BIOMEDICAL & VETERINARY SCIENCES

GRADUATE PROGRAM

ANNOUNCES

The Master of Science Seminar and Examination of

J. Blake Everett, DVM
“Bone marrow mononuclear cells for equine joint therapy”

Wednesday, July 15th, 2020
2:00PM
Zoom: https://virginiatech.zoom.us/j/99102024063
VMIA 220

Bio

I hail from the Volunteer state where I grew up on a horse farm. My passion for horses and the veterinary profession stem from my time raising and showing Tennessee walking horses. I received a bachelor's degree in animal science from Middle Tennessee State University. Veterinary school was completed at the University of Tennessee. While in veterinary school, I was able to marry the love of my life, Constance, and garner a passion for equine surgery. After graduating from the College of Veterinary Medicine, University of Tennessee, I was selected for a rotating internship at Rood and Riddle Equine Hospital. This internship encompassed every facet of equine medicine and surgery at an incredible pace. After completing my internship at RREH, I began a dual Masters research program and large animal surgical residency at Virginia Tech. My research involved evaluating a novel orthobiological therapy for treating horses with osteoarthritis. The results of this controlled short-term study indicated that the treated horses experienced a significant improvement in lameness and decreased inflammation over time.

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VMCVM Office of Research and Graduate Studies

Lay Language Abstract

Osteoarthritis (OA) leads to joint deterioration and is a common source of pain in people and horses. Current treatments provide only symptomatic and temporary relief, creating an urgent need for the development of more effective treatment options. Arthritis incites uncontrolled inflammation that is characterized by progressive destruction of the joint, including the cartilage, which is essential for pain-free movement. Cells called macrophages are responsible controlling inflammation and can either increase or decrease inflammation, depending on the situation. In health, macrophages act a house-keeping cell by clearing aggressor agents and secreting molecules required for maintaining adequate joint health. When these physiologic functions are overwhelmed by damage, macrophages perpetuate inflammation via the recruitment of additional cell types to cope with increased demands for repair. If this process is efficiently accomplished, macrophages lead to inflammation resolution thereby enabling recovery and repair within the joint. Bone marrow-derived macrophages (bone marrow mononuclear cells or BMNC) are used to treat inflammation in various tissues and are known to produce factors that are vital for joint health. Treatment of joints with BMNC improved the joint environment compared to placebo in a recent study in people. A series of studies in horses with experimentally-induced OA revealed that intra-articular injection of BMNC replenishes the inflamed joint with healthy macrophages which allowed them to maximize their anti-inflammatory effects, favoring the recovery of a healthy articular environment. Our clinical trial evaluated the ability of intra-articular BMNC to improve clinical signs of naturally occurring OA in horses. We hypothesized that intra-articular BMNC administration would reduce lameness and joint inflammation compared to negative controls and that the reduction in lameness and joint inflammation would not differ from a positive control, corticosteroids. BMNC-treated horses had significantly reduced lameness after 21 days. Limb circumference measurements, which are are an indirect measure of joint inflammation, revealed statistically less swelling in the joints treated with BMNC over time, whereas no such change was seen in the control groups. In summary, BMNC are exciting because they can be collected from the patient themselves (autologous), do not require extensive processing, and have the potential to benefit thousands of people and horses suffering from arthritis.

Publications

Everett JB, Schumacher J, Doherty T, Whitlock B. Effects of wedge pads and chains applied to the forefeet of Tennessee Walking Horses for a five-day period on behavioral and biochemical indicators of pain, stress, and inflammation. *Am J Vet Res* 2018;79:21-32.

Everett JB, Menarim BC, Barrett SH, Bogers SB, Pleasant RP, Byron CR, Werre SR, Dahlgren LA. Bone marrow mononuclear cell therapy for equine joint disease. In preparation.

Presentations

Everett JB, Menarim BC, Werre SR, Barrett SH, Byron CR, Pleasant RS, Bogers SH, Dahlgren LA. Bone marrow mononuclear cell therapy for equine joint disease. American College of Veterinary Surgeons surgery Summit Resident Forum. Washington, D.C. November 2020.

Everett JB, Menarim BC, Werre SR, Barrett SH, Byron CR, Pleasant RS, Bogers SH, Dahlgren LA. Bone marrow mononuclear cell therapy for equine joint disease. American Association of Equine Practitioner's Annual Convention. Las Vegas, NV. December 2020.

Everett JB, Menarim BC, Werre SR, Barrett SH, Byron CR, Pleasant RS, Bogers SH, Dahlgren LA. Bone marrow mononuclear cell therapy for equine joint disease. BMVS Research Symposium. Blacksburg, VA. November 2019.

Awards and Academic Achievements

Outstanding MS Poster Presentation, VMCVM Annual Research Symposium. November 2019.

Examination Graduate Committee

Major Advisor/Chair:

Linda A. Dahlgren, DVM, PhD, Diplomate ACVS
Professor, Large Animal Surgery
Director, Regenerative Medicine Interdisciplinary Graduate Education Program
Department of Large Animal Clinical Sciences
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Graduate Advising Committee Members:

R. Scott Pleasant, DVM, MS, Diplomate ACVS
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