model Evaluation of Direct and Indirect Exposure to Brachyspira pilosicoli and Interaction with Diet
G.E. Duhamel, P.I.; Novartis Animal Health US, Inc., $86,400; 99 - 00

Characterization and Immunogenicity of Mycobacterium paratuberculosis Secreted and Cellular Proteins
H. Bercovier, R.G. Barletta, and S. Sela. United States-Israel Binational Agricultural Research And Development Fund Program, United States Department of Agriculture; BARD project number IS-2564-95C; $ 107,400 (UNL Subcontract only) 10/96-9/00

Cis-acting elements in the replication of the bovine viral diarrhea genome
R. O. Donis, PI, C. Kelling Co-PI. USDA-NRI $180,000; 9/99-9/01

Cloning and partial sequencing of the 5'UTR of BVDV isolates
Kelling CL; 2000; Biocor Animal Health Corp., $6,667

Comparative protein linkage map of plant and animal viral proteins involved in RNA replication and interactions with their hosts

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

Development and Validation of a Novel Strategy to Test Beef Feedlots for Salmonella spp.

DNA-Based Beef Sire Identification in Multi-Sire Breeding Paradigms
PI:. G. B. Sherman; Co-Is: Dr. Gary Rupp, and Dr. Gary Ross, Private Donor: Helen K. Groves, Silverbrook Ranch, Baird, TX, $6,000, 1/27/00 to Unspecified

Ecological Distribution of E.coli 0157:H7 Strains in Agricultural Environments
J. Sargeant, M. Sanderson, S. Hyngstrom, L. Hungerford. USDA, $210,000, 9/99-8/01

Effect of PRRSV on the immune system during acute and persistent infections
Osorio, F.A., F. Zuckermann, A.R. Doster. USDA, National Research Initiative Competitive Grant Program (NRICGP); $150,000; 9/15/99-9/30/01
Efficacy of recombinant bovine adenovirus expressing BVDV gp53 gene against virulent BVDV challenge
Kelling C.L. 2000, Schering-Plough Animal Health Corp., $50,736

Enhancement of transplanted organ survival: identification of a virus protein that down-modulates the incompatible molecules on the donor organs
S. Srikurnaran & Joyce Solheim. UN-L Office of the Vice Chancellor for Research, NIH Seed Money Grant Program, $66,740, July 00 - June 01

Epidemiologic Approaches to Food Safety: A novel strategy to test and monitor beef feedlot food-safety control points
Smith DR, Hungerford LL, Gray JT, Moxley RA, Klopfenstein TJ, Milton CT, $953,735, 10/00-10/03 USDA CSREES NRI 32.1 (NEB-14-111)

Epidemiological Aspects of Combining E. coli O157:H7 Control Programs and Feedlot Performance

Evaluation of Benefits Derived from Sire Parentage Assignment in Nebraska Beef Herds
PIs: G. B. Sherman, L. L. Hungerford, G. P. Rupp; Co-Is: D. Feuz, S. Kachman, E. Hamilton and D. Dee Griffin, Celera AgGen & Perkin-Elmer, $100,000, 10/01/1998 to Unspecified (ongoing annual allocation by grantor)

Evaluation of novel vaccines for the prevention of Classical Swine Fever USDA-APHIS
R. O. Donis, PI. $149,958 11/98-7/01

Evolutionary Ecology of Disease and the Global Decline of Amphibians
Co-Investigator (J. Collins, Arizona State University, PI). National Science Foundation. $2,975,822 total, UNL subaward, $49,000, 9/99-8/02

Expression and Characterization of Recombinant Luteotrophic Gonadotrophin Beta Subunit
PI: G. B. Sherman; Co-I: L. A. Lund, Morris Animal Foundation, $20,000, Express and purify recombinant rhinoceros LH with the goal of developing a practical field immunoassay for fertility status of rhinos, 11/01/1996 to 11/30/2000

Fecal Prevalence of EHEC O157 in Slaughter-ready Cattle in Summer and Winter
J. Keen, et al, USDA, 2000

Field research to identify risk factors for the occurrence of Escherichia coli O157:H7 in cattle feedlots
Co-Investigator (University-wide project). LB 1206-UNL. $135,000 (FY 1998/99), $173,350 (FY 2000), $90,000 (FY 2001)
Gp96 as a molecular chaperone for antigen delivery in viral systems
S. Srikumarar & Clayton Kelling. USDA NRICGP (00-02268), $200,000; September 00-August 02

Identification of Mycobacterium paratuberculosis Virulence Determinants
R.G. Barletta, C.J. Czuprynski (U. Wisconsin). USDA, National Research Initiative Competitive Grant Program (Sustaining Animal Health and Well Being); $210,000; 9/99-8/01; (Renewal)

Identification of genes that are regulated by Fumonisin B1, a carcinogen that is a contaminant of corn and other cereal grains
C. Jones, Elsa E. Pardee Foundation, 12/99-12/00, $60,000

Improved Detection of Brachyspira (formerly Serpulina) by PCR
G.E. Duhamel (P.I.). Boehringer Ingelheim Vetmedica Inc.; $36,000; 96 - 00

In Vivo Reporter Gene Signaling of Reproductive Endocrine Status
PI: Gary B. Sherman, University of Nebraska - Layman Trust Funds, $7,455, 04/01/1999 to 03/31/2000

Influence of Removal of Starch from the Diet on Colonic pH and Acid-Resistant Escherichia coli
T.J. Klopfenstein, R.A. Moxley, C.T. Milton, D.R. Smith, L.L. Hungerford, J.T. Gray; Nebraska Beef Council; $33,400; 5/1/00-9/30/01

Influence of Limiting Amount of Diet and Starch Content on Colonic pH and Acid-Resistant Escherichia coli
T.J. Klopfenstein, R.A. Moxley, C.T. Milton, D.R. Smith, L.L. Hungerford, J.T. Gray; Nebraska Beef Council; $16,700; 5/1/00-9/30/00

Investigation Into the Role of Concurrent Porcine Reproductive and Respiratory Syndrome Virus and Porcine Circovirus II in the Pathogenesis of Post-weaning Multisystemic Wasting Syndrome
BW Brodersen, Intervet $10,000; 2000

Inhibition of apoptosis by the Bovine Herpesvirus 1 Latency Related Gene Products
USDA, National Research Initiative Competitive Grants Program (2000-2003); 10/1/00-9/30/03, $292,000

Invasion of Host Cells by Legionella pneumophila
Jeffrey D. Cirillo - 1/1/97-indefinite, Center for Indoor Air Research, $387,573

Laboratory Testing for Bacterial Enteric Diseases of Swine
G.E. Duhamel (P.I.). University/Industry/Practitioners; $18,615; 95 - 00
LB1206 Appropriation from the Nebraska State Legislature. Field Research to Identify Risk Factors for the Occurrence of Escherichia coli O157:H7 in Cattle Feedlots

Lyme disease foci in Illinois: Ecological evaluation, integrated disease management and education
U. Kitron, C. Jones, L. Hungerford. Centers for Disease Control and Prevention, $180,000, 5/98-4/01

Minimum Inhibitory Concentration Susceptibility Tests of Swine Isolates of Brachyspira pilosicoli

Monitoring Individual Animal Performance to Evaluate Beef Cattle Production and Economics

Multidisciplinary Evaluation of Fatal Feedlot ARDS
A. Woolums, L. Hawkins (Univ. Georgia), L. Hungerford. USDA/NRICGP, $230,000, 10/00-9/03

NIH COBRE; Viral Pathogenesis
C. Jones, 10/2000-10/2005, $10,400,000. Will receive $168,000/year in direct costs from this grant this year

Optimizing the collection and transportation of pen-test devices for monitoring Escherichia coli O157:H7 and Salmonella prevalence in cattle feedlot pens

Prevalence of Health Problems and Zoonotic Infections Among Urban Illinois Raccoons Procyon lotor
L. Hungerford; Cook County Forest Preserve, $172,000, 8/95-12/00

Prevalence of Bacterial Pathogens in Porcine Diarrhea Complex
G.E. Duhamel (P.I.). Alpharma; $10,940; 98 - 00

Production of Genetically Defined Cattle to Study the Genotypic Basis of Production and Health Traits
PI: Federico A. Zuckermann; Co-PIs: G.B. Sherman, H.A. Lewin, R.S. Ott, L.L. Hungerford, and R.H. Hornbaker, University of Illinois College of Veterinary Medicine, $16,000 first yr (ongoing annual herd maintenance ~10,000/yr), 11/1/1995 to Unspecified

Production and Characterization of Bovine Group A Rotavirus and Coronavirus Challenge Material in Gnotobiotic Calves
G.E. Duhamel (P.I.). Grand Laboratories, Inc.; $28,600; 98-00
Protein-thiol Mixed disulfides in Cataractogenesis  
Marjorie F. Lou, National Institute of Health (R01-EY10595); $1,286,072, 2/1/99-1/31/03; Purpose: Continuation of previous NIH grant

Pseudorabies Surveillance in Nebraska Swine  
Doster, A.R., D.J. Steffen, L. Williams. USDA-APHIS-VS (00-9731-0017CA); $24,875, 9-9/30/00

Relationship of Distributions of Serological Responses to Occurrence of Respiratory Disease in Finisher Pigs  
R. Wills, J. Gray, L. Hungerford, National Pork Producers Council, $25,000, 6/00-7/01

Removal of Starch From the Diet on Colonic pH and Acid Resistant E. coli  

Role of Invasion Genes in Virulence of Legionella  
Jeffrey D. Cirillo, 7/1/97-6/30/02, NIH/NIAID $481,878

Role of Capsule and Hemolysin in Resistance of Enterotoxigenic Escherichia coli to Porcine Serum and Neutrophils  
R.A. Moxley, National Pork Producers Council; NPPC Grant #99-104; $18,500; 6/1/99-5/31/00; Extended to 5/31/01

Role of macrophages in the pathogenesis of porcine colonic spirochetosis  
G.E. Duhamel (P.I.), J.D. Cirillo (co-P.I.), USDA, National Research Initiative, Competitive Grant Program, Animal Health and Well-Being, $240,000, 2000-03

Role of E. coli Heat-labile Enterotoxin-I in Diarrhea and Septicemia in Swine  
R.A. Moxley, R.G. Barletta. USDA, National Research Initiative Competitive Grant Program (Sustaining Animal Health and Well Being); $140,000; 11/01/98-10/31/01

Role of components of the host translation apparatus in brome mosaic virus and Bovine Viral Diarrhea Virus replicase functions  

Safety and Efficacy of a gene deleted Pasteurella Multocida vaccine in chickens  
PI: W. Solano, Co-investigators, D Steffen, Jai Wei, Schering Plough Animal Health, $2,675

Serum Neutralization of Group A Bovine Rotaviruses with G6 and G10 Genotypes  
G.E. Duhamel (P.I). Pfizer Animal Health; $17,011; 99-00

Testing of Probiotic Bacteria for the Elimination of Escherichia coli O157:H7 in Experimentally Infected Cattle  
M. Brashears, R.A. Moxley; Midwest Advanced Food Manufacturing Alliance (MAFMA); $24,000; 10/1/00-9/30/01
Testing of Probiotic Bacteria for the Elimination of Escherichia coli O157:H7 in Experimentally Infected Cattle
M. Brashears, R.A. Moxley. Nutrition Physiology Corporation; $24,000; 1/24/00-2/1/01

The Effect of Porcine Reproductive and Respiratory Syndrome Virus on the Immune System during Acute and Persistent Infections
National Research Initiative Competitive Grant Program/ USDA (Sustaining Animal health and Well-Being), project #99-35204-8041, $150,000, September 1999-October 2001

The role of Chlamydia suis in conjunctivitis in pigs
D.G. Rogers; USDA (58-3625-9-139); $15,000; 8/27/99 - 8/15/2002

Understanding cattle behavior to maximize recovery of food-borne pathogens
Honors student: Irwin, K.; Faculty mentor: Smith, DR, $2,500 12/99-12/00 Honors student project

Up-regulation of K+Channels in the Remodeled Ventricle
National Institute of Health (R01-EY10595); $1,081,579, 10/1/00-9/30/04
PI: George J. Rozanski; 12.2% ($132,231) for Marjorie F. Lou, CoPI; Purpose: Control mechanism of redox buffer glutathione on arrhythmias

Use of the Salmonella type III secretion system for antigen delivery

Use of Actinomycetes and Related Microorganisms as Delivery Systems for the Genetic Manipulation of Plants
R.G. Barletta and A. Vidaver; Center for Biotechnology, Area of Concentration in Comparative Pathobiology. $25,000; 7/1/99-6/30/00, (Renewal)

Whole-genome sequencing and analysis of Lawsonia intracellularis
V. Kapur (P.I.), C.J. Gebhart (co-P.I.), G.E. Duhamel (co-P.I.), USDA, Initiative for Future Agriculture and Food Systems, $997,962, 2000-03

U.S. Environmental Protection Agency, STAR Environmental Research Grants Competition, Veterinary Medical Teaching and Research Center

Grant Proposals Submitted, November 1999-October 2000

A novel strategy to test and monitor beef feedlot food-safety control points
D.R. Smith, L.L. Hungerford, J.T. Gray, R.A. Moxley, T. Klopfenstein, C.T. Milton; USDA/CSREES/NRCP (Area 32.1, Epidemiological Approaches for Food Safety), $953,735; submitted 1/18/00; funded
A Plan for Obtaining More Accurate and Specific Results on PRRSV Serological Tests When using Commercial ELISAs
F. Osorio, submitted to National Pork Producers Council; October 2000; $21,200, pending

An accurate determination of the serologic status of single reactors to PRRSV commercial screening ELISA
F. Osorio; Funded by Pig Improvement Corporation (PIC), September 2000, $10,000, funded

A Workshop on Epidemiologic Methods and Approaches for Food Safety

A novel strategy to test and monitor beef feedlot food-safety control points
Smith DR, Hungerford LL, Gray JT, Moxley RA, Klopfenstein TJ, Milton CT.; $1,003,735; 10/00-10/03; USDA/CSREES/NRI 32.1; Epidemiologic Approaches to Food Safety

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

ADEC Distance Education Grant
G. Rupp, Re-submitted, not funded

An evaluation of the efficacy of valnemulin hydrochloride provided in-feed for the control of porcine colonic spirochetosis utilizing a Brachyspira pilosicoli challenge model

Bovine Congenital Defects Quality Assurance Research Program
D. Steffen; National Association of Animal Breeders, Renewal Requested Board considering ongoing noncompetitive renewal of funding, projected $12,000/year

Bovine Marfans Syndrome
D. Steffen, Godfrey, Edna Ittner pediatric research support grant, University of Nebraska Medical Center 1999, amount $15,000

Cardiac K+ Channels and glutathione: Implications for heart failure
George Rozanski (PI), Marjorie F. Lou (CoPI), Steven Sansom (CoPI), Richard MacDonald (CoPI), Shyamal Roy (CoPI); National Institute of Health (RO1); $1,326,102; the effects of oxidative stress on K+ Channel of the heart

Cellular Aspects of Legionella Invasion
PI: Jeffrey D. Cirillo; Research Grant (RO1); NIH/NITID $966,863; 1/1/00-9/30/05
Core Facility Service Support  
PI: R. Donis CoPI: G. Sarath, J. You, A. Arumuganathan Department of the Army; $500,000; 12/00-12-01

Developing Community Team-Leaders for Interdisciplinary Production Management  
L. Hungerford, G. Rupp, J. King. Co-Principal Investigators. USDA/ADEC Agricultural Communications Program. $75,000. Submitted 4/2000; Preproposal; not funded

Development and validation of a novel strategy to test beef feedlots for Salmonella spp.  
Gray JT, Hungerford LL, Klopfenstein TJ Milton CT, Moxley RA, Smith DR; $53,000; 2000; Interdisciplinary Research Program; selected, but not funded

Drug Targets in the Biosynthesis of the Mycobacterial Cell Wall  
R.G. Barletta. UNL Research Council. $10,000; 3/1//00-2/28/01; not funded

Enhancement of transplanted organ survival: identification of a virus protein that down-modulates the incompatible molecules on the donor organs  
S. Srikrumaran & Joyce Solheim. UN-L Office of the Vice Chancellor for Research, NIH Seed Money Grant Program, $66,740, April, 2000, funded

Entry Mechanisms of Mycobacterium marinum  
PI: Jeffrey D. Cirillo; Research Grant (RO1); NIH/NITID $1,440,000; 7/1/00-6/30/05

Extended Grazing to Enhance Profitability and Sustainability of Small Producers  
G. Rupp; Cooperated with Center for Grasslands Studies to submit Initiative for Future Agriculture and Food Systems Grant; submitted 2/23/99

Genome Sequencing and Analysis of Mycobacterium paratuberculosis  
V. Kapur, J.P. Banantine, C. Bolin, R.G. Barletta; USDA, Initiative on Future Agriculture and Food Systems (IFAFS); $959,552; 9/1/00-6/31/2003; not funded

Gp96 as a molecular chaperone for antigen delivery in viral systems  
S. Srikrumaran & Clayton Kelling. USDA NRICGP, $200,000; January 2000; funded

Host-pathogen interactions of M. avium subsp. paratuberculosis in the Bovine Gut  
T.A. Ficht, R.G. Barletta, A.R. Ficht, L.G. Adams; USDA, Initiative on Future Agriculture and Food Systems (IFAFS); $608,727; 9/1/00-6/31/2003; not funded

In vivo Reporter Signaling of Reproductive Endocrine Status  
Investigator(s): PI: G. B. Sherman & C. M. Clay; USDA - NRI; $225,734; 01/15/2000, not funded

Influence of Limiting Amount of Diet and Starch Content on Colonic pH and Acid-Resistant Escherichia coli  
T.J. Klopfenstein, R.A. Moxley, C.T. Milton, D.R. Smith, L.L. Hungerford, J.T. Gray; Nebraska Beef Council; $33,400; submitted 3/23/00; funded

-124-
Influence of Removal of Starch from the Diet on Colonic pH and Acid-Resistant
*Escherichia coli*
Nebraska Beef Council; $33,400; submitted 3/23/00; funded

Interdisciplinary Approach to Beef Cattle Production
PIs: L. L. Hungerford, G. P. Rupp, et al; Co-I: G. B. Sherman; A*DEC-USDA; $75,000;
01/01/2000, not funded

Killing of Intracellular Virulent Mycobacteria by Phage
L.E. Bermudez, R.G. Barletta, O. Chacón, L. Broxmeyer. National Institutes of Health;
$1,059,005; 7/1/01-6/30/05, pending

Limiting Starch in the Diet
PI: Klopfenstein TJ, Moxley RA, co-investigators Milton CT, Smith DR, Hungerford LL,
Gray JT; Nebraska Beef Council, $16,700; 4/00-4/01

Mechanism of Intracellular Survival of *Brachyspira* (formerly *Serpulina*) *pilosicoli*
Co-P.I. with Gerald Duhamel; Seed Grant IANR-Interdisc. Program, $40,000; 10/01/99-
9/30/01

Mechanisms of Susceptibility to Legionnaires’ Disease
PI: Jeffrey D. Cirillo; Research Grant; Research Management Group; $534,518; 1/01-
4/30/04

Multidisciplinary Evaluation of Fatal Feedlot ARDS.
A. Woolums, L. Hawkins (Univ. Georgia), L. Hungerford. USDA/NRICGP, $230,000,
submitted 1/00, funded

Multiplex PCR-ELOSA for detection of enteric pathogens of swine
Burden, D.W. (P.I.), G. Duhamel (Consultant); USDA Small Business Innovation Research
Grant Program; $60,000; September 2000, pending

Ocular transport mechanisms and efficacy of novel ARIs
Marjorie F. Lou (coPI), Wallace Thoreson (coPI) and Udaua B. Kompella (PI); National
Institute of Health RO1, $1,156,220 total cost. Revision of the Grant is under 2nd review;
grant is aimed to study drug delivery into the lens and retina. The class of drug is a group of
novel aldose reductase inhibitors for indication of diabetic complications, including cataract
and retinopathy.

Optimizing Collection and Transportation of E. coli
PI: Smith DR Gray JT., Hungerford LL, co-investigators Klopfenstein TJ, Moxley RA
Milton CT; Nebraska Beef Council, $22,940; 4/00-4/01

Optimizing the collection and transportation of pen-test devices for monitoring *Escherichia
coli* O157:H7 and *Salmonella* prevalence in cattle feedlot pens
Council, $22,940, submitted 4/00, funded
Optimizing the Collection and Transportation of Pen-Test Devices for Monitoring Escherichia coli O157:H7 and Salmonella Prevalence in Cattle Feedlot Pens
J.T. Gray, D.R. Smith, L.L. Hungerford, T.J. Klopfenstein, C.T. Milton, R.A. Moxley; Nebraska Beef Council; $22,940; submitted 3/23/00; funded

PIXImus Mouse Densitometer, Lunar Corporation
Nielsen, M., PI; D. Pomp, P. Miner, G. Bachman, T. Carr, G. Duhamel, C. Kelling; University of Nebraska Foundation Grant Proposals - 2000; $67,450, March 2000, not funded

Removal of Starch from the Diet
PI: Klopfenstein TJ, Moxley RA, co-investigators Milton CT, Smith DR, Hungerford LL, Gray JT; Nebraska Beef Council, $33,400; 4/00-4/01

Removal of Starch From the Diet on Colonic pH and Acid Resistant E. coli

Influence of Limiting Amount of Diet and Starch Content on Colonic pH and Acid Resistant Escherichia coli

Role of A/E Proteins in E. coli O157:H7 Intestinal Colonization in Adult Cattle
R.A. Moxley; USDA/CSREES/NRICGP; $575,034; submitted 1/18/00; not funded

Role of macrophages in the pathogenesis of porcine colonic spirochetosis
Duhamel, G.E. PI; J.D. Cirillo co-PI; USDA, National Research Initiative, Competitive Grant Program, Animal Health and Well-Being; $240,000, January 2000, funded

Role of Entry Mechanisms in Virulence of Mycobacterium marinum
PI: Jeffrey D. Cirillo; USDA; $333,863; Research Grant 9/1/00-8/31/03

Role of Macrophages in the Pathogenesis of Porcine Colonic Spirochetosis
Co-P.I. with Gerald Duhamel; Research Grant; USDA; $239,998; 9/1/00-8/31/03

Targeting the D-alanine ligase of M. tuberculosis for rational drug design
R.G. Barletta; UNL Research Council; $10,000; 1/1/01-12/31/01, pending

Testing of Probiotic Bacteria for the Elimination of Escherichia coli O157:H7 in Experimentally Infected Cattle
M. Brashears, R.A. Moxley. Midwest Advanced Food Manufacturing Alliance (MAFMA); $24,000; submitted 5/15/00; funded

The integration and enhancement of bioinformatic resources for Nebraska
PI: Sherman Co-PI: R. Donis, J Deogun, V. Gladyshev, G. Sarath and S. Scott; NSF-EPSCOR; 12/00-12/02; $208,267, not funded
Undergraduate Creative Activity and Research Experience (UCARE) Program

Wills RW, Vasa K; $2,000; 7/1/00 to 6/31/01

Understanding cattle behavior to maximize recovery of food-borne pathogens
Smith, DR; $2,500; UNL Honors Student Project Honors student: Irwin, K.; Faculty mentor; 12/99-12/00

Up-regulation of K+ Channels in the Remodeled Ventricle
PI: George J. Rozanski, 12.2% ($132,231) for Marjorie F. Lou, CoPI; National Institute of Health R01-EY10595; $1,081,579; Control mechanism of redox buffer glutathione on arrhythmias

Use of Microbacterium testaceum, an Endophytic Colonizing Bacteria, to Enhance Sorghum Resistance to Fungal Infections
A. Vidaver, and R.G. Barletta; Nebraska Grain Sorghum Check-off Board; $39,353; 7/1/00-6/30/02; not funded

Use of Microbacterium testaceum, an Endophytic Colonizing Bacteria, to Enhance Corn Resistance to Fungal and Bacterial Infections
A. Vidaver and R.G. Barletta; Nebraska Corn Check-off Board; $54,482; 7/1/00-6/30/02; not funded

Use of Probiotics and Prebiotics to Improve Gastrointestinal Health and Nutrition
R. Hutkins, D. Mack, R. Moxley, M. Brasher, T. Carr, M. Schnepf; USDA Initiative for Future Agriculture and Food Systems (IFAFS AREERA Section 401), $889,602; submitted 5/20/00; not funded

Using Cattle Behavior to Maximize Recovery of Food-Borne Pathogens from Feedlot Pens

Using Cattle Behavior to Maximize Recovery of Food-borne Pathogens from Feedlot Pens
Smith DR; $43,556; National Cattlemen's Beef Association; July 28, 2000, in contract dispute

Virulence Determinants of Genotype 2 Bovine Viral Diarrhea Virus isolates
C. Kelling and R. Donis; USDA-NRI,$181,134, 9/99-8/02, not funded

Whole-genome sequencing and analysis of Lawsonia intracellularis

Patents by VBMS Faculty in 2000

Identification of Novel Loci Involved in Entry by Legionella pneumophila.

-127-
Nucleotide Sequences and Method for Detection of *Serpulina hyodysenteriae*
G.E. Duhamel and R.O. Elder; American Type Culture Collection Deposit No. 75826; United States Patents 5,698,394; 5,869,630 and 6,068,843

Use of gp96 as an adjuvant for the induction of cytotoxic T-lymphocytes and antibodies specific for bovine herpesvirus
S. Srikumaran and Navaratnam Manjula. Filed on November 3, 2000, pending


Devireddy, L. and C. Jones. 2000. Olf-1, a neuron-specific transcription factor, can activate the herpes simplex virus 1 ICP0 promoter. J. Biol. Chem. 275:77-81. (J Series # 12858)


Referred Journal Articles in Press Or Accepted in 2000

A familial multisystemic disease in Gelbvieh cattle

Cloning and DNA sequence analysis of an immunogenic glucose/galactose MglB lipoprotein homologue from Brachyspira pilosicoli, the agent of colonic spirochetosis.

Entry Mechanisms of Mycobacteria. Front. Biosci

-130-
Evidence for the Localization of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) Antigen and RNA in Ovarian Follicles in Gilts
SuR JH, Doster AR, Galeota JA, and Osorio, FA. 2001. Vet Path 38 (1); in press; ARD J. Series #12617

Evidence of localization of porcine reproductive and respiratory syndrome virus (PRRSV) antigen and RNA in ovarian follicles in gilts
SuR JH, A.R. Doster, J.A. Galeota, F.A. Osorio. 2001. Veterinary Pathology; J. Series #12187; accepted

Familial Multi-System Disease in Gelbvich Cattle

Identification of differentially expressed genes following treatment of monkey kidney cells with the mycotoxin fumonisin B1

Identification of porcine intestinal spirochetes by PCR-restriction fragment length polymorphism analysis of ribosomal DNA encoding 23S rRNA

Improved diagnosis of porcine proliferative enteropathy caused by Lawsonia intracellularis using polymerase chain reaction-enzyme-linked oligosorbent assay (PCR-ELOSA)

In vivo translation efficiencies of the 5' untranslated region from low and high virulence genotype 2 bovine viral diarrhea virus isolates

Localization of a recessive juvenile cataract mutation to proximal chromosome 7 in mice

Microparticle-mediated RNA immunization of ruminants against bovine viral diarrhea virus

Minimal prophylactic concentration of dietary zinc compounds in a mouse model of swine dysentery

Minimal prophylactic concentration of dietary zinc in a mouse model of swine dysentery

Partial characterization of protective immunity against Chlamyphila felis in a mouse model

Persistent Bovine Viral Diarrhea Virus Infection in Beef Herds

Persistent bovine viral diarrhea virus infection in beef herds

Prevalence of Brachyspira species isolated from diarrheic pigs in Brazil.

Septicemia associated with Streptotrephonas malophilis in a West African dwarf crocodile
The *Legionella pneumophila* entry gene *rtxA* is involved in virulence

The *Legionella pneumophila* Entry Gene *rtxA* Is Involved in Virulence

The zinc ring finger of bovine herpes virus 1 encoded bICP0 is necessary for transcriptional regulation and infection

**Articles Submitted To Refereed Journals in 2000**

Amphibian declines and environmental change: An overview

Calving and Calving Management of Beef Cows and Heifers on Cow/calf Operations in the United States.

Challenges of sudden death syndrome diagnosis and implications for feedyard cattle management

Effect of pasture trace mineral supplementation on liver mineral levels and feedlot morbidity and mortality
2000. ARD J. Series #12703

Effects of immobilization agents on post-release behavior and population estimates of raccoons

Entry Into Host Cells by *Legionella*

Entry Mechanisms of Mycobacteria

Identification of Novel Loci Involved in Entry by *Legionella pneumophila*.

Identification and characterization of an alternatively spliced latency related transcript encoded by bovine herpesvirus 1

*In vivo* translation efficiencies of the 3' untranslated region from low and high virulence genotype 2 bovine viral diarrhea virus isolates

Killing of *Mycobacterium avium* by a mycobacteriophage delivered by a non-virulent *Mycobacterium*: A model for phage therapy of intracellular bacterial pathogens

Localization of DNA sequences in the latency associated transcript (LAT) that inhibit cell death and promote spontaneous reactivation

Lung lesions in feedlot aged beef calves at slaughter
Management Factors Affecting Incidence of Calf Diarrhea in Beef Herds-A Four-State Study

Messenger RNAs encoding the β subunits of guinea pig (Cavia porcellus) luteinizing hormone (gpLH) and putative chorionic gonadotropin (gpCG) are transcribed from a single-copy gpLH/CGβ gene

Minimal prophylactic concentration of dietary zinc compounds in a mouse model of swine dysentery

Mycobacterium avium subsp. paratuberculosis secretes a manganese-dependent superoxide dismutase
Lib, X., 2. Feng, N.B. Harris, J.D. CLillo, H. Bercovier, R.G. Barlem. Submitted to Izjemon and Immunity, ARD J. Series #3168

Mycobacterium avium subsp. paratuberculosis in veterinary medicine
Harris, N.B., and R.G. Barletta. Submitted to Clinical Microbiology Reviews, ARD J. Series #13141

Recombinant human lens thioltransferase: purification, characterization and function

Regulation of thioltransferase expression in human lens epithelial cells

Stimulation of phosphoinositide signal transduction pathway in lens epithelium of diabetic and galactosemic rats
Scheib, S., Dickerson, J.E., Jr. and Lou, M. F. Exp. Eye Res., submitted

The Legionella pneumophila entry gene nraA is involved in virulence

The acute PRRS outbreak: Report on a collaborative field investigative study

The NS5A protein of bovine viral diarrhea virus interacts with the alpha subunit of translation elongation factor 1

Books and Book Chapters in 2000

Beef Quality Assurance

Clinical pathological and other visible traits except coat colour (category 2) in Mendelian Inheritance in Cattle

Diagnosis of Diarrhea in Growing-Finishing Swine, in Diagnosis of Digestive Tract Diseases

Edema disease
Neonatal calf enteric diseases vaccines
Duhamel GE. In: Large Animal Medicine. 3rd ed., in press

Oxidative stress as a biochemical mechanism of senile cataract formation

Porcine gastric ulcer

Vaccines Against Intracellular Pathogens

Research Reports

Atypical PRRS Set Back

Beef Quality Assurance

Cleaning coliform bacteria from feedlot water tanks

Cleaning coliform bacteria from feedlot water tanks

Cleaning coliform bacteria from feedlot water tanks

Diagnostic strategies to classify pens by the prevalence of feedlot cattle shedding Escherichia coli O157:H7

Duration of PRRS virus infections and proportion of persistently infected pigs

Impact of Wean-to-Finish Management on Pig Performance

Influence of diet on total and acid resistant E. coli and colonic pH

Influence of reduced intake and(or) dietary starch on colonic pH and E. coli prevalence

Influence of restricted intake and reduced dietary starch on colonic pH and E. coli prevalence.

Latency of Ajuneszky's Disease Virus
Osorio, F.A. 2000 Veterinary Research (France), 31(1): 117-118
The relationship of the characteristics of feedlot pens to the percentage of cattle shedding *Escherichia coli* O157:H7 within the pen


The accuracy of test strategies to classify herds by Johne's disease status


MP74-A. 29-32

**Extension Publications in 2000**

**An ecological study of the percentage of feedlot cattle shedding detectable *Escherichia coli* O157:H7 in the feces and potential relationships to characteristics of the pen**


**Basic Principles of Mastitis Control (G95-1253)**

Rice DN, Bodman GR and Smith DR. 2000. (major revisions submitted)

**Beef Quality Assurance Training**

D. Griffin, D. Grotelueschen and T. Milton

**Biosecurity Basics for Cattle Operations and Good Management Practices (GMP) for Controlling Infectious Disease. (G00-1411-A)**


**Disposal of Livestock Mortality in Nebraska**

Henry C, Wills B and Wild J. 2000. Department of Biosystems Engineering, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln. Manure Matters 6(2)

**Disposal Methods of Livestock Mortality**


**Dryland Corn in the Cornhusker State**


**Effects of detrimental growing conditions on forage quality for livestock**


**Feedlot Roundtable**

T. Mader, T. Milton, D. Griffin, I. Rush and D. Grotelueschen

**Influence of diet on colonic pH, and generic and acid-resistant *Escherichia coli* in beef steers**


**Introducing the Nebraska Johne's Disease Herd Status Program**

Smith D.R. Submitted as an EARS report 4/19/2000

**Managing Feedlot Heat Stress (G00-1409-A)**

Mader T. and Griffin D.D. 2000

**New development in calf scour prevention using multivalent rotavirus vaccination of pregnant cows**

Duhamel GE. 2000. Nebraska Veterinary and Biomedical Sciences Newsletter 29:3-4

**Selection and Use of Disinfectants (G00-1410-A)**

Kennedy J., Bek J. and Griffin D.D. 2000

**Water quality for livestock**

Schneider N. R., S.M. Ensley and M.P. Carlson. 2000. Nebraska Veterinary and Biomedical Sciences Extension Newsletter, 29(8):9
Computer Software, Other Publications or Media Developed

Bruce Brodersen
Department of Veterinary and Biomedical Sciences World Wide Web home pages
Department of Veterinary and Biomedical Sciences Extension Newsletter World Wide Web pages
Nebraska Veterinary Diagnostic Laboratory System World Wide Web home pages
Publication of these World Wide Web pages has resulted in an average of over 9,000 overall hits per month for the last year
World Wide Web Information Request Form for Prospective Students
Publication of this form has resulted in 85 requests for information about the Department by prospective students
Co-List owner for NEBVET-L
List owner for VACCINOLOGY, Listserv for Dr. Srikumaran’s Vaccinology Course (VBMS 949)

D. Dee Griffin

Laura L. Hungerford
Types of Epidemiologic Studies [http://gpvec.unl.edu/BCC/mod2/default.htm]
Power and Sample Size [http://gpvec.unl.edu/BCC/mod2/default.htm]
Calculating Sample Size [http://gpvec.unl.edu/BCC/mod2/default.htm]
Calculating Power [http://gpvec.unl.edu/BCC/mod2/default.htm]
Introduction to EpiInfo 2000, Part 1: Installing the Program
[http://gpvec.unl.edu/BCC/ mod5/default.htm]
Introduction to EpiInfo 2000, Part 2: Importing Your Data
[http://gpvec.unl.edu/BCC/mod5/default.htm]
Introduction to EpiInfo 2000, Part 3: Conducting Statistical Analyses
[http://gpvec.unl.edu/BCC/mod5/ default.htm]

Gary P. Rupp
CowCalf5 - Updates and two training seminars

Gary B. Sherman
Parentage Program 2000. G. B. Sherman and S. Todd. This program, developed at GPVEC. Enables high through-put analysis of DNA microsatellite genotype data and subsequent generation of an array of research- and client-oriented report formats detailing sire-calf parentage assignments.
Presentations

Large intestinal mucosal explants as a model of Escherichia coli O157:H7 infection in cattle. poster & published abstract #373. 4th International Symposium and Workshop on “Shiga Toxin (Verocytotoxin)-Producing Escherichia coli Infections,” Kyoto, Japan

Identification and typing of porcine intestinal spirochetes by PCR-restriction fragment length polymorphism analysis of the nox gene. Poster, p. 47. Published Proceedings of 16th International Pig Veterinary Society Congress, Melbourne, Australia

Effect of temperature on survival of pathogenic intestinal spirochetes in spiked pig feces. Poster, p. 44. Published Proceedings of 16th International Pig Veterinary Society Congress, Melbourne, Australia

The identification and prevalence of intestinal spirochetes in relation to feed medication in Brazilian pig herds. Oral, p. 10. Published Proceedings of 16th International Pig Veterinary Society Congress, Melbourne, Australia

Expression of glycoprotein 5 (GP5) and protein M of porcine reproductive and respiratory syndrome virus (PRRSV) in Mycobacterium bovis BCG. Poster #133P. Conference of Research Workers in Animal Diseases, Chicago, IL

Validation of immunohistochemistry on skin biopsies to identify cattle persistently infected with bovine viral diarrhea virus. Oral, Abstracts, #228. 80th Annual Meeting of the Conference of Research Workers in Animal Diseases, Chicago, IL


Update on diagnosis and control of porcine colonic spirochetosis. Oral, pp. 1-15. Published Proceedings of Institut Supérieur des Productions Animales et des Industries Agro-alimentaires(ISPALA), Zoopôle, Saint Brieuc - Ploufragan, France

-137-

Dietary modulation of Brachyspira (formerly Serpulina) pilosicoli infection and colitis in a challenge model of porcine colonic spirochetosis. Poster, p. 45. Published Proceedings of 16th International Pig Veterinary Society Congress, Melbourne, Australia


Thiolation of proteins in human lens IN Mini-Symposium on LENS PROTEIN
Annual Meeting of the Association for Research in Vision and Ophthalmology, Fort
Lauderdale, FL

Enhanced protection against oxidative stress in human lens epithelial cells transfected with
thioltransferase in Symposium of OXIDATION AND CATARACT. ORAL, published in
Proceeding of the International society for Eye Research. Volume XIV, p. 63. The XIV
International Congree of Eye Research, Santa Fe, NM

Evaluating economic consequences of risk factor based health improvement decisions. Oral,
Abstract #431. Proceedings, XIth Symposium of the International Society for Veterinary
Epidemiology and Economics, Breckenridge, CO

Identification of five conserved antigenic linear B-cell epitopes within VP5* region of bovine
group A rotavirus. Oral, Abstract p. 67. 31st Midwest Student Biomedical Research Forum,
Omaha, NE

The distribution of E. coli O157 in agricultural range environments: preliminary results. Oral,
Abstract #407. Proceedings, XIth Symposium of the International Society for Veterinary
Epidemiology and Economics, Breckenridge, CO

Comparison of Culture Techniques for the Isolation of Salmonella spp. from Bovine Feedlot
Samples. Oral, Abstract #66. 81ST Annual Conference of Research Workers in Animal
Diseases, Chicago, IL

Influence of diet on colonic pH and generic and acid-resistant E. coli in beef steers. Oral,
Abstract #311. American Society of Animal Science -Midwestern Section, Des Moines, IA

Characterization of Gene and cDNA Sequence of Putative Guinea-Pig Chorionic
Gonadotropin β Subunit. Poster, Vol 62:(Suppl 1):Abstract #476. 33rd Annual Meeting of
the Society for the Study of Reproduction (SSR), Madison, WI

Veterinary Biotechnology: The Coming Era. Oral, Published-Proceedings of the 2000 IVMA
meeting - Large Animal Section. pp. 1-21. Interstate Veterinary Medical Association
Meetings, Marina Inn, South Sioux City, NE
Diagnostic strategies to classify pens by the prevalence of feedlot cattle shedding Escherichia coli O157:H7. Proceedings, 9th Symposium of the International Society for Veterinary Epidemiology and Economics, Breckenridge, CO.


Diagnostic strategies to classify feedlot pens by the prevalence-level of cattle shedding Escherichia coli O157:H7. Oral, Abstract #71. 81st Annual Conference of Research Workers in Animal Diseases, Chicago, IL.


A diagnostic strategy to classify pens by the prevalence of feedlot cattle shedding Escherichia coli O157:H7. Poster & published abstract #133. 4th International Symposium and Workshop on “Shiga Toxin (Verocytotoxin)-Producing Escherichia coli Infections,” Kyoto, Japan.

Escherichia coli O157:H7 in feedlot cattle: what have we learned and what direction the research is heading. pp. 1-5. Nebraska Beef Feedlot Roundtable, Grand Island, NE


An ecological study of the percentage of feedlot cattle shedding detectable Escherichia coli O157:H7 in the feces and potential relationships to characteristics of the pen. Abstract #42. American Society of Animal Science -Midwestern Section, Des Moines, IA


New Mutations in Beef Cattle. Oral [Steffen], Published-Proceedings of the 33rd Annual Convention of the AABP. pp. 155-156. 33rd Annual Convention of the American Association of Bovine Practitioners (AABP), Rapid City, SD

Susceptibility of Selected Non-Swine Species to Infection with PRRS Virus. pp. 411-413. Oral, Published Proceedings of Annual Meeting of AASP. American Association of Swine Practitioners, Indianapolis, IN

Ecological characteristics of feedlot pens associated with the percentage of cattle shedding Escherichia coli O157:H7. Oral, Abstract #68. 81ST Annual Conference of Research Workers in Animal Diseases, Chicago, IL


Public Press, Lay Journals, Etc.

B. Brodersen
Sidebar reference to immunohistochemical detection of cattle persistently infected with bovine viral diarrhea virus. Bovine Veterinarian, January 2000

R. Donis
Overview of Biotechnology Core Facilities. Nebraska Unicameral Legislative Staff Forum. September 29, 1999. Beadle Center, UNL

D. Dee Griffin

D. Grotelueschen

M. Lou
A featured interview of my research has been made and aired on Channel 10/11, Summer, 2000
A video on Cataract Research at UNL, made by UNL Education TV has been televised nationally in the UNL Football games, 2000

G. Rupp
Proceedings, Nebraska Veterinary Medical Association 104th Annual Convention. Kearney, Nebraska, January 21-23, 2000
Proceedings, 2000 Annual Conference, Western Canadian Association of Bovine Practitioners. Saskatoon, Saskatchewan, Canada, January 19-22, 2000
Educating Veterinary for Agricultural Careers. Nebraska Veterinary and Biomedical Sciences Newsletter. August 2000. 29(8):1
D. Smith

Smith DR. 2000. Everything you've ever wanted to know about Johne's disease: but were afraid to ask. Nebraska State Dairymen's Association 1999 Nebraska DHI Annual Summary. 16-17

Smith DR. Improving cattle health and value by using biosecurity management to control BVDV. Written under contract with Nadler and Associates (Synbiotics) for lay release

R. Wills

Hoard, Bill, Omaha World Herald. 3/14/00. Interview for article about pseudorabies
"BVD Skin Test Helping Cattle Producers Detect Disease Earlier," Farm & Ranch’s Heartland Express, May 18, 2000, pgs. 1-2

"BVD Skin Biopsy Test," Bovine Veterinarian, January 2000, pg 30

"BVD Skin Test Helping Cattle Producers Detect Disease Earlier," Voice News Salute to Beef Producers, May 18, 2000, pg 9

"BVD Skin Test Helping Cattle Producers Detect Disease Earlier," May Beef Month 2000


"Compare Diagnostic Tests," Bovine Veterinarian (A supplement to Dairy Herd Management, November-December 2000), pg 8

"Stalk Rot, Other Diseases Possible This Fall," IANR News Service, September 2000

"New E. coli test taps cattle’s propensity to chew, lick," Research Nebraska, September 2000, page 10-11

"USDA Grant Aids NU Research to Identify On-Farm E. coli Controls," IANR New Service, October 2000

"Nitrate Kit Available to Veterinarians," IANR News Service, October 2000

"Chilled-out Chickens," Research Nebraska, September 2000, pgs. 20-21

"Producer Focus of 41st NU George Young Swine Conference," IANR News Service, July 2000


"Lesions and Effects of Location for Administration of Clostridial Bacterin-toxoid Vaccines on Growth Performance and Eating and Drinking Behaviors in Newly Arrived Calves at a Feedlot," American Journal of Veterinary Research, Vol 61, #10, October 2000


"Professor Studies Lung-Disease Causes: UNL Lab Researches Tuberculosis, Legionnaires’ Disease," Daily Nebraskan, April 19, 2000, pg 10


"NU Researchers Target Latency to Control Herpes Viruses," IANR News Service, February 2000

"Probing the Genetics Behind Herpes Virus: Silent Threat: Latency may be key to new treatments, vaccines," NU Research Nebraska, March 2000, pg 14-15

"NU Researchers Target Latency to Control Herpes Viruses," NU Scarlet, March 2000, pgs 1 & 4
Barletta, Ralph G.
- Radiation Safety Committee, University of Nebraska-Lincoln, March 2000-present
- Safety Committee Chair, Department of Veterinary and Biomedical Sciences, September 1999-present
- Safety Committee, Department of Veterinary and Biomedical Sciences, July 1991-present
- Book Chair, Department of Veterinary and Biomedical Sciences, September 1997-present
- Adjunct Professor, Department of Veterinary Pathobiology, Texas A&M University, March 18, 1997-present
- Adjunct Professor, School of Biological Sciences, September 17, 1997-present
- Member, Comparative Pathobiology GREG; September 17, 1997-present
- Member, Microbiology GREG; September 17, 1997-present
- Ad-hoc reviewer, NRI, U.S. Department of Agriculture
- Ad-hoc reviewer, SBIR, U.S. Department of Agriculture
- Reviewer, Antimicrobial Agents and Chemotherapy
- Reviewer, Journal of Clinical Microbiology

Brodersen, Bruce W.
- Board of Directors, Nebraska Veterinary Medical Association, 2000
- Public Relations Committee, Nebraska Veterinary Medical Association, 2000
- Organizational Committee, George A. Young Swine Health and Management Conference, 2000
- 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

Cirillo, Jeffrey D.
- Editorial Board, Frontiers in Bioscience
- Managing Editor, Frontiers in Bioscience
- Ad-hoc reviewer, USDA
- Ad-hoc reviewer, AMFAR
- Ad-hoc reviewer, Biotechnology & Biological Sciences Research Council, UK
- Reviewer, Environmental Microbiology
- Reviewer, Biotechniques
- Reviewer, Infection and Immunity
- Reviewer, Gene
- Reviewer, Molecular Microbiology
- Reviewer, Trends in Microbiology
- Reviewer, Lancet
- Reviewer and beta tester for BioMedNet, the new online journal publisher.
- Adjunct Assistant Professor, Department of Microbiology, University of Hawaii-Manoa. 1998-2000
- Member, Microbiology GREG; 1998-present
- VBMS Graduate Committee; 1999-present
- MSIA Graduate Committee; 2000-present
- Biochemistry Faculty Search Committee; 1999
- UNL Honors Convocation Committee; 1999-present
- Supervisor of project to upgrade departmental webpage.
- Member, UNL Office of Professional and Organizational Development Supervisory Committee; 1999-present
Donis, Ruben O.
- Associate Director, UNL Center for Biotechnology; Annual budget $1,600,000
- Coordinator, Comparative Pathobiology Area of Concentration, Center for Biotechnology. 1999-2000
- Associate Director, Center for Biotechnology. Main responsibility is oversight of the Core Research Facilities
- NIH CSR Vaccines Study Section member 1999-present
- Ad-Hoc reviewer for USDA NRI grants
- Ad-Hoc reviewer for Virus Research

Doster, Alan R.
- American Association of Veterinary Laboratory Diagnosticians: Histopathology Committee
- Pororabies Advisory Committee: ex-official member
- Nebraska Veterinary Medical Association Continuing Education Committee
- Nebraska Veterinary Medical Association Disease Control and Legislative Committee
- Mentor, Nebraska Pork Producers Mentoring Program for Belinda Kars. 3/7/00
- Participant in the National Cattlemen's Association Meeting on Lung Lesions in Slaughter Cattle, Amarillo, TX. April 3-5, 2000
- Attended the NVMA District II Meeting, Veterinary Dermatology, Beatrice, NE. 3/20/00

Duhamel, Gerald E.
- Director, At-Large (1997-00), Comparative Gastroenterology Society
- Organizing Committee, First International Conference on Colonic Spirochaetal Infections in Animals and Humans, Ekh, Sweden, April 2-3, 2000
- Chair (1998-01) and Member (1991-97), Enteric Diseases Committee American Association of Veterinary Laboratory Diagnosticians
- Chair (1997-00) and co-Chair (1994-96) Gastroenteric Diseases Section Annual Meeting Conference Research Workers Animal Diseases
- Member (1996-present), Bacteriology/Mycology Committee, Anaerobic Techniques Sub-committee, American Association of Veterinary Laboratory Diagnosticians
- Member (1991-present), Committee on Transmissible Diseases of Swine United States Animal Health Association
- Co-representative (1988-present), NC-62 Technical Committee on Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety, Nebraska Agriculture Experiment Station
- Member (1998-01, elected), Academic Senate, UN-L
- Member, Institutional Biosafety Committees
- University of Nebraska-Lincoln (1995-present)
- Schering-Plough Animal Health (1995-present)
- At-Large-Representative (1998-01), Nominating Committee, IANR
- Oversight Committee (1990-present), Fermentation Core Facility Center for Biotechnology and Food Processing Center
- Member, Departmental Graduate Committee (1999-02)
- Review Panels for Research Grants
- Comparative Gastroenterology Society Research Grant Program
- Invited Consultant to FDA, Center for Veterinary Medicine
- On behalf of Boehringer Ingelheim Vetmedica Inc., February 25, 2000
- Editor, Animal Health Research Reviews Supplement, in press

Ad Hoc Reviewer
-Veterinary Pathology (1)

- Journal of Clinical Microbiology (1)

- Swine Health and Production (2)

- Departmental Publications (1)

- USDA, Molecular and Cellular Basis of Animal Diseases, National Research Initiative, Competitive Grants Program (1)

- Department of Health and Human Services, Public Health Service, Food and Drug Administration, Research Studies on Microbiological Hazards Associated with the Food Animal Production Environment Grant Program (3)

- Natural Sciences and Engineering Research Council of Canada, Strategic Projects Grant Program (1)

**Grotelueschen, Dale M.**

**National**

- President, American Association of Extension Veterinarians, 1998-99

- Board of Directors, Academy of Veterinary Consultants, 1998-2001

- Coordinator, Feedlot Sessions, 2000 American Association of Bovine Practitioners Annual Convention

- Coordinator, Clinical Forums, 2001 American Association of Bovine Practitioners Annual Convention

- ad hoc Committee to Evaluate BVD Eradication, Chairman, Academy of Veterinary Consultants, 2000-2001

- Food Safety Committee, American Association of Bovine Practitioners, member, 2000

- Editorial consultant, The Bovine Practitioner, 2000

- Epidemiology and Economics of Animal Diseases Committee, American Association of Veterinary Laboratory Diagnosticians, 1998-2000

- Animal Disease Surveillance and Animal Health Information Systems Committee, United States Animal Health Association, member, 1993-Present

- Salmonellosis Committee, United States Animal Health Association, 1988-Present

- Awards Committee, American Association of Extension Veterinarians, chairman, 2000

**State**

- President, Nebraska Veterinary Medical Association, 1995

- Continuing Education Committee, Nebraska Veterinary Medical Association, 1980-Present

- Food Safety Assurance Committee, Nebraska Veterinary Medical Association, member 1990-present, Chairman, 1997-present

- Nominating Committee, Nebraska Veterinary Medical Association, 1996-2000

- ad hoc Committee, Veterinary Record Confidentiality, Nebraska Veterinary Medical Association, Chairman, 1999-2000

- President, Nebraska Veterinary Medical Association Centennial Scholarship Foundation, 2000

- Nebraska State Johne’s Disease Advisory Committee, 1999-2000

- Nebraska Cattlemen, BQA Technical Advisory Subcommittee, 1998-2000


**University of Nebraska-Lincoln**

- Gamma Sigma Delta Extension Award Committee, 2000

- Faculty Senate (interim elected member), 1998-1999

**College of Agricultural Sciences and Natural Resources**

- Beef Feedlot Extension Group, member, 1996-present, Meeting coordinator, 1999-2000

- Beef Feedlot Roundtable Planning Committee member, 1994-present

**Department of Veterinary and Biomedical Sciences**

- Co-chair, Veterinary Position Search Committee, West Central Research & Extension Center, 1999-2000
**Panhandle Research and Extension Center**
- Chair, Awards Committee, Panhandle Research & Extension Center, 2000-2001
- Extension Committee, Panhandle Research & Extension Center, 2000-2001
- Chair, Marketing and Public Relations Committee, Panhandle Research & Extension Center, 1999-2000
- Capitol Construction Committee, Panhandle Research & Extension Center, 1999-2000

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**Hungerford, Laura L.**
- Organized 2 regional meetings of veterinary epidemiologists from Kansas and Nebraska, 2000
- University of Nebraska Field Disease research Group, 1998-present
- Nebraska Veterinary Medical Association; Continuing Education Committee, 1998-present
- Search Committee, Extension Veterinarian and Diagnostician, 1999-2000
- Departmental Graduate Committee, 1999-present
- Departmental Peer Review Committee, 1999-present
- Departmental Curriculum Committee, 2000-present
- Departmental Representative to Masters of Agriculture Committee, 2000-present
- External Reviewer, USDA/ARS and USDA/CSRS grant proposals; 1991-present
- Reviewer, J.A.V.M.A.; 1994-present
- Reviewer, Journal of Wildlife Diseases, 1998-present
- Reviewer, Veterinary Preventive Medicine; 1996-present
- Conference of Research Workers on Animal Diseases, Leader, Epidemiology Section, 1998-2000
- Faculty, Conservation Medicine Center of Chicago, Loyola University and Brookfield Zoological Society; Scientific Research Advisory Committee, 1999-present
- Scientific Advisory Panel for Cook County Zoonotic Disease Research, 1999-present
- NASA Declining Amphibian Population Task Force; 1998-present
- University of Nebraska advisor for Wonderwise, 1999-present

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**Jones, Clinton J.**
- Head VBMS Graduate Committee September 1996- August 2000
- Head of UNL Biosafety Committee; September 1994- Present
- Served on Search Committee for Virologist. Dr. Robert Weldon, a retrovirologist, was hired

---

**Kelling, Clayton L.**
- Ad hoc reviewer for 2000 USDA NRI Competitive Grants program
- Ad hoc reviewer for 2000 USDA SBIR Competitive Grants program
- Reviewer for *American Journal of Veterinary Research*
  - Reviewer for *Vaccine*
  - Reviewer for *Journal of American Veterinary Medical Association*
  - Reviewer for *Bovine Practitioner*
- External reviewer of PhD candidate, College of Vet Med, Michigan State University
- Moderator, Viral pathogenesis, 2000 CRWAD
- NIH-NIAID Special Emphasis Scientific Review Committee, 2000
- Member (1996-2002), Peer Review Committee
- Member (1993-present), Department Curriculum Committee
Lou, Marjorie F.
- Organizer and Session Chairman of Meetings/Conferences (2000), Chairman of the Program Committee for Lens Research, the Association for Research in Vision and Ophthalmology for the annual conference ARVO, Fort Lauderdale, FL, April 30-May 6, 2000. Reviewed, 360 abstracts and programmed for the conference.
- Program Chairman, Lens Section, Annual Meeting of Association for Research in Vision and Ophthalmology (ARVO), Fort Lauderdale, FL, April 30-May 6, 2000
- Program Chairman, Lens Section, Annual Meeting of European Research Meeting in Ophthalmology and Vision, Spain (2001-2002)

Moxley, Rodney A.
- USDA/NRRCGP Grant Review Panel Member, Area 44.0 Sustaining Animal Health and Well-Being, 2000
- USDA/CSREES Regional Research Technical Committee, NC-62 Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety, Nebraska Representative, 10/1/97-9/30/02
- Curriculum Committee, UNL College of Agricultural Sciences and Natural Resources, 1999-2001
- Curriculum Committee, UNL Department of Veterinary & Biomedical Sciences, 1999-2001
- Supervisor, glassware sterilization lab, second floor VBS, 9/1/00-8/31/01

Osorio, Fernando A.
- Examinations Committee, American College of Veterinary Microbiologists (1999-2002)
- Section Leader, Viral Pathogenesis, 80th Annual Meeting of the Conference of Research Workers in Animal Diseases, Chicago, Illinois November 1999
- Ad-Hoc reviewer for: Veterinary Microbiology, Journal of Virological Methods, Journal of Clinical Microbiology, Ciencia Rural (Brazil), North Dakota EPSCOR
- Nebraska representative to the NC-229 (PRRSV Research) Multi-State Project

Rogers, Douglas G.
- American Association of Veterinary Diagnosticians Aquaculture Committee

Rupp, Gary P.
- NVMA Continuing Education Committee
- Nebraska College of Technical Agriculture Advisory Committee
- AABP Nutritional Committee
- South Central Cattlemen and Cattleswomen, President
- VBS Peer Review Committee
- KSU Food Animal Review Committee
- Journal of Theriogenology Ad Hoc Reviewer

Schmitz, John A.
- NCR-168 Epidemiology and Economics of Animal Diseases, Administrative Advisor
- US Animal Health Association, Committee on Infectious Diseases of Cattle, Bison and Lama, Chair
Schneider, Norman R.

- National
  - Association of Official Analytical Chemists, Associate Referee for Nitrate/Nitrite Analytical Methodology

- State
  - Advisor/Consultant for Nebraska Master Poison Control Center, Children's Memorial Hospital, Omaha, NE
  - Advisory Committee for the Veterinary Technology Division — Nebraska College of Technical Agriculture
  - Nebraska Veterinary Medical Association, Public Relations Committee
  - Nebraska Veterinary Medical Association, Student Scholarship Committee
  - Nebraska Veterinary Medical Association, Disease Control and Legislation Committee

- University of Nebraska
  - State 4-H Small Animal Advisory Committee
  - Extension Stored Grain Task Force

- University of Nebraska-Lincoln
  - Faculty Advisor, NU Pre-Veterinary Club
  - Faculty Advisor, Alpha Phi Omega
  - Faculty Participant, Summer Reading Program
  - New Student Enrollment Academic Adviser
  - Sue Tidball Award Program Committee
  - Central Planning Committee, 2000 LeaderShape Nebraska
  - University Marshal Corps
  - Life Sciences Task Force Subcommittee on Curriculum Coordination
  - Student Leadership Awards Selection Committee

- College of Agricultural Sciences and Natural Resources
  - Teaching Community
  - Faculty Advisory Council
  - Academic Transfer Programs Conference
  - Recruitment, Retention and Placement Committee
  - Achievement, Commitment & Excellence (A.C.E.) Program Steering Committee

- Department of Veterinary and Biomedical Sciences
  - Curriculum and Teaching Committee, Chair
  - Student Outcomes Assessment Committee, Chair

Sherman, Gary B.

- GPVEC Safety Officer
- Society for the Study of Reproduction, Education Committee Member
- USDA-NRI ad hoc reviewer
- ad hoc VBMS Research Committee Member - USDA Departmental Review
- Conservation Breeding Specialist Group Scientific Network
- Review for a variety of scientific journals in my area of expertise

Smith, David R.

-Secretary, American Association of Extension Veterinarians, 1999-present
-Food Safety Committee, American Association of Bovine Practitioners, 1999-present
-Co-manager, AABP-L listserv, American Association of Bovine Practitioners, 1999-present
-Job Content Analysis Committee, American Board of Veterinary Practitioners, 2000
-Board of Directors, Nebraska State Dairymen’s Association, 2000
-Nebraska Veterinary Medical Association, Continuing Education Committee, 1999-present
-Nebraska Veterinary Medical Association, Food Animal Safety Committee, 1997-present
-Bureau of Animal Industry, Johne's Disease Advisory Committee, 1998-present

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**Strikumaran, Subramanian**

-**National**
  -Member, Review Panel on Animal Protection: Binational Agricultural Research and Development (BARD) Fund

-**Regional**
  -Representative to the USDA NC-107 Regional Committee on Bovine Respiratory Diseases, from October 1988 to present

-**University Of Nebraska**
  -Member, Core Research Facility Advisory Committee of the Center for Biotechnology, July 1995 to present

-**Department**
  -Member, Graduate Committee, 1999-2002
  -Member, Peer Review Committee, 2000-2003
  -Member, Curriculum Committee, 2000-2003

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**Steffen, David J.**

-Departmental Peer Review Committee 1996 elected 2000
  -Social committee 1997-2000
  -Associate Editor, Journal of Veterinary Diagnostic Investigations. 1996-present
  -AAVLD Pathology Committee Chair, By-Laws Committee Member 1997-2000
  -AAVLD publications Committee 1998-present
  -ARDC Advisory Committee 1997-1999

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**Wills, Robert W.**

-George A. Young Swine Conference Committee Chair
  -IANR Pork Interest Group, Chair
  -Graduate College Faculty Member of the University of Nebraska-Lincoln
  -Nebraska Veterinary Medical Association, Continuing Education and Food Safety Committees
  -Nebraska Pork Producers Association Board of Directors
  -Nebraska Pork Producers Association Pork Research/Producer Education Committee
  -Nebraska Pork Exposition, Inc. Board of Directors
  -Nebraska Department of Agriculture Pseudorabies Advisory Committee
  -NCR-168 Epidemiology and Economics of Animal Health Committee, Chair
  -American Association of Swine Practitioners, Conference Planning Committee
  -American Association of Swine Practitioners, Communications Committee
  -American Association of Extension Veterinarians, North Central Region Director
Table 20. Budget, Veterinary and Biomedical Sciences Department – Fiscal Year 2000

<table>
<thead>
<tr>
<th>FY Budget</th>
<th>PTE*</th>
<th>Personnel</th>
<th>Benefits</th>
<th>Operating</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>50.39</td>
<td>1,406,637</td>
<td>477,099</td>
<td>520,528</td>
<td>2,404,264</td>
</tr>
<tr>
<td>Teaching</td>
<td>5.5</td>
<td>486,189</td>
<td>96,136</td>
<td>119,125</td>
<td>692,450</td>
</tr>
<tr>
<td>Extension</td>
<td>4.73</td>
<td>279,650</td>
<td>59,503</td>
<td>29,044</td>
<td>368,197</td>
</tr>
<tr>
<td>TOTAL</td>
<td>60.62</td>
<td>2,172,476</td>
<td>632,738</td>
<td>659,697</td>
<td>3,464,911</td>
</tr>
</tbody>
</table>

*Includes faculty and staff

Table 21. Summary of Other Income - Fiscal Year 2000**

<table>
<thead>
<tr>
<th>Source of Income</th>
<th>Amounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Health Funds (10-01-00/09-30-01)</td>
<td>108,979</td>
</tr>
<tr>
<td>Regional Research Funds (10-01-00/09-30-01)</td>
<td>53,512</td>
</tr>
<tr>
<td>Grants Received (Calendar Year 2000)</td>
<td>3,516,678</td>
</tr>
<tr>
<td>Research Revolving Income (07-01-00/09-30-01)</td>
<td>168,213</td>
</tr>
<tr>
<td>Teaching Revolving Income (07-01-00/09-30-01)</td>
<td>76,094</td>
</tr>
<tr>
<td>Extension Revolving Income (07-01-00/09-30-01)</td>
<td>18,825</td>
</tr>
<tr>
<td>Diagnostic Revolving Income</td>
<td>674,228</td>
</tr>
<tr>
<td>Biotechnology Support (07-01-00/09-30-01)</td>
<td>159,871</td>
</tr>
<tr>
<td>Animal Research Facility Income from Extramural Sources</td>
<td>105,504</td>
</tr>
<tr>
<td>TOTAL</td>
<td>4,880,964</td>
</tr>
</tbody>
</table>

* July 1, 1999 - June 30, 2000
** Includes UNL Center for Biotechnology, Area of Concentration Funds
Table 22. Nebraska Veterinary Diagnostic Laboratory System Revolving Account Summary for Fiscal Year 2000

<table>
<thead>
<tr>
<th>LINCOLN DIAGNOSTIC LAB (VDC)</th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>579,038</td>
<td>143,785</td>
<td>421,469</td>
<td>13,784</td>
<td>31,965</td>
</tr>
<tr>
<td>Personnel Expense</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Expense</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Balance</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(a) VDC Fees to WCREC &amp; PREC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Balance, including fees to WCREC &amp; PREC</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NORTH PLATTE (WREC)</th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>9,905</td>
<td></td>
<td></td>
<td>14,509</td>
<td>-4,604</td>
</tr>
<tr>
<td>Personnel Expense</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Operating Expense</td>
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<tr>
<td>Balance</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(a) VDC Fees/Slides</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>(b) Balance, including fees &amp; slides</td>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCOTTSBLUFF (PVDL)</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>56,525</td>
<td>6,643</td>
<td>41,684</td>
<td>8,198</td>
<td>-31,674</td>
</tr>
<tr>
<td>Personnel Expense</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Expense</td>
<td></td>
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<tr>
<td>Balance</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(a) VDC Fees/Slides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Balance, including fees &amp; slides</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

2000 TOTAL: -46,629

a) Lab fees from VDC (Lincoln) that have not been charged back to WCREC or PVDL. These fees are the NVDLS Fee Schedule charges that would have been charged to a client.
b) Balance if VDC fees were charged back to WCREC or PVDL, including all costs.
Table 23. Summary of Research Funds* Allocations to Veterinary and Biomedical Sciences Department by Agricultural Research Division for Fiscal Year 2000 and Comparison to Average for 20 IANR Administrative Units**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Veterinary &amp; Biomedical Sciences</th>
<th>ARD Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Research FTE</td>
<td>10.88</td>
<td>6.51</td>
</tr>
<tr>
<td>Faculty Salary, $/FTE</td>
<td>83,821</td>
<td>77,213</td>
</tr>
<tr>
<td>Managerial/Professional Employee, fte/FTE</td>
<td>0.31</td>
<td>0.70</td>
</tr>
<tr>
<td>Managerial/Professional Salary, $/FTE</td>
<td>11,828</td>
<td>22,214</td>
</tr>
<tr>
<td>Office/Service Employee, fte/FTE</td>
<td>0.79</td>
<td>0.70</td>
</tr>
<tr>
<td>Office/Service Salary, $/FTE</td>
<td>18,140</td>
<td>17,269</td>
</tr>
<tr>
<td>GRA Stipends, $/FTE</td>
<td>13,137</td>
<td>11,475</td>
</tr>
<tr>
<td>Hourly Employee Wages, $/FTE</td>
<td>625</td>
<td>1,587</td>
</tr>
<tr>
<td>Fringe Benefits, $/FTE</td>
<td>23,976</td>
<td>24,971</td>
</tr>
<tr>
<td>Operating, $/FTE</td>
<td>32,689</td>
<td>25,973</td>
</tr>
<tr>
<td>Total Support, $/FTE</td>
<td>100,395</td>
<td>103,381</td>
</tr>
<tr>
<td>Total Investment, $/FTE</td>
<td>184,216</td>
<td>180,394</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 24. Veterinary and Biomedical Sciences Unit Performance Characteristics

UNIT PERFORMANCE CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>FY 2000</th>
<th>Average of FY 1998-2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VBS</td>
<td>ARD Ave.</td>
</tr>
<tr>
<td>Total Approp. $/FTE²</td>
<td>184,216</td>
<td>180,694</td>
</tr>
<tr>
<td>Ref. Publications/FTE³</td>
<td>1.19</td>
<td>3.51</td>
</tr>
<tr>
<td>Theses/FTE⁴</td>
<td>0.92</td>
<td>0.85</td>
</tr>
<tr>
<td>Competitive Grant $/FTE</td>
<td>93,880</td>
<td>50,087</td>
</tr>
<tr>
<td>Total Grant $/FTE⁵</td>
<td>160,688</td>
<td>102,513</td>
</tr>
<tr>
<td>Total Grant $/Total Approp. $</td>
<td>0.87</td>
<td>0.57</td>
</tr>
<tr>
<td>Compet. Grant Proposals/FTE</td>
<td>1.65</td>
<td>1.12</td>
</tr>
<tr>
<td>Total Grant Proposals/FTE</td>
<td>7.17</td>
<td>7.94</td>
</tr>
<tr>
<td>Total Resources, $/FTE</td>
<td>344,904</td>
<td>283,207</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 Foundations, corporations and internal grant proposals).
Table 25. RESOURCE AND PERFORMANCE TRENDS

UNIT: VETERINARY & BIOMEDICAL SCIENCES

(INCLUDES GPVEC)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Fiscal Year</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Approp. $/FTE 1/</td>
<td>115,905</td>
<td>148,003</td>
<td>147,671</td>
<td>156,233</td>
<td>197,394</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></td>
</tr>
<tr>
<td>Comp. Grant $/FTE</td>
<td>26,495</td>
<td>111,752</td>
<td>33,954</td>
<td>33,686</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></td>
<td></td>
</tr>
<tr>
<td>FTE</td>
<td>41,432</td>
<td>146,092</td>
<td>64,801</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></td>
</tr>
<tr>
<td>exp. $</td>
<td>0.357</td>
<td>0.987</td>
<td>0.439</td>
<td>0.346</td>
<td>0.478</td>
<td>1.92</td>
<td>1.188</td>
<td>0.585</td>
<td>0.958</td>
<td>0.704</td>
<td>0.87</td>
<td></td>
</tr>
<tr>
<td>eval. $/FTE</td>
<td>157,337</td>
<td>294,095</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>
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<tr>
<td>FTE</td>
<td>0.80</td>
<td>0.93</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>
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</tr>
<tr>
<td>reports/FTE 2/</td>
<td>0.54</td>
<td>0.23</td>
<td>0.11</td>
<td>1.54</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>
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<tr>
<td>evals/FTE 3/</td>
<td>1.88</td>
<td>1.87</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></td>
</tr>
<tr>
<td>evals/FTE 4/</td>
<td>3.58</td>
<td>9.51</td>
<td>9.85</td>
<td>9.69</td>
<td>12.32</td>
<td>9.35</td>
<td>8.50</td>
<td>0.34</td>
<td>4.89</td>
<td>8.40</td>
<td>7.17</td>
<td></td>
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</tbody>
</table>

1/ State and federal formula funds plus additional resources added to units on a recurring basis. Does not include administrative "overhead," diagnostic federal 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 26. Research Grant and Contract Income During the Last Four Calendar Years Expressed on Dollars Per Research FTE Basis*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Economics</td>
<td>3,111</td>
<td>2,639</td>
<td>24,409</td>
<td>24,511</td>
<td>13,668</td>
</tr>
<tr>
<td>Ag Leadership, Ed &amp; Comm</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Agronomy</td>
<td>102,631</td>
<td>63,403</td>
<td>142,844</td>
<td>104,545</td>
<td>103,356</td>
</tr>
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<td>Animal Science</td>
<td>77,981</td>
<td>79,949</td>
<td>58,342</td>
<td>61,589</td>
<td>69,465</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>184,299</td>
<td>226,515</td>
<td>414,194</td>
<td>344,416</td>
<td>292,356</td>
</tr>
<tr>
<td>Biological Systems Engineering</td>
<td>58,619</td>
<td>54,266</td>
<td>22,902</td>
<td>41,638</td>
<td>44,356</td>
</tr>
<tr>
<td>Biometry</td>
<td>-0-</td>
<td>-0-</td>
<td>14,970</td>
<td>36,569</td>
<td>12,885</td>
</tr>
<tr>
<td>Entomology</td>
<td>131,234</td>
<td>147,483</td>
<td>134,446</td>
<td>125,557</td>
<td>134,680</td>
</tr>
<tr>
<td>Family &amp; Consumer Science</td>
<td>-0-</td>
<td>-0-</td>
<td>-0-</td>
<td>602</td>
<td>151</td>
</tr>
<tr>
<td>Food Science &amp; Technology</td>
<td>200,032</td>
<td>362,253</td>
<td>495,135</td>
<td>355,539</td>
<td>353,240</td>
</tr>
<tr>
<td>Horticulture</td>
<td>104,240</td>
<td>63,841</td>
<td>101,157</td>
<td>78,760</td>
<td>87,000</td>
</tr>
<tr>
<td>Northeast R&amp;E Center</td>
<td>76,140</td>
<td>80,861</td>
<td>243,917</td>
<td>45,018</td>
<td>111,484</td>
</tr>
<tr>
<td>Nutritional Science &amp; Dietetics</td>
<td>3,226</td>
<td>7,722</td>
<td>1,003</td>
<td>9,766</td>
<td>5,429</td>
</tr>
<tr>
<td>Panhandle R&amp;E Center</td>
<td>142,273</td>
<td>97,986</td>
<td>103,847</td>
<td>134,992</td>
<td>119,775</td>
</tr>
<tr>
<td>Plant Pathology</td>
<td>138,274</td>
<td>86,465</td>
<td>124,770</td>
<td>126,765</td>
<td>119,069</td>
</tr>
<tr>
<td>School of Natural Resources Science*</td>
<td>—</td>
<td>—</td>
<td>218,217</td>
<td>266,917</td>
<td>242,567</td>
</tr>
<tr>
<td>South Central R&amp;E Center</td>
<td>64,918</td>
<td>85,862</td>
<td>115,893</td>
<td>67,085</td>
<td>83,440</td>
</tr>
<tr>
<td>Textiles, Clothing &amp; Design</td>
<td>13,075</td>
<td>18,174</td>
<td>-0-</td>
<td>-0-</td>
<td>7,812</td>
</tr>
<tr>
<td>Veterinary &amp; Biomedical Sciences</td>
<td>168,937</td>
<td>173,260</td>
<td>221,454</td>
<td>161,627</td>
<td>181,312</td>
</tr>
<tr>
<td>West Central R&amp;E Center</td>
<td>29,177</td>
<td>37,342</td>
<td>44,914</td>
<td>37,583</td>
<td>37,254</td>
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<tr>
<td><strong>AVERAGE</strong></td>
<td>104,231</td>
<td>109,461</td>
<td>124,121</td>
<td>106,232</td>
<td>100,965</td>
</tr>
</tbody>
</table>

* Included in list for the first time

** Does not include Nebraska Veterinary Diagnostic Laboratory System user fee income
Table 27. Nebraska Cash Receipts from Farm Marketings by Commodity**

Total All Commodities = $10,092,232

<table>
<thead>
<tr>
<th>LIVESTOCK PRODUCTS</th>
<th>$ Value in Thousands</th>
<th>$ of Total</th>
<th>CROPS</th>
<th>% Value in Thousands</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livestock &amp; Products</td>
<td>5,542,050</td>
<td>54.9</td>
<td>Food Grains</td>
<td>252,243</td>
<td>2.5</td>
</tr>
<tr>
<td>Meat Animals</td>
<td>5,229,679</td>
<td>51.8</td>
<td>Rye</td>
<td>654</td>
<td>—</td>
</tr>
<tr>
<td>Cattle &amp; Calves</td>
<td>4,385,044</td>
<td>43.4</td>
<td>Wheat</td>
<td>251,589</td>
<td>2.5</td>
</tr>
<tr>
<td>Hogs</td>
<td>832,518</td>
<td>8.2</td>
<td>Feed Crops</td>
<td>3,014,214</td>
<td>29.9</td>
</tr>
<tr>
<td>Sheep &amp; Lambs</td>
<td>12,117</td>
<td>.1</td>
<td>Oats</td>
<td>3,018</td>
<td>—</td>
</tr>
<tr>
<td>Dairy Products</td>
<td>133,980</td>
<td>1.3</td>
<td>Barley</td>
<td>1,187</td>
<td>—</td>
</tr>
<tr>
<td>Milk, Wholesale</td>
<td>133,980</td>
<td>1.3</td>
<td>Corn</td>
<td>2,643,162</td>
<td>26.2</td>
</tr>
<tr>
<td>Poultry &amp; Eggs</td>
<td>136,383</td>
<td>1.3</td>
<td>Hay</td>
<td>162,851</td>
<td>1.6</td>
</tr>
<tr>
<td>Broilers</td>
<td>3,075</td>
<td>—</td>
<td>Sorghum Grain</td>
<td>203,996</td>
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</tr>
<tr>
<td>Chicken Eggs</td>
<td>106,990</td>
<td>1.1</td>
<td>Oil Crops</td>
<td>1,060,801</td>
<td>10.5</td>
</tr>
<tr>
<td>Other Poultry</td>
<td>26,006</td>
<td>.3</td>
<td>Soybeans</td>
<td>1,053,419</td>
<td>10.4</td>
</tr>
<tr>
<td>Misc. Livestock</td>
<td>42,320</td>
<td>.4</td>
<td>Sunflower</td>
<td>7,301</td>
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<tr>
<td>Honey</td>
<td>3,147</td>
<td>—</td>
<td>Vegetables</td>
<td>116,091</td>
<td>1.2</td>
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<tr>
<td>Other Livestock</td>
<td>39,173</td>
<td>.4</td>
<td>Dry Beans</td>
<td>65,668</td>
<td>.7</td>
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<tr>
<td>Crops</td>
<td>4,550,182</td>
<td>45.1</td>
<td>Potatoes</td>
<td>41,673</td>
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<tr>
<td>Fruits &amp; Nuts</td>
<td>1,300</td>
<td>—</td>
<td>Other Vegetables</td>
<td>8,750</td>
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<td>Sugar Beets</td>
<td>44,933</td>
<td>.4</td>
<td>All Other Crops</td>
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<tr>
<td>Other Crops</td>
<td>60,600</td>
<td>.6</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* Most current data available
** Data from Nebraska Agricultural Statistics
Table 28. Nebraska - 1999/2000 Rank in Agriculture*

<table>
<thead>
<tr>
<th>Rank</th>
<th>Description</th>
<th>1999</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Commercial livestock slaughter, all species</td>
<td>Thousand lbs.</td>
<td>10,874,886</td>
</tr>
<tr>
<td>2nd</td>
<td>Commercial red meat production</td>
<td>Thousand lbs.</td>
<td>9,231,325</td>
</tr>
<tr>
<td>3rd</td>
<td>Great northern beans production</td>
<td>Cwt.</td>
<td>2,111,000</td>
</tr>
<tr>
<td>4th</td>
<td>Commercial cattle slaughter (live weight)</td>
<td>Thousand lbs.</td>
<td>7,435,800</td>
</tr>
<tr>
<td>5th</td>
<td>Commercial cattle slaughter</td>
<td>Number</td>
<td>6,650,000</td>
</tr>
<tr>
<td>6th</td>
<td>Alfalfa meal production</td>
<td>Tons</td>
<td>141,100</td>
</tr>
<tr>
<td>7th</td>
<td>Hay harvested in Nebraska</td>
<td>Tons</td>
<td>7,610,000</td>
</tr>
<tr>
<td>8th</td>
<td>Cash receipts from cattle and calves</td>
<td>$</td>
<td>4,583,159,000</td>
</tr>
<tr>
<td>9th</td>
<td>Cattle on feed, January 1, 2000</td>
<td>Number</td>
<td>2,440,000</td>
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<tr>
<td>10th</td>
<td>Value of all cattle and calves on farms, January 1, 2000</td>
<td>$</td>
<td>4,455,500,000</td>
</tr>
<tr>
<td>11th</td>
<td>Fed cattle and calves marketed (1,000+ capacity lots), 1999</td>
<td>Number</td>
<td>4,770,000</td>
</tr>
<tr>
<td>12th</td>
<td>Corn for grain production</td>
<td>Bushels</td>
<td>1,155,700,000</td>
</tr>
<tr>
<td>13th</td>
<td>Sorghum grain production</td>
<td>Bushels</td>
<td>42,770,000</td>
</tr>
<tr>
<td>14th</td>
<td>Cash receipts from corn</td>
<td>$</td>
<td>1,796,045,000</td>
</tr>
<tr>
<td>15th</td>
<td>Cash receipts from sorghum grain</td>
<td>$</td>
<td>71,141,000</td>
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<tr>
<td>16th</td>
<td>Frijole beans production</td>
<td>Cwt.</td>
<td>1,096,000</td>
</tr>
<tr>
<td>17th</td>
<td>All dry edible beans production</td>
<td>Cwt.</td>
<td>3,740,000</td>
</tr>
<tr>
<td>18th</td>
<td>Cash receipts from all livestock marketings</td>
<td>$</td>
<td>5,424,870,000</td>
</tr>
<tr>
<td>19th</td>
<td>Beef cows and heifers that have calves, January 1, 2000</td>
<td>Number</td>
<td>1,974,000</td>
</tr>
<tr>
<td>20th</td>
<td>Land in farms and ranches</td>
<td>Acres</td>
<td>46,400,000</td>
</tr>
<tr>
<td>21st</td>
<td>Sorghum silage production</td>
<td>Tons</td>
<td>250,000</td>
</tr>
<tr>
<td>22nd</td>
<td>On-farm grain storage capacity, December 1, 1999</td>
<td>Bushels</td>
<td>1,030,000,000</td>
</tr>
<tr>
<td>23rd</td>
<td>Cash receipts from farm marketings</td>
<td>$</td>
<td>8,555,037,000</td>
</tr>
<tr>
<td>24th</td>
<td>Capacity of commercial grain storage facilities, December 1, 1999</td>
<td>Bushels</td>
<td>6</td>
</tr>
<tr>
<td>25th</td>
<td>All hay production</td>
<td>Tons</td>
<td>7,610,000</td>
</tr>
<tr>
<td>26th</td>
<td>Calves born</td>
<td>Number</td>
<td>1,860,000</td>
</tr>
<tr>
<td>27th</td>
<td>Soybean production</td>
<td>Bushels</td>
<td>180,625,000</td>
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<tr>
<td>28th</td>
<td>Alfalfa hay production</td>
<td>Tons</td>
<td>5,180,000</td>
</tr>
<tr>
<td>29th</td>
<td>Commercial hog slaughter</td>
<td>Number</td>
<td>6,356,300</td>
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<tr>
<td>30th</td>
<td>Cash receipts from hogs and pigs</td>
<td>$</td>
<td>527,073,000</td>
</tr>
<tr>
<td>Rank</td>
<td>Description</td>
<td>Year</td>
<td>Value/Measure</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
<td>------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>6th</td>
<td>Value of principal crops produced, 1999.</td>
<td></td>
<td>$4,561,328,000</td>
</tr>
<tr>
<td>6th</td>
<td>Winter wheat production, 1999. Bushels - 86,400,000</td>
<td></td>
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</tr>
<tr>
<td>6th</td>
<td>Sunflower production, 1999. Lbs. = 115,950,000</td>
<td></td>
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</tr>
<tr>
<td>6th</td>
<td>Value of all hogs and pigs on farms, December 1, 1999 - $219,000,000</td>
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</tr>
<tr>
<td>6th</td>
<td>Cash receipts from soybeans, 1999. $742,305,000</td>
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</tr>
<tr>
<td>7th</td>
<td>All hogs and pigs, December 1, 1999. Number - 3,000,000</td>
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<td></td>
</tr>
<tr>
<td>7th</td>
<td>Harvested acreage, principal crops, 1999. Acres = 19,400,000</td>
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<tr>
<td>8th</td>
<td>Cash receipts from crops, 1999. $3,130,167,000</td>
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<tr>
<td>8th</td>
<td>Pigs saved, 1999. Number = 5,528,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8th</td>
<td>All other hay (includes wild) production, 1999. Tons - 2,430,000</td>
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<td></td>
</tr>
<tr>
<td>8th</td>
<td>Corn silage production, 1999. Tons = 3,910,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8th</td>
<td>Sugar beets production, 1999. Tons = 1,258,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9th</td>
<td>Cash receipts from sugar beets, 1999. $44,282,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10th</td>
<td>All wheat production, 1999. Bushels = 86,400,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10th</td>
<td>Oats production, 1999. Bushels = 4,650,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10th</td>
<td>Eggs produced, December 1, 1998-November 30, 1999. Number = 2,837,000,000</td>
<td></td>
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</tr>
<tr>
<td>11th</td>
<td>Cash receipts from wheat, 1999. $186,375,000</td>
<td></td>
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</tr>
<tr>
<td>12th</td>
<td>All potato production, 1999. Cwt. = 10,524,000</td>
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<td></td>
</tr>
<tr>
<td>12th</td>
<td>All chickens, December 1, 1999. Number = 13,846,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13th</td>
<td>Rye production, 1999. Bushels = 360,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14th</td>
<td>Honey production, 1999. Pounds = 4,466,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16th</td>
<td>Value of all chickens on hand December 1, 1999. $23,538,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16th</td>
<td>All sheep and lambs, January 1, 2000. Number = 102,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16th</td>
<td>Wool production, 1999. Pounds = 675,000</td>
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<td></td>
</tr>
<tr>
<td>16th</td>
<td>Value of wool production, 1999. $162,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25th</td>
<td>Barley production, 1999. Bushels = 144,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Data from the Nebraska Agricultural Statistics Service, Lincoln, NE
1) 41st Annual George A. Young Swine Health and Management Conference

2) Western Nebraska Beef Quality and Value
**THE 41ST ANNUAL
GEORGE A. YOUNG
SWINE HEALTH AND
MANAGEMENT CONFERENCE**

August 4, 2000

"Achieving the Best of Production Through Knowledge"

Holiday Inn Lincoln — Downtown
141 North 9th Street
Lincoln, NE

- Swine Industry Economics
- Swine Diseases
- Production Strategies

**PROGRAM**

7:30 Registration (with coffee and rolls)
Chair - Dr. Bruce Brodersen
Welcome — Dr. Robert Wills, Conference Chair
8:00 "Managing Price Risk in Pork Production" — Dr. John Lawrence
9:15 "Price Risk Management: Untangling Your Options" — Dr. Briar Buhr
10:00 BREAK
10:20 "Feasibility of Producer-Owned Packing and Processing Cooperatives" — Dr. Tom Stein
11:00 "Putting Theory Into Practice" — Mr. Allen Prosch and Nebraska Producers
12:00 LUNCH: Speaker, Dr. Ron Hanson, University of Nebraska — "The Unspoken Words of Family Farming"
1:30 "Top 10 Rules for 90% Farrowing Rate" — Dr. Don Levis
2:00 "Top 10 Rules to Heavier Weaning Weights" — Dr. Phil Hardenburger
2:30 "Top 10 Rules for a Successful Nursery Program" — Dr. Steve Dritz
3:00 BREAK
3:20 "Top 10 Rules for the Best Grower/Finisher" — Dr. Mike Bruun
3:50 "Top 10 Rules for Controlling Porcine Respiratory Disease Complex — Dr. Pat Halbur
4:30 "Top 10 Rules " Panel Discussion

**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 tradition 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**

Brian Buhr — University of Minnesota; St. Paul, Minnesota
Steve Dritz — Kansas State University; Manhattan, Kansas
Pat Halbur — Iowa State University; Ames, Iowa
Phil Hardenburger — Crete Veterinary Clinic; Crete, Nebraska
John Lawrence — Iowa State University; Ames, Iowa
Tom Stein — MetaFarms.com; Eagan, Minnesota

**INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES (IANR)**

**PROGRAM PARTICIPANTS**

Bruce Brodersen — Dept. of Veterinary & Biomedical Sciences, Veterinary Diagnostic Center, Univ. of Nebraska; Lincoln, Nebraska
Mike Bruun — Univ. of Nebr. Haskell Agricultural Laboratory; Concord, Nebraska
Ron Hanson — Agricultural Economics, Univ. of Nebraska; Lincoln, Nebraska
Don Leva — Dept. of Animal Science, Univ. of Nebraska; Lincoln, Nebraska
Al Prosch — PorkCentral Coordinator, Univ. of Nebraska; Lincoln, Nebraska

Sponsors

University of Nebraska-Lincoln
Institute of Agriculture and Natural Resources
Nebraska Cooperative Extension

Department of Veterinary and Biomedical Sciences
"Managing Price Risk in Pork Production" — Dr. John Lawrence
Some of the new prominent long term packer contracts offered producers cash flow reducing short term financial risk. However, there are strings attached with many of these contracts. Futures and options on lean hogs have been available for price risk management, but have been rarely used by producers. Alternative futures and options strategies are compared to the cash market and packer contracts over time to evaluate the relative profit risk exposure these tools provide producers.

"Price Risk Management: Untangling Your Options" — Dr. Brian Busch
The recent price volatility in the stock market mingles what swine producers are already familiar with in hog prices. Just as portfolio diversification is useful for managing the volatility of the stock market, there are several alternatives available for managing market price risk in swine. This paper and presentation will provide a comparative overview of price risk management alternatives, including the use of short and long-term forward price contracts with packers and the more traditional use of futures options and hedges. Additional emphasis will be placed on the strategic considerations of alternative price risk management tools.

"Feasibility of Producer-Owned Packing and Processing Cooperatives" — Dr. Tom Stahl
Dr. Stahl will present information from a study he conducted on the financial, structural, and marketing viability of producer-owned packing and processing cooperatives. The study addressed the feasibility of the cooperatives and the development of a template to evaluate proposed business plans. The project was funded by the Illinois, Iowa and Nebraska Pork Producers Associations, NFPC, and other Illinois and Nebraska state associations.

"Putting Theory into Practice" — Al Prouse
Al Prouse will facilitate this program presented by Nebraska pork producers who have ventured into new areas of risk management and marketing. They will provide insight into how they changed their businesses to meet the challenges presented by a rapidly evolving swine industry. They will share their experiences in moving from concept, theory and generalization to a farm-specific business model.

"Top 10 Rules for..."
- 90% Farrowing Rates — Dr. Don Levis
- Hauser Weaning Weight — Dr. Phil Hardenbarger
- Successful Nursery Programs — Dr. Steve Dritz
- the Best Grower/Finishers — Dr. Mike Brumm

Controlling Porcine Respiratory Disease Complex
— Dr. Pat Hall
This afternoon session will be a series of presentations, each focusing on a particular phase of production. In the series, veterinary and animal scientists will present the ten most important health and management details they have identified as crucial factors for success in different phases of pork production. These presentations will provide veterinarians, producers, and managers insight into how to prioritize health and management practices for the different phases of production. Following the last presentation, there will be a panel discussion in which the afternoon speakers will address questions and comments from the audience.

PROGRAM COMMITTEE
Robert W. Willis, Chair, University of Nebraska
Mavis Seelke, Conference Coordinator, University of Nebraska
Bruce Brodersen, University of Nebraska
Tom Busch, Pinnacle Animal Health
Liz and Gary Dozer, Producers
Dave Ellis, Eli Lilly Animal Health
Phil Hardenbarger, Cattle Veterinary Clinics
Don Levis, University of Nebraska
Stan Rosenblad, Nebraska Pork Producers Association
John Widdess, Sutton Veterinary Clinics

SPONSORS

We would like to thank the following sponsors for their support and contributions in making this Conference possible:

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Grand Laboratories, Inc.  Pfizer Animal Health

CANCELLATIONS

If you must cancel your registration, please notify us prior to July 28 in order to receive a full refund. Cancellations received after July 28 will be subject to an administrative charge of $10.00.

HOTEL RESERVATIONS

For those people needing hotel accommodations, a block of rooms has been reserved for the Conference at the Holiday Inn Downtown, 141 N. 5th St., Lincoln, NE. The rate for a single/double occupancy room is $75.00. To make your reservations, call (402) 471-6011. The hotel is located in the historic Haymarket district.

For further information, contact Mavis Seelke, Conference Coordinator, Department of Veterinary and Biomedical Sciences, 131 Veterinary Diagnostic Center, P.O. Box 83067, University of Nebraska-Lincoln, Lincoln, NE 68583-0907, phone 402/472-4453; FAX 402/472-3094 E-mail address: maseelkei1@unl.edu

It is the policy of the University of Nebraska-Lincoln to not discriminate on the basis of gender, age, disability, race, color, religion, marital status, veteran's status, national or ethnic origin or sexual orientation.
Program:

September 14, 2000
8:00
- Welcome and Registration
- Quality and Consistency challenges from the packer view point
- Yield Grading and Quality Grading of live market beef and introduction of grids for value
- Break
- Beef Slaughter Procedures
- Evaluate 4 market steers on video and select cattle for fabrication
- USDA Beef Carcass grading
- Yield and Quality grade carcasses and value on grid
- Lunch
- Beef Carcass anatomy and cutting safety
- Beef Carcass Fabrication (4 groups)
- Break
- Value addition to beef products
- Transglutamase or Fibramax
- Injected and tumbled roasts steaks
- Restructured and processed beef items

5:00 - Adjourn
6:00 - Dinner
Forum on Managing for Quality and Consistency

September 15, 2000
8:00
- Beef Quality Assurance
- Retail perspective on Quality and Consistency
- Consumer attitudes about beef
- Break
- Shear and Taste Panel Evaluation
- Review of carcass value calculations
- Review of processed beef products
- Lunch
1:00 - Adjourn

Addressing Beef Production, Quality, Consistency and Value to meet Consumer Needs

September 14 & 15, 2000
Lionel Harris Building
East Side of Veterinary Diagnostic Lab, on Experiment Farm Road.
North of Scottsbluff, Nebraska
Objectives:
Provide hands on training on quality and consistency issues in the beef industry.
Provide insight on value differences in beef cattle, beef carcasses and beef primal due to quality variation in beef products.
Provide insight on processing to enhance beef product value.

To Should Attend:
Designed for ranchers, feeders, industry representatives interested in learning more about beef as a consumer product.

Sponsors:
Dennis Burson, Extension Meats Specialist.
Tim Schiefelbein, Monfort Meat er.
Dillon Feuz, Ag Economics Specialist.
Roger Mandigo, Animal Science Specialist.
Dale Grotelueschen, DVM, University of Nebraska Vet Medicine Specialist.
Daryl Wright, Usave Foods Meat Department Manager.
Sallie Atkins, Nebraska Beef Council.
Ivan Rush, Animal Science Specialist.

Cost:
$135.00 per person includes all materials, meals and breaks. The cattle used in fabrication will be harvested at Packerland Packing Co. (a federally inspected plant) and will be packaged at Robinson’s Meat Processing. We are attempting to pre-sell 4 halves of beef. If we are unsuccessful some of the meat we fabricate may be available for sale at current cut prices.

Co-Sponsors:
University of Nebraska Extension
Nebraska Beef Council
Midwest PMS
Platte Valley National Bank
First National Bank Scottsbluff & Gering
Valley Bank
Pinnacle Bank
Wyo-Braska Cattle Feeders

Registration:
Space is limited to 20 participants due to safety concerns and space limitations. Participants will be selected on a first come first serve basis with an attempt to select a cross section of the beef industry. Participants will be selected from paid registration forms received prior to September 6, 2000. Unsuccessful pre-registrations will receive a complete refund.

Western Nebraska Beef Quality and Value Registration Form

Name:__________________________________
__________________________________
Address:_________________________________
__________________________________
City:_________________________________
State:_________________________________
Zip:_________________________________
Phone Number:________________________
$________________Enclosed

Return to:
Tom Holman
Scotts Bluff County Extension Office
4502 Ave. I
Scottsbluff, NE. 69361-4939

For More Information call:
Tom Holman 308-632-1480