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COCKER SPANIEL Update

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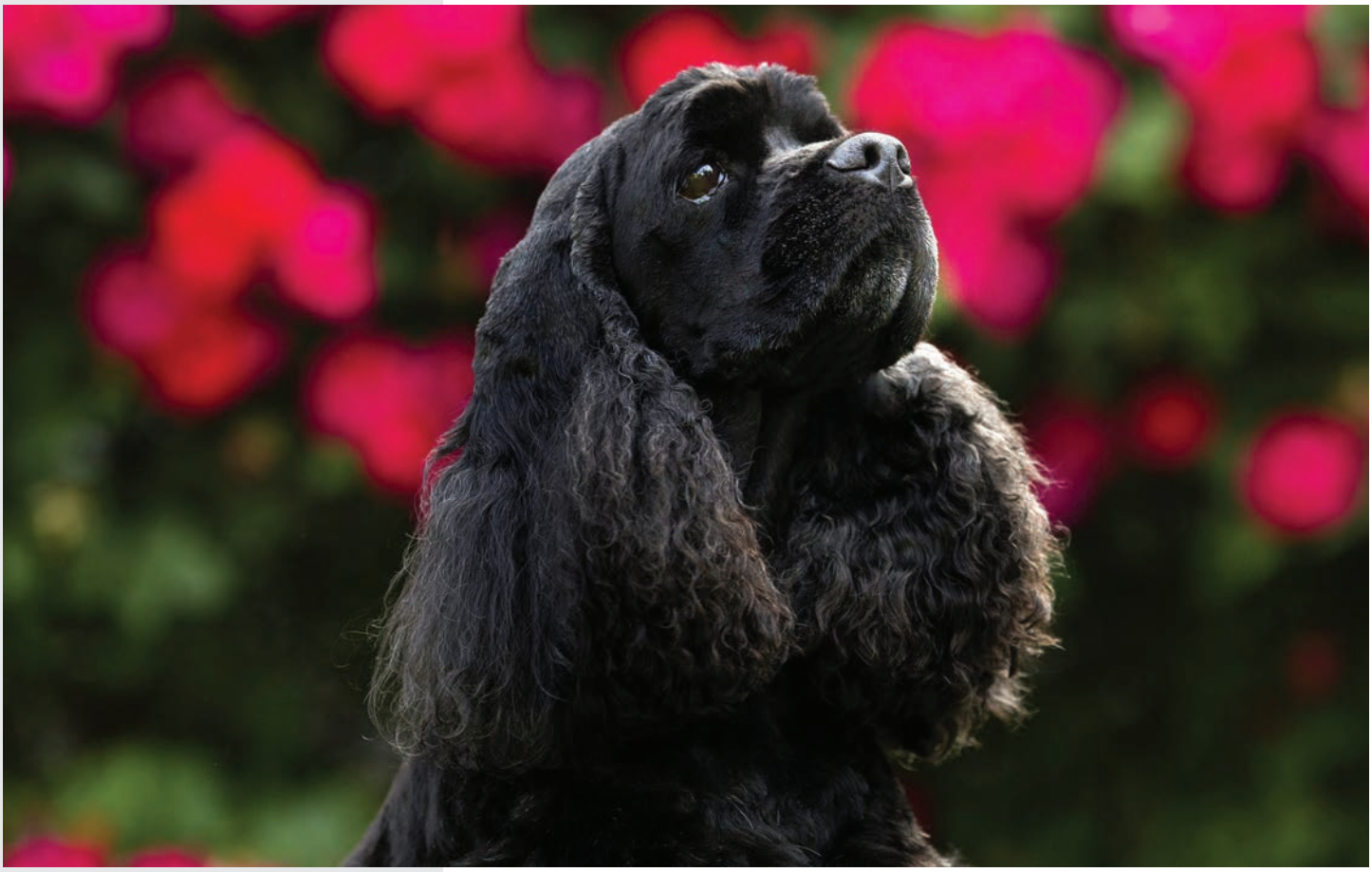
RESEARCHERS STUDY

GENETIC CAUSES OF GLAUCOMA IN COCKER SPANIELS



AMERICAN COCKER SPANIELS HAVE THE HIGHEST INCIDENCE OF PRIMARY ANGLE-CLOSURE GLAUCOMA.

Glaucoma can happen fast.

Fast is exactly the way Harold Watson of Florence, South Carolina, recalls glaucoma affecting his 9-year-old tricolor Cocker "Cody" (CH Kamps Palmtree's Dress Code). "All of a sudden one evening, Cody was rubbing his face, and his eye immediately turned gray and cloudy," he says.

The next morning Cody was diagnosed with glaucoma, the leading cause of blindness in dogs and a highly heritable condition in Cocker Spaniels. The eye disease occurred despite Cody having passed the Canine Eye Registration Foundation (CERF) certification test for five consecutive years. One of the most painful and devastating canine eye diseases, glaucoma occurs when intraocular pressure builds up in the eye. It often happens without a warning.

"Cocker Spaniels are the most common breed that we see with glaucoma," says Sara M. Thomasy, DVM, PhD, associate professor of veterinary ophthalmology at the University of California-Davis. "One study suggested that 5 percent of

dogs that present with glaucoma are American Cocker Spaniels. Both American and English Cocker Spaniels are affected by glaucoma."

Glaucoma often takes breeders by surprise when a dog they bred is affected. In Cody's case, his glaucoma came unexpectedly to Watson and to breeder Harriet Kamps of Sparks, Maryland, a 2010 inductee of the American Spaniel Club (ASC) Hall of Fame. A breeder since 1956 of ASCOB (any solid color other than black) and parti-colored Cocker Spaniels, Kamps is well-known for her integrity in helping to promote the breed's health and welfare. Her positive influence on the breed also is noted on her support of the ASC Health Registry.

Dr. Thomasy has just begun a study of primary angle-closure glaucoma (PACG) in American Cocker Spaniels to identify genetic markers that cause the disease. Advanced imaging technology used to investigate glaucoma in human patients will help her visualize the changes that occur in dogs with PACG. The goal is to advance testing for PACG and develop therapies that can help manage the disease in dogs and contribute to treating people with glaucoma. The AKC (American Kennel Club) Canine Health Foundation is providing funding of $40,000 for the one-year study.

INTRAOCULAR PRESSURE

Rubbing the face or eye, as did Watson's Cocker Spaniel Cody, is one of the signs of glaucoma. Other signs are redness of the eyeball, cloudiness of the cornea giving the eye a bluish appearance, excessive tearing, green or yellow eye discharge, a dilated pupil, squinting, hanging the head down, and loss of vision.

If the intraocular pressure in the eye remains elevated for more than a few hours, permanent damage or blindness can result. A dog should receive immediate treatment by a veterinarian to save the eye, but only a small percentage of affected dogs regain vision. Glaucoma cannot be cured, thus treatment focuses on managing the condition.

When a dog has glaucoma, drainage of the aqueous fluid, found between the cornea and iris and between the iris and lens, is impeded. The aqueous fluid helps to maintain the eye's globular shape and nourish the eye, but when it does not drain properly, intraocular pressure in the eye causes pain and eventually blocks blood flow and nerve impulses along the optic nerve. This causes degeneration of the retinal visual cells leading to blindness.

Primary glaucoma is an inherited disease. Glaucoma also can occur secondary to conditions such as luxation or displacement of the lens, trauma, advanced cataracts, eye tumors, chronic retinal detachment, or inflammation of the inside of the eye. Closed-angle glaucoma, the type common in dogs, occurs when the drainage angle is blocked or abnormally narrow.

"PACG occurs when there is acute blockage of the iridocorneal angle leading to a rapid increase in intraocular pressure," Dr. Thomasy explains. "Consequently, this is painful, demands intermediate veterinary attention and often causes vision loss. The American Cocker Spaniel has the highest reported prevalence of PACG."

Acute PACG can occur rapidly. "A Cocker Spaniel could have normal intraocular pressure in the morning and extremely elevated pressure in the afternoon," says Dr. Thomasy. "While we recommend regularly checking intraocular pressure in dogs with PACG, it is a less useful test in an asymptomatic Cocker Spaniel."

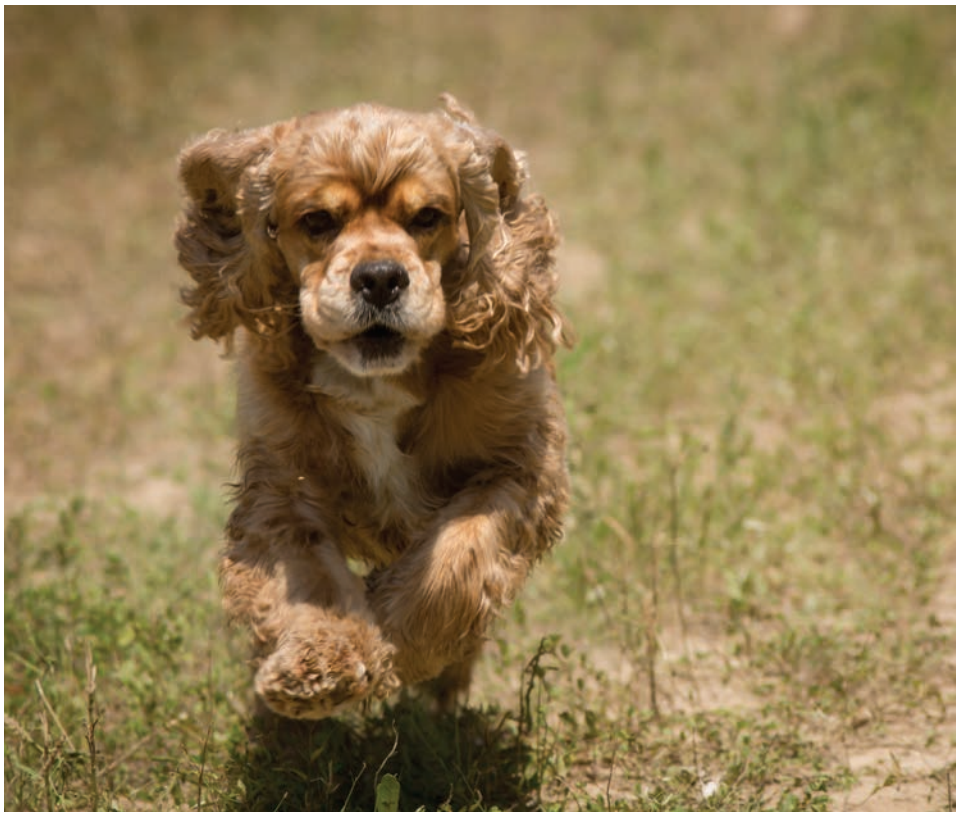
A test called gonioscopy that is not part of eye certification tests can be used to detect narrow drainage angles. During the test, an ophthalmologist applies anesthetic drops to the cornea and then uses a special lens on the surface of the cornea to see inside the eye and determine the condition of the drainage angles.

Breeders are encouraged to have gonioscopy performed before breed-

COCKER SPANIEL OWNERS CAN TAKE PART IN GLAUCOMA STUDY

Owners of American Cocker Spaniels can participate in a study underway at the University of California-Davis to identify genetic markers for primary angle-closure glaucoma (PACG). Dogs that have been diagnosed with PACG and healthy control dogs at least 10 years of age are needed for the study.

Participants will receive a thorough eye examination, and healthy controls will receive testing to assess their risk for developing PACG. For information, please call 530-752-6967 or contact Monica Motta.



"IDENTIFYING THE DNA BASIS OF PACG MAY LEAD TO NOVEL THERAPIES OR TESTING STRATEGIES THAT MAY HELP TO MANAGE THIS DISEASE. POSSIBLY, OUR FINDINGS COULD TRANSLATE TO GLAUCOMA IN HUMANS."

Sara M. Thomasy, DVM, PhD, associate professor of veterinary ophthalmology, University of California-Davis

ing Cocker Spaniels due to the high prevalence of PACG in the breed. The test can help predict whether a dog is likely to develop glaucoma. Since Cockers are typically 6 to 7 years old when PACG develops, they often have already been bred when the eye disease is recognized.

As her study begins, Dr. Thomasy plans to learn about the genetics of PACG in the breed to identify genetic markers. The goal is to develop a genetic test to aid breeders in their breeding programs. "The fact that Cockers are overrepresented compared to other breeds suggests that glaucoma in Cockers has a hereditary basis," she says.

Teaming up with geneticist Danika Bannasch, DVM, PhD, professor of population health and reproduction at the University of California-Davis, Dr. Thomasy plans to use gonioscopy and ultrasound biomicroscopy to view the drainage angle, as well as optical coherence tomography to assess the health of the retina and optic nerve. This will enable them to identify dogs with PACG, as it can be challenging to distinguish PACG from glaucoma due to other causes. Although genetic tests are available for primary open angle-glaucoma in several breeds, no tests are available for PACG.

Thus far, the mode of inheritance of PACG in American Cocker Spaniels is not known. An earlier study in Basset Hounds indicated three genes in the anterior part of the eye could possibly contribute to PACG in this breed. Research is needed to learn whether Cocker PACG could be related to the same genes or different ones.

"Learning more about this type of glaucoma in Cocker Spaniels may help other dogs that suffer from this condition," says Dr. Thomasy. "Identifying the DNA basis of PACG may lead to novel therapies or testing strategies that may help manage this disease. Possibly, our findings could translate to glaucoma in humans."

GLAUCOMA IN BOTH EYES

It was the weekend when Cody, the Cocker Spaniel, developed glaucoma. When he was examined by a veterinary ophthalmologist the next week, he had already lost his

sight in the affected eye. "The ophthalmologist said his sight most likely went immediately as high as the pressure was," Watson says.

This is common, says Dr. Thomasy. "Although dogs have usually lost their vision by the time they are examined by a veterinarian, topical and systemic anti-glaucoma medications are given to decrease the intraocular pressure to see if vision returns," she says. "These medications may reduce the production of aqueous fluid or increase its outflow. If the eye still has vision, surgery is essential once the pressure is reduced."

The preferred surgery for glaucoma is endolaser cyclophotocoagulation (ECPC), in which a laser beam is used to destroy cells that produce the aqueous fluid. This surgery requires removal of the lens to access the ciliary body processes, and an artificial lens is placed in the eye. An artificial drainage device also may be inserted to help drain the aqueous fluid. For example, an anterior chamber shunt is a tiny valvular device with a small tube that provides an alternate drainage pathway.

Regardless whether a dog has surgery for glaucoma, if the eye still has vision, the dog is prescribed eye drops or an oral medication for the rest of its life to help decrease the production of aqueous fluid or increase its outflow. In addition, the intraocular pressure in the eye must be regularly monitored. It helps to avoid stress and to use a harness when walking an affected dog.

"It is critical that the intraocular pressure measurement is interpreted with other clinical data, such as pupil size, pupillary light reflexes and corneal clarity," says Dr. Thomasy. "The measurement varies depending on the circumstances, time of day, pressure on the eye globe or neck, and how the dog is restrained and the eye is held open."

Glaucoma in one eye is almost always followed weeks or months later by glaucoma in the other eye. An important precautionary prophylactic medication is demecarium bromide prescribed once daily combined with a topical steroid. Using demecarium bromide has been shown to delay the onset of glaucoma in the unaffected eye to 31 months compared to eight months without treatment.

Preventive medications also are prescribed when a dog has lost its vision to glaucoma to help reduce intraocular pressure and the pain that comes with it. The medication is expensive, and some dogs don't like having drops put in their eyes. Surgery to replace the eyeball with a prosthetic eye is usually recommended.

GENETIC MARKER TEST

As is common, Cody developed glaucoma in his other eye about a year after the first episode. Once again, he lost his vision almost immediately. With both of Cody's eyes, Watson opted for surgery to have a prosthetic eyeball replace the affected one. He also had the eyes sent to a veterinary pathologist to confirm it was PACG. Although Watson had hoped to breed his champion Cocker, Cody was neutered.

Since there is no genetic test for PACG, the best a breeder can do is to avoid breeding affected dogs. Even so, this will not eliminate carriers from the gene pool. "We are optimistic that this study will help us identify genetic markers associated with PACG in Cocker Spaniels," says Dr. Thomasy. "Once we know the markers, this will help us develop a genetic test for breeders."

Sadly, glaucoma can be an expensive disease to treat as well as a painful one for dogs to experience. Watson estimates Cody's medications and surgeries cost around $5,000. Today, 12-year-old Cody is a beloved pet with a spunky personality despite being blind from PACG. ■

Purina thanks Doug McFarlane, grants chair and board member of the American Spaniel Club Foundation, for helping us to identify this topic for the *Cocker Spaniel Update*.

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Have comments about the *Cocker Spaniel Update*? Send them to Barbara Fawver, Editor, Nestlé Purina PetCare.

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