Ongoing Research for Degenerative Myelopathy
Protocol for Submission of Information, Tissue & Blood Samples

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We would like to thank you for participating in this research project. Your involvement with this study is very much appreciated by the project investigators and participating breed clubs. Our ultimate goal for this project is reduce the prevalence of degenerative myelopathy (DM) in dogs and to gain further understanding of the disease cause and progression.

Research is underway to determine the relative risk for having the mutation and subsequently developing clinical signs of DM, to further evaluate for other genetic or environmental modifying factors influencing the onset & progression of clinical signs, and to further document the pathology in the nervous system. Ultimately, these studies hope to establish measures of disease that can be used to evaluate potential therapies.

Below is a protocol for submission of information and historical information along with instructions for tissue collection. **Please note that we are targeting some cases for a more in-depth workup – please contact us to determine if your case meets the targeted criteria, and a special collection kit should be sent.** The checklist that follows details all the forms of information that we are ideally interested in. However, we understand that not all of these evaluations will be available for every case. We are interested in all the information you can gather and share with us.

CHECK LIST

(Please include all information that is available; it is not essential that we obtain all of the diagnostic information)

General Information: (page 3) – please complete for ALL cases & send with all other information – this one IS essential!

Questions for pet owner: (page 4)

History: (page 5)

Physical Examination: (page 6)

Neurologic Examination: (page 7-9)

Laboratory Results: (if available)

- **Complete blood count –** attach results
- **Serum biochemistry panel –** attach results
- **Urinalysis –** attach results

Radiology Studies: (if available)

- **Thoracic Radiographs –** attach results
- **Myelogram / CT / MRI (if available)** – attach results

Blood Samples for Genetic Research (follow these instructions if you are sending blood samples only):

- Obtain pedigree of DM affected dog (if available)
- Instructions and form for blood sample collection available on website – www.CanineGeneticDiseases.net in the "Sample Submission" section for DM
- Collect 5.0 to 10 ml of whole blood in EDTA tubes from DM affected dog and ship sample as soon as possible to the address on downloaded form.
- Please email (HansenL@missouri.edu) or call (573-884-3712) Liz Hansen if you have questions.

Tissue Samples for Diagnosis (follow these instructions if your dog is being euthanized and you are sending tissue samples):

- Please contact Joan Coates (CoatesJ@missouri.edu or 573-882-7821), or Liz Hansen (HansenL@missouri.edu, or 573-884-3712) when euthanasia is being planned. Most cases can follow a general protocol provided in this document (page 10-11). **For some cases that fit specific research targets, a kit may be sent to the veterinarian or owner prior to euthanasia. Please contact us a week or more in advance of planned euthanasia to inquire if your case meets the criteria for a kit.**
- Complete the forms below as completely as possible and send along with the tissues.
- Please email: CoatesJ@missouri.edu and cc KatzM@health.missouri.edu prior to shipping

UMC CANINE DM RESEARCH – General Information

Breed: _____

Registered Name _____ Call name _____

Reg# _____ Birth Date _____ Male / Female - - Intact / Neutered

Microchip or Tattoo: _____ Color _____

Owner: name _____ Veterinarian _____

address _____ address _____

cty-st-zip _____ cty-st-zip _____

phone (day) _____ phone _____

phone (eve) _____ _____

cell _____ Fax _____

EMAIL _____ **EMAIL** _____

Has this dog been previously DNA tested for DM? Yes No

If yes, please provide AMGL case number, or OFA barcode # _____

I submit these samples for the purpose of study of DM; I understand that the tissues will be stored for future research at the University of Missouri or shared with other researchers who are investigating DM or ALS; I understand that accuracy of results are dependent upon quality of tissue samples; I understand that the results of the histopathology will be reported only to the owner listed on this form and to the veterinarian (if requested) listed here.

Signed: _____ ***date*** _____

IMPORTANT!! PLEASE COMPLETE THE QUESTIONNAIRE ON THE NEXT PAGE !!

Record Date/Time of Euthanasia: _____

Record Date/Time Necropsy Completed: _____

Please circle your answer to the questions below, and fill in blanks as appropriate.

Has this dog been diagnosed with Degenerative Myelopathy? Y N

Was Degenerative Myelopathy in this dog diagnosed by a veterinarian? Y N

What was the date (month and year) that this dog began showing signs of DM? _____

Is this dog still alive? Y N **If NO, when did this dog die** _____

What was the cause of death? _____

How long has this dog been showing signs of DM? (Please Circle)
1-3 mos; 4-8 mos; 9-12 mos; 13-18 mos; 19 mos-24 mos; 25 mos-36 mos; >36 mos

Which of the following tests were done to make the diagnosis of DM?

No diagnostic tests, clinical symptoms only ..... Y N
Spinal radiographs (X-rays) ..... Y N ..... result was: normal abnormal
Myelogram (contrast X-rays) ..... Y N ..... result was: normal abnormal
CT (CAT) scan ..... Y N ..... result was: normal abnormal
MRI ..... Y N ..... result was: normal abnormal

For any abnormal result, please list findings: _____

_____

Describe the *FIRST* symptoms of DM in this dog:

One rear leg weaker than other ..... Y N
Dragging toes ..... Y N
Falling in rear legs ..... Y N
Tremors in rear legs ..... Y N
Pain in back ..... Y N

Describe the *CURRENT* symptoms of DM in this dog (if deceased, symptoms at time of death):

Weakness in one rear leg..... Y N
Weakness in both rear legs ..... Y N
Unable to support weight in rear legs .... Y N
Unable to move rear legs ..... Y N
Weakness in front legs ..... Y N
Unable to support weight in all limbs ..... Y N
Unable to move all limbs ..... Y N

Loss of muscle mass in rear legs ..... Y N
Loss of muscle mass over entire body Y N
Urinary incontinence..... Y N
Fecal incontinence ..... Y N
Difficulty swallowing..... Y N
Pain in back..... Y N

When did your dog start needing assistance to walk outside: _____

When was your dog unable to move the rear legs: _____

If the front limbs were affected, when did you start noticing weakness: _____

FECAL INCONTINENCE: yes no Date of onset: _____

URINARY INCONTINENCE: yes no Date of onset: _____

Do you know of relatives of this dog who are diagnosed with Degenerative Myelopathy? Y N

If yes, please circle: sire dam sibling grandparent other _____

HISTORY

Chief Complaint	
History of Present illness (describe signs, when started and rapidity of disease progression)	
Past History	
Vaccination	
Deworming	
Prior illness	
Surgery	
Trauma	
Toxicity	
Medications (include insecticides)	
Environment (indoor, outdoor)	
Family History (other related dogs affected)	
Diet	
Dog food	
Supplements	

PHYSICAL EXAMINATION

T _____ P _____ R _____ Wt _____lbs

Outline	NAF	Description of Abnormal Findings
General		
Eyes, Ears, Nose		
Skin		
Musculoskeletal		
Cardiovascular		
Respiratory		
Digestive		
Urinary		
Reproductive		
Lymphatic		
Neurologic		
Other		

NAF = No Abnormal Findings

NEUROLOGIC EXAMINATION FINDINGS: (At time of Euthanasia)

MENTATION: **Alert** **Obtunded** **Disoriented**

Stupor **Coma**

MUSCLE MASS/TONE:

Increased tone in pelvic limbs **Decreased tone in pelvic limbs**

Muscle atrophy in pelvic limbs **Muscle atrophy in all limbs**

TREMORS: **Yes (Describe location)** _____ **No**

POSTURE: **Normal** **Head Tilt** **Falling** **Wide base stance**

GAIT:

Date gait abnormalities first noticed: _____

Gait at time of euthanasia: (Circle all that apply)

Normal **Ataxia Pelvic limbs only** **Ataxia all limbs**

Paraparesis **Right asymmetric paraparesis** **Left asymmetric paraparesis**

Intermittently falls in pelvic limbs **Frequently falls in pelvic limbs**

Unable to support weight but still can move pelvic limbs

Paraplegia

Thoracic limb weakness

Tetraplegia

When did this dog start needing assistance to walk outside: _____

When was this dog unable to move the rear legs: _____

If the front limbs were affected, when was weakness first noticed: _____

FECAL INCONTINENCE: **yes** **no** **Date of onset:** _____

URINARY INCONTINENCE: **yes** **no** **Date of onset:** _____

POSTURAL REACTIONS: N=Normal; ↑= Exaggerated; ↓=Decreased; A=Absent

Left	Reaction	Right
	Proprioception	
	Fore	
	Rear	
	Hopping	
	Fore	
	Rear	
	Extensor Postural Thrust	
	Fore	
	Rear	
	Wheelbarrowing	
	Fore	
	Rear	

CRANIAL NERVES: N=Normal; ↑= Exaggerated; ↓=Decreased; A=Absent

Left	Nerve + Function	Right
	II Vision + Menace	
	II/III Pupil Size	
	V/VI/VII Corneal	
	V/VII Palpebral	
	II/III PLR	
	VIII Strabismus	
	Spontaneous Nystagmus (direction)	
	Positional Nystagmus	
	Physiologic Nystagmus	
	V Sensation Face	
	VII Sensation Pinnae	
	V Mastication	
	VII Facial Muscles, Symmetry	
	IX/X Swallowing	
	XII Tongue	

SPINAL REFLEXES: N=Normal; ↑= Exaggerated; ↓=Decreased; A=Absent

	Left	Reflex	Right
Myotactic		Triceps	
		Biceps	
		Patellar	
		Gastrocnemius	
		Cranial Tibial	
Flexor		Flexor Fore	
		Flexor Hind	
		Cutaneous Trunci	

Crossed Extensor Reflex: L fore _____R fore _____L hind _____ R hind _____

PERINEAL REFLEX: **exaggerated** **normal** **decreased** **absent**

TAIL TONE: **normal** **decreased** **absent**

PAIN ON SPINAL MUSCLE PALPATION:

Cervical: **yes** **no** **Thoracic:** **yes** **no**

Lumbar: **yes** **no** **Sacral:** **yes** **no**

SENSATION: N=Normal; ↑= Exaggerated; ↓=Decreased; A=Absent

Superficial Pain		Deep Pain
	L fore	
	R fore	
	L hind	
	R hind	

Tissue Sample Collection for Canine Degenerative Myelopathy Study
General Protocol

1) Collect 5 ml blood sample in EDTA tube and 5 ml blood in a red top for serum.
2) Euthanize dog.
3) Collect 1.0 ml of CSF
4) Collect the section of ***spinal cord T10 to L2*** to include roots to level of intervertebral foramen.
5) Place the section of spinal cord in formalin
6) Please also collect ***Gastrocnemius*** muscle and ***Biceps femoris*** muscle. Place a 2cm cube of each muscle in formalin, and refrigerate another 2cm cube in a ziplock bag or red top tube
7) Lastly, collect 2 cm of ***common peroneal nerve*** (near stifle joint, beneath the distal aspect of the biceps femoris muscle running across the proximal gastrocnemius muscle)

Keep the samples refrigerated until ready for shipment. Ship all samples on ice packs by ***overnight*** mail.

Please notify Dr. Coates on the day of euthanasia by email: coatesj@missouri.edu. If possible please ship the samples on the same day for overnight delivery (AM) to the address below:

Dr. Joan R. Coates

900 E. Campus Drive, Clydesdale Hall

College of Veterinary Medicine

University of Missouri

Columbia, MO 65211

Phone: 573-882-7821

Please call (573-823-9892, C*ell phone* Joan Coates) if you have any questions and thank you for all your help.

The dark lines in figure A represent the lateral extent of the laminectomy (at the level of the foramen). Try to cut the nerve root distal to the dorsal root ganglion as it enters the foramen (see yellow line in Figure B).