

HYPOTHYROIDISM IN ENGLISH SETTERS

As you are aware the ESA health sub committee has been looking at the incidence of hypothyroidism in our breed. Members sent in blood samples from their affected dogs and these were forwarded to researchers at the Universities of Liverpool and Manchester to be included in their research project on autoimmune disease. It will be a few years yet before the result of this work is known, but they have promised to let us have a report of their findings and thank all that participated for their help. Many members contacted me, either by letter or phone, to discuss their pets problems with hypothyroidism and it was remarkable that in almost all cases the animal suffered from a long term skin complaint as well as showing other classical clinical signs of thyroid deficiency. Most owners reported that as soon as the animal was diagnosed and stabilised on thyroxine medication, as well the reversal of the standard thyroid symptoms; the skin condition either cleared up completely or at least improved tremendously. Long term skin conditions can be notoriously difficult to treat and it may well be worth the small cost of a blood test to check for low level hypothyroidism even if other clinical signs are not readily visible.

It was also interesting to note that several owners had more than one animal with this condition. However as diet, vaccine or general environmental factors appeared to have no influence on the incidence of this problem, it was felt that after having one affected animal, an owner was more aware of the symptoms and so more likely to arrange for blood tests to confirm their suspicions. As reported in previous newsletters this problem tends to occur in middle aged animals and many of the symptoms of hypothyroidism can be missed as owners sometimes think that the lethargy, weight gain etc is just due to their pet getting older.

The sub committee felt that one way to help all of our members was to determine the normal range of thyroid hormones present in the blood of a "healthy" English Setter. You may remember that this plan was put into action by asking for canine volunteers at last years championship show. The results of this screening, and a general review of hypothyroidism, are contained in the following report kindly submitted by the Cambridge Specialist Laboratory Services Ltd.

LINDA TAYLOR, Chair, Health Sub Committee

HYPOTHYROIDISM IN ENGLISH SETTERS

Helen J. Evans, BSc and Dr Ian Ramsey* BVSc PhD DSAM DipECVIM MRCVS

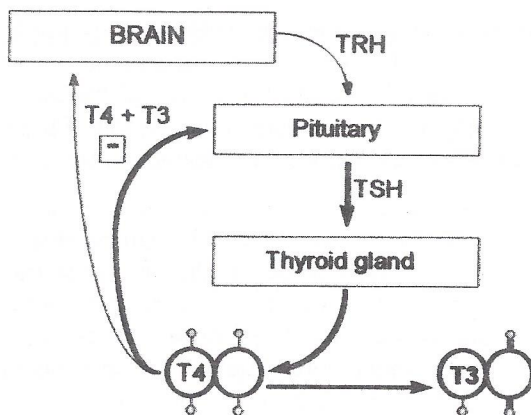
Cambridge Specialist Laboratory Services Ltd, PO Box 967, Stapleford, Cambridge

*Department of Veterinary Clinical Studies, University of Glasgow, Bearsden, Glasgow

INTRODUCTION - WHAT IS HYPOTHYROIDISM ?

Hypothyroidism is a deficiency of the thyroid hormones. Thyroid hormones are released from the thyroid gland (which is in the neck) in response to thyroid stimulating hormone (TSH). TSH itself is produced by the pituitary gland (which is attached to the brain) under the control of TSH releasing hormone (TRH). There are two thyroid hormones; thyroxine or T4 and tri-iodothyronine or T3. The thyroid gland mostly releases T4 into the circulation and almost all is bound to protein. The little bit of T4 that is not bound to protein is called Free T4. Free T4 is able to come out of the blood into the tissues of the body. Once in the tissues T4 is converted to T3 which is the active form of the thyroid hormones. T3 (and therefore T4) affects virtually all the cells in the body stimulating metabolism, growth, development and heat production. Levels of TSH are controlled by a negative feedback of T4 and T3 in the circulation.

Hypothyroidism only occurs when the thyroid gland is diseased. This is usually caused by immune-mediated destruction or idiopathic atrophy (wasting) of the thyroid gland. Such damage is permanent. There are many other diseases that can lower T4 production by the thyroid gland but do not damage the gland itself. This is a reversible situation and it is called the 'sick euthyroid syndrome'. This syndrome is not the same as hypothyroidism because it is reversible. Some drugs can also lower T4 production by the thyroid gland.



CLINICAL SIGNS OF HYPOTHYROIDISM

<i>Common Signs</i>	<i>Uncommon Signs</i>	<i>Unknown*</i>
Lethargy Weight Gain Hair loss (alopecia) Skin infections (pyoderma) Excess wax production (seborrhea)	Neuromuscular disease Female infertility Myxoedema Eye disorders (ocular) Cretinism	Male infertility Coagulation disorders Cardiovascular disorders Gastrointestinal disorders Behavioral disorders

*Signs which have been associated with hypothyroidism but for which convincing evidence is lacking.

A combination of the above clinical signs is more suggestive of hypothyroidism than any one sign in isolation.

DIAGNOSING HYPOTHYROIDISM

The diagnosis of hypothyroidism must be based on a thorough physical examination combined with clinical findings and relevant laboratory tests. A routine blood screens (haematology and biochemistry) should be obtained prior to specific thyroid function tests to look for evidence of other diseases which might be producing the clinical signs.

If hypothyroidism is still suspected after these tests then all the T4 should be measured (called a total T4 (tT4) test). At the same time the amount of canine TSH should be tested. Depending on the results of the initial screen further thyroid function tests may be appropriate (for example TSH/TRH stimulation tests, Free T4). Your veterinary surgeon will tell you when this is necessary.

Total T4 (tT4) is the most common measurement and estimates both protein-bound and free fractions, however free T4 can be measured as well and is sometimes more useful in cases of 'sick euthyroid syndrome'. Total T3 and free T3 can also be measured but are of no use in diagnosing hypothyroidism because the levels in the blood do not reflect the concentrations in the body tissues. TSH is a very useful test but must be used in conjunction with either tT4 or free T4.

COMPLICATIONS WITH DIAGNOSING HYPOTHYROIDISM

There are 3 main groups of factors that affect circulating thyroid hormone levels and can lead to mistaken diagnoses of hypothyroidism ...

1. Other drugs

It is especially important to make sure that the dog has been off all drug therapy (where possible) for at least four weeks prior to testing. Many drugs have been reported to cause a decrease in thyroid hormone concentrations including steroids, certain types of antibiotics (potentiated sulphonamides), anti-epileptics (such as phenobarbitone), and anti-arthritis drugs (such as aspirin and its derivatives). It has been shown that thyroid function tests do not return to pre-treatment values until many weeks after treatment has stopped. Thyroid function results from dogs on treatment must be interpreted very carefully.

2. Other diseases

'Sick euthyroid syndrome' can occur in any serious disease but it is particularly associated with other endocrine diseases, for example Cushing's disease (an excess production of the hormone cortisol). These conditions will usually produce depression of T4 and may even lower TSH as well. A thorough examination of the dog must be carried out to rule out other diseases.

3. Individual variation

Normal thyroid hormone levels are different in certain breeds. Sight hounds and hunting hounds (greyhound, Saluki, Deerhound, Wolfhound and Afghan) have lower levels of tT4 and higher levels of TSH compared to other breeds. It is therefore very important to establish a normal range for a specific breed before screening for a potential hypothyroidism in that breed.

ENGLISH SETTERS AND HYPOTHYROIDISM

The English Setter Association requested that thyroid screening was undertaken to see if there was a potential problem with hypothyroidism in the breed. In order to do this effectively the first step had to be the establishment of a normal range for English Setters.

A normal range was established by sampling as many dogs and bitches of all ages and from as many different breeding lines as possible in order to get a normal population distribution. The championship show was selected as a suitable venue to try to collect most of the samples. A total of 27 samples were collected from 13 bitches (age range 20 months - 4 years) and 14 dogs (age range 18 months - 5 years), representing a good distribution of breeding lines.

Results

The T4 levels ranged from 20 to 55 nmol/l and TSH levels ranged from <0.01 to 3.2 ng/ml

The T4 normal range for adult dogs (all breeds) is 13 - 52 nmol/l* and the TSH normal range for adult dogs (all breeds) is up to 0.41 ng/ml*

* reference range used by SCL-LCG Bioscience (current at the time of sample analysis).

All data points were included in the tT4 data. Two points were removed from the TSH data (3.2 and 0.8) as these were acceptable outliers, which if included, would cause the reference range to be falsely elevated.

tT4 and TSH reference range in English Setters was calculated to be:

$$\begin{aligned} \text{tT4} &= 21 - 52 \text{ nmol/l} \\ \text{TSH} &= \text{up to } 0.53 \text{ ng/ml} \end{aligned}$$

CONCLUSIONS

The tT4 and TSH reference range for English Setters does not appear to be significantly different from that used for all breeds. The TSH is slightly higher but the tT4 is the same.

FURTHER READING

1. BSAVA Manual of Small Animal Endocrinology, 2nd Edition, Ed: Andrew Torrence and Carmel Mooney, Published by British Small Animal Veterinary Association
2. Ramsey, Evans & Herrtage, Journal of Small Animal Practice, (1997), Volume 38, 540 - 545
3. Ramsey, I.K. (1997), In Practice Volume 19, 378. (free copies of this illustrated article are available from Helen Evans on receipt of an SAE)