

Hyperthyroidism in Cats



Supervised by: Dr. Toshinori Sako, Professor Emeritus, Nippon Veterinary and Life Science University

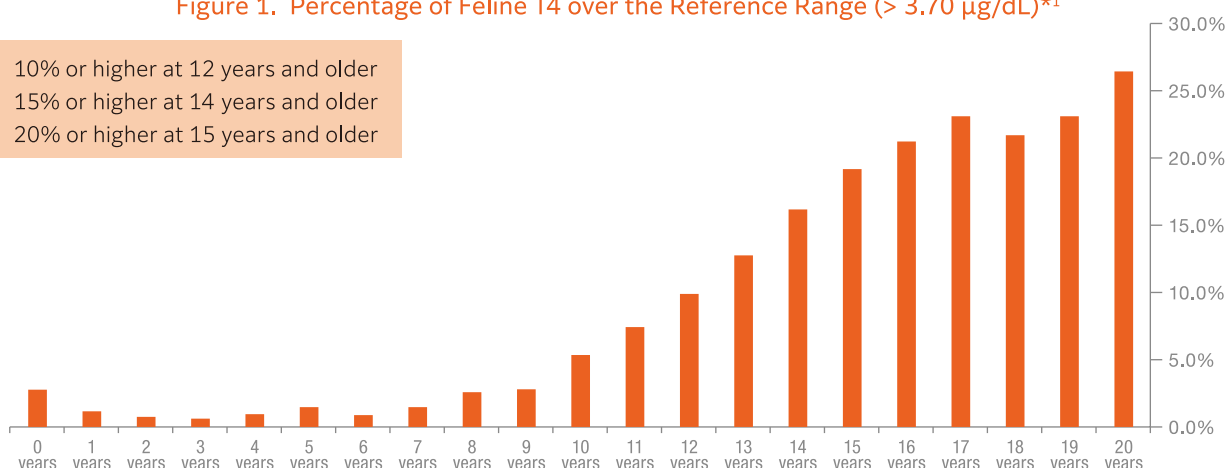
This article is supervised by a Japanese professor and veterinarian. Conduct diagnosis and treatment according to the guidelines in your respective countries.

Epidemiology/Signalment

Hyperthyroidism in cats is a disorder presenting various clinical symptoms due to the excessive secretion of a thyroid hormone secreted from the thyroid gland, such as T4 (thyroxine). It is said to be common in indoor cats at the age of 7 years or older; however, the results of health checkups by the company (FUJIFILM VET Systems Co., Ltd.) (Figure 1) show the incidence to increase particularly from the age of 10 years and older with an incidence of up to 15% in cats aged 14 years or older. As a result of calculation based on the statistics on the population of pet cats by the Japan Pet Food Association, at least 300,000 cats are considered to have this condition.

Figure 1. Percentage of Feline T4 over the Reference Range ($> 3.70 \mu\text{g/dL}$)*¹

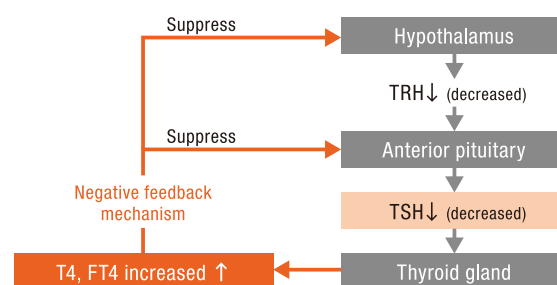
10% or higher at 12 years and older
15% or higher at 14 years and older
20% or higher at 15 years and older



*¹ Based on the survey results on the addition of optional tests in the health checkups conducted by the company from February 2021 to January 2022

With regard to the thyroid hormone, T4 and T3 are secreted in the stimulation system from hypothalamus (TRH) → anterior pituitary (TSH) → thyroid gland. In addition, the secretion of thyroid hormone from the thyroid gland suppresses the secretion of TSH from the anterior pituitary based on the amount of secretion. This suppression system is referred to as the “negative feedback mechanism”. This mechanism is applied in the diagnosis of thyroid disorders. (Figure 2) For cat hyperthyroidism, the presence of increased T4 and FT4, as well as decreased TSH, enables the diagnosis of primary hyperthyroidism. However, care must be taken for interpretation of the results because TSH in cats available at present have high sensitivity and low specificity ^{1) 2)}.

Figure 2 Typical Hormone Balance in Hyperthyroidism



1) Peterson, M E et al. “Evaluation of Serum Thyroid-Stimulating Hormone Concentration as a Diagnostic Test for Hyperthyroidism in Cats.”

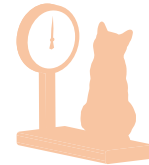
Journal of Veterinary Internal Medicine vol. 29, 5 (2015): 1327-34. doi:10.1111/jvim.13585

2) Mooney, Carmel T. “Using CTSH in Cats.” WSAVA Congress Proceedings, 2018, p. 198.

Symptoms

Clinical symptoms reported in 2009 are as follows. (See the table below) Behavioral changes include hypersensitivity, agitation, wandering, aggressiveness, muscle tremor, lassitude, and decreased activity. There are also reports of hyperventilation, muscle weakness, and excessive nail growth, including those experienced by the company. Other symptoms include changes in voice and manner of crying, which are considered important during the treatment.

Clinical Symptoms of Cat Hyperthyroidism			
Body weight decreased	93%	Polyuria polydipsia	43%
Increased appetite	68%	Hair loss, decreased gloss in fur	43%
Behavioral changes	48%	Diarrhea	18%
Vomiting	46%	Decreased appetite	11%



Frenais R, et al (2009)

Test method

Physical examination

Physical examination may find emaciation, dehydration, hyperventilation/gasping, circulatory abnormalities (tachycardia, arrhythmia/gallop, heart murmur, hypertension, etc.), increased blood pressure, high body temperature, eye lesion, increased body temperature, or palpable thyroid enlargement.

Hematology/biochemistry

Thyroid function disorders suspected in health check-up items

Erythrocyte system (RBC, PCV, etc.)	ALP/ALT	Blood glucose	Cholesterol	Urine specific gravity	Urea nitrogen, creatinine, SDMA, FGF23
Increased	Increased	Increased	Decreased	Decreased	Increased

Diagnostic imaging

If thyroid enlargement is detected upon palpation, and hyperthyroidism is suspected by various tests, diagnostic imaging must be performed. Bilateral or unilateral thyroid enlargement may be observed. If thyroid enlargement is observed, surgical resection must be prioritized (particular for cats aged 9 years or younger).

Endocrine tests

Recommendation for hormone test = Measure T4

Senior cats (10 years?)	T4 measurement	T4 (µg/dL)	Judgment
Clinical symptoms (body weight decreased, increased appetite, changes in activity, etc.)		>4.0	Judged as hyperthyroidism*2
Physical examination (tachycardia, heart murmur, thyroid enlargement, hypertension)		3.0 to 4.0	Hyperthyroidism not ruled out, treatment indicated if symptomatic
CBC test (PCV, Hb increase stress pattern)		<3.0	Hyperthyroidism unlikely
Blood biochemistry (ALP, ALT, Glu increased)			
Decrease in urine specific gravity, increase in urea nitrogen and creatinine			

*2 In humans, TSH is measured in the case of high T4 level and use the TSH level for a definitive diagnosis; however, care is considered necessary at present for the interpretation of TSH measurement results in cats.

Treatment

Summary of the treatment methods

Clinical symptoms and an increase in thyroid hormone are indicated for treatment. If clinical symptoms are present and T4 is within the reference range, the family must be consulted on whether treatment should be performed, or continuous hormone monitoring should be conducted.

Clinical signs	T4 (µg/dL)	Action
Yes	>4.0	Start treatment
	3.0 to 4.0	Start treatment or T4 retest after 2 to 4 weeks
	<3.0	T4 retest after 2 to 4 weeks or start treatment
No	>4.0	Start treatment
	3.0 to 4.0	T4 retest after 2 to 4 weeks
	<3.0	Hyperthyroidism unlikely if thyroid enlargement is detectable by palpation → Echography must be performed, with consideration of surgery if necessary, periodic T4 test