**BIOMEDICAL & VETERINARY SCIENCES**

**GRADUATE PROGRAM**

**ANNOUNCES**

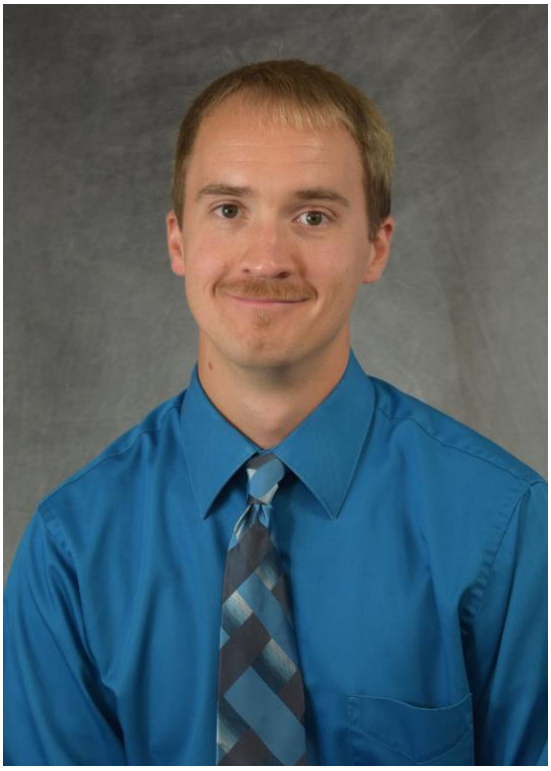
The Master of Science Seminar and Examination of

# Jeremy D. Hansford, DVM

**“Pharmacokinetics of a highly concentrated formulation of buprenorphine (Simbadol®) in male dogs”**

**Monday, April 19th, 2021**
**8:00 AM**
**291, Vet Med Phase 4C Clinic**

## Bio



Jeremy graduated with a BS from West Virginia University in 2009 and earned his DVM in 2012 from the University of Georgia: College of Veterinary Medicine. The year after he completed a rotating small animal medicine and surgery internship here at the VMCVM (some of you remember him from then). Five years of clinical practice in small animal practice followed before returning to the VMCVM to pursue a residency in Anesthesia and Analgesia in 2018. Following the residency conclusion this summer, he will be happily staying on as a clinical assistant professor!

## Funded by

University of California Davis Center for Companion Animal Health

VMCVM Office of Research and Graduate Studies

## Lay Language Abstract

Veterinary pain management is a growing industry with increased knowledge on the degree of pain animals feel. Buprenorphine is a partial mu-receptor agonist and Schedule III controlled substance in the United States, indicating it is less habit-forming that Schedule II narcotics, such as morphine, a full mu-receptor agonist. There is an FDA-approved long-acting formulation of buprenorphine for cats available (Simbadol®), and it has become used more clinically off-label in dogs despite lack of empirical information.

The present study is descriptive in nature. Six healthy male Beagle dogs were utilized in a prospective, randomized, crossover study. Each was anesthetized and a central venous catheter placed subcutaneously in the right external jugular vein. Once recovered, 0.12mg/kg Simbadol buprenorphine was administered subcutaneously or intravenously and blood samples collected at multiple time points from 1 minute to 72 hours, creating a buprenorphine plasma time-concentration profile. Following completion of blood collection, the catheters were removed and the dogs allowed 14 days as a washout interval. The process was then repeated with the left external jugular vein utilized for catheter placement and each dog receiving the opposite treatment from the first period.

A 3-compartment model with zero or rapid and slow first order input into (intravenous or subcutaneous data, respectively) and first-order elimination from the central compartment best fitted the data. Typical

values (% interindividual variability) for the three compartment volumes were 900 (33), 2425 (not assessed), and 6360 (28) mL/kg. The metabolic and two distribution clearances were 25.7 (21), 107.5 (74), and 5.7 (61) mL/minute/kg. The absorption rate constant for the fast absorption phase was 0.08 (63) per minute with a 0.7 (103) minute delay. The absorption rate constant for the slow absorption phase was 0.002 (36) per minute with a 226 (42) minutes delay. Median (range) bioavailability calculated from non-compartmental analysis was 143 (80-239) %. Calculated terminal half-life was 963 minutes.

Side effects varied among dogs, with no to marked sedation occurring in both treatment groups. Hyperptyalism and whining were fairly common, tending to occur in the same dogs in both treatment phases. All dogs had a reduced appetite for the first 24 hours in the first phase of the study, but not the second phase.

The high concentration formulation of buprenorphine administered subcutaneously had a large volume of distribution and a rapid absorption phase followed by slower, delayed absorption.

## Publications

Hansford, J., Henao-Guerrero, N., Pypendop, B., & Machado, M. (In Progress). Pharmacokinetics of a highly concentrated formulation of buprenorphine (Simbadol®) in male dogs. Veterinary Anaesthesia and Analgesia

Hansford, J. & Henao-Guerrero, N. (2020). Orthostatic hypotension secondary to a suspected thymoma in a dog: a case report. BMC Veterinary Research, 16(1), 388. https://doi.org/10.1186/s12917-020-02604-z

## Presentations

2021:
- Interpreting Blood Gases: Anesthesia Technician Continuing Education
- Local Anesthetics and Analgesics: 1st Year DVM students
- Regional Anesthesia Techniques: Anesthesia Technicians Continuing Education

2020:
- Local Anesthetics and Adjuncts: Anesthesia Technicians Continuing Education
- IVECCS Abstract Presentation
- Respiratory Monitoring: 2nd Year DVM Students
- Respiratory Complications: 2nd Year DVM Students
- Ventilation Strategies: Anesthesia Technicians Continuing Education
- Local Anesthetics and Analgesics: 1st Year DVM students
- Bloodwork and Diagnostics: Anesthesia Technicians Continuing Education

2019:
- Maropitant for All: Myth or Magic?: Intern-Resident Seminar
- Respiratory Monitoring: 2nd Year DVM Students
- Respiratory Complications: 2nd Year DVM Students
- Hypotension Under Anesthesia:  A Case of An Unseen Villain: Intern-Resident Seminar
- Local Anesthetics and Analgesics: 1st Year DVM students

2018:
- Pharmacokinetics of a high concentration formulation of Buprenorphine (Simbadol®) in dogs: Intern-Resident Seminar

## Examination Graduate Committee

**Major Advisor/Chair:**
Natalia Henao-Guerrero, DVM, MS, DACVAA
Associate Professor
Small Animal Clinical Sciences

**Graduate Advising Committee Members:**

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

Vaidehi Paranjape, BVSc, MVSc, MS, DACVAA
Assistant Professor
Small Animal Clinical Sciences

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