

Canine Hypothyroidism

**Richard W Nelson and Gina Davis
University of California, Davis**

Canine hypothyroidism is the most common endocrine disorder encountered in small animal practice. Hypothyroidism is caused by immune-mediated destruction of the thyroid gland (i.e., lymphocytic thyroiditis) or an idiopathic, non-inflammatory, degenerative process resulting in atrophy of the gland. Genetics are believed to play a role in development of lymphocytic thyroiditis in dogs. Tests to identify lymphocytic thyroiditis are available, the most commonly utilized being the thyroglobulin (Tg) autoantibody test. A positive Tg autoantibody test suggests lymphocytic thyroiditis but provides no information on the severity or progressive nature of the inflammatory response or the extent of thyroid gland involvement. The Tg autoantibody test is currently being used as a prebreeding screen for lymphocytic thyroiditis in breeds with a known predisposition for hypothyroidism (Table 1).

Clinical signs result from the deficiency in thyroid hormone following destruction of the thyroid gland. Most adult dogs develop problems with metabolism, the skin or the neuromuscular system (Table 2). Other organ systems may be affected but clinical signs related to these systems are usually not the reason for presentation of the dog to the veterinarian. Identification of lipemia, mild non-regenerative anemia, and hypercholesterolemia on routine blood tests adds further evidence for hypothyroidism.

Baseline serum thyroxine (T_4) concentration is often used as the initial screening test for hypothyroidism because it is widely available at low cost and can be measured in-house. Because serum T_4 concentrations can be suppressed by a variety of factors, most notably concurrent systemic illness and glucocorticoids, a normal serum T_4 concentration establishes normal thyroid gland function but a low serum T_4 , by itself, does not confirm hypothyroidism. Results of the history, physical examination and routine blood tests must also be considered. A low

serum T₄ concentration in conjunction with appropriate clinical signs and hyperlipidemia supports the diagnosis of hypothyroidism, especially if systemic illness is not present. Measurement of serum free thyroxine (fT₄) by modified equilibrium dialysis and serum thyrotropin (TSH) are warranted if the serum T₄ concentration is not definitive, if systemic illness is present and the potential for suppression of thyroid gland function is high or if drugs known to decrease serum T₄ concentration are being administered.

Synthetic levothyroxine is used to treat hypothyroidism. The recommended initial dosage is 0.02 mg/kg of body weight (0.1 mg/10 lb; maximum dose, 0.8 mg). As a general rule, levothyroxine is initially administered twice daily unless the product is specifically formulated for once a day therapy. With appropriate therapy, all of the clinical signs and clinicopathologic abnormalities caused by hypothyroidism are reversible. An increase in mental alertness and activity usually occur within the first week of treatment, regrowth of hair is seen within the first month although complete regrowth typically takes several months, and improvement in neuromuscular signs is seen within a month although complete resolution is unpredictable and may take several months. Thyrotoxicosis is an uncommon complication that results from excessive administration of levothyroxine. Thyrotoxicosis should be suspected if the dog develops clinical signs of hyperthyroidism such as polyphagia, weight loss, hyperactivity or aggressive behavior. Clinical signs will resolve following a reduction in the dosage or frequency of levothyroxine administration.

Serum T₄ and TSH should be measured 4 to 8 weeks after initiating therapy, whenever signs of thyrotoxicosis develop or if there has been minimal or no response to therapy. Serum T₄ and TSH concentrations are evaluated 4 to 6 hours after administration of levothyroxine. Serum T₄ may also need to be evaluated prior to levothyroxine administration in dogs receiving the supplement once a day. If the dose and dosing schedule are appropriate, the serum T₄ concentration should be in the upper half or slightly above the reference range 4

to 6 hours after levothyroxine administration and the serum TSH concentration should be in the reference range. Post-dosing serum T₄ concentrations measured at times other than 4 to 6 hours after levothyroxine administration should be interpreted with the realization that serum T₄ may not be at peak concentrations. If clinical signs persist despite appropriate serum T₄ and TSH concentrations, an incorrect diagnosis of hypothyroidism, concurrent disease (e.g., allergic skin disease, flea hypersensitivity), and poor owner compliance in administering the hormone should be considered.

Table 1. Dog breeds reported to have an increased prevalence of positive test results for lymphocytic thyroiditis listed from highest to lowest prevalence

Pointer
English Setter
English Pointer
Skye Terrier
German Wirehaired Pointer
Old English Sheepdog
Boxer
Maltese
Kuvasz
Petit Basset Friffon Vendeen
American Staffordshire Terrier
Beagle
American Pit Bull Terrier
Dalmatian
Giant Schnauzer
Rhodesian Ridgeback
Golden Retriever
Shetland Sheepdog
Chesapeake Bay Retriever
Siberian Husky
Brittany Spaniel
Borzoi
Australian Shepherd
Doberman Pinscher
Malamute
Cocker Spaniel

Table 2. Clinical manifestations of hypothyroidism in the adult dog

Metabolic:	Lethargy Mental dullness Inactivity Weight gain
Dermatologic:	Dry, brittle hair coat Thinning of the hair coat Endocrine alopecia, especially areas of pressure or friction Seborrhea Pyoderma Hyperpigmentation Otitis externa Myxedema
Neuromuscular:	Weakness Knuckling Ataxia Circling Vestibular signs Facial nerve paralysis Seizures
Ocular:	Corneal lipid deposits Corneal ulceration Uveitis
Reproductive:	Persistent anestrus Weak or silent heats Prolonged estrual bleeding Inappropriate galactorrhea or gynecomastia
Hematologic:	Anemia Hyperlipidemia Coagulopathy
Behavior:	Aggression