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Dog Tips

This Condition Can Kill Over 50% of Affected Dogs in 6 Weeks — Finally, There's a Cure

This rare but fatal disease finally has a viable treatment, but early treatment is critical. One breed is at particularly high risk, but it's also found in other breeds. If you breed or are simply choosing a puppy among them, watch out for these 9 symptoms.

Reviewed by Dr. Becker

STORY AT-A-GLANCE

- Duchenne muscular dystrophy (DMD) is a rare but fatal disease in dogs that destroys muscle tissue
- It’s caused by a genetic mutation that interferes with the production of dystrophin, a protein
- Dogs with Duchenne muscular dystrophy shouldn't be bred, which isn't typically a problem, since affected dogs usually don't live long enough to reach reproductive age
- Researchers have developed a gene therapy that successfully treats DMD in dogs
- The new gene therapy uses a harmless virus to carry the gene to every muscle in the body of affected dogs

Editor's Note: This article is a reprint. It was originally published December 30, 2015.

Researchers at the University of Missouri School of Medicine have published a study to report the discovery of gene therapy to successfully treat a form of muscular dystrophy in dogs.[1]

Duchenne muscular dystrophy (DMD) also occurs in humans, primarily boys. Muscular dystrophy damages muscle tissue, which is then replaced with fibrous, fatty, or bony tissue. Those with DMD grow less able to walk and breathe as they get older.

Harmless Virus Delivers the Gene to Every Muscle of the Body

Duchenne muscular dystrophy is caused by a genetic mutation that interferes with the production of dystrophin, a protein. Lack of dystrophin ultimately leads to muscle cell degeneration and death.

The affected gene is one of the largest in the body, according to study author Dongsheng Duan.

> *"Due to its size, it is impossible to deliver the entire gene with a gene therapy vector, which is the vehicle that carries the therapeutic gene to the correct site in the body," Duan said.*
>
> *"Through previous research, we were able to develop a miniature version of this gene called a microgene. This minimized dystrophin protected all muscles in the body of diseased mice."*[2]

It took Duan and his fellow researchers over 10 years to discover a method that would safely deliver the microgene to every muscle in the bodies of dogs with DMD. The technique uses a harmless virus to transport the gene.

> *"The virus we are using is one of the most common viruses; it is also a virus that produces no symptoms in the human body, making this a safe way to spread the dystrophin gene throughout the body," Duan said.*

The dogs who received the therapy were 2 to 3 months old and were beginning to show symptoms of the disease, which develops naturally in dogs and similarly to the way it develops in humans.

At 6 to 7 months of age, the treated dogs were developing normally. According to Duan, it's important to treat DMD as early as possible to prevent significant damage to the body.

Symptoms of DMD in Dogs

Duchenne muscular dystrophy is called "X-linked muscular dystrophy" in veterinary medicine. **Golden Retrievers** are at high risk, but the disease has also been reported in other breeds including the Labrador Retriever, German Short-Haired Pointer, Weimaraner, and Corgi.[3]

The mutated gene is located on the X-chromosome, which typically means male dogs inherit the chromosome from their mothers. Female dogs can be carriers if they carry one affected chromosome. They can also develop the disease if the gene is present on each X-chromosome.

Fortunately, DMD is relatively rare in dogs, and in females in particular. Dogs with DMD have progressive muscle weakening starting at about 8 weeks of age. Severity of the disease varies from one dog to the next. Symptoms can range from a change in the dog's gait to widespread muscle atrophy, and include:

- Thickening of the tongue
- Coughing spasms
- Difficulty swallowing
- Poor growth
- Generalized weakness
- Skeletal muscle atrophy
- Slow heart rate
- Pelvic limb weakness
- Loss of appetite

Diagnosing Duchenne Muscular Dystrophy

Biopsies of muscle tissue are required to pinpoint the precise type of dystrophy and if possible, its mode of inheritance. Blood tests are also required to rule out certain infectious diseases (e.g., toxoplasmosis) with symptoms that mimic muscular dystrophy.

Treatment Options for Duchenne Muscular Dystrophy

Aside from the promising new gene therapy described above, traditionally there hasn't been much help available for dogs with DMD. It is considered a fatal disease, with less than half of affected dogs living beyond 6 weeks of age.

Anabolic steroids have been used in traditional veterinary medicine, but are considered largely unhelpful.

Stem cell therapy has also been tried, using cells from the lining of blood vessels of healthy dogs. Sadly, a couple of dogs in the study died of complications related to either the stem cell therapy, or possibly the powerful anti-rejection drugs they were given.

Dogs with Duchenne muscular dystrophy shouldn't be bred, which isn't typically a problem, since affected dogs usually don't live long enough to reach reproductive age. However, carriers of the gene currently can't be identified, so all dogs who turn out to be carriers and their offspring should be sterilized to prevent further hereditary transmission.

Sources and References

HealthDay November 2, 2015 (Archived)

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[1] Hum Mol Genet. 2015 Oct 15;24(20):5880-90

[2] News Bureau, University of Missouri, October 22, 2015

[3] Vetbook