

**BIOMEDICAL & VETERINARY SCIENCES
GRADUATE PROGRAM**



ANNOUNCES

The Master of Science Seminar and Examination of

Kellie Alexandra King

**“Discovery and Characterization of a Novel
Regulatory Small RNA, VcrS, Required for Virulence
of *Brucella abortus*.”**

Friday, December 17, 2021

11:00 am

VetMed Phase 2 Classroom 125

Zoom link is: <https://viriniatech.zoom.us/j/81854927177>

Bio



Kellie King was born and raised in Cincinnati, Ohio. In highschool, Kellie was very active on the basketball and diving team. She earned her Bachelor of Science degree at Ohio University in Athens, Ohio, majoring in Cellular and Molecular Biology. She worked in the research lab of Dr. Ronan Carroll studying the virulence mechanisms of *Staphylococcus aureus*. She then began her graduate career in Dr. Clay Caswell's lab defining the role regulatory small RNA molecules play in the virulence of the zoonotic pathogen *Brucella abortus*. Outside of the lab, Kellie enjoys cooking, hiking, and playing with her cat Stevie.

Funded by

American Heart Association (15SDG23280044)
National Institute of Allergy and Infectious Diseases (AI117648)
National Institute of Allergy and Infectious Diseases (AI125958)
National Institute of Allergy and Infectious Diseases (AI151494)
Virginia-Maryland College of Veterinary Medicine at Virginia Tech
Fralin Life Sciences Institute - Virginia Tech
VMCVM Office of Research and Graduate Studies

Lay Language Abstract

Brucella abortus is a bacterial pathogen that primarily infects cattle but is also transmitted to humans. Human disease most commonly results from the consumption of unpasteurized milk. Human brucellosis has very limited treatment options, with a high incidence of disease relapse. *B. abortus* survives and replicates within immune cells, which create a harsh environment. However, the bacteria is able to sense and adapt to survive and replicate within these immune cells, maintaining a chronic infection. A better understanding of the adaptation process *B. abortus* utilizes to survive within the human host can lead to improvement of treatment options. The present work characterizes a novel regulatory small RNA- VcrS, which was found required for survival and replication inside immune cells.

Publications

1. **King, K.A.**, Benton, A.H., Kang, L., Michalak, P., Dunman, P.M., Jutras, B.L., and Caswell, C.C. A newly discovered regulatory small RNA, VcrS, is essential for virulence in *Brucella abortus* (in preparation)
2. **King, K.A.**, and Caswell, C.C., A Comprehensive Review of *Brucella* Regulatory Small RNAs (in preparation)
3. Tupik JD, Coutermarsh-Ott SL, Benton AH, **King KA**, Kiryluk HD, Caswell CC, Allen IC. ASC-Mediated Inflammation and Pyroptosis Attenuates *Brucella abortus* Pathogenesis Following the Recognition of gDNA. *Pathogens*. 2020 Nov 30;9(12):1008. doi: 10.3390/pathogens9121008. PMID: 33266295; PMCID: PMC7760712.
4. Sheehan LM, Budnick JA, Fyffe-Blair J, **King KA**, Settlege RE, Caswell CC. The endoribonuclease RNaseE coordinates expression of mRNAs and small regulatory RNAs and is critical for the virulence of *Brucella abortus* [published online ahead of print, 2020 Aug 3]. *J Bacteriol*. 2020;JB.00240-20. doi:10.1128/JB.00240-20
5. Zapf, R.L., Wiemels, R.E., Keogh, R.A., Holzschu, D.L., Howell, K.M., Trzeciak, E., Caillet, A.R., **King, K.A.**, Selhorst, S.A., Naldrett, M.J., Bose, J.L., and Carroll R.K. (2019) The Small RNA Teg41 Regulates Expression of the Alpha Phenol-Soluble Modulins and Is Required for Virulence in *Staphylococcus aureus*. *mBio* 5;10(1). (PMID: 30723124)

Presentations

King, K.A., Benton, A.H., Michalak, P., Lahmers, K.K and Caswell, C.C. (2021) VcrS, a novel regulatory small RNA is crucial for virulence in *Brucella abortus*. 65th Annual Wind River Conference on Prokaryotic Biology, Estes Park, CO.

King, K.A., Benton, A.H., Michalak, P., Lahmers, K.K and Caswell, C.C. (2021) A new regulatory small RNA, VcrS, is required for virulence in *Brucella abortus*. 31th Annual BMVS Graduate Research Symposium, Blacksburg, VA

King, K.A., Benton, A.H., Michalak, P., Lahmers, K.K and Caswell, C.C. (2021) A new regulatory small RNA, VcrS, is required for virulence in *Brucella abortus*. 34th Annual Graduate Student Assembly Research Symposium, Blacksburg, VA.

King, K.A., Benton, A.H., Michalak, P., Lahmers, K.K and Caswell, C.C. (2021) A new regulatory small RNA, VcrS, is required for virulence in *Brucella abortus*. Via Research Recognition Day, Blacksburg, VA.

King, K.A., Benton, A.H., Michalak, P., Lahmers, K.K and Caswell, C.C. (2020) A new regulatory small RNA, Bsr18, is required for virulence in *Brucella abortus*. Department of Biomedical and Veterinary Sciences Research in Progress Seminar, Blacksburg, VA

King, K.A., Budnick, J.A., Kohl, K.A., Michalak, P., Lahmers, K.K and Caswell, C.C. (2019) Discovery and Characterization of regulatory small RNAs in *Brucella abortus*. 29th Annual BMVS Graduate Research Symposium, Blacksburg, VA.

***King, K.A.**, Budnick, J.A., Kohl, K.A., Michalak, P., Lahmers, K.K and Caswell, C.C. (2019) Discovery and Characterization of regulatory small RNAs in *Brucella abortus*. 62nd Annual Wind River Conference on Prokaryotic Biology, Estes Park, CO.

***King, K.A.**, Budnick, J.A., Kohl, K.A., Michalak, P., Lahmers, K.K and Caswell, C.C. (2019) Discovery and Characterization of regulatory small RNAs in *Brucella abortus*. 34th Annual Graduate Student Assembly Research Symposium, Blacksburg, VA.

King, K.A., Budnick, J.A., Kohl, K.A., Michalak, P., Lahmers, K.K and Caswell, C.C. (2019) Discovery and Characterization of regulatory small RNAs in *Brucella abortus*. Via Research Recognition Day, Blacksburg, VA.

King, K.A., Budnick, J.A., Kohl, K.A., Michalak, P., Lahmers, K.K and Caswell, C.C. (2019) Discovery and Characterization of regulatory small RNAs in *Brucella abortus*. The Mid-Atlantic Microbial Pathogenesis Meeting, Wintergreen, VA.

^King, K.A., Budnick, J.A., Kohl, K.A., Michalak, P., Lahmers, K.K, Caswell, C.C. (2018) Discovery of new regulatory small RNAs in *Brucella abortus*. Virginia Branch American Society for Microbiology Annual Meeting, Radford, VA.

^-Oral Presentation

*-Lightening Talk Presentation

Awards and Academic Achievements

1. 2021 1st Place in Biomedical Research Graduate Student Poster Competition, Poster Research Presentation, VCOM-Virginia Campus Research Recognition Day
2. 2019 Oral Research Award, Animal and Poultry Sciences Symposium
3. 2019 1st Place in Biomedical Research Graduate Student Poster Competition, Poster Research Presentation, VCOM-Virginia Campus Research Recognition Day
4. 2018 Oral Research Award, ASM Virginia Branch Annual Meeting
5. 2018 1st Place in Poster Competition, ASM Ohio Branch Annual Meeting
6. 2017 Three Minute Thesis, Appalachian Regional Cell Conference
7. 2017 2nd Place in Poster Competition, Appalachian Regional Cell Conference
8. 2017 2nd Place in Poster Competition, SURF Capstone Poster Symposium

Travel awards:

Travel Award to attend the Mid-Atlantic Microbial Pathogenesis Meeting in February, 2019

Travel Grant to attend the 62nd Annual Wind River Conference on Prokaryotic Biology, June 2018

Examination Graduate Committee

Major Advisor/Chair:

Clayton Caswell, PhD
Associate Professor
Department of Biomedical Sciences and Pathobiology

Graduate Advising Committee Members:

Irving Coy Allen, PhD, MBA, MS
Associate Professor
Department of Biomedical Sciences and Pathobiology

Kevin Lahmers, DVM, PhD, DACVP- Anatomic Pathology
Clinical Associate Professor
Department of Biomedical Sciences and Pathobiology

Birgit Scharf, PhD
Associate Professor
Department of Biological Sciences



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