

**BIOMEDICAL & VETERINARY SCIENCES  
GRADUATE PROGRAM**



**ANNOUNCES**

The Master of Science Seminar and Examination of

**Kayla Waler**

**“Aqueous humor concentration and prostaglandin E2 suppression efficacy of topically applied ophthalmic ketorolac 0.5% and diclofenac 0.1% solutions in dogs with cataract”**

**Wednesday, May 13th, 2020  
10:00 AM**

**Zoom - <https://virginiatech.zoom.us/j/93923529218>**



## **Bio**



Dr. Waler grew up in South Florida and obtained her Bachelor of Science degree in Animal Sciences at the University of Florida in 2012. She then received her Doctor of Veterinary Medicine degree from Auburn University in 2016 where she developed her passion for ophthalmology. Following veterinary school, she moved to Blacksburg, Virginia where she completed a small animal rotating internship at Virginia-Maryland College of Veterinary Medicine and is scheduled to complete a three-year residency in veterinary ophthalmology at Virginia-Maryland College of Veterinary Medicine in July 2020.

## **Funded by**

Veterinary Memorial Fund Grant

VMCVM Office of Research and Graduate Studies

## **Lay Language Abstract**

Nonsteroidal anti-inflammatory drugs (NSAIDs) are widely used for their analgesic, anti-pyretic and anti-inflammatory properties in both human and veterinary patients. Topical ophthalmic NSAIDs are commonly employed in the management of intraocular inflammation (uveitis), corneconjunctival inflammatory disease and pre-operatively to prevent intraoperative miosis during cataract surgery. Despite their routine application in these clinical scenarios, little is known regarding the intraocular penetration and relative anti-inflammatory efficacy of the available topical ophthalmic NSAIDs in the dog. Decisions regarding which of these agents to employ are therefore based upon factors such as cost and ease of acquisition as opposed to established efficacy.

Efficacy of topical anti-inflammatory medications in controlling intraocular inflammation is primarily related to the ability of the medication to penetrate the cornea and its efficacy at suppressing inflammatory mediators. The purpose of this study, therefore, is to investigate the relative intraocular penetration and anti-inflammatory efficacy of two commonly utilized topical ophthalmic NSAIDs in dogs, diclofenac 0.1% and ketorolac 0.5%.

Twenty-two dogs presenting to the VTH ophthalmology service for routine cataract surgery with the presence of a mature or hypermature cataract were enrolled in a prospective, randomized clinical trial. Subjects were treated with either topical ketorolac 0.5% or topical diclofenac 0.1% ophthalmic solutions at specified times in the 24-hour

period pre-operatively. Aqueous humor samples were obtained intra-operatively and stored for subsequent evaluation of drug concentrations (n=22) and prostaglandin E2 (PGE2) concentrations (n=19) via ultra performance liquid chromatography (UPLC) and enzyme-linked immunoassay (ELISA) analysis, respectively.

Treatment with topical ketorolac 0.5% resulted in higher median aqueous humor drug concentrations when compared to treatment with diclofenac 0.1% (1311.6 ng/mL vs. 284.9 ng/mL). However, there was no significant difference in anti-inflammatory efficacy when comparing PGE2 concentrations between the two groups. Furthermore, no significant association was determined when drug concentration was directly compared with PGE2 concentration. The results of these assays suggest that topical ketorolac 0.5% and diclofenac 0.1% are equally suitable for use based on their comparable anti-inflammatory profiles, and provides clinically relevant information regarding intraocular penetration and anti-inflammatory efficacy of these medications in dogs with cataract.

## **Publications**

Abdel-Maksoud FM, Knight R, **Waler K**, et al. Exposures of male rats to environmental chemicals [bisphenol A and di (2-ethylhexyl) phthalate] affected expression of several proteins in the developing epididymis. *Andrology*. 2018;6(1):214–222.

**Waler K**, Voyles M. Vision Changes. In Gardner M, McVety D eds. *Treatment and Care of the Geriatric Veterinary Patient*. 1st ed. Hoboken: Wiley; 2017:23-34.

## **Presentations**

### **Poster presentation:**

“Aqueous humor concentration and prostaglandin E2 suppression efficacy of topically applied ophthalmic ketorolac 0.5% and diclofenac 0.1% solutions in dogs with cataract” VMCVM 30th annual research symposium 2019.

### **Presentations:**

“In vivo pharmacokinetics and in vitro pharmacodynamics of nepafenac, amfenac, ketorolac and bromfenac” Graduate seminar presentation 2018.

“NSAID Use in Veterinary Ophthalmology” VA-MD College of Veterinary Medicine Resident Seminar Series 2017.

## **Awards and Academic Achievements**

Outstanding master of science poster presentation award - VMCVM 30th annual research symposium 2019.

## Examination Graduate Committee

### **Major Advisor/Chair:**

Ian Herring, DVM, MS, DACVO  
Associate Professor  
Department of Small Animal Clinical Sciences

### **Graduate Advising Committee Members:**

Jennifer Davis, DVM, PhD, DACVIM, DACVCP  
Associate Professor  
Department of Biomedical Sciences & Pathobiology

William Huckle, MS, PhD  
Associate Professor  
Department of Biomedical Sciences & Pathobiology

Roxanne Rodriguez Galarza, DVM, MS, DACVO  
Clinical Assistant Professor  
Department of Small Animal Clinical Sciences



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