

## **Primary Ciliary Dyskinesia**

Primary Ciliary dyskinesia, in dogs, is a rare genetic (inherited) disorder with defective structure and/or function of cilia that can lead to chronic respiratory or otic disease, reversed organs, fertility problems, and even hydrocephalus. Electron microscopy can be used to examine the cilia for defects in the ultrastructure of the cilia associated with ciliary dyskinesia.

Proper fixation and shipment of the sampled tissues are important for accurate diagnosis. Please follow the guidelines below:

### ***Sample tissues:***

Nasal, bronchial, or tracheal biopsies may be submitted. The patient should be free of respiratory infections prior to obtaining the biopsy, if possible, as secondary changes associated with inflammation can confound diagnosis.

All specimens should be placed in a fixative immediately after obtaining said specimens. **DO NOT SEND FRESH SPECIMENS OR SPECIMENS IN ANY LIQUID OTHER THAN AN APPROPRIATE EM FIXATIVE!**

Oviduct and sperm (ejaculate or testes) are optimal samples because they are typically without associated infection; however, we realize this is not possible in patients who have been spayed/neutered. If submitting reproductive tissue, it would be advantageous to send a biopsy from the respiratory area as a second sample. Male dogs occasionally have aspermia, and female dogs at certain stages of the cycle have few ciliated cells in the oviduct.

### ***Fixation of tissues:***

The best fixative for any of the tissues sampled is a buffered glutaraldehyde fixative (2% - 3% glutaraldehyde in a buffer pH 7.2 – 7.4). Biopsies may be bisected or even trisected to allow proper penetration of the fixative during shipping. A maximum of 2-3mm in any one direction is a good rule of thumb for proper fixation with glutaraldehyde. The amount of fixative should more than double the tissue sample in the container used for shipping. Respiratory brushings and sperm ejaculate (up to 1mL in volume) are added to a 4-5mL container of fixative.

If glutaraldehyde is not readily available, the next best fixative to use is Neutral-Buffered Formalin (NBF), which is used in most histology laboratories. If NBF is on hand and has not expired, it will be acceptable to send the sample tissues.

Here at GEM, we will send EM fixative to your facility. Give us several days to a week's notice so we may send you freshly-made fixative. We send 5ml of EM fix in 7ml vials in most cases. Let us know if you need a larger volume, and we will supply 10ml scintillation vials with ~8ml of EM fix. Our charge for the EM fix is \$5.00 per 5ml of fixative. We will automatically send you two vials (7ml vials) of EM fix shipped overnight under cold packs to your facility. We add half the shipping fees to the EM fix charges and your facility will receive an invoice with the total of the two charges.

***Submission forms and past history:***

Include as much history as possible about the patient. Copies of previous reports or other data relevant to the patient's case may be added or attached to our submission form. Use our *EM Submission Form* when submitting tissue samples. The form is fillable; fill in what is applicable including: (1) choose the right fixative; (2) place "Ciliary Dyskinesia" under the Clinical Diagnosis; (3) the service requested is Transmission Electron Microscopy; and (4) give us the person to receive the invoices under Accountant Name & Email.

***Shipment of specimens:***

Send all samples double contained overnight with any accompanying forms. There are instructions on our EM Submission Form. Glutaraldehyde-fixed samples are shipped under refrigeration (cold pack) overnight. Formalin-fixed samples are shipped overnight; cold pack recommended during summer months. *Days of the week to ship are Monday through Thursday.* Ship as you would any Biological Specimen to the following address:

Georgia Electron Microscopy  
University of Georgia  
ISTEM Research Bldg 1, Suite 1000  
302 East Campus Road  
Athens, GA 30602  
(706) 542-5537

It is important to pass on the tracking information to our facility as soon as your sample ships. Do not hesitate to notify us a sample is on its way. Timing is essential when receiving samples like this for a more accurate diagnosis.

***Turnaround time:***

A reasonable turnaround time is 3-5 weeks. We take 10-14 working days for the processing and sectioning in our facility and 1 – 2 weeks for the scope time and pathologist's evaluation. Our facility will send an update if it is taking more than 4 weeks. The past year has been very busy with a heavy load of diagnostic EM submissions. We ask for your patience as we work through each case, giving the utmost attention to proper protocols in processing and sectioning of your submitted specimens.

***Estimated fees and invoicing:***

(a) Electron microscopy for ciliary dyskinesia specimens: \$385.00 – if a second sample is submitted, the fee is \$40 more (\$425.00).

(b) Pathologist's fee for evaluation and reporting: \$134.00.

(c) Total cost: \$519.00 for one sample submission.

(d) Your clinic will receive one invoice from us from your submission. We would appreciate payment within 30 days of receiving the invoice.

If there are any other questions, either Mary Ard or Dr. Elizabeth Howerth should be able to answer them.

*Updated December 2022*