



University of Missouri Veterinary Medical Diagnostic Laboratory (VMDL) Annual Report – 2016

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Summary

The University of Missouri Veterinary Medical Diagnostic Laboratory (MUVMDL) is a full service veterinary diagnostic laboratory and it is Missouri's only laboratory accredited by the American Association of Veterinary Laboratory Diagnosticians (AAVLD). The VMDL is also a Level II Lab of the National Animal Health Laboratory Network (NAHLN) and Tier I Lab of the FDA Veterinary Laboratory Response Network (FDA Vet-LRN). In 2016, the VMDL processed approximately 48,599 accessions (about 13% increase from 2015) and performed 111,506 tests. The VMDL diagnostic service was utilized by veterinarians and owners from 45 US states and 109 MO counties. In 2016, the VMDL faculty taught (or co-taught) 37 courses and 16 clinical/diagnostic rounds. The VMDL faculty participated in various national, state and university leadership activities. The faculty were funded by 10 extramural grants, published 41 peer-reviewed papers; presented 56 conference abstracts, posters, and presentations; and attended 15 international, national and state conferences and trainings.



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Introduction

The MU VMDL is a full service veterinary diagnostic laboratory and it is Missouri's only laboratory accredited by the American Association of Veterinary Laboratory Diagnosticians (AAVLD). The faculty and staff of VMDL are committed to excellence in diagnostic service, veterinary education, and research. The faculty and staff strive to provide relevant, timely, and cost-effective diagnostic services to our clients and create a positive learning environment for our students. In collaboration with the United States of America (USDA), Food and Drug Administration (FDA), Missouri Department of Agriculture (MDA) and Missouri Department of Health and Senior Services (MDHSS), the VMDL plays a vital role in safeguarding Missouri's animal agriculture, animal health, and public health.

The Veterinary Medical Diagnostic Laboratory (VMDL) Annual Report – 2016 is a compilation of test data from Jan 1, 2016 to Dec 30, 2016. To monitor service productivity, testing data from 2012 to 2015 are also included in this report.

VMDL Mission Statement

To provide appropriate and timely diagnostic support to veterinary practitioners, livestock and poultry interests, companion animal interests, wildlife conservationists, and state-federal regulatory officials.

To monitor domestic animals, indigenous wildlife, and zoo animals for diseases that are a threat to livestock health and public health.

To support the teaching mission of the College of Veterinary Medicine.

To create new knowledge through fundamental and translational research.

VMDL Advisory Board

Mission Statement

To advise VMDL management on policies, long-term developmental strategies, and collaborations with relevant university, private, state, national and international organizations.

VMDL Advisory Board Membership

The Advisory Board consists of 12 members representing the State Veterinarian's office, commodity groups, small animal practice, large animal practice, and the Veterinary Teaching Hospital.

VMDL Advisory Board Members

Linda Hickam, DVM, Missouri State Veterinarian

Tony Martin, DVM, Director of Animal Health Division, MFA, Inc.

Don Nikodim, Executive Vice President, Missouri Pork Association



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Steve Patterson, DVM, Bethel, MO

Clark Fobian, DVM, Sedalia, MO, Immediate Past President AVMA

Steve Strubberg, DVM, Hermann, MO

Chuck Massengill, DVM, Missouri Cattlemen's Association

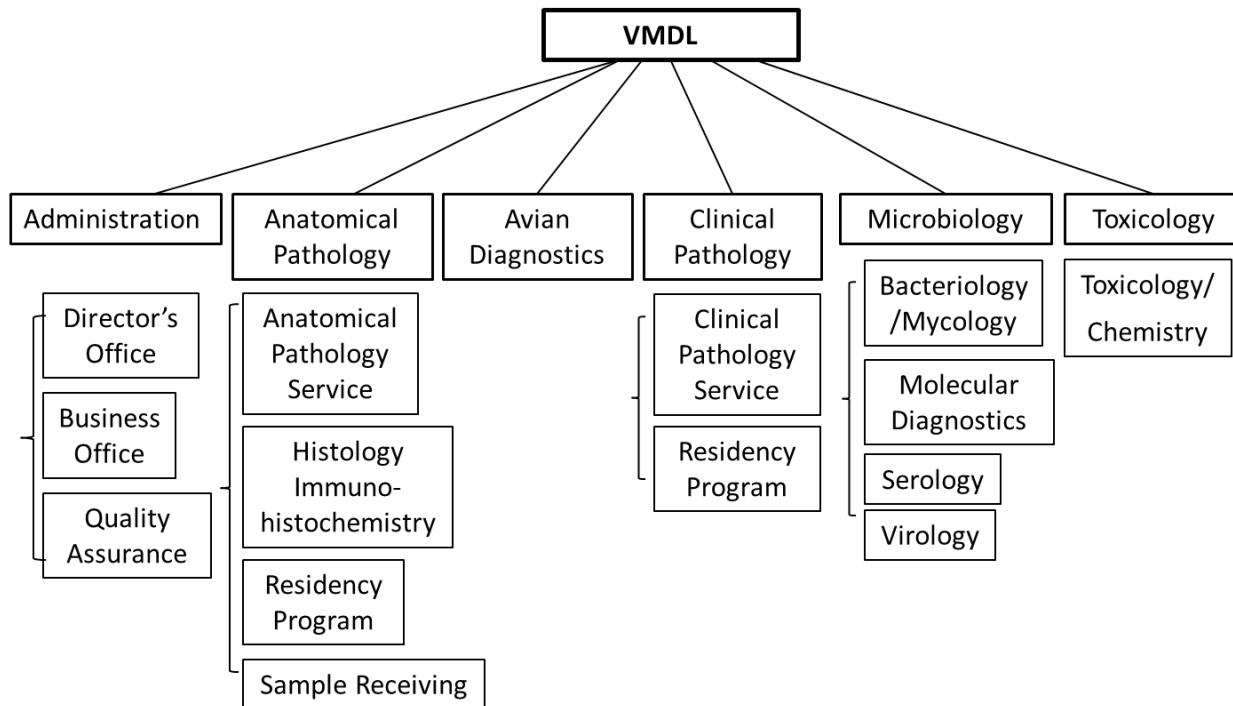
Bruce Addison, President, Addison Biological Laboratory, Inc.

David Wilson, DVM, MS, ACVS, MU VHC Director

Phillip Johnson, BVSc, MS, MRCVS, ACVIM MU VHC Equine Service

John Middleton, DVM, PhD, ACVIM MU VHC Food Animal Service

VMDL Organizational Structure



VMDL Section Heads/Leaders and Staff Supervisors

Anatomical Pathology – Dr. Gayle Johnson

Avian Pathology – Dr. Dan Shaw

Bacteriology/Mycology – Dr. Bill Fales/Ms. Irene Ganjam



Business Office – Mr. Mike Wimmenauer

Clinical Pathology – Dr. Marlyn Whitney/Ms. Cheryl Rojas

Director's Office – Ms. Geri Hegstad

Histology – Dr. Dae-Young Kim/Ms. Candace Kassel

Molecular Diagnostics – Dr. Jeff Mitchell/Dr. Odemuyiwa, Solomon (Wole)

Quality Assurance – Dr. Tom Reilly/Ms. Susan Martin

Sample Receiving – Ms. Geri Hegstad

Serology – Dr. Mike Zhang

Virology – Dr. Jeff Mitchell

Toxicology – Dr. Tim Evans/Dr. George Rottinghaus

VMDL Diagnostic Program Coordinators

Anatomical Pathology Residency Program – Dr. Kei Kuroki

Clinical Pathology Residency Program – Dr. Charles Wiedmeyer

Equine Diagnostic Investigations – Dr. Fred Williams III

Food Animal Diagnostic Investigations – Dr. Tim Evans

Neuropathology and Oncopathology – Dr. Gale Johnson

Small Animal Internal Medicine Pathology – Dr. Dae-Young Kim

VMDL Service Activities

Table 1. Five Year VMDL (Main Lab and Clinical Pathology) Accessions*

Year	Total Accession	Main VMDL	Clinical Pathology	Missouri & Other States	Teaching Hospital	MU Research	Others
2012	37,715	24,923	12,792	19,911 (53%)	16,118 (43%)	1,451 (3.8%)	235 (1%)
2013	38,499	25,165	13,334	20,081 (52%)	16,460 (43%)	1,867 (4.8%)	91 (<1%)
2014	37,666	24,431	13,235	19,733 (52%)	16,476 (44%)	1,378 (3.6%)	79 (<1%)
2015	42,929	26,276	16,653	20,966 (49%)	20,475 (48%)	1,390 (3.2%)	98 (<1%)
2016	48,599	30,014	18,585	26,279 (54%)	22,320 (46%)	603 (1.2%)	338 (<1%)

*A Main Lab accession may include multiple tests for multiple samples whereas each Clin Path accession represents one test performed on one sample. Caseload increased 13.2% from 2015 to 2016. Data do not include non-technical procedures.



Table 2. Five Year VMDL (Main Lab and Clin Path) Tests by Animal Species*

Year	Total	Avian	Bovine	Canine	Caprine	Equine	Feline	MISC	Ovine	Porcine
2012	86,693	6,688	16,225	34,472	2,495	12,175	6,043	4,203	645	3,747
2013	86,570	6,554	14,599	36,173	1,649	11,339	6,752	4,614	361	4,529
2014	83,869	5,784	15,806	35,421	1,280	10,038	5,908	4,964	462	4,206
2015	90,515	6,919	17,070	37,258	1,307	10,031	6,563	6,961	404	3,780
2016	111,506	8,977	19,971	45,036	1,682	9,726	7,159	12,269	671	6,015

Table 3. Five Year VMDL (Main Lab and Clin Path) Tests by Section

Year	Total	Avian	Bacti	Clin Path	Path/Hiso	Mol	Sero	Vir	Tox	Other
2012	86,693	2,490	15,552	18,050	22,062	9,498	13,723	491	1,277	3,550
2013	86,570	2,535	14,849	20,123	23,696	7,105	12,464	515	1,179	4,104
2014	83,869	2,145	14,094	18,632	22,306	7,521	12,994	588	1,558	4,031
2015	90,515	3,450	15,371	22,958	22,601	7,816	13,548	584	1,456	2,731
2016	111,506	5,374	18,896	26,516	32,282	9,094	14,039	949	4,355	N/A

Figure 1. Distribution of Diagnostic Tests by Animal Species

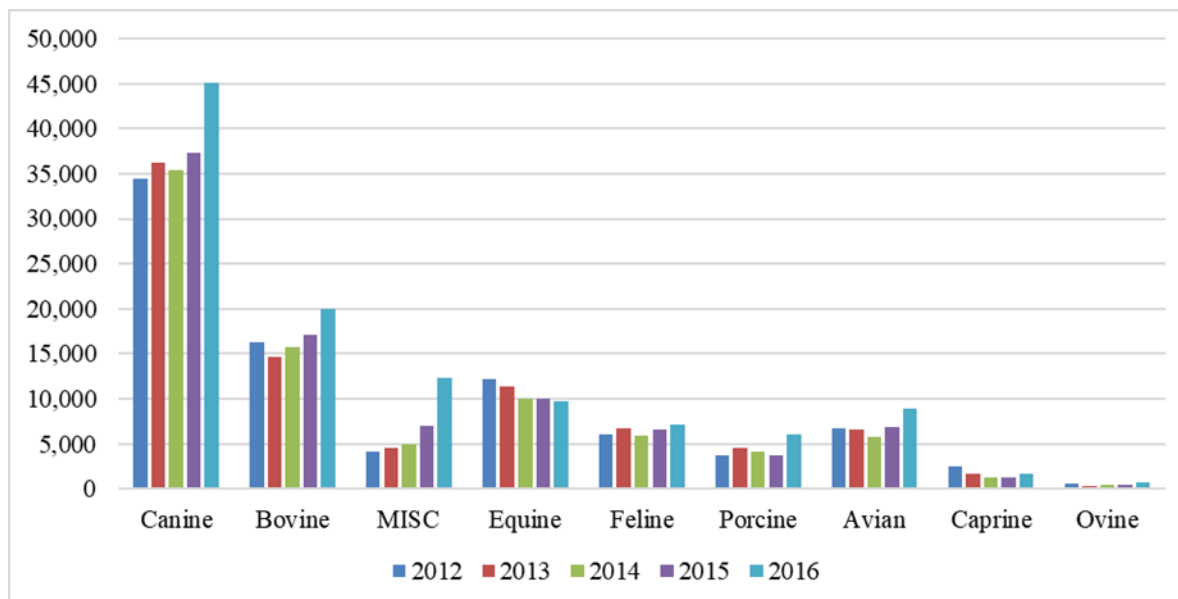


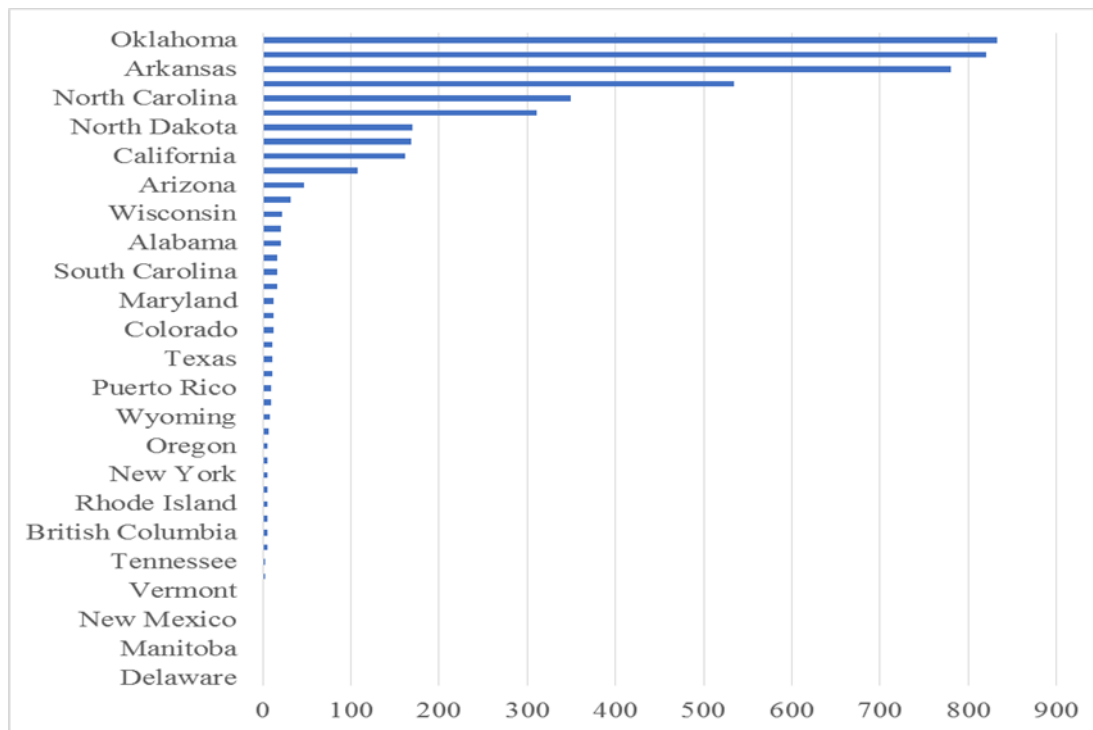


Table 4. Distribution of VMDL Accessions in 109 MO Counties/Independent City

Boone	28134	St. Francois	186	Macon	74	Henry	27
Saint Louis	1628	Newton	180	Madison	74	Harrison	21
Greene	1036	Pettis	172	Saint Louis City	72	Mississippi	21
Not Specified	1028	Saline	172	Warren	72	Barton	20
Saint Charles	811	Clay	159	Oregon	66	Lewis	19
Jackson	566	Ray	149	Taney	66	Bollinger	18
Johnson	525	Texas	146	Benton	62	Pulaski	15
Franklin	522	Webster	146	Cedar	62	Maries	14
Callaway	495	Lawrence	145	Carroll	61	Shannon	13
Cole	483	Miller	143	Audrain	60	Atchison	12
Cape Girardeau	352	Andrew	135	Adair	57	Chariton	11
Jefferson	318	Osage	122	Sainte Genevieve	56	Ozark	11
Christian	304	Wright	122	Platte	55	Ripley	10
Howell	286	Cooper	119	Dent	49	DeKalb	9
Phelps	274	Scott	118	Morgan	49	McDonald	9
Jasper	272	Moniteau	116	Montgomery	47	Perry	7
Gasconade	263	Saint Clair	111	Knox	45	Sullivan	5
Camden	262	Howard	107	Laclede	45	Gentry	4
Lafayette	261	Bates	98	Shelby	39	Putnam	4
Lincoln	252	Livingston	98	Scotland	38	Clinton	3
Cass	236	Stone	98	Stoddard	38	Holt	3
Grundy	226	Marion	97	Vernon	37	Schuyler	3
Barry	213	Nodaway	92	Clark	36	Dade	2
Buchanan	204	Pike	81	Crawford	32	Alameda	1
Butler	203	Randolph	81	Washington	31	Daviess	1
Polk	198	Dunklin	80	Dallas	29	Douglas	1
Monroe	195	Linn	78	Caldwell	27	Hickory	1
						Marion	1



Figure 2. Distribution of VMDL Accessions in 45 Non-MO States*



*Oklahoma, Illinois, Arkansas, Florida, North Carolina, Kansas, North Dakota, Iowa, California, Minnesota, Arizona, Wisconsin, Indiana, South Dakota, Pennsylvania, South Carolina, Kentucky, Maryland, Colorado, Nebraska, Texas, Virginia, Puerto Rico, Massachusetts, Wyoming, Montana, Idaho, New York, Ohio, Oregon, Alaska, British Columbia, Ontario, Rhode Island, Michigan, Tennessee, Maine, New Mexico, Utah, Vermont, Delaware, Georgia, Manitoba

VMDL Client Outreach Programs

The VMDL offers an online portal for its clients to check their results in real-time as we work on their samples.

VMDL continues to offer the FedEx Express Prepaid Stamps to all its clients, which enables inexpensive overnight delivery from clients' office to the VMDL for laboratory testing. In 2016, the program was utilized 5,089 times by VMDL's clients from 78 MO counties and 25 other states in the US.

VMDL Participation in National Diagnostic and Surveillance Network



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Figure 3. Level II Lab of the National Animal Health Laboratory Network (NAHLN)

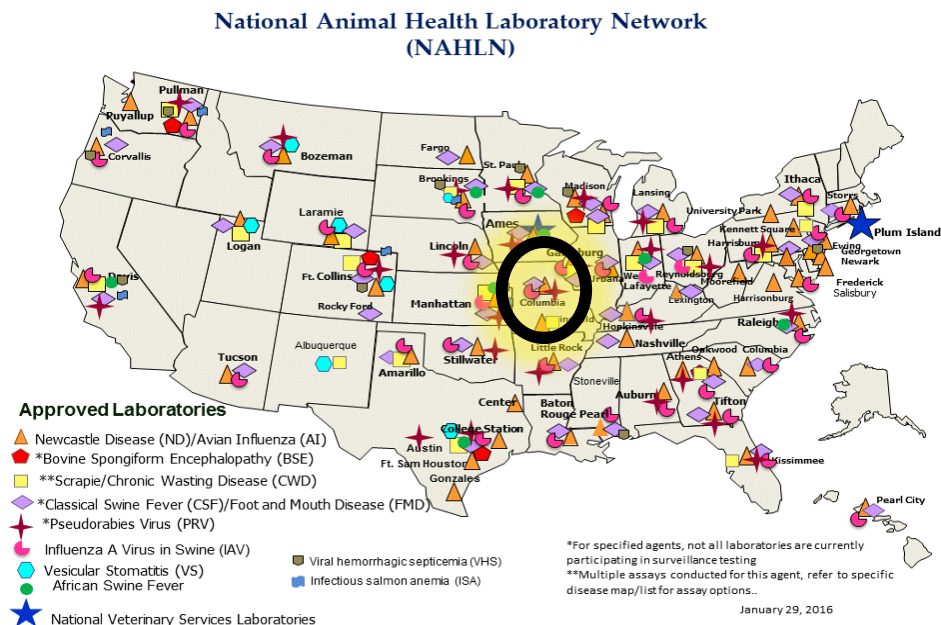
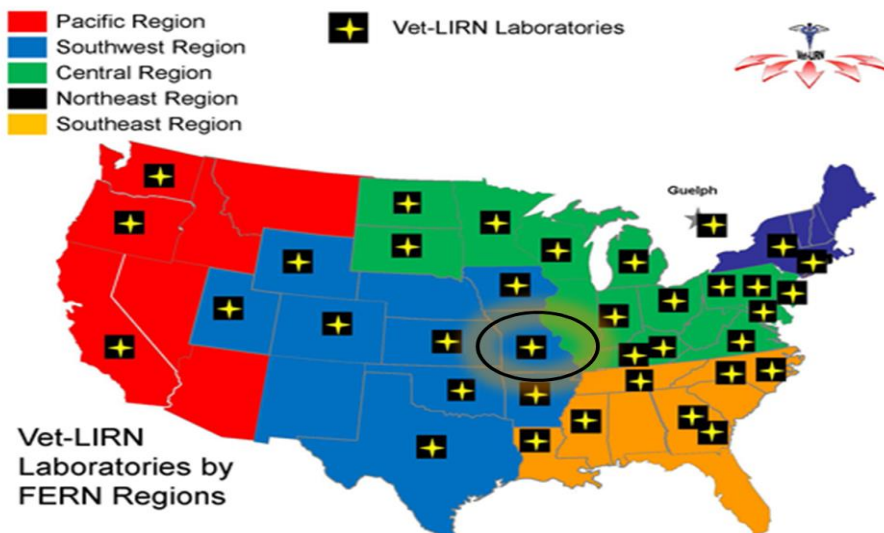


Figure 4. Tier I Member of the FDA Veterinary Laboratory Response Network (Vet-LRN)





VMDL Faculty Teaching Activities

Didactic and Laboartory Courses (N = 37; Bold: Coordinated by VMDL Faculty)

AS 140/2140	Companion Animals
AS 325/4977	Horse Production
BioMed 3200	Comparative Hematology
BioMED 3310	Biomedical Pathophysiology Online
BioMed 4100	Veterinary Clinical Chemistry, On-line
BioMed 4110/V_PBIO 7110	Veterinary Cytology
BioMED 4120	Principles of Toxicology On-line
LAB_AN 9437	Lab Animal Pathology
MMI 8050	Mechanisms of Microbial Pathogenesis
MICROB 9001	Topics in Microbiology
P Health 8001	Human Health and the Environment
V_BSCI 5506	Veterinary Cellular Biology
V_BSCI 5507	Veterinary Pharmacology
V_BSCI 5508	Veterinary Pharmacology
V_BSCI 5509	Veterinary Toxicology
V_M_S 6400	Food Animal Medicine & Surgery I
V_M_S 6420	Equine Medicine and Surgery I
V_M_S 6987	Problem-Based Learning Clinic Preparation
V_M_S 6996	Advanced Dermatology
V_M_S 8036	Advanced Physiology of Dog and Cat
V_M_S 8402	Seminar in Veterinary Clinical Sciences
V_M_S 8402 B	Seminar in Veterinary Clinical Sciences
V_M_S 8402 D	Clinicopathologic Case Conference (CPC)
V_M_S 8415	Advanced Veterinary Neurology
V_M_S 8485	Problems in Veterinary Clinical Science
V_PBIO 5552	Veterinary Bacteriology 1
V_PBIO 5553	Veterinary Bacteriology 2
V_PBIO 5554	Veterinary Virology
V_PBIO 5575	General Veterinary Pathology
V_PBIO 5576	Veterinary Systemic and Special Pathology I
V_PBIO 5577	Veterinary Systemic and Special Pathology II
V_PBIO 5578	Veterinary Clinical Pathology
V_PBIO 6647	Diagnostic Pathology and Special Species Medicine I



V_PBIO 6679	Diagnostic Pathology and Special Species Medicine II
V_PBIO 8434	Advanced Clinical Pathology
V_PBIO 8435	Advanced Microscopy in Veterinary Clinical Pathology
V_PBIO 9090	Area Veterinary Pathobiology Dissertation Research

Clinical and Diagnostic Rounds and Seminars (n=16)

Chemistry Rounds
Comparative Orthopaedic Laboratory (COL) journal club
Cytology Rounds
Dermatology Rounds
Food for Thought Rounds
Gross Pathology Rounds
Hematology Rounds
Human Health and the Environment -
Image Review
Joint Pathology Center Wednesday Slide Conference
Mentoring International Students
Mentoring Pre-Vet Students
Neurology Rounds
Ophthalmic Pathology Rounds
Slide treats
VMDL-Food Animal Monthly Rounds

Residency Training Programs

Anatomical Pathology Resident Training
Clinical Pathology Resident Training



VMDL Faculty/Staff Academic Service & Leadership Activities

National

1. American Association of Veterinary Laboratory Diagnosticians (AAVLD) Quality Assurance Committee, Ms. Susan Martin, Dr. Tom Reilly, Dr. Shuping Zhang
2. American Association of Veterinary Laboratory Diagnosticians (AAVLD) Directors Committee, Government Relations Committee, Bacteriology and Mycology Subcommittee, Antimicrobial Subcommittee, Publication Committee, Dr. Shuping Zhang – Member
3. American Association of Veterinary Laboratory Diagnosticians (AAVLD) Virology Committee, Dr. Mike Zhang – Member
4. American Association of Veterinary Laboratory Diagnosticians/NAHLN Antimicrobial Surveillance Working Group, Dr. Shuping Zhang – Member
5. American Board of Veterinary Toxicologists, Dr. Evans – President-elect, 2014 to 2016
6. American Board of Veterinary Toxicologists, Dr. Evans – President, 2016 to 2018
7. American College of Veterinary Microbiologists (ACVM) Budget Committee, Dr. Shuping Zhang – Member
8. JVDI Editorial Board, Dr. Shuping Zhang – Member
9. Phi Zeta Veterinary Honor Society, Dr. Chuck Wiedmeyer – Secretary/Treasurer/Director, 2007 to present
10. USAHA-AAVLD Joint Committee on the Environment and Toxicology, Dr. Evans – Co-Chair, 2013 – present

University

1. Mizzou United Way Dr. Evans – Tri-Chair, 2015-2016
2. MU Campus Conflict of Interest Committee, Dr. Chuck Wiedmeyer – Vice Chair, 2011 to present
3. MU Chancellor's Committee on Student Conduct, Dr. Chuck Wiedmeyer – Chair, 2009 to 2013, 2015 to present
4. MU Chancellor's Standing Committee on Safety, Dr. Evans – Chair, 2014-2016
5. MU Chancellor's Standing Committee on Safety, Dr. Evans, Member, 2016
6. MU College of Veterinary Medicine AES Research Committee, Dr. Evans – Member, 2013 – present
7. MU College of Veterinary Medicine Curriculum Committee, Dr. Evans – Member, 2014 – present
8. MU Council of International Initiative (CII), Dr. Shuping Zhang – Member
9. MU Faculty Equity Panel, Dr. Shuping Zhang – Panelist



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10. MU Masters in Public Health Program, Dr. Evans - Core Faculty Member, 2016 - present
11. MU Pathobiology Area Executive Committee, Dr. Evans – Member, 2012-Present
12. MU VHC Advisory Board, Dr. Shuping Zhang – Member

College

1. CVM Academic Research Advisory Board, Dr. Shuping Zhang – Member
2. CVM Administrator Evaluation Committee, Dr. Kei Kuroki– Member
3. CVM Admissions and Scholarships Committee, Dr. Dae-Young Kim & Dr. Mike Zhang – Members
4. CVM Animal Resources Committee, Dr. Jeff Mitchell – Member, 2006 to present
5. CVM Computer Committee, Dr. Kei Kuroki – Member
6. CVM COR Grant Review Committee, Dr. Gayle Johnson – Member
7. CVM Faculty Responsibility Committee, Dr. Angela Royal – Member
8. CVM Safety Committee, Dr. Shuping Zhang – Member

Departmental

1. Pathobiology Non-Tenure Track Promotion Committee, Dr. Dae-Young Kim & Dr. Shuping Zhang
2. Vet Pathobiology Promotion and Tenure Committee, Dr. Gayle Johnson – Member, 2016
3. VMDL Faculty Search Committee – Molecular Diagnostician. Dr. Chuck Wiedmeyer – Chair.
4. VMDL Faculty Search Committee – Bacteriologist. Dr. Kei Kuroki – Chair
5. VMDL Marketing Committee, Dr. Tim Evans, Dr. Kei Kuroki, Dr. Fred Williams, Dr. Shuping Zhang
6. VMDL Quality Committee, Dr. Tom Rielly, Dr. Angela Royal, Mr. Jesse Bowman, Ms. Raina Cornell, Ms. Candace Kassel, Mr. Ben Landers, Ms. Amber Mann, Ms. Susan Martin, Ms. Rachel Newton, Ms. Cheryl Rojas, Ms. Latoyia Sly.

VMDL Faculty Scholarly Activities

Extramural Funding in 2016

1. **Kuroki, K.** Co-Investigator. Hung C (PI) (Cook JL Consortium PI). Columbia University/Prime sponsor: Musculoskeletal Transplant Foundation. Local Dexamethasone Delivery for Osteochondral Grafting. Direct: \$85,307; Indirect: \$17,061; Total: \$102,368. 20% shared credit. 02/01/16 – 01/31/18
2. **Kuroki, K.** Co-investigatior. Zimmer Holdings, Inc. Cook JL (PI). Assessment of Enhanced Subchondroplasty Treatment for Post-Traumatic Osteoarthritis in a Canine Model. Direct: \$234,658; Indirect: \$100,744; Total: \$335,402. 10% shared credit. 11/01/15 – 10/31/17.



3. Wiedmeyer, C. and Evans, T. Co-investigators. Johnson, PJ (PI), Bukoski, A (Co-I), Whelchel, D (Co-I). Development of a lithium chloride continuous rate infusion protocol for the prevention of acute laminitis in horses, USDA Animal Health Formula Funds, \$13,202. 02/19/2015 – 01/25/2016
4. **Dr. Goerge Rottinghaus.** Oliveira CAF and Rottinghaus GE. Multi-Mycotoxin Biomarker Evaluation of Exposure to Mycotoxins in Residents from Sao Paulo and Santa Caterina State, Brazil. Science without Borders, CNPq, 2015-2017.
5. **Rottinghaus, G.** Co-PI. Analytical Core Research Sample Testing, 2016. (\$160,000) 100% to VMDL.
6. **Zhang S.** PI. National Animal Health Laboratory Network Membership. Direct: \$124,370; indirect \$13,819; and total: \$138,000. 100% to VMDL. 2015 – 2016.
7. **Zhang, S., Evans, T., Johnson, G., Reilly, T.** FDA CVM Vet-LRN Vet Diagnostic Lab Program. Direct: \$ 26,500, indirect: \$1,500; total: \$25,000. 100% to VMDL. 9/2015 – 8/2016.
8. **Zhang, S.** Validation of PCR assays for tick-borne diseases. Missouri Department of Conservation. \$1,000. 2016 – 2017.
9. **Zhang, S.** Validation of Campylobacter culture and PCR method for veterinary specimens. FDA/TAMU/ \$6,000.
10. **Zhang, S.** (Clinical PI), Almasri, M. (Engineering PI). Coulte MU. GermSensor for simultaneous detection of multipel *Salmonella* serogroups. 7/2015 – 6/2017. Total direct: \$101,500 and shared credit: 50%. Supplement: \$23,986, 2016-2017.

Publications (N = 41)

1. Barker, E. N., Dawson, L. J., Rose, J. H., Van Meervenne, S., Frykman, O., Rohdin, C., Leijon, A., Soerensen, K. E., Järnegren, J., **Johnson, G. C.**, O'Brien, D. P., Granger, N. Degenerative Encephalopathy in Nova Scotia Duck Tolling Retrievers Presenting with a Rapid Eye Movement Sleep Behavior Disorder. J Vet Intern Med. 30(5):1681-1689, 2016.
2. Bozynski, C. C., Stannard, J. P., Smith, P., Hanypsiak, B. T., **Kuroki, K.**, Stoker, A. M., Cook, C. R., Cook, J. L. Acute management of anterior cruciate ligament injuries using novel canine models. J Knee Surg 29:594-603, 2016.
3. Brimmo, O. A., Pfeiffer, F., Bozynski, C. C., **Kuroki, K.**, Cook, C. R., Stoker, A., Sherman, S. L., Monibi, F., Cook, J. L. Development of a novel canine model for posttraumatic osteoarthritis of the knee. J Knee Surg 29:235-241, 2016.
4. Brownstein, K., Thomas, A. L., **Rottinghaus, G. E.**, Lynch, B. A., Gang, D. R., Folk, W. R. Harpagide and related iridoid glycosides in vegetative tissues of cultivated *Scrophularia marilandica* and *Scrophularia lanceolata*. In: S. Patil, S. Gafner, L. Craker, and S.R. Mentreddy (Eds.): V World Congress on Medicinal and Aromatic Plants and International Symposium on Plants as Factories of Natural Substances, Edible and Essential Oils. Acta Horticulturae 1125:83-90, 2016.



5. Cook, J.,L., **Kuroki, K.**, Stoker, A. M., Monibi, F. A., Roller, B. L. Meniscal biology in health and disease. *Connect Tissue Res* 2016 Oct. 7. [Epub ahead of print]
6. Cook, J. L., Smith, P., Pfeiffer, F., **Kuroki, K.**, Bozynski, C. C., Cook, C. R. A Canine Arthroscopic Anterior Cruciate Ligament Reconstruction Model for Study of Synthetic Augmentation of Tendon Allografts. *J Knee Surg* 2016 Dec 26. doi: 10.1055/s-0036-1597618. [Epub ahead of print]
7. Cook, J. L., Smith, P. A., Bozynski, C. C., **Kuroki, K.**, Cook, C.R., Stoker, A. M., Pfeiffer, F. M. Multiple injections of leukoreduced platelet rich plasma reduce pain and functional impairment in a canine model of ACL and meniscal deficiency. *J Orthop Res.* 34:607-615, 2016.
8. Cook, J. L., Stannard, J. P., Stoker, A. M., Bozynski, C. C, **Kuroki, K.**, Cook, C. R., Pfeiffer, F. M. Importance of donor chondrocyte viability for osteochondral allografts. *Am J Sports Med* 44:1260-1268, 2016.
9. Crist, B. D., Stoker, A. M., Pfeiffer, F. M., **Kuroki, K.**, Cook, C. R., Franklin, S. P., Stannard, J. P., Cook, J. L. Optimising femoral-head osteochondral allograft transplantation in a preclinical model. *J Orthop Trans* 5:48-56, 2016
10. Di Gregorio, M. C., Jager, A. V., Souto, P. C., Costa, A. A., **Rottinghaus, G. E.**, Passarelli, D., Budiño, F. E., Corassin, C. H., Oliveira, C. A. F. Determination of serum aflatoxin B1-lysine to evaluate the in vivo efficacy of an aflatoxin-adsorbing feed additive in pigs fed aflatoxin B1-contaminated diet. *Mycotoxin Research* DOI 10.1007/s12550-016-0267-5, 2016.
11. Dos Anjos, F. R., Ledoux, D. R., **Rottinghaus, G. E.**, Chimonyo, M. Efficacy of Mozambican bentonite and diatomaceous earth in reducing the toxic effects of aflatoxins in chicks. *World Mycotoxin Journal* 9(1):63-72, 2016.
12. Dos Anjos, F. R., Ledoux, D. R., **Rottinghaus, G. E.**, Chimonyo, M. Efficacy of Mozambican bentonite and diatomaceous earth in reducing the toxic effects of aflatoxins in chicks. *World Mycotoxin Journal*, 9(1):63-72, 2016.
13. El-Kassas, S., **Odemuyiwa, S.**, Hajishengallis, G., Connell, T. D., Nashar, T. O. Expression and regulation of cholecystokinin receptor in the chicken's immune organs and cells. *J Clinical & Cellular Immunology* 7:6, 2016.
14. Galarza-Seeber, R., Latorre, J. D., Wolfenden, A., Hernandez-Velasco, X., Merino-Guzman, R., Ledoux, D. R., **Rottinghaus, G. E.**, Bielke, L. R., Hargis, B. M., Tellez, G. Evaluation of *Bacillus* spp. as direct fed microbial (DFM) candidates for aflatoxin B1 biodegradation in broiler chickens. *International Journal of Probiotics and Prebiotics* 11(1): 29-36, 2016.
15. Gronkiewicz, K. M., Giuliano, E. A., **Kuroki, K.**, Bunyak, F., Sharma, A., Teixeira, L. B., Hamm, C. W., Mohan, R. R. Development of a novel in vivo corneal fibrosis model in the dog. *Exp Eye Res* 143:75-88, 2016
16. Grunz-Borgmann, E. A., Nichols, L. A., **Wiedmeyer, C. E.**, Spagnoli, S., Trzeciakowski, J. P., Parrish, A. R. Structural equation modeling identifies markers of damage and function in the aging male Fischer 344 rat. *Mech Aging, Dev.* 156; 55-62, 2016.
17. Husby, K. A., **Kuroki, K.** Pathology in practice: Clostridial enterocolitis in a foal. *J Am Vet Med Assoc* 248:617-9, 2016.



18. Husby, K. A., Reed, S. K., Wilson, D. A., **Kuroki, K.**, Middleton, J. R., Hoepp, N. C., Charles, E. M., Cook, J. L. Evaluation of a permanent synthetic osteochondral implant in the equine medial femoral condyle. *Vet Surg* 45:364-73, 2016.
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1. Cook, J. L., Nagelli, C., **Kuroki, K.**, Bozynski, C. C., Hewett, T. E. Denervation of Sensory Afferents in the ACL Affects Joint Health and Function. Orthopaedic Research Society. Orlando, FL. March 5-8, 2016.
2. **Evans, T. J.** Is it toxic?/how toxic is it? Electronic toxicology resources available to small animal practitioners. Proceedings Supplement of CVC Virginia Beach 2016, Virginia Beach, VA, May 12-15, 2016.
3. **Evans, T. J.** My “neighbor” poisoned my dog syndrome. Proceedings Supplement of CVC (Central Veterinary Conference) Virginia Beach 2016, Virginia Beach, VA, May 12-15, 2016.
4. **Evans, T. J.** Prescribed, OTC, and recreational drugs associated with small animal intoxications. Proceedings Supplement of CVC Virginia Beach 2016, Virginia Beach, VA, May 12-15, 2016.
5. **Evans, T. J.** So many pet food recalls....Is manufactured pet food actually safe??? Proceedings Supplement of CVC Virginia Beach 2016, Virginia Beach, VA, May 12-15, 2016.
6. **Evans, T. J.** What you thought you would never need to know about mycotoxins. Proceedings Supplement of CVC Virginia Beach 2016, Virginia Beach, VA, May 12-15, 2016.
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15. **Evans, T. J.** Fescue toxicosis update. Proceedings of CVC Kansas City 2016, Kansas City, MO, August 25-28, 2016.
16. **Evans, T. J.** How to identify cause of death when it's NOT the vaccine or the feed. Proceedings of CVC Kansas City 2016, Kansas City, MO, August 25-28, 2016.
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28. **Evans, T. J.** Baby on board: Effects of poisons and medications on pregnancy and lactation. CVC Kansas City 2016, Kansas City, MO, August 27, 2016.
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32. **Evans, T. J.** Mycotoxins and the effects on livestock. USDA Cochran Foundation Indian Delegation. University of Missouri. October 12, 2016.
33. **Evans, T. J., Rottinghaus, G. E., Landers, B. R., Cole, E. W., Wiedmeier, R. D.** Reduction of ergopeptine alkaloid concentrations in ergotized grasses by hay production. Proceedings of World Mycotoxin Forum and XIVth IUPAC International Symposium on Mycotoxins. Winnipeg, Manitoba, Canada, June 6-9, 2016.
34. **Fales, W.** Trends of bacterial antimicrobial resistance associated with bovine respiratory disease complex (BRDC) in Missouri cattle. West Central Missouri Veterinary Medical Association Meeting. March 10, 2016.
35. **Fortin, J. S.,** Calcutt, M. J., **Kim, D. Y.** Sublingual pythiosis in a cat. Annual ACVP meeting, New Orleans, LA, Dec 3-7, 2016
36. **Fortin, J. S., Kramer, J., Kim, D.Y.** Expression of beta-amyloid precursor protein in post-anesthetic myelomalacia in a Clydesdale horse, Annual ACVP meeting, New Orleans, LA, Dec 3-7, 2016
37. **Johnson, G., Fales, W., Shoemaker, B., Williams, F., Mitchell, J. W.** Calcutt, M. An outbreak of mycoplasmosis causing arthritis, pneumonia and encephalitis in dairy goat kids. The 59th Annual Meeting of American Association of Veterinary Laboratory Diagnosticians, Greensboro NC. October 13-19 Oct 2016



38. Jones, A., Levine, C., **Johnson, G.**, O'Brien, D. A Neuronal Storage Disease in a Litter of Mixed Breed Dogs (student poster competition). American College of Veterinary Pathologists. New Orleans LA. Dec. 3-4, 2016.
39. **Kuroki, K.** Bone and joint pathology. IDEXX Japan. Tokyo, Japan. May 30, 2016.
40. **Kuroki, K.** Introduction of veterinary pathology practice. Tokyo University of Agriculture and Technology. Tokyo, Japan. May 30, 2016.
41. **Kuroki, K.** Is it an immune-mediated polyarthritis? Japanese Society of Veterinary Clinical Pathology, Tokyo, Japan. May 28-29, 2016.
42. **Kuroki, K.** Tularemia. Japanese College of Veterinary Pathologists annual meeting. Tokyo, Japan. March 28-29, 2016.
43. **Martin, S. L., Reilly, T. J., Evans, T., Zhang, S.** Attaining document control compliance using the I.D.E.A.S. framework. Proceedings of Annual Meeting of American Association of Veterinary Laboratory Diagnosticians, Greensboro, NC, October 13-19, 2016.
44. Monibi, F. A., Smith, P. A., Bozynski, C. C., **Kuroki, K.**, Cook, C. R., Stoker, A. M., Pfeiffer, F. M., Cook, J. L. Effects of Platelet Rich Plasma on ACL and Meniscal Healing in a Canine OA Model. Orthopaedic Research Society. Orlando, FL. March 5-8, 2016.
45. Monibi, F. A., Stoker, A. M., Pfeiffer, F. M., **Kuroki, K.**, Sherman, S. L., Cook, J. L. Development of a Novel Decellularized Meniscal Scaffold for Use in Tissue Engineering. Orthopaedic Research Society. Orlando, FL. March 5-8, 2016.
46. **Moser, C. J. Royal, A.** Chemistry Case Presentation – Not your typical diabetic dog. ACVP/ASVCP meeting in New Orleans LA. Dec 3-7 2016
47. Ota-Kuroki, J., **Kuroki, K.** Limbal xanthogranuloma in a dog. American College of Veterinary Ophthalmologists meeting. Monterey, CA. Oc. 26-29, 2016.
48. **Piech, T., Hoffman, D., Taylor, H., Royal, A.** ASVCP Mystery Slide Presentation – Pancreatic flukes in a cat. A ACVP/ASVCP meeting in New Orleans LA, Dec 3-7 2016
49. **Reilly, T. R., Kim, D., Ganjam, I., W. H. Fales.** When Bugs hugs bugs: Isolation and Identification of Francisella tularensis in neonatal cats after the consumption of infected rabbits (2016). Presentation at AAVLD National Meeting October, 2016
50. **Rothacker, T., Royal, A** (faculty mentor). ASVCP Mystery Slide Presentation – Extra-adrenal paraganglioma in a dog. ACVP/ASVCP meeting in New Orleans LA, Dec 3-7 2016
51. **Shaw, D. P.** Avian influenza. Cage-free Egg Production Meeting. Edina, MO, 11 February 2016
52. **Shaw, D. P.** Laying hen necropsy workshop. Missouri Organic Association Poultry Session. Springfield, MO, 6 February 2016
53. Sibigtroth, C., Jones, M., Garcia, V., **Johnson, G.**, Coates, J., Villalon, E., Garcia, M. Lumbar fractalkine and M2 microglia increase throughout disease progression in canine degenerative myelopathy. 21st Annual American College of Veterinary Internal Medicine. Denver CO. June 8 – 11, 2016.
54. Stoker, A. M., Bozynski, C. C., **Kuroki, K.**, Hung, C. T., Stannard, J. P., Cook, J. L. Validation of Long-Term Preservation of Human Osteochondral Allografts at Room Temperature. Orthopaedic Research Society. Orlando, FL. March 5-8, 2016.



55. Yang, M., **Zhang, C., Zhang, M. Z., and Zhang, S.** Novel Synthetic Analogues of Avian β -Defensin-12 with Enhanced Antimicrobial and Immunomodulatory Activities. Joint Meeting of the Missouri Valley and Missouri Branches of the American Society for Microbiology. University of Kansas Medical Center. March 4-5, 2016.
56. Yang, M., **Zhang, C., Zhang, M., and Zhang, S.** Novel Synthetic Avian β -Defensin-12 Analogues with enhanced Biological Functions. The 39th Annual Phi Zeta Research Day. University of Missouri-Columbia, MO May 6th, 2016.

2016 Major Annual Professional Meetings and Trainings Attended by VMDL Faculty and Staff (N = 15)

AAVLD/NAHLN Auditors Training, february 2016
AAVLD/NAHLN Quality Assurance Training, July 2016
American Association of Avian Pathologists Ann. Meeting, San Antonio, TX, 6-9 August 2016
American Association of Veterinary Clinical Pathologists
AAVLD/USAHA Annual Meeting, Greensboro, NC, October 14-16, 2016
American College of Veterinary Pathologists meeting, New Orleans, LA, Dec 3-7, 2016
AVMA Annual Convention, San Antonio, TX, August 6-8, 2016.
CVC Kansas City 2016, Kansas City, MO, August 26 & 27
Layer Health Management School, Madison, WI, 25-26 May 2016
Midwest Association of Veterinary Pathologists Annual Meeting, August 11-12, 2016, Fall Creek Falls State Park, Pikeville, Tennessee.
Missouri Veterinary Medical Association
Missouri Department of Agriculture State and Federal Conference
Missouri Dept. of Agriculture VFD Mtg., Columbia, MO, 30 October 2016
Missouri Veterinary Medical Association West Central Monthly meetings
