

## THYROID-Hypothyroid Testing

Here's the scoop on thyroid testing ... at least my most current info when I left practice a year ago ...

Total T4 is NOT a reliable test for canine hypothyroidism. Total T4 can be affected by a lot of things, such as other illness (this is called euthyroid sick syndrome), and it can even vary during the time of day. This is the test that can be run in-house at a vet clinic, and is useful for looking at levels if the dog is on meds, but should NOT be used to make an initial diagnosis. (Things are different in the cat, but that's not really relevant here.)

The FREE T4 is what needs to be tested to check for true hypothyroidism, as this level doesn't really vary in response to other illness. Testing the Free T4 involves sending the bloodwork out to a lab, such as Antech. So if the dog's Free T4 is low, he is truly hypothyroid, and isn't going to get better in time. This, however, does not tell you WHY the dog is hypothyroid. There are several reasons (tumors, etc.), but by far the most common is hereditary immune-mediated destruction of the thyroid gland. Yes, hypothyroidism is an autoimmune disease, which means the body fails to recognize self and attacks the thyroid gland. The mode of inheritance isn't clear, but there was an article in the AKC Gazette some years ago by Dr. Jerod Bell that discussed it (I've heard Dr. Bell speak at Veterinary Continuing Education and he's an awesome speaker, very knowledgeable about genetics, and a conformation breeder to boot), and it's definitely heritable.

Hypothyroid dogs used in a breeding program produce more hypothyroid dogs, period. And autoimmune diseases are serious, and we shouldn't be perpetuating them.

One way to try to tell if the cause of the hypothyroidism is immune-mediated is to look at the autoantibody levels. If the autoantibody levels are high, then it's immune-mediated and thus heritable. However, by the time many cases of hypothyroidism are diagnosed (by Free T4), there may be so little thyroid tissue left that the autoantibody levels have fallen to low or normal. So autoantibody is a test best used early on, as a screening test, before the dog shows clinic signs of hypothyroidism (weight gain, poor haircoat, lethargy, lack of interest in surroundings, inability to focus during training, "slowness"). Another test that can "predict" hypothyroidism is the TSH, will can increase before the Free T4 drops. The "OFA Thyroid" panel includes all four tests: T4, free T4, autoantibody, and TSH, to try to get a total picture of the dog's thyroid health at that point in time. Breeding animals should be tested yearly, because things can change!

Some examples of test results and what they mean:

Low T4, all others normal - likely normal dog, T4 is low for a reason other than heritable hypothyroidism

Low T4, low Free T4, high TSH, high autoantibody - you loose, heritable hypothyroidism, neuter the dog and start on meds

High autoantibody, all others normal - this dogs may be on his way to becoming hypothyroid in the future, rule out other causes (recent vaccination, etc.) and retest in 6 mo. to 1 year

Just one more point - recent (within 90 days) vaccination can cause a temporary increase in TSH and autoantibody. This is normal and not a true problem, but it can mess up your test results. So if you are having thyroid testing done at the same time as shots, have the blood drawn first, and then the shots given. Or, wait at least 90 days after any shots before having thyroid bloodwork drawn.

Sorry if this is long-winded. Thyroid testing is important, yet confusing, and I tried to explain it clearly. The OFA website has some more great info on it (see [www.offa.org](http://www.offa.org)) if anyone is interested.

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HI T UCD Ch. Layclyf Mint Chip CD RAE AX AXJ FFX-AP OAC EJC NGC TN-E RS-O JS-O GS-N CGC TT HOF ("Speed Racer" - male Toy Manchester Terrier)

Ch. Layclyf Dreamstruck RE MX MXJ NF NAC TG-N TN-N RS-N JS-N CGC TT HOF ("Carlee" - female Toy Manchester Terrier)

UCDX Jysrund the Investigator CDX RAE OA OAJ NAP NJP ASCA-CD NAC OJC OGC TN-N JS-N GS-N CGC TT TDI BFL ("Luke" - male Doberman Pinscher, retired)

(An older article)

## **Canine Hypothyroidism**

By Regina R. Allen DVM

Hypothyroidism is a common heritable disease in dogs. This condition is caused by a deficiency in thyroid hormone naturally produced by the dog's body, and affects nearly all body systems. This deficiency is most commonly caused by immune-mediated destruction of the thyroid gland (primary hypothyroidism), or rarely, a brain tumor that prevents release of signals sent to the thyroid gland (secondary hypothyroidism).

Clinical signs of this disease are slow in onset, and may range from mild to severe. In general, hypothyroid dogs show weight gain, lethargy, metal dullness, cold intolerance, scaly dry skin, dry flaky haircoat, excessive shedding, hair loss without itchiness, and recurrent skin and ear infections. The skin may also become darkly pigmented and thicken over time. Less common signs of hypothyroidism are muscle wasting, weakness, slow heartbeat, weak pulses, infertility, eye problems, and very rarely stupor or coma.

This disease is most common in four to seven year-old medium and large breed dogs. Males and females are equally affected. Hypothyroidism most commonly occurs in the Golden Retriever, Doberman Pinscher, Irish Setter, Great Dane, Airedale Terrier, Old English Sheepdog, Dachshund, Miniature Schnauzer, Cocker Spaniel, Poodle, and Boxer, but any breed, even mixed breeds, can be affected.

Diagnosing hypothyroidism may be confusing, but is most reliably done with a blood test for total T4 (L-thyroxine, the main thyroid hormone) and free T4 (unbound thyroid hormone). Low total T4 is almost always present when a dog is hypothyroid, but can also be low in dogs that are suffering from other illness, or are on certain medications. The free T4 level, determined by a process called equilibrium dialysis, is not affected by medications or other illnesses except for hyperadrenocorticism (Cushing's Disease), and is the most reliable test for diagnosing hypothyroidism. Bloodwork used to diagnose hypothyroidism usually includes both the total T4 and free T4 levels. If a dog has a low total T4 and a normal free T4, I would recommend searching for other illness and retesting the thyroid level in the future before determining that the dog is truly hypothyroid. Other thyroid function tests, such as TSH (thyroid stimulating hormone) and autoantibody levels are available, but are not as reliable as total and free T4 levels. High TSH levels in conjunction with low T4 and free T4 confirm the diagnosis of hypothyroidism, but 25-40% of hypothyroid dogs have normal TSH levels, and high TSH levels have been reported in 10-20% of dogs with non-thyroidal illness. Autoantibodies occur in 30-50% of dogs with confirmed hypothyroidism, but these antibodies are also found in healthy, normothyroid dogs. At this time, there is speculation that autoantibody levels may be used as an indicator to predict if the dog will become hypothyroid in the future, but this is unconfirmed.

Treatment of canine hypothyroidism is fairly easy and effective. Oral supplementation with synthetic L-thyroxine, usually twice daily, is very effective in reducing or eliminating the clinical signs. The dog will need to be on the medication for life, and the blood levels should be checked periodically to make sure that the dose does not need to be adjusted. With treatment, dogs with primary hypothyroidism have an excellent prognosis and a normal lifespan. Dogs with secondary hypothyroidism (much rarer) have a poor prognosis because the condition is usually caused by a brain tumor.

Hypothyroidism is a known heritable disease in the dog. Since the onset is slow and early signs may be missed, all dogs should be tested prior to inclusion in a breeding program, and once yearly or every other year to make sure they continue to have normal levels. Hypothyroidism can occur at any age, and normal bloodwork early in life does not guarantee that the animal will remain free of the disease. Any dog diagnosed with hypothyroidism should not be bred. The Orthopedic Foundation for Animals, well-known for certifying hips and elbows, maintains a thyroid certification database. For more information, visit their web site at <http://www.offa.org>.