BIOMEDICAL & VETERINARY SCIENCES

GRADUATE PROGRAM

ANNOUNCES

The Doctor of Philosophy Seminar and Examination of

S. Grant Waldrop

"Rough leucine auxotrophic strains of *Brucella* expressing Salmonella flagellin C conjugated gonadotropins, an immunocontraceptive brucellosis vaccine for feral swine population control"

Wednesday, August 12th, 2020
9:00 am
Vet Med VMIA 220
Zoom link: https://virginiatech.zoom.us/j/97064672786

Bio

Originally from South Carolina, Steven Grant Waldrop completed his bachelor's of science at Ferrum College and graduated from the Boone Honor's Program in 2014. While at Ferrum College, Waldrop participated in three and a half years of undergraduate *Mycobacterium* research, under Dr. Michaela Gazdik. All the while continuing to gain more experience in both large and small animal veterinary medicine, under the guidance of Dr. Chris Ayelsworth. He then went on to become one of two candidates selected for the Virginia-Maryland College of Veterinary Medicine's (VMCVM) PhD/DVM dual degree program's class of 2021. Waldrop immediately started working on developing a dual-purpose brucellosis immunocontraceptive vaccine for feral swine, in the summer of 2014. He will be completing the DVM curriculum as a food animal tracker this coming academic year (2020 - 2021). He has completed veterinary externships at The National Institutes of Health (NIH) and The Virginia Department of Agriculture and Consumer Services (VDACS). He actively participated in organizations like the Food Animal Practioner's Club (FAPC) and the Biomedical and Veterinary Sciences Graduate Student Assembly. He was selected to be a member of the VMCVM's One Health Working Group (OHWG). He has won several awards both nationally and internationally for his research presentations. He also has multiple publications, and received several scholarships during his time here at VMCVM. Post-veterinary school, Waldrop plans to pursue becoming a diplomate of the American College of Veterinary Microbiologists. He also plans to practice at a mixed animal veterinary hospital, before one-day combining his love for infectious diseases and food animal medicine in a federal position focusing on disease surveillance and eradication.

Funded by

Smithfield Foods Murphy-Brown, LLC.

VMCVM's Office of Research and Graduate Studies

Lay Language Abstract

While brucellosis has been eradicated from domestic livestock in the United States, the causative agent is still present in wildlife like elk, bison, and feral swine. The interactions between these infected wildlife populations with domestic livestock and human populations poses a great health risk. Many tools are employed to mitigate these interactions including vaccination programs and population management. In particular, the feral swine population has proven difficult to control. It has quadrupled in the past ten years and continues to expand nationwide, making their population control an important national objective. Furthermore, feral swine are known carriers of zoonotic diseases, including hemorraghic *E. coli,* leptospirosis, trichinosis, swine influenza, and brucellosis. Many cases of these diseases in humans have been traced back to interactions with feral swine. The current population control practices have failed to minimize the $1.5 billion of damage they cause to the agricultural industry per year. Thus, there is a need to effectively control the feral swine population and prevent the spread of zoonotic diseases like brucellosis. Rough leucine auxotrophic strains of *Brucella* expressing gonadotropin releasing hormone (GnRH) or porcine follicle stimulating hormone beta subunit (FSH) conjugated to *Salmonella* FliC (an adjuvant) show promise. They have been shown to provide protection against virulent *Brucella* challenge and reduce fertility characteristics in mice. Their effectiveness as an immunocontraceptive for feral swine management, while reducing the spread of brucellosis needs to be tested in swine. These vaccine strains could pave the way for effective novel population control in wildlife management.

Publications

Waldrop, S.G., Smith, G. P., Boyle, S. M., Sriranganathan, N. *Brucella abortus* RB51 Δ*leuB* expressing *Salmonella* FliC conjugated gonadotropins reduces mouse fetal numbers: A possible feral swine brucellosis immunocontraceptive vaccine. Heliyon. Under Review

Lu Y, Clark-Deener S, Gillam F, Heffron CL, Tian D, Sooryanarain H, LeRoith T, Zoghby J, Henshaw M, **Waldrop S.G.**, Pittman J, Meng XJ, Zhang C. Virus-like particle vaccine with B-cell epitope from porcine epidemic diarrhea virus (PEDV) incorporated into hepatitis B virus core capsid provides clinical alleviation against PEDV in neonatal piglets through lactogenic immunity. Vaccine 2020. doi:10.1016/J.VACCINE.2020.06.009.

Jain-Gupta N, **Waldrop S.G.**, Tenpenny NM, Witonsky SG, Boyle SM, Sriranganathan N. Rough *Brucella neotomae* provides protection against *Brucella suis* challenge in mice. Vet Microbiology 2019;239. doi:10.1016/j.vetmic.2019.108447.

Waldrop S.G., Sriranganathan N. Intracellular invasion and survival of *Brucella neotomae*, another possible zoonotic *Brucella* species. PLoS One 2019;14:e0213601. doi:10.1371/journal.pone.0213601.

Kaur G, **Waldrop S.G.**, Kumar V, Pandey OP, Sriranganathan N. *An introduction and history of the bioactive glasses*. vol. 53. 2016. doi:10.1007/978-3-319-44249-5_2.

Kaur G, Sriranganathan N, **Waldrop S.G.**, Sharma P, Chudasama BN. Effect of copper on the up-regulation/down-regulation of genes, cytotoxicity and ion dissolution for mesoporous bioactive glasses. *Biomed Mater* 2017;12. doi:10.1088/1748-605X/aa7664.

Kaur G, Baino F, Mauro JC, Kumar V, Pickrell G, Sriranganathan N, **Waldrop S.G**. Biomaterials for cell encapsulation: *Progress toward clinical applications*. 2017. doi:10.1007/978-3-319-56059-5_14.

Presentations

Waldrop, S.G., Smith, G.P., Jane-Gupta, N Boyle, S.M., Sriranganathan, N. Rough *Brucella neotomae* and *Brucella suis* overexdpressing GnRH and FSH: A novel brucellosis immunocontraception vaccine. 60th AAVLD/121st USAHA Annual Meeting; 2017.

Waldrop, S.G., Smith, G.P., Jane-Gupta, N Boyle, S.M., Sriranganathan, N. Rough *Brucella neotomae* and *Brucella suis* overexdpressing GnRH and FSH: A novel brucellosis immunocontraception vaccine. VMCVM BMVS Annual Research Symposium; 2017.

Waldrop, S.G., Smith, G.P., Jane-Gupta, N Boyle, S.M., Sriranganathan, N. Rough *Brucella neotomae* and *Brucella suis* overexdpressing GnRH and FSH: A novel brucellosis immunocontraception vaccine. Brucellosis 2016 New Dehli, India; 2017.

Waldrop S.G., *Brucella neotomae* Vaccine to Control Brucellosis and Reproduction in Feral Swine: Prevention of Zoonotic Disease Transmission to Humans. Blacksburg, VA: Annual GSA Research Symposium; 2016.

Waldrop S.G., *Brucella neotomae* Vaccine to Control Brucellosis and Reproduction in Feral Swine: Prevention of Zoonotic Disease Transmission to Humans. Blacksburg, VA: VMCVM BMVS Annual Research Symposium; 2016.

Waldrop S.G., Ernst, M. Control of Intracellular Bacterial Infections: Research Into Novel Vaccines and Antibiotic Strategies. Blacksburg, VA: BMVS Research In Progress Seminar; 2016.

Waldop S.G., Smith, G.P., Jane-Gupta, N Boyle, S.M., Sriranganathan, N. Rough *Brucella neotomae* and *Brucella suis* overexpressing GnRH and FSH: A novel brucellosis immunocontraception vaccine. Blacksburg, VA: BMVS Research In Progress Seminar; 2016.

Awards and Academic Achievements

- Dr. and Mrs. Tyler J. Young Travel Award - 2020
- Omega Tau Sigma – 2019-2021
- Tyler J. & Frances F. Young Scholarship – 2017 – 2021
- VMCVM One Health Working Group – 2018-2020
- Food Animal Practioners Club Historian – 2018-2019
- Food Animal Practioners Club Social and Fundraising Chair – 2017-2018
- Guest Judge at The Virginia Academy of Science's Undergraduate Research Meeting at Ferrum College – 2018
- American Association of Veterinary Laboratory Diagnosticians (AAVLD) Brenda Love Memorial Travel Scholarship Award – 2017
- VMCVM BMVS 28th Annual Research Symposium Outstanding PhD Poster Award – 2017
- BMVS Graduate Student Assembly President – 2015-2016
- BMVS Graduate Student Assembly Vice-President – 2014-2015
- Brucellosis 2016 International Research Conference, New Dehli, India Best Poster Award – 2016
- VA Tech Graduate Student Assembly Travel Scholarship – 2016

Examination Graduate Committee

Major Advisor/Chair:

Dr. Nammalwar Sriranganathan, BVSc, MVSc, PhD, Diplomate, ACVM
Professor
Department of Biomedical Sciences and Pathobiology

Graduate Advising Committee Members:

Dr. Brandy A. Burgess, DVM, MSc, PhD, DACVIM (LAIM), DACVPM
Assistant Professor, Director of Infection Control
Food Animal Health and Management, Veterinary Teaching Hospital
College of Veterinary Medicine
University of Georgia

Dr. Stephen M. Boyle, PhD
Professor Emeritus
Department of Biomedical Sciences and Pathobiology

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

Dr. M. Renee Prater, DVM, PhD
Associate Dean for Curriculum, Assessment and Medical Education
Edward Via College of Osteopathic Medicine

VIRGINIA TECH™