

## Hyperthyroidism in Cats

### What is hyperthyroidism?

Cats have two thyroid glands in the neck that are vital in regulating the body's metabolic rate. Hyperthyroidism is characterized by the overproduction of thyroid hormone, resulting in an increase in metabolic rate. This disease is common in older cats.

Although the thyroid gland enlarges in hyperthyroidism, it is usually a benign or non-malignant change. Only 1–2% of hyperthyroid cases in cats involve malignant (cancerous) thyroid gland tumors. Many organs are affected by hyperthyroidism, especially the heart.

### Are certain cats more likely to develop hyperthyroidism?

Older cats are at greater risk for developing hyperthyroidism. No individual breed is known to have a greater risk, although Siamese, Burmese, Persian, Abyssinian, Tonkinese, and British shorthair breeds appear to have a somewhat *decreased* incidence of hyperthyroidism compared to other breeds.

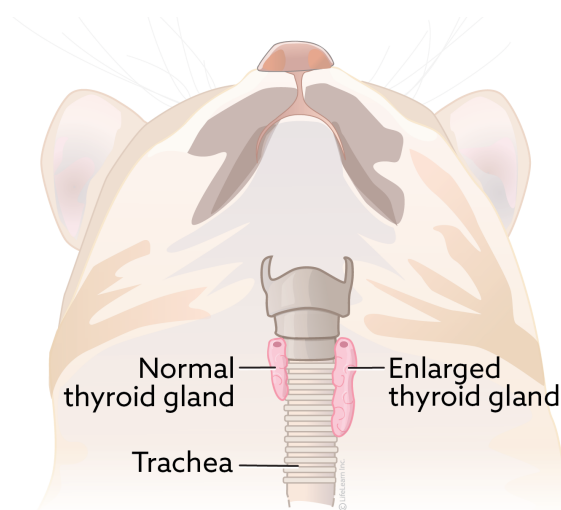
### What causes hyperthyroidism?

There are several hypothesized causes of hyperthyroidism. Environmental risk factors, such as flame retardants and other organic pollutants, have been investigated and may predispose some cats to hyperthyroidism, although the specific mechanisms are unknown. Exposure to high levels of dietary iodine may cause susceptible cats to develop hyperthyroidism.

### What are the signs of hyperthyroidism?

The typical cat with hyperthyroidism is middle-aged or older; the average age of affected cats is approximately 12 years. Only about 5–30% of hyperthyroid cats are younger than 10.

The most common clinical sign of hyperthyroidism is weight loss due to the increased metabolism despite an increased appetite. Affected cats are often restless and may become cranky or aggressive. They may have increased water consumption and urination. It is also common for hyperthyroid cats to exhibit increased vocalizing, particularly at night. They may develop periodic vomiting or diarrhea, and fur may appear unkempt. In some cats, anorexia develops as the disease progresses.



Several complications of hyperthyroidism can be significant, including hypertension (high blood pressure) and a heart disease called thyrotoxic cardiomyopathy. Hypertension develops due to the increased pumping pressure and elevated heart rate that occurs with hyperthyroidism. About 20% of cats with hyperthyroidism become hypertensive. In some of these cats, blood pressure can become so high that retinal bleeding or retinal detachment will occur, resulting in sudden blindness. Permanent blindness can occur if the retinal detachment is not treated immediately.



Thyrotoxic cardiomyopathy may develop because the heart enlarges and thickens to meet the increased metabolic demands. In some cases, the cat will develop a heart murmur associated with cardiomyopathy. Both cardiomyopathy and hypertension are potentially reversible with appropriate treatment of the disease.

Although many cats diagnosed with hyperthyroid disease already have kidney disease, untreated hyperthyroidism can also cause kidney disease due to the damaging effects of hypertension on the kidneys.

### How is hyperthyroidism diagnosed?

Diagnosis of feline hyperthyroidism is generally straightforward. The first step is determining the blood level of one of the thyroid hormones called total thyroxine (TT4). Usually, the TT4 level is so high that there is no question about the diagnosis (see the handout "Thyroid Hormone Testing in Cats").

Occasionally, a cat suspected of having hyperthyroidism has a TT4 level within the upper range of normal. When this occurs, a second test, usually a free T4 by equilibrium dialysis (FT4 by ED) or a T3 suppression test, is performed. If these tests are not diagnostic, a thyroid scan (thyroid scintigraphy) can be performed at a veterinary referral center, or the TT4 can be measured again in a few weeks.

### How is hyperthyroidism treated?

Treatment is usually very successful, as fewer than 2% of cats with hyperthyroidism have cancerous growths of the thyroid gland.

Before deciding the form of treatment, several tests are performed, including additional blood tests, a urinalysis, chest X-rays (radiographs), an ECG, and blood pressure measurements. These tests are needed to evaluate your cat's overall health and predict the likelihood of complications with the chosen treatment protocol.

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Ultrasound of the heart (called echocardiography) may be recommended based on your cat's condition, especially if there is any concern about cardiomyopathy. Thyroid scintigraphy (a radioactive scan of the thyroid gland) may also be recommended to confirm a diagnosis and determine the size of the organ before surgery or radioactive iodine.

There are several treatment options, and your veterinarian will determine the best choice for your cat. When choosing the best therapy for an individual cat, many factors must be considered. The treatment options for hyperthyroidism are as follows:

**Oral medication.** Lifelong administration of methimazole can control the effects of an overactive thyroid gland. It takes several weeks for methimazole to restore thyroid hormone levels to normal. Some cats develop side effects from methimazole, such as vomiting, lethargy, anorexia, fever, liver damage, anemia, and a decrease in white blood cells. In some cases, a decrease in blood platelets (thrombocytopenia) may also occur. Since platelets are essential for blood clotting, thrombocytopenia may lead to problems with excessive bleeding. Because of these rare but serious side effect risks, your cat will need to be closely monitored by having simple blood tests performed every 3–6 months when using this medication.



Methimazole blocks excess thyroid hormone production rather than destroying the abnormal thyroid tissue, so the medication must be given for the rest of the cat's life. This treatment is appropriate for cats with more surgical risk due to other health problems or who are exceptionally old. As stated above, it may also be used for a few weeks to stabilize a cat at increased surgical risk because of cardiac complications. The required dose of methimazole can change over time, so monitoring thyroid levels in treated animals is recommended every 3–6 months once their condition is stable.

**Radioactive iodine.** Radioactive iodine (I-131) therapy is a very effective way to treat hyperthyroidism. When an injection of radioactive iodine is given, it destroys the abnormal thyroid tissue without endangering other organs. I-131 therapy does not require anesthesia and eliminates the need for daily medication. Treatment usually requires 1 or 2 weeks of hospitalization at a veterinary hospital licensed to administer radiation therapy; this is necessary because their urine will contain radioactive iodine, and it must be collected for safe disposal. Your cat will likely be started on methimazole for about a month before radioactive iodine therapy, for the same reasons as surgical treatment.

**Prescription nutrition.** Feeding an iodine-limited diet (Hills Prescription Diet y/d®) can resolve clinical signs and lower thyroid hormone concentration. The food is not medication. Over 10 years of clinical nutrition research has revealed that, when dietary levels of iodine are controlled, the hyperthyroid cat's body resumes normal thyroid hormone production. This is not an iodine-free diet but a diet with a controlled iodine content of 0.2ppm – a minimal amount. For this prescription diet to work, it must be the only food fed, which means no cheating with treats.

**Other therapeutic monitoring.** Due to the damaging effects of hyperthyroid-induced hypertension on your cat's kidneys, blood kidney values must be reassessed once the thyroxine level has normalized, even if they were normal on initial blood tests. Often, treating hyperthyroidism will unmask hidden kidney failure that will require additional care and is best detected early in the course of the disease.

**Surgery.** Surgical removal of the affected thyroid gland(s) may be very effective. Since hyperthyroid cats are usually over 8 years of age, there is a degree of risk involved. However, the risk is minimal if your cat is otherwise healthy, and the initial diagnostic tests and treatment did not reveal any underlying conditions. If the disease involves both lobes of the thyroid gland, two surgeries may be required, depending on the surgeon's choice of procedures. In many cats, only one thyroid lobe is abnormal, so only one surgery is needed.

Some hyperthyroid cats have thyroid cells in abnormal locations called ectopic thyroid tissue (thyroid tissue under the tongue, further down the neck, or all the way to the base of the heart), and they may remain hyperthyroid after surgery. It is best to perform a nuclear scan before surgery to rule out ectopic thyroid tissue.

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If surgery is the chosen treatment method, the anti-thyroid medication methimazole (Tapazole®, Felimazole®) may be prescribed for several weeks before the operation. During that time, the ravenous appetite should subside, your cat will probably gain weight, and her blood pressure and heart rate should normalize. Methimazole is also given before surgery to determine if the cat has a secondary medical condition, such as kidney or liver disease, masked by hyperthyroidism. Surgery will be performed if your cat successfully undergoes the initial treatment without complication. Your cat may be hospitalized for 1 to 2 nights following surgery and should begin to eat and behave normally after returning home. Another TT4 level is measured 1 to 2 weeks after surgery.

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If both thyroid glands require removal, there is a risk of developing hypocalcemia (low blood calcium levels) after surgery. This is because the parathyroid glands (responsible for calcium balance in the body) are near the thyroid gland and may be damaged or accidentally removed during surgery. Hypocalcemia can be life-threatening and may require either short-term or long-term medication postoperatively should it occur.

Because each cat is different, your veterinarian will advise you on the best treatment for your cat. What may work for one cat may not work for another.

## **Will my cat be cured with treatment?**

Recurrence of the disease is possible in some cats. Recurrence of hyperthyroidism is rare after I-131 therapy, with a success rate of greater than 95%. Surgical patients may become hyperthyroid again if abnormal cells are missed during surgery or if new abnormal cells develop. If methimazole dosing is discontinued, hyperthyroidism will return. Cats exclusively fed the prescription diet will remain normal, but if the diet is discontinued, they will once again become hyperthyroid.

Many owners of cats with hyperthyroidism are hesitant to have radiation therapy or surgery because of their cat's advanced age. It is important to remember that old age is not a disease.

The outcomes following most hyperthyroid therapies are usually excellent, and most cats have a very good chance of returning to a normal state of health. Cats managed with diet or medication generally do well if their feeding is consistent, their medication is administered routinely, and follow-up blood and diagnostic tests are performed as scheduled.

There are currently no known preventive measures for hyperthyroidism, but early diagnosis decreases the secondary problems and improves the prognosis. All middle-aged and senior cats should receive a complete physical examination by a veterinarian every six months. Special attention should be given to the thyroid glands to look for evidence of enlargement and the clinical signs of hyperthyroidism. Annual blood and urine tests are important in all cats seven years and older to detect hyperthyroidism before potentially irreversible damage occurs.

## Can hyperthyroidism be prevented?

There are currently no known preventive measures for hyperthyroidism, but early diagnosis decreases the secondary problems and improves the prognosis. All middle-aged and senior cats should receive a complete physical examination by a veterinarian every 6 months. Special attention should be given to the thyroid glands to look for evidence of enlargement and the clinical signs of hyperthyroidism. Annual blood and urine tests are important in all cats aged 7 years and older to detect hyperthyroidism before potentially irreversible damage occurs.

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