

BIOGRAPHICAL SKETCH

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NAME Douglas R Call	POSITION TITLE		
eRA COMMONS USER NAME DRCALL	Professor of Molecular Epidemiology & Associate Director, Paul G. Allen School for Global Animal Health		
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	MM/YY	FIELD OF STUDY
Washington State University, Pullman, WA	B.S.	5/87	Wildlife Management
Humboldt State University, Arcata, CA	M.S.	5/90	Wildlife Management
Washington State University, Pullman, WA	Ph.D.	5/97	Zoology
University of Michigan, Ann Arbor, MI	Postdoc	4/97-2/99	Immunopathology
Pacific Northwest National Laboratory, Richland, WA	Postdoc	3/99-12/99	Environmental Microbiology

A. Position Statement

My lab has a diverse research portfolio that includes past work on molecular epidemiology and comparative genetics of food-borne pathogens. We are currently working on (1) Antibiotic resistance of enteric bacteria including studies of the molecular epidemiology of antibiotic resistance, evaluating the role of excreted antibiotics in development of resistance, and antibiotic use practices in developing countries. This includes a recently awarded NSF grant (EEID) to study the ecological and socio-economic factors that contribute to the persistence and dissemination of antibiotic resistance in Tanzania; we are also collaborating with Dr. Broschat to develop algorithms to rapidly identify antibiotic resistance genes (and allelic variants) from deep sequencing data; (2) Alternatives to antibiotics such as a novel microcin that we have discovered that is effective against enterohemorrhagic *E. coli* (funded by USDA-AFRI) and another putative bacteriocin-producing bacterium (*Enterobacter*) that is effective against coldwater disease (*Flavobacterium psychrophilum*) in trout aquaculture (USDA-AFRI application pending); (3) Role of hyperosmotic agents against MRSA and *Acinetobacter baumannii* biofilms in wounds (recently funded by the US Army); and (4) Pathogenesis of *Vibrio parahaemolyticus* with a focus on type III secretion systems.

I recently moved my academic appointment to the Paul G. Allen School for Global Animal Health at Washington State University where I work with interdisciplinary teams across units (see affiliate faculty listings below) and I am actively developing research programs in collaboration with scientists from low- and middle-income countries including Tanzania, Kenya, and Nigeria. For all of these efforts we emphasize the importance of hypothesis-based research. My lab has hosted scholars from 17 different countries in the past 13 years and I have successfully guided 8 PhD students to completion (five in progress). I also serve on multiple graduate student committees and on the executive steering committee for a T32 biotechnology training grant at WSU. I will bring this diverse range of experience to the project to help with training and project design, execution, analysis, and publication.

B. Positions and Honors

Employment

1/99-6/00	Research Scientist 2, Pacific Northwest National Laboratory, Richland, WA
7/00-6/06	Assistant Professor, Veterinary Microbiology & Pathology, WSU
7/06-6/10	Associate Professor, Veterinary Microbiology & Pathology, WSU
7/08-6/09	Acting Local Director, WSU-NIH Zoonosis Research Unit, WSU
7/10-6/12	Professor, Veterinary Microbiology & Pathology, WSU
7/12-6/13	Sabbatical leave; working at PNNL, University of Glasgow, Tanzania, and WSU
7/12-pres.	Professor of Molecular Epidemiology, Paul G. Allen School for Global Animal Health, WSU
7/13-	Associate Director, Paul G. Allen School for Global Animal Health (scheduled promotion)

Other professional appointments

- 7/08-pres. Adjunct Faculty, Electrical Engineering & Computer Science, WSU
7/09-pres. Affiliate Faculty, School of Molecular Biosciences, WSU
9/12-pres. Adjunct Faculty, Department of Veterinary Microbiology and Pathology, WSU
5/13-pres. Adjunct Professor, Nelson Mandela African Institute for Science and Technology, Arusha, Tanzania

Other Service and Professional Memberships

- 10/05-8/06 Chair of the University Research and Arts Committee
5/10-5/12 Chair of the WSU Faculty Status Committee
5/11-5/12 Chair of the WSU College of Veterinary Medicine Research Committee
1/08-pres. Editorial Board for *Applied and Environmental Microbiology*
1/12-pres. Section Editor, 4th Ed., Manual for Environmental Microbiology (ASM Press)
8/10-pres. WSU Biotechnology Program Executive Steering Committee
Member: American Association for the Advancement of Science, American Society for Microbiology, American Fisheries Society, and Northwest Scientific Association

Honors

- 1995-96 EPA STAR Fellowship
1999 American Society for Investigative Pathology Merit Award
3/6-3/9 Inaugural Caroline Engle Faculty Fellow in Research on Infectious Disease
7/9-6/12 Inaugural Caroline Engle Distinguished Professor in Research on Infectious Disease
3/10 Honorary Life Membership to the Northwest Scientific Society

C. Selected Peer-reviewed Publications (from 132 publications; trainees underlined)

1. Broschat, SL, FJ Loge, JD Peppin, D White, DR **Call**, and E Kuhn. 2005. Optical reflectance assay for the detection of biofilm formation. *Journal of Biomedical Optics* 10:44027. PMID: 16178660.
2. Broschat SL, DR **Call**, EA Kuhn, and FJ Loge. 2005. Comparison of the reflectance and crystal violet assays for measurement of biofilm formation by *Enterococcus*. *Biofilms* 2:177-181.
3. Broschat SL, DR **Call**, MA Davis, D Meng, A Ahmed, and TE Besser. 2010. Improved identification of epidemiologically related strains of *Salmonella enterica* using a fusion algorithm based on PFGE and MLVA. *Journal of Clinical Microbiology* 48:4072-4082.
4. **Call**, DR, RS Singer, D Meng, SL Broschat, LH Orfe, JM Anderson, DR Herndon, LS Kappmeyer, JB Daniels, and TE Besser. 2010. *bla*_{CMY-2} positive Inc A/C plasmids from *Escherichia coli* and *Salmonella enterica* are a distinct component of a larger lineage of plasmids. *Antimicrobial Agents and Chemotherapy*. 54:590-596.
5. Daniels, JB, DR **Call**, and TE Besser. 2007. Molecular epidemiology of *bla*_{CMY-2} plasmids carried by *Salmonella enterica* and *Escherichia coli* isolated from cattle in the Pacific Northwest. *Applied and Environmental Microbiology* 73:8005-8011.
6. Daniels, JB, DR **Call**, DD Hancock, WM Sischo, K Baker, and TE Besser. 2009. The role of ceftiofur in the selection and dissemination of *bla*_{CMY-2} – mediated cephalosporin resistance in *Salmonella enterica* and commensal *Escherichia coli* isolated from cattle. *Applied and Environmental Microbiology* 75:3648-3655.
7. Davis, MA, TE Besser, LH Orfe, KNK Baker, AS Lanier, SL Broschat, D New, and DR **Call**. 2011. Genotypic-phenotypic discrepancies between antibiotic resistance characteristics of *Escherichia coli* from calves in high and low antibiotic use management settings. *Applied and Environmental Microbiology* 77:3293-3299. PMID: 21421795.
8. Eberhart, L, JR Deringer, KA Brayton, A Sawant, TE Besser, and DR **Call**. 2012. Characterization of a novel microcin that kills enterohemorrhagic *E. coli* O157:H7 and O26. *Applied and Environmental Microbiology* 78:6592-6599.

9. Khachatryan, AR, DD Hancock, TE Besser, and DR **Call**. 2004. The role of calf-adapted *Escherichia coli* in maintenance of antibiotic resistance in dairy calves. *Applied and Environmental Microbiology* 70:752-757.
10. Khachatryan, AR, DD Hancock, TE Besser, and DR **Call**. 2006. Antimicrobial drug resistance genes do not convey secondary fitness advantage in calf-adapted *Escherichia coli*. *Applied and Environmental Microbiology* 72:443-448.
11. Khachatryan, AR, TE Besser, DD Hancock, and DR **Call**. 2006. Use of a nonmedicated dietary supplement correlates with increased prevalence of streptomycin-sulfa-tetracycline-resistant *Escherichia coli* on a dairy farm. *Applied and Environmental Microbiology* 72:4583-4588.
12. Khachatryan, AR, TE Besser, and DR **Call**. 2008. The SSuT antimicrobial resistance element from calf-adapted *Escherichia coli* is widely distributed in Washington State cattle. *Applied and Environmental Microbiology* 74:391-395.
13. Leach, MD, SL Broschat, and DR **Call**. 2008. A discrete, stochastic model and correction method for bacterial source tracking. *Environmental Science and Technology* 42:524-529. PMID: 18284157.
14. Meng, D, SL Broschat, and DR **Call**. 2008. A Java-based tool for the design of classification microarrays. *BMC Bioinformatics* 9:328.
15. Subbiah, M, EM Top, DH Shah, and DR **Call**. 2011. Selection pressure required for long-term persistence of *bla*_{CMY-2}-positive IncA/C plasmids. *Applied and Environmental Microbiology* 77:4486-4493.
16. Subbiah, M, SM Mitchell, JL Ullman, and DR **Call**. 2011. Beta-lactams and florfenicol antibiotics remain bioactive in soils while ciprofloxacin, neomycin, and tetracycline are neutralized. *Applied and Environmental Microbiology* 77:7255-7260.
17. Subbiah, M, DH Shah, TE Besser, JL Ullman, and DR **Call**. 2012. Urine from treated cattle drives selection for cephalosporin resistant *Escherichia coli*. *PLoS ONE* 7(11):e48919.
18. Wan, Y, SL Broschat, and DR **Call**. 2007. Validation of mixed-genome microarrays as a method for genetic discrimination. *Applied and Environmental Microbiology* 73:1425-1432
19. Zhou, Y, DR **Call**, SL Broschat. 2012. Genetic relationships among 527 Gram-negative bacterial plasmids. *Plasmid* 68:133-141.
20. Zhou, Y, DR **Call**, SL Broschat. *Accepted*. Using protein clusters from whole proteomes to construct and augment a dendrogram. *Advances in Bioinformatics*.

D. Research Support

Ongoing Research Support

Call, Project Director
NSF EEID program

9/12-9/16

Ecological and socio-economic factors affecting the emergence, persistence, and dissemination of antibiotic resistance. The goal of this work is to develop a community-scale ecological model of antibiotic resistance epidemiology that integrates microbiological and socio-anthropological data.

Call, Project Director
Washington State University Research Advancement Challenge

10/12-9/13

Challenging conventions to combat the spread of antibiotic resistance. This project will support development of lab and analytical tools needed to employ multiplexed deep sequencing methods for genotyping multidrug resistant bacteria.

Beyenal, PI
DMRDP, DM110308

8/12-8/14

Fundamental research at the nanoscale and microscale to understand how biofilms interact with wounds in the presence of hyperosmotic agents. We are evaluating structural, biochemical, and immunological responses to biofilms using *in vitro* (explants) and *in vivo* (porcine) models.

Role: Co-investigator; responsible for development and application of explant and in vivo models.

Besser, PI
USDA-AFRI

2/11-1/16

Reducing seasonal increases in *Stec* prevalence in cattle to reduce human exposures and improve public health. The goal of this work is to test the hypothesis that drinking water systems serve as the primary reservoir for sustaining *E. coli* O157:H7 over winter months.

Role: Co-investigator; responsible for developing microcin applications for control of EHEC in water.

Completed Research Support

N01-AI-30055

Besser (PI)

12/02—10/2010

NIH NIAID, Food and Waterborne Diseases Integrated Research Network

Multiple projects

- *Epidemiology of antibiotic resistance plasmids*. 08/07—10/10. Determine the fitness attributes that make *bla*_{CMY-2} positive, IncA/C plasmids successful. Call (PD).
- *Pathogenesis of circulating norovirus strains*. 01/08—8/10. Examines the innate immune response to norovirus infection using a novel 3-dimensional cell culture technique. Call (Co-I).
- *Development of new model systems to study Campylobacter jejuni-host cell interactions*. 10/08-09/10. Develop new model systems that enable analysis of host cell response to *C. jejuni* infection. Call (Co-I).
- *Differential virulence of Salmonella enteritidis*. 10/08-09/10. Comparative phenotypic and genomic analysis of Enteritidis isolates. Call (Co-I).

USDA WRAC 464701

Cain (PI)

01/08-09/12

Western Regional Aquaculture Commission

Coldwater disease prevention and control through vaccine development and diagnostic improvements.

Identify antigenic peptides using IVIAT technology and to apply a newly developed ELISA and FAT test to determine if control of vertical transmission will limit coldwater disease outbreaks in commercial fish facilities.

Role: Co-investigator

USDA 2008-34468-9306

Call (PD)

09/08—08/12

Comparative genomics and proteomics of *Flavobacterium psychrophilum* and regulation of host genes during a protective immune response

The goal of this project (renewed annually since 2003) was to develop improved control strategies, diagnostics, and vaccines for coldwater disease.

Role: PI