

# Thyroid Testing in Dogs

## SCREENING FOR HYPOTHYROIDISM

Spontaneous hypothyroidism in dogs is typically an adult-onset condition associated with immune mediated destruction of the thyroid follicles. Clinical onset may be insidious and early clinical signs may be subtle. There may also be significant overlap of clinical symptoms with other chronic and metabolic conditions.

Total T4 and TSH determination is central to diagnosis of hypothyroidism, and in many cases, diagnosis is relatively straightforward. Unfortunately, many non-thyroidal conditions may be associated with a physiological decrease in thyroid hormone concentrations, and differentiation between physiological and pathological decreases may be tricky. Diagnosis of hypothyroidism is further compounded by anti-thyroid antibodies which may interfere with diagnostic tests.

## CANINE BASIC THYROID PANEL

This panel covers the basic analytes used for assessment of thyroid function in dogs and will be suitable for screening and diagnosis in most cases. The typical pattern in hypothyroid dogs is low Total T4 with increases in both TSH and cholesterol. All these analytes may, however, be influenced by other factors including non-thyroidal illness and medication. With a basic understanding of these influences the decision can be made to include/ exclude a diagnosis of hypothyroidism or proceed to further testing.

### Total T4

A normal Total T4 concentration indicates a very low probability of hypothyroidism (<10%). False negative results may be returned in <10% of dogs due to the presence of autoantibodies which interfere with most commercially available assays, including the assay used at NovaVet.

### TSH

Elevated TSH concentrations are typically associated with canine hypothyroidism, however, it is reported that in up to 30% of cases measured TSH is within the reference interval. The exact mechanism is unclear, but suggested mechanisms include pituitary exhaustion and intrinsic variation in TSH structure, yielding forms which are not adequately identified by assay systems. Despite its poor sensitivity, TSH alone remains a highly specific means of identifying hypothyroidism (approximately 93%). False positive results may be seen with recovery from non-thyroidal illness and sulphonamide administration.

In sighthound breeds TSH alone is the most valuable test for hypothyroidism due to naturally occurring very low Total T4 concentrations.

Elevated TSH concentrations may precede a decrease in Total T4, and this abnormality is thus encountered in very early or subclinical hypothyroidism.

## Cholesterol

Hypercholesterolaemia is a non-specific indicator of thyroid function which may be affected by other factors including diet, other metabolic, renal and hepatic disease. Moderate to severe hypercholesterolaemia provides supporting evidence of hypothyroidism.

## CANINE FULL THYROID PANEL

This panel also includes Free T4 (chemiluminescence) and PCV. This may assist in increasing the index of suspicion of hypothyroidism in cases where there may be complicating/ non-thyroidal factors, or initial screening tests do not deliver a conclusive diagnosis.

### Free T4

Free T4 is the biologically active portion of thyroxine and concentrations of Free T4 are less affected by in vivo protein binding. Decreased Free T4 is thus regarded as a more specific indicator of hypothyroidism than Total T4, with specificity in excess of 90% in some studies. Unfortunately, severe non-thyroidal illness and medication including sulphonamides and phenobarbitone may also decrease Free T4. As with Total T4, auto-antibodies may falsely elevate Free T4 in many commercially available assay systems, including that in use at NovaVet. This effect is negated when Free T4 is measured by equilibrium dialysis (ED). Free T4 (ED) has limited commercial availability at this stage but may be requested as part of a specialist thyroid panel in those cases where this is warranted.

### PCV

Mild normocytic normochromic anaemia is relatively common in canine hypothyroidism. Decreased PCV may therefore provide non-specific supportive evidence of hypothyroidism.

With all thyroid testing it is important to consider a full clinical history, taking into account the current clinical history, concurrent or recent clinical disease, medication and breed. If you are unsure which panel to request or would like further interpretation or discussion of results please contact NovaVet directly.