

Funded Study: Characterizing the fecal microbiome in spinal cord injury

Study Title: Characterization of the fecal microbiome in dogs with spinal cord injury secondary to intervertebral disc disease (IVDD)

Purpose of Study/Background/Objectives: Intervertebral disc disease (IVDD) is a common cause of spinal cord injury (SCI) in dogs and significantly impacts quality of life. While surgical decompression is the recommended treatment for compressive injury, information is lacking on what treatment best targets contusive injury. Several methods for treating the contusive injury have been investigated in dogs but an optional treatment has yet to be determined. Studies in mice and people have demonstrated the presence of gut dysbiosis (alterations in gut bacterial homeostasis) secondary to SCI. The dysbiosis is thought to impair recovery by decreasing the production of short-chain fatty acids (SFCAs) which play a role in suppressing inflammation within the central nervous system (CNS). Thus, the dysbiosis contributes to the onset and progression of intraspinal pathology after SCI, including further inflammation. Canine studies have demonstrated that inflammatory mechanisms may play a critical role in canine SCI associated with IVDD. Therefore, targeting gut dysbiosis could have significant therapeutic value in the management of SCI.

The purpose of this study is to determine if gut dysbiosis occurs in dogs with spinal cord injury secondary to IVDD compared to healthy dogs. We are looking for dogs presenting for acute paralysis with intact pain sensation of less than 7 days duration.

Inclusion Criteria:

- Dogs at least 2 years of age, in overall good health, otherwise presenting for suspected IVDD
- Neurologic status of paraplegic with intact deep pain
- Dogs on Gabapentin (pain medication) CAN BE ENROLLED if this is the only medication.
- Any dog that received any vaccines within the month prior to enrollment WILL NOT be enrolled in the study.

Exclusion Criteria:

- Previous history of IVDD or surgery for IVDD
- History of gastrointestinal disease, other neurologic disease, or concurrent illness
- Antibiotic, corticosteroid, non-steroidal anti-inflammatory (NSAID), or proton pump inhibitor (omeprazole) use for at least 1 month prior to enrollment. Dogs CANNOT currently be on any of these medications either.

- Dogs that have been paraplegic longer than 7 days CANNOT be enrolled in the study.

Eligibility Diagnostics: In order to be enrolled in the study, all dogs will have to have a normal physical exam and normal lab work, including a CBC, serum chemistry, and urinalysis. Additionally, MRI confirmation of intervertebral disc disease between T11 and L2 is required for enrollment.

Treatment/Protocol: Upon presentation, bloodwork (CBC, chemistry) and a urinalysis will be performed. Additionally, a fresh fecal sample will be collected after being naturally passed or collected via digital removal from the rectum for the purpose of DNA extraction and sequencing.

Owner Commitments: Patients will be enrolled as they present to the Veterinary Teaching Hospital. No further commitments following sample collection at the time of presentation is needed.

Compensation: For patients meeting all inclusion criteria discussed above, the cost of the examinations and lab work (CBC, chemistry, urinalysis) will be covered by the study, for an approximate total of \$400 per dog.

Contact Information: Please feel free to contact the Neurology & Neurosurgery Service at VTHNeurology@vetmed.illinois.edu to refer a patient or for any additional information. Referring veterinarian and client inquiries are welcome.