

© THIS JUST IN

## Robotic Cat for Dementia

*Affordable, interactive robotic pet cats in an adult day center*

**W**ith the help of a cuddly and furry companion, researchers from Florida Atlantic University's Christine E. Lynn College of Nursing tested the effectiveness of affordable, interactive robotic pet cats to improve mood, behavior, and cognition in older adults with mild-to-moderate dementia. The non-pharmacological intervention took place over the course of 12 visits in an adult day center. Participants were informed that their pet was a robot and not a live animal. Each of them selected a name for their cat, which was fitted with a collar and a personalized nametag.

For the study, published in the journal *Issues in Mental Health Nursing*, researchers assessed mood and behavioral symptoms using the Alzheimer's Disease and Related Dementias Mood Scale, the Observed Emotion Rating Scale, and the Cornell Scale for Depression in Dementia. They also assessed cognition via the Mini Mental State Examination.

Results showed that intervention with a robotic pet cat improved all mood scores over time, with significant improvements in the Observed Emotion Rating Scale and the Cornell Scale of Depression in Dementia. More than half of the participants scored higher on the Mini Mental State Examination post-test

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## Ease the Stress of Upper-Respiratory Infections

*Sniffles and sneezes don't always mean a vet visit*

**V**iruses cause most feline upper-respiratory infections (URIs). While many of these infections are mild and resolve without medical intervention, stress can make things worse. So, since going to the veterinary clinic is stressful for cats, it's smart to know when veterinary care is necessary and when a "wait-and-see" decision is right for your cat.

If your cat starts sneezing, with or without clear nasal discharge, and has no other symptoms (appetite is fine, he is behaving normally), the best advice is to wait before scheduling a veterinary appointment.

If symptoms do not progress to include thick, discolored nasal discharge, lethargy, and loss of appetite, and if the sneezing resolves within seven to 10 days, you're all set. Your cat may have had a

mild viral upper respiratory infection that self-resolved. It's a common scenario. Cats whose symptoms worsen or last longer, however, should be seen by a veterinarian.

### These signs indicate wait and see:

- ▶ Sneezing
- ▶ Clear or no discharge
- ▶ All symptoms resolve in seven to 10 days

### These signs indicate taking action:

- ▶ Thick, discolored nasal discharge
- ▶ Lethargy
- ▶ Loss of appetite
- ▶ Mild symptoms (listed above) do not resolve

## Secondary Infections

The two most common respiratory viruses in cats are feline herpesvirus 1 (FHV-1) and feline calicivirus (FCV).

The inflammation caused by these viruses compromises the integrity of the lining of the respiratory tract, which allows bacterial invaders to come in and take advantage. The result of these secondary bacterial invaders is that classic, miserable-looking, congested, sneezing kitty with purulent discharge (known as "pus") coming from the cat's eyes and nose.

This secondary infection usually needs to be treated with antibiotics, as the infection can spread deeper into the cartilage and bones of the nasal passages and sinuses. If it does, the result can be permanent damage and chronic upper-respiratory symptoms. The prescription for an antibiotic therapy may be required for weeks, depending on the extent of the cat's bacterial invasion.

The viral component of URIs can be chronic and recurring in an individual cat, especially with the herpesvirus.

*(continues on page 3)*



*A milky white discharge warrants prompt veterinary consultation.*

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# Choline Supplementation to Help Overweight Cats

*Studies finding connections between nutrients and weight*

**A** doctoral candidate at the University of Guelph is exploring choline in the diets of overweight cats, according to the Pet Food Industry newsletter. Alexandra Rankovic's concern is that 50 to 60% of North American cats are overweight and she is concerned about hepatic lipidosis (fatty liver).

Hepatic lipidosis is often diagnosed in cats and can be fatal. In this condition, the liver becomes filled with fat (triglycerides accumulate in the cells of the liver) and cannot function. Known as fatty liver syndrome, the disease can severely impair a cat's health.

Choline is a water-soluble organic compound that is similar to B vitamins. It is an essential nutrient for cats, which means it must be included in the cat's diet. The main food sources are eggs and organ meats such as hearts and livers.

The Association of American Feed Control Officials (AAFCO), which sets nutrient requirements used by food manufacturers, says that adults cat need a daily minimum of 2,400 mg/kg (2,400 ppm) choline. Cats on unconventional/homemade diets, restricted diets, those that are obese or undergoing weight loss, and animals that are growing, may need additional choline.

Rankovich did three studies involving dietary choline supplementation in cats. For the first study, obese cats consumed five times the recommended amount of choline. In this study, the extra choline appeared to decrease fat stores in the liver by breaking down and mobilizing fat from liver tissues.

The second study looked at growing kittens. For 12 weeks post neutering, kittens free fed but also given extra choline. Since neutering can contribute to obesity in cats, it was hoped this would help keep neutered kittens fit and trim. Choline supplementation did help to keep weight gains down, partly through decreased appetite.

For the third study, cats that were already overweight were selected and given six to eight times the recommended amount of choline in their diets. As in the first study, these cats showed better liver health with fat mobilized out of the liver.

More research needs to be done before additional choline can be considered desirable in cat food, but these studies provide an important first step in understanding the potential role of choline in feline obesity. ■



*With the epidemic of obesity in cats, researchers are looking at dietary nutrients for solutions.*

(Robots, continued from page 1)

than pretest, with slight to moderate improvement in attention/calculation, language, and registration. Post-test scores on the Alzheimer's Disease and Related Dementias Mood Scale were six points higher than pretest conditions.

Researchers frequently observed study participants smiling and talking to their robotic cats and expressing sentiments. Participants believed that the robotic pet was responding to their statements through meowing, turning their head, or blinking their eyes and that they were

having a conversation with the pet. Several of the caregivers reported that their loved one had slept with the cat, held onto the cat when sitting, or consistently played with the cat. One even slept with her robotic pet cat while she was hospitalized.

By using therapeutic pets instead of live pets, there was no concern about the safety or care of the pet. ■

*Streit La Rose, B., et al. Improving Behavioral and Psychological Symptoms and Cognitive Status of Participants With Dementia Through the Use of Therapeutic Interactive Pets. Issues in Mental Health Nursing, 2021; 1 DOI: 10.1080/01612840.2021.1979142. Science Daily.*

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*(Respiratory, continued from page 1)*

Again, stress is a known cause of reactivation of the virus, not unlike in humans with herpesvirus cold sores.

“Minimizing stress is essential for lessening severity of signs and recurrence,” says Dr. Erin Henry, instructor of Shelter Medicine, Maddie’s Shelter Medicine Program, Cornell University College of Veterinary Medicine.

While this is especially true in the shelter environment, where overcrowding and less-than-ideal environmental conditions sometimes occur, Dr. Henry says the same is true for cats in a home environment, which many cat owners do not realize.

“Studies have shown that all of the primary agents involved in URI for cats can also be found in asymptomatic cats. It is suspected that stress contributes to the pathogens’ ability to invade the respiratory tissues and cause clinical signs,” she says.

“A stressful event in the home can cause a weakening of the immune response, allowing a pathogen like feline herpesvirus to recrudescence. Cats in a home environment are more likely to clear a viral URI with no additional treatment when it is a low-stress environment,” says Dr. Henry. (See our sidebar “Combating Stress” for ways to help you reduce your cat’s anxiety in his own home.)

### Treatment Options

Clearly, you need your veterinarian’s help to get the proper antibiotics, but there’s a lot you can do at home to help your cat get through an upper respiratory infection as quickly and comfortably as possible. In addition to administering the antibiotics prescribed by your veterinarian, consider nebulizing (inhalational steam therapy) by confining your cat in a bathroom while running a nice, hot, steamy shower.

The moist steam helps soften and loosen thick upper-respiratory secretions so your cat can clear them more easily. Similarly, you can purchase an over-the-counter nasal saline spray made for humans and instill one drop in each nostril twice daily, which also helps loosen up secretions.

Congested cats can’t smell their food very well, which sometimes leads to disinterest in eating. Warming canned food in the microwave for a few seconds (literally, like 10 to 12 seconds) helps

intensify the aroma, thereby helping maintain appetite. Don’t feed it to your cat while it’s hot. You’re looking for warmly aromatic!

### Prevention

Minimize stress, of course, but you can also supplement your cat’s diet with l-lysine, an amino acid that is thought to interfere with viral replication. While the efficacy of l-lysine has recently been called into question, there are anecdotal reports of this helping prevent recurrences. It is worthy of a conversation with your veterinarian about how it may help your cat.

Supplementing with the probiotic Fortiflora (Purina) showed promise in a preliminary study (“Pilot study to evaluate the effect of oral supplementation of *Enterococcus faecium* SF68 on cats with latent herpesvirus 1,” Lappin et al, *J Feline Med Surg.* August 2009;11(8):650-4).

Further studies are underway to assess probiotics ability to lessen stress-related recurrences of infection. However, because this product is safe, easily available, and may be good for your cat’s health in other ways, it is definitely something to consider to help your cat with stress-related infection. ■

## Combating Stress

While we advocate indoor living for cats for their own safety, it’s one of the biggest stressors for cats. Be sure to enrich your indoor cat’s indoor environment with elevated perches, safe windows to enjoy, climbing condos, scratching posts, and lots of play time!

Your cat also needs a safe haven somewhere in the house, a place where she can go when something is upsetting to her. This should be a comfortable, quiet place to hide and relax, with food, water, and litter nearby.

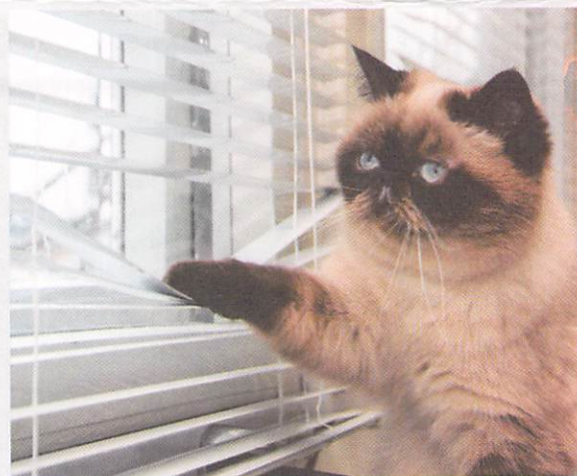
Cats thrive best in stable environments in which they feel safe. They don’t love change. Make any necessary changes, like renovations or moving furniture, as gradually as possible. Likewise, introduce new pets slowly, allowing the resident cat plenty of time to acclimate to the new situation.

People coming (guests, new baby, in-laws moving in) and going (vacation, hospital stays, deaths in the family, work-schedule changes) stresses cats. It’s the same with construction noise and chaos, both inside and outside your home. Your cat’s safe haven should help in these situations.

Having a trusted pet-sitter will always be better than boarding when you go away. Leaving a shirt or other article of clothing with your scent on it can help.

Veterinary visits and travel are stressful for your cat. Feliway (Ceva Animal Health) is a spray containing calming pheromones that may help in these situations. Feliway also comes in a diffuser that can be plugged in in the home. Last year, Ceva launched Feliway Optimum, which contains a new and improved blend of calming pheromones.

For more suggestions for indoor cat environmental enrichment and stress management, visit The Ohio State University College of Veterinary Medicine’s Indoor Pet Initiative at [indoorpet.osu.edu](http://indoorpet.osu.edu).



*We keep cats inside for their safety, but they don’t always agree that it’s the best decision and can become stressed.*

# Crusty, Itchy Skin Lesions

*Your cat may be battling an autoimmune disease*

**A**utoimmune diseases are frustrating. In an autoimmune illness, the protective immune cells in your cat's body turn hostile and attack the body. Diagnosing and treating autoimmune illnesses is rarely easy, especially with skin diseases.

The most common skin-related autoimmune disease in cats is pemphigus foliaceus. In pemphigus foliaceus, the normally protective antibodies attack the proteins that hold the skin cells together.

Cats with pemphigus generally have a variety of skin lesions, mainly pustules often covered with crusty debris. Pus accumulates in the spaces left behind when the antibodies destroy the proteins holding the cells together. Inflammation follows, with potential secondary bacterial infections. Lesions are often found in bilaterally symmetrical patterns.

Many affected cats are pruritic (itchy), although others act more like their skin is painful. Areas usually affected include the head (eyes, ears, chin, lips, and nose), paws (nail beds and paw pads), and nipples. Left untreated, other areas of the body may eventually show damage as well.

Some cats will have a fever with a corresponding lethargy and decreased appetite. Lymph nodes may be enlarged. Any age cat may develop pemphigus, but most are middle age to seniors.

## Causes

Why immune cells go rogue is unknown, although reactions to medications, some toxins, and severe allergic reactions are suspected culprits. Reactions to medications, however, are often not true autoimmune problems. Once the medication is stopped and all metabolites are gone from the body, the cat's skin returns to normal on its own. Other cats can have immunosuppressive medication gradually weaned off and do not relapse unless exposed to the offending medication again.

Stress certainly lowers a cat's resistance to immune problems, but it's not clear if it's a direct trigger for pemphigus. In a few cases, littermates have been affected, which suggests an underlying genetic defect or predisposition.

Despite frequent blame, vaccinations have not been associated with this autoimmune skin problem. In addition, cats with the two feline viruses commonly connected to immune problems (feline leukemia virus and feline immunodeficiency virus) are not at higher risk of developing pemphigus.

## Diagnosis

A biopsy is required to arrive at a definitive diagnosis of pemphigus. "It is very common to treat any skin disease in the cat with steroids. The dosages used to treat the allergic cat will do little or nothing for the cat with pemphigus except slow down the diagnostic effort. The diagnosis of any autoimmune skin disease is based on skin biopsy results. Steroids will alter the inflammatory changes in the skin and may make it impossible to diagnose the condition. If the cat has a very unusual skin disease and the owners have the resources,

## What Is Immunity?

Basic immunity, the body's natural ability to fend off infection, is based on two mechanisms: 1) antibodies, which are proteins produced to fight specific threats, and 2) lymphocytes, which are immune cells that attack and kill invading cells. In autoimmune diseases, these cells attack healthy normal cells instead of foreign, invading organisms and are called "autoantibodies."

following the 'Let's try steroids and see what happens' protocol isn't the way to go. Do the diagnostics first, because the cat will have to be treated with potentially dangerous drug protocols for the rest of its life," says William H. Miller Jr. VMD DACVD, professor emeritus of medicine, section of dermatology, at Cornell University's College of Veterinary Medicine.

Typical of many autoimmune problems, pemphigus can be treated and put into remission but is never really cured. Some cats will have a cyclical nature to their skin lesions, which may make it tempting to stop treatment. However, many cats will relapse, especially when treatment is stopped or tapered to a low level. Once off the medication, or on a lower dose, if the cat is exposed to its triggers again, the disease will often reappear. Many, if not most, affected cats need to be on some type of immunosuppressive medication for life once the disease has appeared.

The first line of therapy for cats with pemphigus foliaceus is usually prednisolone. This is inexpensive and cats are more resistant to glucocorticoid side effects than dogs are. This may be combined with immunosuppressive medications such as chlorambucil and cyclosporine. These drugs tend to have

*"Do the diagnostics first, because the cat will have to be treated with potentially dangerous drug protocols for the rest of its life," says William H. Miller Jr. VMD DACVD.*



*Because pemphigus is sometimes seen in littermates, a genetic cause is suspected but has not yet been proven.*

more serious side effects, however. A study published in *Veterinary Dermatology* ([ncbi.nlm.nih.gov/pubmed/24118463](https://pubmed.ncbi.nlm.nih.gov/24118463/)) found that cats treated with a simple low dose of prednisolone did as well as cats with the more expensive combined treatment. Many cats relapsed once the dose was lowered dramatically, although some cats maintained their skin health on weekly doses. Topical steroids are rarely successful.

Cats with nail-fold lesions are often put on antibiotics based on cytology showing bacteria in the exudate from around the claws. However, in this same study, once problems resolved with the immunosuppressive medications, no antibiotics were needed.

“The big issue with treating cats for any autoimmune disease is the size of the drug doses (i.e., pills) available, since cats are small and require small doses. Luckily, steroids are inexpensive and come in cat-friendly sizes. The other immunosuppressive drugs, used regularly in dogs, are expensive (e.g., cyclosporine) or only come in dosage sizes too large for the cat (e.g., mycophenolate). Steroids typically are the initial drug of choice in most cats because they are inexpensive, usually work very well and cats are more resistant to, but not immune from, steroid side effects,” says Dr. Miller.

### Bottom Line

Since true pemphigus rarely goes into spontaneous remission, most cats will need steroids for the rest of their lives and will eventually show side effects. Resolution of clinical signs or disease control often takes a couple of weeks. Cats on long-term glucocorticoids such as prednisolone should have periodic blood monitoring to watch for side effects such as anemia and diabetes. Fairly benign side effects are polyuria and polydipsia (urinating and drinking more than usual).

Avoid the impulse to bathe your cat. The skin of a cat with pemphigus is fragile, and standard bathing with cat shampoo will likely make things worse. When the lesions start to crust up while healing is occurring, a gentle soaking to help remove the crusts might be beneficial. However, stress can weaken the immune response of the cat and even a gentle soaking might make things worse if the cat isn't a big fan of baths. Minimizing stress is always recommended (see sidebar on combatting stress on page 3). ■

## Oral Gingivostomatitis

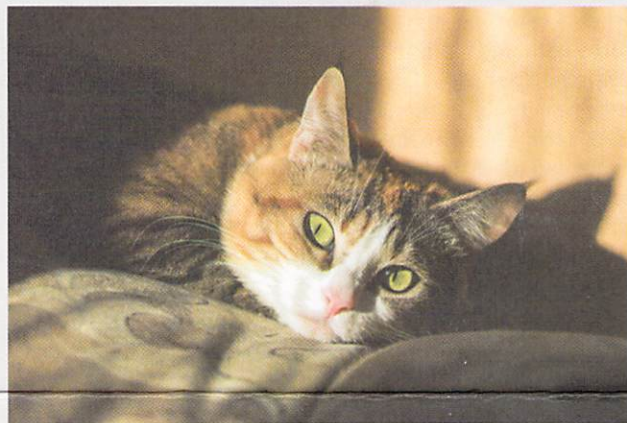
It may surprise you to learn that chronic gingivostomatitis complex (a severe, chronic form of gum disease) is an autoimmune disease. In gingivostomatitis, the antibodies attack the mouth, specifically around the teeth. While immunosuppressive medications, laser, and stem-cell therapy have all shown potential success in treating this condition, removing all the teeth remains the gold standard for therapy. This sounds drastic, but it gives cats a pain-free mouth, and they are still able to eat, drink, and play without teeth.

Gingivostomatitis is a debilitating feline dental disease marked by severe and chronic inflammation of a cat's gingiva (gums) and mucosa, the moist tissue that lines its oral cavity. Although the condition is most frequently diagnosed among cats with certain viral diseases, as well as bacterial infections and various nutritional and hormonal conditions, no direct causal relationship between such disorders and gingivostomatitis has as yet been established. Any or all of these conditions, however, can cause an abnormal immune response to plaque, the thin coating of bacteria that normally accumulates on the surface of teeth.

According to Jennifer Rawlinson, DVM, chief of the dentistry and oral surgery section at Cornell University's College of Veterinary Medicine, “The immune system becomes overly reactive to plaque and causes severe inflammation in the gingiva, initially around an affected tooth and then quickly progressing to the tissue in the surrounding area.”

## Additional Skin Lesions to Be Aware Of

Pemphigus vulgaris and pemphigus erythematosus are rare but can occur in cats. Vulgaris occurs primarily at mucocutaneous junctions such as the mouth and anus, while erythematosus usually affects the nose and may be influenced by ultraviolet light exposure.



Ultraviolet light may trigger pemphigus erythematosus.

Bullous pemphigoid shows up as fragile vesicles (fluid-filled blisters), mostly at mucocutaneous junctions but also in the groin and armpits. It is difficult to find the vesicles as they are thin-walled and break easily. Cats with bullous pemphigoid are itchy. Owners might notice hives or welts and severe pruritus before any vesicles are noted. Luckily, this illness may spontaneously resolve. Otherwise, the same immunosuppressive drugs for pemphigus foliaceus are used for treatment.

Lupus erythematosus (commonly called lupus) can be seen in cats in both the systemic and discoid or cutaneous forms, although both are rare. The antinuclear antibody blood test (ANA) used for diagnosis in dogs and humans is not standardized for cats. Dr. William Miller says cats with the systemic form of lupus have multiple organs, such as the kidneys, involved as well as the skin. Lameness may be noticed by astute owners. Skin lesions tend to resemble pemphigus foliaceus. The prognosis is poor. Cats with the discoid form may lose pigment around their lips and eyes. The texture of their nasal skin may also change from the normal “rough” appearance to very smooth. Luckily, this form is fairly benign.

# Controlling Difficult Diarrhea

*A fecal transplant may be just the right fit*

**D**iarrhea is no fun for anyone. Your poor cat is constantly in the litterbox and doing some nasty cleanup grooming. The mess and smell aren't pleasant for you either.

Tried-and-true treatments for diarrhea include probiotics, medications like metronidazole (Flagyl), and diet changes. But for some chronic cases, a fecal microbiota transplantation (FMT) might be in order.

"Chronic diarrhea in cats is frustrating for owners, cats, and veterinarians. FMT is considered a last-resort treatment modality after all other treatments have been attempted and thorough diagnostic panels have been performed," says Leni K. Kaplan, MS, DVM, of Cornell University's Small Animal Community Practice.

## It's a Transplant

A fecal microbiota transplantation, also called a fecal transplant or simply FMT, is when a veterinarian takes stool from a healthy cat and puts it into the sick cat's intestines. Your cat's digestive tract plays a huge role in her immune system, and part of both a healthy immune system and normal digestive processes is having a healthy community of normal gut bacteria.

Cats with chronic diarrhea may



*If your cat is giving you that "I don't dare leave this box" look when in the litterbox, it may be time to talk with your veterinarian.*

have normal, healthy gut bacteria. Abnormal gastrointestinal digestive flora (microorganisms, mainly bacteria), either caused by an underlying condition such as inflammatory bowel disease (IBD) or in response to the ongoing diarrhea and/or antibiotic use, can worsen diarrhea by preventing your cat from digesting food normally and producing formed stools.

By taking healthy stool that contains normal gut bacteria and placing it in your cat's intestinal tract, your veterinarian

can give your cat the boost he needs to stop the diarrhea cycle.

## The Transplant

"This treatment requires making sure a healthy donor cat is available," says Dr. Kaplan. The donor cat should have a known health history, be screened for disease and illness, and have a fecal analysis done to check for parasites or other signs of digestive issues.

Ideally, the donor cat should be eating the same diet as the cat receiving the transplant. This can help avoid any issues with food sensitivities. Bloodwork is recommended for the donor cat to make sure he or she doesn't have any other underlying medical issues that might make them a poor candidate.

Once a good fit has been found, a stool sample from the donor cat is collected close to the time of the procedure. And, of course, fresh is best. The stool will then be mixed with a lactated Ringer's solution and strained to remove debris.

The cat being treated will need some attention too, although most diagnostics will have already been done as part of the ongoing workup for the diarrhea. "The patient receiving the transplant will need enemas prior to the transplant and may need heavy sedation/light anesthesia during the procedure," says Dr. Kaplan. Depending on the protocol followed, the cat may need to be under anesthesia for 30 to 45 minutes.

It is possible to buy freeze-dried stool samples packed into capsules. When swallowed by your cat, the capsule won't break down until it reaches the intestines. It is still necessary to fully "check out" the donor cat to check on health and feeding.

"Fecal transplantation is most commonly used for cats with chronic diarrhea that have not responded to any other treatment modalities including diet trials, medications, and supplements," says Dr. Kaplan. Very little research has been done on fecal transplants in cats or dogs, and it is a new treatment on the scene in human medicine as well. Because of this, we don't yet have a standard protocol.

"As this is a "last resort" treatment modality, it is crucial that owners strictly adhere to their veterinarian's recommendations including special prescription diets, medications, and supplements before declaring those treatments unsuccessful," says Dr.

## Cornell Study Underway

# Defining the Metabolic and Fecal Microbiome Signatures of Hyperthyroid Cats

**J**ohn Loftus DVM, PhD, DACVIM, assistant professor, Section of Small Animal Medicine, is studying the effects of hyperthyroidism on the feline metabolism and microbiome, both before and after successful radioiodine therapy. The results of the study will provide important insight, not only into the effects of hyperthyroidism itself, but also into how this common condition may interplay with other important feline diseases.

Hyperthyroidism is the most common endocrine disease of cats, and although there are good treatment options available (radioiodine therapy, oral anti-thyroid drugs), there is evidence that even once a hyperthyroid cat's thyroid status has been successfully returned to normal with therapy, persistent metabolic abnormalities that may predispose to and overlap with other health problems may persist.

In spite of this fact, the effects of hyperthyroidism on feline metabolism and on populations of gastrointestinal microscopic organisms (the microbiome) have yet to be well described, both before and after successful treatment for hyperthyroidism.

This study is being funded by the Cornell Feline Health Center. ■

Kaplan. “There have been some case reports of diarrhea resolving in cats following fecal transplant that didn’t respond to other treatments BUT not all cats respond to fecal transplantation and the response may wear off over time so the fecal transplantation procedure may need to be repeated.”

Basically, the best chances of resolving diarrhea for most cats is to stick with more common treatment methods. Going straight to a fecal transplant for the first bout of diarrhea is excessive, and doesn’t dramatically increase your odds of success.

### Bottom Line

“There are still many unknowns about fecal transplantation in cats, but research is definitely underway,” says Dr. Kaplan. “As soon as we determine whether this modality is truly helpful and doesn’t harm the patients, veterinarians will be more comfortable and aggressive about recommending and performing it.”

### The Evidence

A well-documented case of fecal microbiota transplantation in a cat is a case report from Israel published in 2017. This cat was suffering from chronic ulcerative colitis, and had been undergoing treatment without success for about a year. She received a fecal transplant under anesthesia. Her stool showed dramatic improvement within days of the transplant. After five weeks she started having diarrhea again, and a second transplant was performed. *After that she did well long term.*

In 2020, the San Francisco SPCA ran a project evaluating fecal transplants as a treatment for kittens with panleukopenia. Because these kittens were both small and ill, they chose not to sedate and instead gave the transplant enemas once a day for three days in a row. The results of the study were inconclusive – the FMT kittens were more likely to have normal stools and to gain weight, but the control group tested negative for panleukopenia more quickly and had a lower mortality rate. There were also only 38 kittens in the study—22 controls and 16 who received FMT treatment.

# Feline Bacteria Inhibits MRSA

*The healthy bacteria produce antibiotics that kill*

Researchers at University of California San Diego School of Medicine used bacteria found on healthy cats to successfully treat a skin infection on mice. These bacteria may serve as the basis for new therapeutics against severe skin infections in humans, dogs, and cats.

The study, published in eLife, was conducted by specialists in using bacteria to treat illnesses, which is known as “bacteriotherapy.” They looked at methicillin-resistant *Staphylococcus pseudintermedius* (MRSP), a bacterium commonly found on domesticated animals that becomes infectious when the animals are sick or injured. MRSP is an emerging pathogen that can jump between species and cause severe atopic dermatitis or eczema.

The team identified a strain of cat bacteria called *Staphylococcus felis* (*S. felis*) that was especially good at inhibiting MRSP growth, producing multiple antibiotics that kill MRSP by disrupting its cell wall and increasing the production of toxic free radicals.

Bacteria can easily develop resistance to a single antibiotic. To get around this, *S. felis* has four genes that code for

four distinct antimicrobial peptides. Each of these antibiotics is capable of killing MRSP on their own, but by working together, they make it more difficult for the bacteria to fight back.

Having established how *S. felis* kills the MRSP, the next step was to see whether it could work as a therapy on a live animal. The team exposed mice to the most common form of the pathogen and then added either *S. felis* bacteria or bacterial extract to the same site. The skin showed a reduction in scaling and redness after either treatment, compared with animals that had no treatment. There were also fewer viable MRSP bacteria left on the skin after treatment with *S. felis*.

The next steps include plans for a clinical trial to confirm whether *S. felis* can be used to treat MRSP infections in dogs. Bacteriotherapies like this one can be delivered via topical sprays, creams, or gels that contain either live bacteria or purified extract of the antimicrobial peptides.

*Alan M O'Neill A.M., et al. Antimicrobials from a feline commensal bacterium inhibit skin infection by drug-resistant S. pseudintermedius. eLife, 2021; 10 DOI: 10.7554/eLife.66793. Science Daily.n*

# Conquering Cat Allergies

*Work continues to help humans enjoy their cats*

Purina’s Pro Plan Live Clear diet may reduce the availability and effects of a feline protein called “Fel d1” that causes cat-allergic reactions in people. Estimates say up to 10 to 30% of humans may be allergic to cats.

Fel d1 is found in cat saliva (and tears), so when cats groom their coats, they spread this allergen all over their coat. When you pet or hold your cat, you are exposed to that protein. The Purina diet uses antibodies produced in chicken eggs and then sprayed on food to reduce Fel d1 by as much as 47% after feeding it for three weeks. Studies have shown that Fel d1 does not serve any useful purpose for cats, so reducing its production should not be harmful.

In additional research, Saiba Animal Health in Switzerland has developed a vaccine for cats called HypoCat that uses recombinant Fel d1 to stimulate a cat’s own antibodies against Fel d1. Saiba reports that more than 80% of cat-allergic humans have potent allergy-inducing IgE antibodies against this protein. The vaccine utilizes a plant virus as a coating to help. The company would like to have this vaccine available in the United States by 2024. At this time, it appears that cats would need boosters every six months.

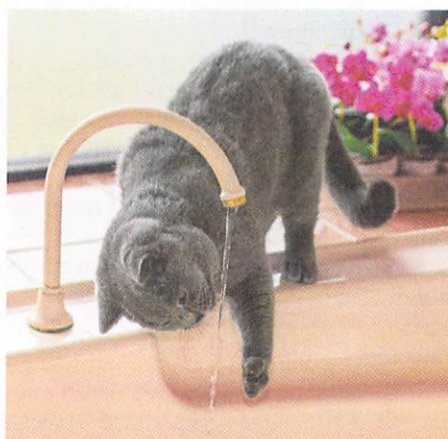
Meanwhile, Nicole Brackett, a postdoctoral scientist at Indoor Biotechnologies in Virginia, is looking at removing the Fel d1 genes in feline tissues (specifically the salivary glands to prevent a cat from spreading the protein while licking while grooming). Theoretically, gene editing could lead to feline embryos without Fel d1.

# Diet and Kidney Disease

## Why not feed all cats the prescription food?

**Q** My calico foster cat came to me with a diagnosis of chronic kidney disease (CKD). She willingly ate wet prescription foods for a long time. When she began rejecting them, she accepted non-prescription wet foods, which I picked because they contained phosphorus and protein amounts that were similar to that of her prescription food. She recently passed away, after spending three years and two months with me.

I now feed my other, healthy cat non-prescription wet food that's relatively low in phosphorus and protein, hoping to save her from Isabell's fate. Is there any evidence that feeding this kind of diet to otherwise healthy cats can prevent the onset of renal disease?



Most of us will do whatever it takes to ensure our kitty takes in adequate water.

**A** Thanks for getting in touch, and I am very sorry to hear of the loss of your beloved friend. I know that this is a very hard thing to go through, and most sincere condolences from all of us here at the Cornell Feline Health Center.

To my knowledge, it is true that the only intervention that has been shown to alter long term outcomes in cats diagnosed with CKD is restriction of dietary protein and phosphorus. While other therapies, including the addition of antioxidants to the diet and the administration of stem cells of various origin, have shown some potential promise in preliminary studies, these have yet to be shown to improve quality of life or survival in cats with naturally-occurring CKD.

Unfortunately, I am not aware of any evidence that shows that any intervention, including dietary modification, can alter the likelihood of the development of CKD in cats. One major limitation in identifying such a potential preventive intervention is that we do not yet fully understand the mechanism of the development of CKD.

Proposed mechanisms for CKD in

cats include autoimmune/inflammatory disease, bacterial/viral infections, and decreased blood flow to the kidney. If and when the mechanism(s) of this common feline problem is worked out, the possibility of identifying an intervention that can prevent its development, and of improved ways to treat it once it develops will almost certainly become more likely.

The fact that we do not yet know how

to prevent CKD in cats, coupled with the knowledge that intervening early in the disease process once it develops improves outcomes, highlights the importance of regular screening of cats in an effort to identify CKD as soon as it develops.

Recent advances such as the use of symmetrical dimethyl arginine (SDMA) as a marker of long-term kidney health and of more advanced algorithms to predict the development of CKD in individual cats using commonly measured biochemical parameters hold promise for improving our ability to detect CKD as early as possible.

The most important intervention at this point, though, is making sure to promote adequate water intake and to bring your cat to the veterinarian at least once yearly until the age of 10 years, at which time twice yearly visits should be instituted. In doing this, the likelihood of catching CKD early is increased, and dietary interventions (along with other measures to address potential anemia, hypertension, and electrolyte problems that commonly accompany CKD in cats) can be instituted.

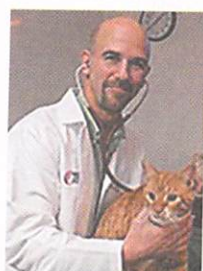
I hope that this is helpful, and we will be sure to inform the cat-loving public of any advances in this important topic in feline health as soon as we become aware of them. ■

## Iron Poisoning Is a Household Concern in Cats

### It's in common household items like hand warmers

**T**he season is upon us for hand and foot warmers (those packets you shake to activate, which then emit heat), but be careful with them. They can be toxic to your cat because they usually contain iron powder. Once the warmers are activated and have cooled, they are less toxic as the form of iron in the product changes. However, the little oxygen absorber packets (found in packaging to absorb moisture and oxygen) are also potentially toxic to your cat because of the iron they contain, and they are just the right size for your cat's batting practice.

Signs of iron toxicity include gastrointestinal signs, such as vomiting, diarrhea, nausea, and not eating. The irritation can lead to ulcers and scarring when the injury heals. Mild cases can be handled at home, but if your cat is caught with any of these items, a call to your veterinarian or the animal poison control centers is recommended. ■



### Do You Have a Health Concern?

Send your health questions to Bruce Kornreich, DVM, PhD, DACVIM, Director of the Cornell Feline Health Center and Editor-in-Chief of CatWatch. Email to [catwatcheditor@cornell.edu](mailto:catwatcheditor@cornell.edu) or send by regular mail to CatWatch, 535 Connecticut Ave., Norwalk, CT 06854-1713.



Scan this code for more information on Cornell Feline Health Center.

### Coming Up ...

- ▶ Solutions for Cat Scratching
- ▶ Feline Hydration Help
- ▶ When Kittens Can Leave the Queen
- ▶ Dandruff and Shedding