

Perspectives On Cats

A Newsletter for Cat Fanciers
From The Cornell Feline Health Center

Winter 1986



A Look at Hyperthyroidism

The thyroid glands secrete hormones (thyroxine [T₃] and tri-iodothyronine [T₄]) which regulate the body's rate of metabolism. However, the system can go awry, with increased (hyperthyroidism) or decreased (hypothyroidism) hormone production.

Within the last six years, hyperthyroidism has emerged as a new disease in cats 10 years and older. In fact, it now ranks as one of the most common endocrine disorders in the cat, afflicting one of every 300 cats seen at the Animal Medical Center in New York City.

It is not yet known whether feline hyperthyroidism is the result of a primary thyroid disorder, or whether some factor(s) may be stimulating the thyroid glands to produce an excessive amount of thyroid hormones. Presently, studies are being conducted by Dr. Scarlett-Kranz at the New York State College of Veterinary Medicine to determine if nutritional or environmental risk factors are associated with the disease.

Inside this issue . . .

A Look at Hyperthyroidism	page 1
Breeding Basics	page 3
Did You Know ...	page 5
Article Index	page 6
1986 Wish List	page 7
Honor Roll	page 8

Symptoms and Diagnosis

Typical symptoms of hyperthyroidism include weight loss, increased appetite, hyperactivity, restlessness, increased fluid intake and urination, vomiting, diarrhea, and muscle weakness. Often the hair coat looks unkempt and dull. The heartbeat feels strong and rapid, sometimes with noticeable arrhythmias. (Fortunately, heart problems subside once the hyperthyroid state is corrected.) If you own a middle-aged or older cat displaying these symptoms, you should schedule an appointment with your veterinarian.

Because the symptoms can be suggestive of other diseases, your veterinarian will probably suggest a complete blood count, routine serum biochemical tests, and serum thyroid hormone concentrations to aid in a definitive diagnosis.

During the physical examination the veterinarian will also feel the neck region to determine if the thyroid glands are enlarged, indicating hyperthyroidism. Either one or both glands may be affected. In approximately 90 percent of cats diagnosed as being hyperthyroid, both thyroid glands are diseased.

Treatment

There are three basic forms of treatment available -- surgery, anti-thyroid drugs, or radioac-

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(Please disregard this notice if you recently sent in your membership dues.)

tive iodine therapy. Each form of treatment has its advantages and disadvantages. Your veterinarian's choice of treatment will be based on several factors, including the cat's age, and the presence of associated heart disease or other medical problems.

Surgery:

Surgical removal of the enlarged thyroid gland(s) -- thyroidectomy -- is a curative treatment. However, hyperthyroid cats are increased anesthetic and surgical risks, usually due to their advanced age and the affect the disease has had the cat's heart and metabolism. Also, postoperative complications can occur. The most common problem is a calcium imbalance known as hypocalcemia. This occurs when the parathyroid glands (small glands attached to the thyroid glands) are inadvertently injured or removed during surgery. However, if only one parathyroid gland remains, it can compensate and maintain the proper calcium-phosphorus balance. If hypocalcemia does develop, it usually occurs within the first three days after surgery. Symptoms of hypocalcemia include weakness, muscle tremors, tetany, and convulsions. Hypocalcemia can be remedied by administering calcium supplements supplied by your veterinarian.

When both thyroid glands are removed, a thyroid supplement is given daily. Your veterinarian will probably schedule a blood test about every six months to monitor dosage levels. If only one thyroid gland is removed, the remaining gland usually can maintain the proper hormone balance without additional treatment.

Anti-thyroid Drugs:

Anti-thyroid drugs only alleviate the symptoms of hyperthyroidism. If doses are missed, the signs will recur. The most commonly used drugs are propylthiouracil (PTU) and methimazole (MMI). Both drugs act by inhibiting the synthesis of hormones by the thyroid glands.

Adverse reactions can occur with these drugs. Loss of appetite, vomiting, and lethargy appear to occur more frequently with PTU than with MMI. In most cats, these mild reactions are transient and disappear in a few days. However, if gastrointestinal symptoms continue, contact your veterinarian. Another problem,

usually associated with PTU, are skin rashes, facial swelling, and itching.

Another regimen of treatment can include dosages of iodide (a form of iodine) and propranolol.

Your veterinarian will probably want to schedule complete blood counts and platelet counts on a regular basis to monitor your cat's treatment.

Radioactive Iodine Therapy:

Radioactive iodine is an effective treatment because it selectively destroys functioning thyroid tissue. Ideally, it is the best form of treatment. However, not only is it difficult to find a facility that can treat a cat with radioactive iodine, but its usage is strictly regulated by the government. For example, after treatment cats must be quarantined for 5 to 30 days while their secretions and excretions containing radioactivity are collected and disposed of according to regulations.

(continued on page 5)

Perspectives On Cats

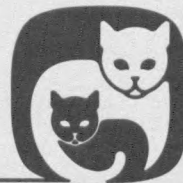
A Newsletter for Cat Fanciers
From The Cornell Feline Health Center

The ultimate purpose of the Cornell Feline Health Center is to improve the health of cats everywhere, by developing methods to prevent or cure feline diseases, and by providing continuing education to veterinarians and cat owners. All contributions are tax-deductible.

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Breeding Basics

Did you know that reproductively the cat is unique among mammals? For example, the queen (breeding female) is sexually receptive several times during the breeding season and is a reflex-ovulator (ovulation occurs after mating). Understanding these basic differences in feline reproduction will assist you in assessing breeding problems that can occur with toms (breeding male) and queens.

The reproductive life of the cat is long. Toms and queens can continue breeding for 14 or more years. However, a period of 8 to 10 years is considered optimum for continuous breeding of the queen.

Puberty

Queens usually become sexually active between seven and twelve months of age. However, timing can be influenced by general health, breed, weaning age of the queen, and by the number of hours of artificial or natural light.

Queens can have their first heat (estrus) as early as five months of age if they reach a minimal body weight of 5 to 5 1/2 pounds, or can be as late as 21 months of age. If the normal pubertal age and weight are reached during October to December (in the northern hemisphere), cycling usually begins the following January or February. If pubertal weight is attained in May to September, then an earlier heat can occur. Toms usually reach sexual maturity at a minimal body weight of seven to eight pounds which occurs at about nine months of age. If the offspring will be raised together, then the male and female kittens should be separated by five months of age.

Purebred cats may reach puberty later than non-purebreds. Also, indoor cats, especially those that are housed alone, generally reach puberty later. A British study of several breeds reported that puberty averaged between 9 to 10 months of age, but there were considerable differences among breeds. Himalayans or colorpoints were the oldest, averaging 13

months, while Burmese were the youngest, averaging 7.7 months.

The Heat Cycle (estrus)

The natural breeding season in temperate zones usually begins 20 to 60 days after the winter solstice and may end any time after the summer solstice. However, many queens will cycle throughout the year if they are exposed to 12 to 14 hours of light per day. Installing a timer is an efficient way to control the amount of artificial light in a breeding cattery.

There are four phases of the heat cycle. Cycles occur at intervals of two to four weeks. An unbred queen may have four to 20 heat cycles a year.

Proestrus: This is the first stage of estrus, often considered the courtship period. During this time the queen begins to attract toms, but refuses to mate. She usually becomes increasingly restless. This phase lasts up to three days.

Estrus: This is the time when the queen is receptive to the tom. The queen's behavior, in the absence of a tom, usually includes persistent vocalization, rolling, rubbing, extreme affection, and with variable incidence and intensity, treading the hind legs, raising the hindquarters, and tail twitching. The facial expression is similar to that seen with aggression or fright. A repeated monotone crying or howling for as long as three minutes may accompany treading and rolling. The estrus howl is given by the queen to indicate that she is in estrus and in the presence of a tom. Estrus lasts from 3 to 20 days, with an average of 7 or 8 days.

Metestrus: During this phase, which lasts about 24 hours, the queen will actively reject the tom.

Anestrus: This is the queen's inactive reproductive phase, after which time she will return

to the proestrus phase.

If not mated, most queens will have nonovulatory estrous cycles throughout a breeding season. This results in periods of behavioral estrus interrupted by periods of sexual non-receptivity.

Vaginal cytology can be very helpful in determining the queen's estrous phase.

Inducing Estrus

Induction of estrus in queens can be accomplished by lengthening the daily light cycle, socializing the queen with other cycling queens and/or exposure to a tom, or using hormonal therapy.

Estrus behavior of queens receiving hormonal therapy should be evaluated daily by a handler or by observing the queen's response in the presence of an experienced tom. Studies indicate that litter size can be normal for induced-estrus queens.

Sexual Behavior and Mating

Restlessness, general uneasiness, and pacing may be apparent in both queens and toms during the breeding season. A general loss of appetite by both the queen and tom often occurs during the breeding season.

The mating sequence usually involves the male biting the queen's neck, followed by mounting and intromission. After mating the tom usually stays nearby, watching the queen and protecting his territory. If freeroaming, other toms may challenge him, and if successful, will mate with the queen, resulting in a litter from different toms (superfecundation).

Relative body size of the tom and queen may influence the success of mating. Queens that are too large or too small may make it difficult for a successful rapid mating and can result in a frustrated, unsuccessful breeding tom. This is especially a problem with young or timid toms that are hand bred. The activity of the tom attempting to breed a queen may be enough to induce ovulation although the lack of intromission and ejaculation has failed to deposit semen for fertilization.

Ovulation

Ovulation in the queen, as in other species, depends on the release of sufficient amounts of a particular hormone, luteinizing hormone (LH) from the anterior pituitary gland. Since the queen is a reflex-ovulator, this hormone is only released on a neural reflex initiated by vaginal-cervical stimulation during mating. Ovulation can also be induced in estrus queens by artificially stimulating the vaginal walls and/or cervix with a probe and just like multiple breedings, multiple repeated probings at 5 to 15 minute intervals will enhance adequate LH release. Sometimes handling and stroking a queen in heat may provide enough neural stimulation to cause ovulation.

Ovulation usually occurs within 25 to 30 hours after mating. It appears that some queens will not release an adequate amount of LH until the second, third, or even fourth day of estrus. *Therefore, the best time to breed queens is on the second or third day of estrus and to observe at least four or more matings to ensure adequate LH release and maximal ovulation.*

Pregnancy and Parturition

Gestation lasts 64 to 69 days (average of 66 days). Breeders often depend on the physical change of the queen's nipples from light pink to rosy pink in the second and third weeks following mating as an indication of pregnancy. However, the best pregnancy diagnosis is by careful abdominal palpation by your veterinarian. Usually this is done 17 to 25 days after mating. However, after 30 to 35 days the palpation method cannot distinguish a pregnancy from just an enlarged uterus. Abdominal radiographs is another way to determine pregnancy.

A phenomenon known as pseudopregnancy can occur with queens. In fact, a queen can have as many as five pseudopregnancies in a breeding season. Within about 40 days the pseudopregnancy will terminate as progesterone hormone levels return to prebreeding season levels. Ovarian activity is re-established within 7 to 10 days after the end of pseudopregnancy.

The physiology of parturition in the queen is

Did You Know . . .

Cats are the most popular pet in the United States?

Fewer dollars are contributed to study cat diseases than dog diseases?

You can make a difference!

Your membership is the best way to ensure that our vital work on important feline diseases continues. Your cat, and all cats, benefit each time a vaccine is developed or a new treatment cures a disease. However, such progress is impossible without your support. **Now is the best time to join as a member of the Cornell Feline Health Center.** Use the attached envelope to send in your membership today. *(For your information, all memberships and contributions remain deductible for federal income tax purposes.)*

Membership entitles you to the following benefits:

- * the quarterly newsletter, "Perspectives on Cats"
- * membership certificate suitable for display
- * membership decal



SPECIAL GIFT OFFER ...

Give a gift that keeps giving all year -- a membership to the Cornell Feline Health Center. **For a limited time save 20% on gift memberships.** If you order before December 31, the cost is only pay \$12 instead of the regular rate of \$15. All recipients of gift memberships receive a special acknowledgment letter.

Breeding Basics (continued from page 4)

not fully known, and requires further study. Rectal temperature falls in the first stage of labor. The second stage of labor is usually quite rapid with a few abdominal strains, similar to defecation, and the first kitten is delivered. The third stage -- placenta expulsion-- closely follows the fetal delivery.

Summary

Because of the cat's unique reproductive physiology, many associated breeding problems can occur. However, by gaining a basic understanding of feline reproduction it is easier to assess breeding problems and discuss it with your veterinarian. ■

Hyperthyroidism (continued from page 2)

In Conclusion

During the last six years substantial progress has been made on diagnosis and treatment of feline hyperthyroidism. However, further clinical studies are needed to determine the causes(s) and develop safer drugs to treat hyperthyroidism. ■

Correction

In the last issue it stated that the normal heart rate is 110-140 beats per minute (bpm). Although a sleeping cat may have a heart rate that low, the normal heart rate for the cat ranges between 160-240 bpm, with an average of 197 bpm.

Article Index (1981-1986)

The following is a categorical listing of past articles published in *Perspectives on Cats*. If you are interested in receiving a past issue or a reprint of a particular article, there is a charge of \$1 per request to cover the cost of handling and mailing.

Bacterial Diseases

- Cat Scratch Disease, Win '83
- Cause of Cat Scratch Disease, Sum '86

Basic Information

- Cats Through the Ages, Sum '84
- Summer Camp for Your Cat, Sum '86
- Barnyard Cat, June '81
- Special Needs of the Older Cat, Sept '82
- New Hope & Healing Through Pet Therapy, Dec '82
- Allergic to Cats? Don't Despair, Fall '85
- How do Cats Purr? Fall '85

Behavior

- Feline Behavior Problems, Nov '81
- High-Rise Syndrome, Spr '83
- Solving Housesoiling Problems, Sum '86

Diagnostic Tests

- In-hospital Test for FeLV, June '81
- The KELA Test for Coronavirus, Apr '82
- How Viruses are Diagnosed, Apr '82

Digestive System

- Cornell Survey on GI Viruses, Mar '81
- Giardia Can Cause Chronic Diarrhea, Fall '85
- Feline Gum Disease, Fall '85

Eyes

- Intraocular Inflammation in Cats, Spr '84

First Aid

- Summer Safety Hazards, Sum '83
- Life-threatening Injuries, Fall '83
- Care for Burns and Frostbite, Win '83
- Is Your Cat a Pill About Pills? Win '84
- Abscesses in the Cat, Fall '85
- Holiday Hazards, Win '85
- Heat Stroke, Sum '86
- CPR: The Breath of Life, Fall '86

Genetics

- Inherited Craniofacial Malformations in Burmese, Dec '82
- A Matter of Color: Calico & Tortie, Fall '86

Heart

- New Studies on Heart Disease, Apr '82
- Heartworm: A New Feline Disease, Sum '85
- Lincoln Sets Pace for Cardiology, Spr '86

Metabolic Disorders

- Feline Thyroid Disease, Sept '82

Nervous System

- CNS Disease in the Cat, Nov '81

Neonatal Care

- Premature Kitten Deaths, Sum '85
- Queen for a Day ... or More, Spr '86

Nutrition

- Read the Label, Spr '85

Parasites

- Feline Toxoplasmosis, Spring '83
- Heartworm: A New Feline Disease, Sum '85
- Giardia Can Cause Chronic Diarrhea, Fall '85
- Don't Let Fleas Become a FAD, Spr '86

Poisons

- Antifreeze Poisoning, Apr '82
- Plant Poisoning, Spr '84
- Counteract Chemical Poisons, Sum '84

Respiratory System

- Feline Respiratory Disease, Win '85

Skin

- Fleas and Flea Allergy Dermatitis, June '81
- Rodent Ulcer is Perplexing Disease, Fall '86
- Don't Let Fleas Become a FAD, Spr '86

Urinary System

- What's the Fuss over FUS?, Win 85

Viral Diseases

- Cornell Study on GI Viruses, Mar '81
- FeLV Transmission, Human Risk, Mar '81
- Cornell Study Herpesvirus, Mar '81
- FIP Update, Jun '81
- Worldwide FIP, Apr '82
- Feline Rabies on the Rise, Win '83
- Answers to Questions on FIP, Win & Spr '84
- Rabies Alert! Fall '85
- FeLV Vaccine is Now Available, Spr '85

1986 Christmas Wishlist

Make this a joyous holiday season by contributing to better health care for all cats. The following equipment will provide greater accuracy in diagnostic tests for cat diseases, better treatment for Clinic patients, and an improved method to study housesoiling behavior in cats. Use the form below to indicate which item you want your contribution to be used toward. The form and your check can be returned in the envelope located in the centerfold of this issue.

Simplicity Plus Infusion Pump (\$795)

This pump is capable of administering small amounts of fluids to hospitalized cats. It also electronically monitors fluid intake of the patient.

Hemotec ACT (\$1,700)

Knowing the activated clotting time of a patient is crucial, especially if a patient has bleeding problems. This apparatus can provide the information accurately and quickly.

Video Camera (\$600) & Time Lapse Recorder (\$1,495)

Housesoiling is one of the most common forms of feline misbehavior. This equipment would allow animal behavior specialists to unobtrusively observe feline behavior, particularly elimination behavior.

Sartorius Analytical Balance (\$2,345)

This scale will allow the rapid and accurate production of aqueous solutions that are critical in FIP research and vaccine development.

Serum Diluter/Dispenser SMI Unipump 300 (\$2,950)

Dilution errors can occur when performing serology tests. This computer controlled unit accurately dilutes serum samples and delivers them to the serum sample handler.

Serum Sample Handler, Gilson 212 (\$6,946)

This equipment provides greater accuracy and efficiency in testing of serum samples for FIP, toxoplasmosis, and other feline diseases.

Power Supply (\$800)

This unit helps to separate viral proteins -- one of which may serve as a new vaccine for FIP of feline rhinotracheitis.

Red Rotor (\$650)

This unit does double duty by providing continuous mixing of solutions and for staining and washing electrophoresis gels.

Automatic MIC & ID System (\$14,000)

This advanced technological system can provide information on an antibiotics' susceptibility when used pharmacokinetically.

1986 Christmas Wish List

Yes, I want to give the gift of life. Please accept the enclosed contribution of \$ _____ for the purchase of:

- | | |
|---|--|
| ☐ Simplicity Plus Infusion Pump | ☐ SMI Unipump |
| ☐ Hemotec ACT | ☐ Serum Sampler Handler |
| ☐ Video Camera & Time Lapse Recorder | ☐ Power Supply |
| ☐ Sartorius Analytical Balance | ☐ Red Rotor |
| | ☐ Automatic MIC & ID System |

Given by: _____
(name)

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Please complete and return this form to the Cornell Feline Health Center with your contribution.

Honor Roll

The following individuals have contributed \$100 or more to support the Cornell Feline Health Center's work on feline diseases. We are most grateful for their support. We also wish to thank those individuals that have also contributed during the last few months, but who are not listed on the honor roll.

Name

Mr. and Mrs. David Cremers, New Mexico
Mr. and Mrs. Russell DiBella, New York
Mr. Robert Eccles, Massachusetts
Mr. and Mrs. James Enright, Virginia
Virginia Himmel, Connecticut
Hi Tech K9 Services, Inc., New Jersey
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Jane S. Street, Pennsylvania
United Pet Supply, Inc., New Jersey

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We also wish to express our thanks to the following cat clubs. They are very special because they have shown their commitment to promoting better health care for all cats by supporting the Cornell Feline Health Center.

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