

Best Friends BULLETIN



Dear Clients & Friends...

It's been a long time since our last newsletter. 2019 was the first spring since 1994 that I haven't written a spring newsletter. Too many patients to see and not enough hours in the day! Dr. Wilder and I are worn out from getting through our busiest time of year with only the two of us – but we have a light at the end of our tunnel! At long last, our new veterinarian, Dr. Alex Ripperger, starts in late July. We really like her and we hope you do as well! You can find a letter of introduction from her at right.

We have several new staff members since the first of the year, so we've been spending a lot of time on training. That will intensify when our new veterinarian starts. It takes time to train new people to our protocols, computer system and equipment.

Like Dr. Wilder, Dr. Ripperger joins us after a year working at a different practice – so she's a recent graduate but not brand new. She should be up-to-date with her knowledge while also having some experience with surgery, dentistry and client education.

Kimberly is back! She worked for BFVC for several years, then left the practice for a few years. She has been working for us from home for the past year while being a stay-at-home Mom. She will be back in the clinic three days a week, while also still handling phone calls and record checking from home.

Also like Dr. Wilder, we know her pretty well because she spent a summer shadowing our doctors while she was in veterinary school and did one of her senior externships with us as well. She grew up right in Cedarburg, so some of you may already know her or her family. I am so pleased that she chose to work here at Best Friends – there is an

ongoing shortage of veterinarians right now, so she had many other opportunities she could have taken instead.

With Dr. Ripperger's arrival, Dr. Horsch will no longer be part of our regular appointment schedule. We will schedule ultrasound consultations with her on an individual basis. She can usually fit an ultrasound or two into her schedule with a day or two's notice.

We hope you will give Dr. Ripperger a warm welcome!

Nan Boss, DVM

SUMMER 2019

Tidbit..

Veterinarians have been seeing more dogs with marijuana intoxication, primarily from eating their owners' cannabis products. Edible marijuana products that contain chocolate are particularly dangerous for dogs and can cause seizures, coma and death. Dogs love the scent of marijuana and will eat discarded marijuana cigarette butts, marijuana-laced food and even human feces tainted with the drug.

*To the Best Friends Veterinary Center family, hello! My name is **Dr. Alexandra Ripperger**, and I am the new associate veterinarian at BFVC.*



I am absolutely thrilled to be joining the team this summer and look forward to getting to know you and your furry family members in the future. Some of you may have seen me before at BFVC- I was lucky enough to do externships here during my final years of veterinary school. Dr. Boss and everyone at BFVC strives to create a positive clinic culture focused on patient-centered care and superb client education.

Here is a little bit about my background: I grew up on the East Coast, where I spent a lot of time riding horses and caring for goats on my friend's farm. My childhood pets included a guinea pig named Cinnamon and a Soft Coated Wheaten Terrier named Jazz. My family moved to Cedarburg in 2003, and I attended Webster Middle School and Cedarburg High School (Go Bulldogs!). I received my undergraduate degree in biology from St. Olaf College in Northfield, MN. There I played on the volleyball team, was the President of the Pre-Vet Club, and wrote for the college newspaper.

I attended the University of Minnesota for my DVM. In vet school, I had amazing opportunities to learn about and work with animals of all kinds- everything from sled dogs to sea lions! After 8 years of Minnesota winters, I needed something slightly warmer, so I took a position at a busy clinic in the West Loop of downtown Chicago. Living and working in Chicago was a wonderful experience, but I think I'm a cheesehead at heart, and I am very excited to be coming back to Ozaukee County. This summer, you might see me walking my family's current dog, a Sheltie-Poodle mix named Macy, to the Cedarburg Coffee Roastery on the Interurban Trail or playing sand volleyball in a local league.

I hope everyone is having an enjoyable summer, and I look forward to meeting you and your pet at the end of July!

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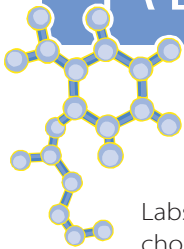
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NEW GENETIC FINDING IN LABRADOR RETRIEVERS



The Labrador retriever is the most popular dog breed in Wisconsin and in our practice. We see 3-4 times as many Labs as the next most common breed in our database, the golden retriever.

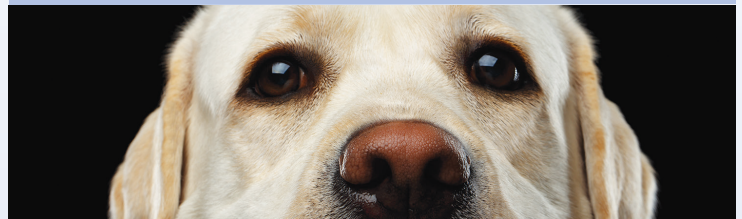
Labs come in three different colors – black, yellow and chocolate. (Coat color is not the same as breed. There is no such breed as a yellow lab. The breed is Labrador retriever and the color is a characteristic or trait.) The chocolate color is recessive, meaning that both parents must carry the gene in order for any puppies to be born chocolate in color. If B codes for black hair and b codes for brown hair, and B is dominant, BB, Bb or bB will all lead to black hair. Only bb will lead to brown hair. This is why black labs are more common than chocolate labs.

As with all breeds, Labs are prone to certain inherited diseases. A new study conducted by investigators at the University of Sydney, in Australia, and the Royal Veterinary College in London looked at health care data for 33,320 Labrador retrievers. The most commonly reported conditions in these dogs were ear infections (10.4%), obesity (8.8%), degenerative joint disease (5.5%), lameness (4.4%) and periodontal disease (4.2%). None of this is surprising.

Now here's where it gets interesting. The study broke the data down further to compare numbers by coat color. 44.6% of the dogs in the study were black, 27.8% were yellow and the remaining 23.8% were chocolate. Chocolate labs had a higher risk for ear infections, dermatitis, musculoskeletal diseases and cancer. Otitis was identified in 12.8% of black labs, 17% of yellow Labs and 23.4% of chocolate Labs. The incidence of hot spots – moist, superficial skin infections – was more than double in chocolate Labs than in the other colors. Sadly, this increased susceptibility to disease is leading to a life expectancy that was quite a bit shorter – an average of 10.7 years for chocolate labs versus 12.1 years for black and yellow Labs.

Other interesting Lab genetic facts:

- ◆ Labrador retrievers have been found to be more attracted to water than to social stimuli (humans or other dogs). Labs love to swim!
 - ◆ A birthday in summer or fall is more likely to lead to atopy.
- Labs have some risk for diabetes mellitus. Being spayed or neutered increases that risk. Diabetes is more frequently diagnosed in the winter months.
- ◆ Labs have increased risk for kidney damage caused by Lyme disease.
 - ◆ 12% of Labs in one study had low serum IgA levels. IgA is a form of immunoglobulin, a component of the immune system. Immunodeficiency is associated with recurrent infections of the mouth and nose as well as increased susceptibility to immune-mediated disease.
 - ◆ Exercise-induced collapse is carried by 18-38% of Labrador retrievers, with the incidence varying depending on location. It is more common in some local populations than others. 1.8-13.6% carried two copies of the abnormal gene that codes for this disease. Of those, 83.6% had suffered at least one episode of collapse by age four.
 - ◆ Laryngeal paralysis-polyneuropathy syndrome is a condition in which nerve function to the larynx (the voice box) is damaged, followed by nerve function deficits in the hind legs. Hoarse, noisy breathing is usually the first sign noticed. Difficulty walking is usually present within 6 months. Affected dogs are usually euthanized within a year due to increasing difficulty with breathing and walking. 65% of affected dogs are male and 46% are Labs.
 - ◆ Altogether, there are about 70 genetic disease of this breed, including 16 different orthopedic conditions, 12 kinds of cancer, 10 eye diseases, 6 skin problems, 5 neurological conditions and 4 kinds of heart disease.



NEW PRODUCTS



Smart Rabies tags

are state-approved aluminum Rabies tags with added benefits. They have a QR code on the back that lets you access pet health records – you can pull up a Rabies certificate or vaccine records right on your phone, and upload pictures, pet insurance or license numbers, contact information and other data you want to keep handy. They also serve as a GPS tracking device, so you can see your pet's location on Google Maps, plus if someone finds your pet and scans the QR code you will automatically receive a text message to alert you. We will soon be able to offer you a choice of a regular tag or a smart one when we vaccinate your pet.

Pentosan polysulfate

is a molecule similar to glucosamine that restores the mucous lining of the bladder. It is an injection delivered into the bladder via a needle or urinary catheter. We can use it when we do surgery to remove bladder stones, when we treat a cat with a urinary obstruction or in chronic cystitis cases. It's not expensive so it will be a great addition to our protocols for treating these problems.

in-house culture kits

that give us results in just 16 hours, so we can quickly know what type of bacterial or fungal infection is present. Standard cultures sent to the lab take days to return results. We can use the new kits for skin, wound or urinary tract infections.

ESSENTIAL OILS AND CATS

BY KIA BENSON, DVM, ASSOCIATE VETERINARIAN, PET POISON HELPLINE



Essential oils are volatile, organic constituents of plants that contribute to fragrance and taste. They are extracted from plants via distillation or cold pressing. Essential oils are utilized in a variety of ways: as insecticides, in aromatherapies, personal care products (e.g., antibacterials), flavorings, herbal remedies and liquid potpourri.

Essential oils can pose a toxic risk to household pets, especially to cats. They are rapidly absorbed both orally and across the skin, and are then metabolized in the liver. Cats lack an enzyme system in their liver that dogs and humans have, and thus have difficulty metabolizing and eliminating certain toxins like essential oils.

Cats are also very sensitive to phenols and phenolic compounds, which can be found in some essential oils. The higher the concentration of the essential oil (i.e. 100%), the greater the risk to the cat.

Essential oils that are known to cause poisoning in cats include oil of wintergreen, oil of sweet birch, citrus oil (d-limonene), pine oils, Ylang Ylang oil, peppermint oil, cinnamon oil, pennyroyal oil, clove oil, eucalyptus oil, and tea tree oil. Symptoms that develop depend on

the type of oil involved in the exposure and can include drooling, vomiting, tremors, poor balance, respiratory distress, low heart rate, low body temperature, and liver failure.

Diffuser Types and Health Hazards

Until recently, the use of essential oils for aromatherapy was restricted to such devices as candles, liquid potpourri products, room sprays, passive diffusers, or applying it to skin like perfume.

The main hazard to cats from essential oils dispersed through passive diffusers is respiratory irritation, unless the oil in a passive diffuser gets onto a cat's skin or is ingested in some way (e.g. the

diffuser tips over onto or near the cat, or the cat ingests a personal diffuser). Inhalation of strong odors or fragrances can cause some cats to develop a watery nose or eyes, a burning sensation in the nose/throat, nausea leading to drooling and/or vomiting, and difficulty breathing.

Difficulty breathing in a cat is evidenced by labored breathing, fast breathing, panting, coughing, or wheezing. NONE of these signs are normal in cats. A coughing episode in a cat can be mistaken by owners for the cat trying to vomit up a hairball. However, in this case the cat crouches low to the ground, with little to no abdominal movement that is more typical of vomiting. No hairball is produced.

Cats suffering such symptoms need to be moved immediately into fresh air, and require emergency veterinary treatment should their symptoms not quickly resolve once they are in fresh air. Cats with pre-existing respiratory issues such as asthma, airborne allergies, or cats exposed to second hand smoke from their human companions, are at greater risk for developing severe respiratory irritation than cats without such conditions.

Recently, active essential oil diffusers have hit the market. The active diffusers differ from passive ones in that actual microdroplets or particles of oil are emitted into the air in addition to the pleasant aroma of the oil. Nebulizing diffusers (pressurized high-speed air stream and an atomizing nozzle) and ultrasonic diffusers (electric current causes an instrument to emit a vibration) fall into this category.

The droplets dispersed by these new diffusers may be small, but they still pose a risk to cats. Depending on how close the cat is to the dispenser, the essential oil microdroplets may collect on the cat's fur if it is the same room as the active diffuser. The oil can be either absorbed directly through the skin, or ingested when the cat grooms itself.

Drooling, vomiting, tremors, loss of balance, respiratory distress, low heart rate, low body temperature, and liver failure can potentially develop depending on the type of essential oil that was used and the dose that the cat was exposed to.

Like oil and water, essential oils and cats really do not mix. Owners should be cautious using essential oils and diffusers in their homes in order to protect their cat(s) from a toxic risk. Most importantly, concentrated essential oils should never be directly applied to cats.

Pet Poison Helpline, an animal poison control center based out of Minneapolis, MN is available 24/7 for pet owners and veterinary professionals that require assistance treating a potentially poisoned pet. The staff provides treatment advice for poisoning cases of all species, including dogs, cats, birds, small mammals, large animals and exotic species. As the most cost-effective option for animal poison control care, Pet Poison Helpline's fee of \$59.00 per incident includes follow-up consultations for the duration of the poison case. Pet Poison Helpline is available in North America by calling 800-213-6680. Additional information can be found online at www.petpoisonhelpline.com.

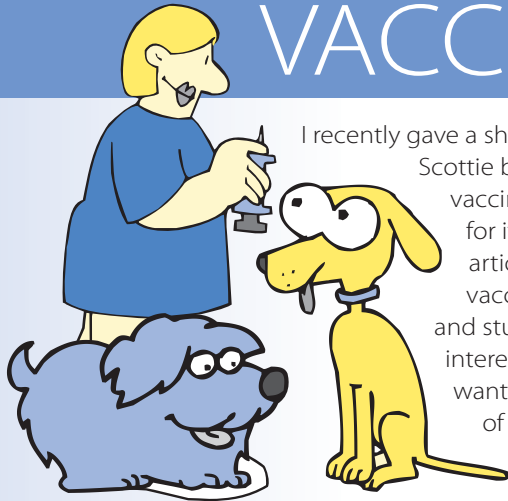


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VACCINATION UPDATE



I recently gave a short lecture to a Scottie breed club on vaccinations. To prepare for it, I reviewed some articles on recent vaccine developments and studies. I found it an interesting subject that I wanted to share with all of you. This is a timely topic because anti-vaccination sentiment that

has been decreasing vaccine rates in humans has also affected vaccine rates in pets. As with humans, when an insufficient percentage of a population is immunized, unvaccinated pets are left at high risk for acquiring infectious diseases.

As I learned in reading in the newspaper and Time magazine articles, human immunologists aim for 95% of a population to be vaccinated in order to prevent a disease outbreak. Measles has started popping up all over the country because vaccination rates are currently only at around 90%, leaving 10% of the population able to acquire and spread the disease. Vaccination rates in dogs and cats have never even been close to 95%, plus wild animals that are never vaccinated serve as reservoirs for most of the viral diseases we see in pets. Our animal family members have far higher risk for exposure to contagious diseases than we do. You can't count on "herd immunity" to protect your pets, you can only count on what you provide in the way of vaccinations.

Did you know that canine distemper virus is very closely related to measles? Measles is so contagious that merely being in the same room with someone who has it results in a 90% transmission rate to anyone who is unvaccinated. The difference is that measles is rarely fatal, while distemper viruses in cats and dogs have mortality rates of 50-90% or more. In other words, if your unvaccinated pet has no immunity and comes in contact with an infected animal, either directly or indirectly, he or she has a 90% chance of catching distemper and then a greater than 50% chance of dying from it. All your pet has to do is sniff the ground where a sick animal passed by to acquire the infection.

Pet owners tend to worry about vaccine reactions or side effects more than they worry about the infections those vaccines protect against, simply because you don't have any personal experience with those diseases. However, the risk of getting sick from a contagious disease is far higher than the risk for an adverse consequence from the immunization. Vaccines are very safe, and getting safer all the time as technology improves.

There are a lot of different ways to make a vaccine. Killed virus vaccines use the real virus that has been inactivated. Modified-live vaccines contain live virus or bacteria that has been modified so that it doesn't cause disease. These types of vaccines stimulate the immune system strongly, so they are usually very effective. This also means, however, that they are more likely to cause allergic reactions. In the case of modified live vaccines, it's usually not the vaccine itself that's the problem. Instead, the proteins that cause

the reaction come from the animal tissue the virus was cultured on. Egg protein and bovine serum are the most common culture media used, and both can cause allergic reactions.

Newer vaccine techniques include subunit vaccines, where just a portion of the virus was used; surface protein vaccines, where proteins located on the outer coating of the virus are used; and RNA vaccines that utilize a portion of the genetic code of the virus. The smaller the portion of an organism that is used to make the vaccine the less likely it is to cause soreness, fever or other side effects, but the immunity doesn't tend to be as good or as long-lasting. Vaccine technology is all about finding a balance. In order to be effective, the immune system has to be stimulated, which can cause these side effects. If a vaccine is too "smooth" and causes no reaction at all it may not work.

It's important to realize that just because a vaccination causes mild side effects doesn't mean it's dangerous! Severe anaphylactic reactions to vaccines are uncommon. You may hear about or read on the internet all kinds of horror stories about vaccine side effects causing permanent damage to pets but many of these tales are untrue or completely unsubstantiated. Vaccines have saved the lives of more humans and animals than any other advance in the history of medicine, and they will continue to do so. Only if your pet has had major problems from vaccination should you decide to forego vaccines.

You may also find information on titer testing. Titers are blood tests measuring the amount of antibody in the bloodstream that protects against a specific disease. Titers are used to determine if your pet needs a booster or not. I worry about patients whose owners rely on titers to decide whether a booster vaccination is needed. First, we can only titer test for two diseases in dogs, distemper and Parvovirus, and none in cats. Second, there are no studies to tell us what a protective titer is, so laboratories that do the testing give us a result and note whether the titer number is protective or not – but that "protective titer" number isn't based on any real data or studies. Third, a titer only measures one type of immune response out of several, so it gives us a very limited picture of how well the immune system will function if exposed to the virus.

Another factor to carefully consider when deciding whether to vaccinate or not is that viruses change and mutate. The strains of viruses we were vaccinating for ten years ago are not necessarily the same as we are vaccinating for now. As viruses mutate, good vaccine manufacturers develop new and improved vaccines to counteract them. If you are counting on protection from a Parvovirus vaccination your dog received ten years ago it may not protect your pet at all from the strain that he encounters today.

As viruses mutate, good vaccine manufacturers develop new and improved vaccines to counteract them.



For example, a distinct strain of distemper seen only once before was found recently in eight wild animals in Vermont and New Hampshire, including a skunk, a raccoon and two grey foxes. Although the strain has not yet been seen in dogs, distemper is highly contagious, so it may very well end up spreading throughout the country. A new vaccine may be needed to counteract this new viral strain. Some viruses, such as flu viruses in humans and dogs or Calicivirus in cats, mutate very quickly, so even a vaccine given a year ago may no longer be protective.

Distemper and Parvovirus have a fairly long lag period between initial exposure to a virus and the development of symptoms. This allows time for a systemic (injectable) vaccine to counteract the infection and for white blood cells to start pouring out antibodies against it. Some diseases, such as Rhinotracheitis and Calicivirus in cats or Bordetella (kennel cough) in dogs, start replicating in the nasal lining very quickly after exposure. There isn't time for that ramp up of antibody production. Nasalgen vaccines, which stimulate immunity in the lining of the respiratory tract, work far better than injectable vaccinations for these diseases.

Bordetella bronchiseptica, which causes kennel cough in dogs, is very similar to Bordetella pertussis that humans get – otherwise known as whooping cough. As with measles, there have been outbreaks of whooping cough worldwide due to reduced numbers of humans who are vaccinated. Vaccines administered via nose drops are very safe and very effective for prevention of Bordetella.

When disease outbreaks happen, it's the immune compromised or unvaccinated individuals who get the most sick. This includes puppies, kittens, elderly pets, those taking immune suppressant drugs such as steroids or chemotherapy, or those already ill with something else. Many people stop vaccinating when their pets get older but this is actually a vulnerable stage of life where immune function tends to decline. Older pets are more likely to become ill or die from infectious diseases, not less likely. Vaccines should not be withheld simply due to a pet's age.

The duration of immunity after vaccination is different for each individual infection. Vaccinations that protect against viral diseases usually last much longer than those against bacterial diseases. Bordetella and Lyme disease are caused by bacteria, so vaccines for these infections are boosted every year.

The most effective and long-lasting vaccine we have is for Panleukopenia in cats, the feline distemper virus. Vaccinations for this disease that are given in kittenhood may last the entire life of the cat – but the other viral infections included in the feline distemper combination, the FVRCP vaccine, don't last nearly that long. In order to keep protection for rhinotracheitis, Calicivirus and Chlamydia, we end up vaccinating more than we need to for distemper in order to maintain protection for the other viruses in that same vaccination. The same is true for the DHLPP vaccine – each viral infection included in the vaccine wears off at a different rate – so it's confusing to figure out when a booster is warranted.

Interestingly, some breeds of dog have special considerations for immunizations, because a dog's genetics affects how it responds to vaccination. For example, some breeds, especially Doberman pinschers, Rottweilers and pit bulls, don't respond effectively to Parvovirus vaccination, so they need vaccination more often.

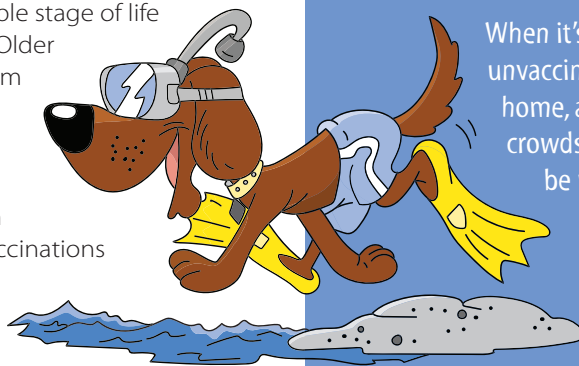
Dachshunds are particularly likely to be allergic to Leptospirosis vaccine, so we are cautious w/ Lepto vaccinations for this breed.

Rhinotracheitis, the most common respiratory infection of cats, is a difficult disease to protect against because it is a Herpesvirus. Nearly all kittens are exposed to this virus and then harbor it in their bodies all their lives. The goal of vaccination for this disease is not to prevent it but to try to keep it under control. Periodic nasalgen vaccination helps to keep up immunity right in the lining of the nose, mouth and eyes, where the virus lingers. Chicken pox is also caused by a Herpes virus and can flare up years later as shingles. The virus has been lingering in the nerve fibers for 40 years or more before it again causes symptoms. In cats, rhinotracheitis can cause eye ulcers or respiratory infections years after the original infection.

As you can tell from all of this, vaccination is not necessarily a simple procedure. What vaccines to administer and when depends on a pet's age, breed, lifestyle and past history. We are always happy to discuss your pet's vaccination schedule and the reasons for our specific recommendations for their health.

Tidbits..

Dogs belonging to people with high levels of the stress hormone cortisol also have high levels of cortisol, suggesting that dogs become chronically anxious in response to their owners' chronic anxiety. The study, published in Scientific Reports, did not find that anxious dogs create chronic stress in their owners, nor did the study authors suggest that chronically stressed people avoid adopting a dog.



When it's time for a trip to the beach, unvaccinated puppies should be left safely at home, as should dogs that don't like water, crowds or other dogs, and owners should be wary of heat and sun exposure. When bringing a dog to the beach, pack a sturdy leash, treats, at least a gallon of water and a bowl, a canine flotation device, canine sunscreen and bags for collecting excrement.

According to a study published in the Journal of the American Veterinary Medical Association, none of 114 homemade cat food recipes evaluated provided adequate nutrition, and many were severely deficient in multiple nutrients. The researchers evaluated recipes found online and in books, and found that only five of the recipes contained adequate amounts of all but one essential nutrient, and numerous recipes included potentially harmful ingredients.

A growing number of animal shelters in the US are using facial-recognition technology to identify lost pets, and the public also has access to the technology. Like shelters, pet owners can upload a photo, details about the pet and contact information to the Finding Rover website in case their pet gets lost.

GENETIC DISEASES OF CATS



Only about 11% of cats in the US are purebreds with a pedigree. Most are the mutts of the cat world, also referred to as random-bred cats. They are categorized by the length of their fur, not by their breed. We call them domestic short-haired cats (DSH), domestic medium hairs (DMH) or domestic long-haired (DLH). These are descriptions, not breeds.

Being a mutt, whether cat or dog, does not protect against inherited diseases. 89% of cats are not purebred but the most common genetic diseases may occur in any cat, both pedigreed and random-bred. Many times the risk of a certain disease is higher in particular breeds but is also present in random-bred cats.

Many genetic diseases are complexly inherited, involving multiple genes in combination with environmental factors and often diet as well. In other words, it is not so simple as to say "If this cat has inherited this gene he will develop this disease." That disease may never occur if environmental or nutritional triggers are not present. For many diseases we don't know what the triggers are or why some cats will develop symptoms of the disease while others who share the same genes do not.

It's important to realize that genetic diseases are generally chronic conditions that we cannot cure. We can't alter the genetics of a given animal. We can, however, recognize and treat patients earlier when we know they are at risk. Early diagnosis and treatment usually gives us better health and longevity, so the goal is to test for these diseases whenever testing is available.

We have had DNA testing available for many dog diseases for a number of years, including DNA test panels that screen for 150 or more genetic problems. We now have this same sort of screening available for cats, enabling us to look at 40 different inherited diseases of felines. The test kit for this screening uses cheek brush swabs to collect cells for testing.

For some diseases, we look directly for symptoms of disease, such as testing blood sugar to look for diabetes. Having the gene for diabetes risk doesn't necessarily mean a cat will become diabetic, so we still need to screen for signs that gene has become active and insulin production has become insufficient.

You will probably be surprised at some of the diseases that are genetic in cats. We don't tend to think of these as inherited but they are – and thus are not curable, only treatable.

1) FLUTD, feline lower urinary tract disease, is one of the most common genetic problems, affecting 1-2% of

domestic cats. This is a complex disease, which may involve increased susceptibility to the formation of mineral crystals in the urine as well as the development of bladder inflammation when stressed. Cats may have one or the other of these tendencies, or both. Persian cats are at increased risk, and Siamese are at decreased risk for bladder problems. Overall, almost equal rates of the development of struvite or calcium oxalate crystal formation but individual breeds may have higher risk for particular types of crystals and stones.

With housing, diet and stressors being equal, only those with genetic susceptibility develop symptoms. A hereditary component has been documented for a similar syndrome in people, called interstitial cystitis. So far, no specific genes and no mode of inheritance has been discovered in cats. (Hundreds of genetic defects have been identified in humans and dogs but we are much farther behind in genetic research in cats.)

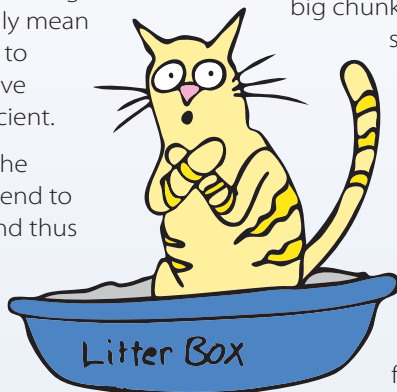
Unless contributing factors are controlled, FLUTD symptoms will likely recur, because we can't cure genetic diseases. Once FLUTD has been identified in your cat you will want to control the factors that trigger the symptoms:

- a. Minimize stress
- b. Use anti-inflammatory medications when symptoms arise
- c. Utilize behavior-modifying drugs to decrease anxiety
- d. Feed a prescription or therapeutic diet from your veterinarian
- e. Encourage water consumption by use of canned food, water fountains and providing cold, fresh water frequently.

2) Diabetes Mellitus (DBM), commonly just called diabetes, is seen frequently in cats. High carbohydrate diets and obesity are the primary triggers, though we see this disease in normal weight cats as well. DBM is primarily seen in random-bred cats, however Burmese, Tonkinese, Norwegian Forest cats and possibly Siamese and Abyssinians have increased incidence. In the DSH, diabetes is possibly due to a mutation to the melanocortin 4 receptor gene, similar to humans predisposed to Type 2 DBM. Controlling obesity with diet is the best preventive measure. It's also the best treatment, with many cats not needing insulin injections if they lose weight and eat a low-carbohydrate prescription canned food.

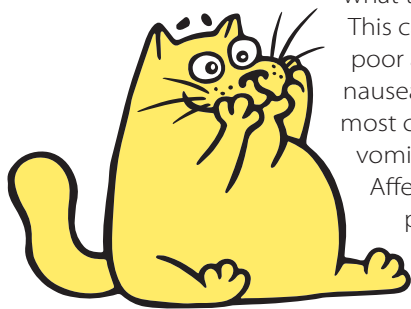
3) Lymphocytic/Plasmacytic Inflammatory Disease is a common diagnosis. Lymphocytes and plasmacytes are two types of cells that are part of the immune system. When these cells invade the intestinal lining or the tissues inside the mouth they cause severe disease. This invasion is a complex immunologic response involving innate, humoral and cell-mediated immunity – in other words, big chunks of the immune system go awry. There are two main syndromes – gingivostomatitis (usually just called stomatitis) and inflammatory bowel disease (IBD). They rarely occur in conjunction but instead cats will develop one or the other.

In stomatitis, the immune system becomes overly sensitized to plaque bacteria on the teeth, causing severe inflammation in the mouth. Affected cats will have bright red, swollen or ulcerated gum tissue, and severe damage to the teeth. They may drool, paw at the mouth or stop eating. Their breath is usually foul. The most effective treatment is extraction of all the



teeth, to physically remove all the plaque bacteria that triggers the inflammation. A similar syndrome is seen in humans, called recurrent aphthous stomatitis.

In IBD, the immune system becomes overly sensitized to bacteria and proteins present normally in the digestive tract. Lymphocytes and plasmacytes invade the lining of the intestine, to fight off



what they perceive as an invasion. This causes intestinal thickening, poor absorption of food, ulcers, nausea and pain. IBD is one of the most common causes of chronic vomiting or diarrhea in cats. Affected cats show a lifelong propensity for inflammatory cell infiltration, so lifelong steroid medication is usually needed. Siamese and related breeds are at increased risk.

Genes for IBD have been identified in German shepherd dogs and humans but not yet in cats.

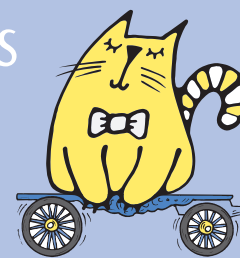
4) Brachycephalic syndrome is the name for the flattened face shape of Persian and Himalayan cats and other related breeds. This face shape makes for cute kittens and cats but it's very abnormal functionally. Affected cats may have respiratory distress, exercise intolerance, nasolacrimal duct collapse, moist dermatitis from tears spilling onto the face, facial fold dermatitis, corneal ulceration, exposure keratitis, dental crowding and periodontal disease. It's a rare Persian cat who makes it to the age of ten still having all its teeth. Corrective surgery may be needed for stenotic nares (small, pinched nostrils), elongated soft palate or chronic infection of nasal skin folds.

5) Polycystic kidney disease is just what the name implies. Cysts form in the kidneys, gradually destroying normal kidney architecture and function, leading to early renal failure. Poly means many, so usually we see numerous cysts. PKD is the most common single-gene feline disease, and is autosomal dominant. This means cats need only inherit one copy of the gene to develop the disease. In fact, having two copies of the gene is generally fatal before birth because the kidneys fail to develop properly. It is present in 6% of cats worldwide, 38% of Persian cats, and in many Himalayans and other related Asian breeds.

PKD is variable in expression and penetrance, with some cats developing only a few cysts and maintaining good renal function while others suffer dramatic, progressive illness. Cats with a positive DNA test for it should have regular ultrasound scans of the kidneys in order to diagnose and treat symptoms as early as possible. Signs usually develop between four and ten years of age, with the average age of onset of kidney failure being seven years. Cats that test positive should not be used for breeding. Anyone choosing to purchase a kitten of a susceptible breed should request DNA testing of either the parent cats or the kitten.

6) Hypertrophic cardiomyopathy, HCM, is the deadliest of genetic cat diseases. It causes gradual thickening of the walls of the heart, until they are too thick and stiff to pump blood adequately. Irregular heart rhythm is common and can lead to sudden death. Heart failure or sudden death usually develops between 6 months and 7 years of age.

Genetics Fun Facts



- *Hereditary = genetic = inherited*
- *Dogs have 78 chromosomes; cats have 38.*
- *An allele is a different version of the same gene*
- *Homozygous means each copy of the gene (one inherited from each parent) is the same, for example BB or bb.*
- *Heterozygous means the two genes are different alleles, for example Bb or bB.*
- *Genes may be dominant-recessive (one or the other, for example a flower may be red if BB, Bb or bB, or white if bb) or co-dominant (the Bb and bB flowers may be somewhere in between, e.g. red + white = pink).*
- *Not every gene, even if dominant, will produce a physical effect in the host.*
- *Penetrance is the proportion of individuals with a particular genotype that demonstrate the characteristics associated with that genotype.*
- *The study of triggers that turn genes on and off is called epigenetics.*

There are several different forms and variations of disease, depending on the breed of cat. 33% of Maine coon cats have a mutation in the myosin-binding protein C gene (MYBPC3) and is autosomal dominant. Homozygous cats, those having two copies of the defective gene, suffer heart failure earlier and more severely. Heterozygous cats have incomplete penetrance – some will become ill and some will not. There is a DNA test available.

20% of ragdoll cats have a different mutation of the same gene as Maine coons, for which there is also a DNA test available. HCM also occurs in random-bred cats, as well as Maine coons and ragdolls that are negative for the MYBPC3 mutations. Some other gene mutation is at fault in those cats. Other breeds have their own specific forms of HCM for which genetic mutations have not been identified. This means that all cats, regardless of breed, are at risk for this deadly disease. ECG screening, ProBNP heart muscle enzyme testing and echocardiograms may all be used to try to detect this disease. It is not usually detectable using chest x-rays.

7) Polydactyly means having too many toes. This is one of the few genetic abnormalities that is actually fun and relatively harmless. We do sometimes have to declaw extra toes when the nails curl around and puncture the skin of an adjacent toe. Polydactyly is an autosomal dominant trait with high penetrance and variable penetrance – so the number of toes varies with the kitten. There is a higher frequency in Maine coons due to selective breeding for this trait. Other breeds may have their own forms of it and there are no DNA tests available for any of those as yet.

8) Atopy is allergy to airborne allergens such as pollens, molds, mildews and dust mites. What causes hay fever symptoms in

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humans usually causes itchy skin in cats and dogs. Overgrooming, skin sores, ear infections, watery or



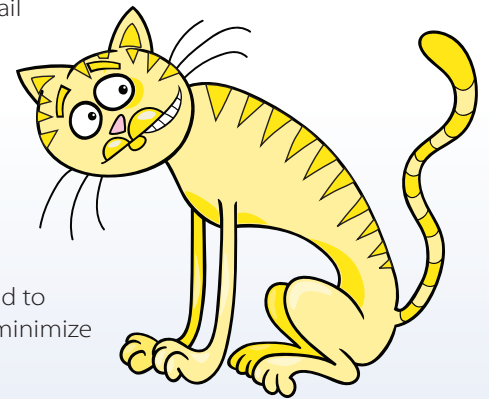
inflamed eyes and occasionally allergic bronchitis are the symptoms. About 1.8% of feline patients will develop atopy, versus 10% of dogs. Most of them are random-bred cats. There is an increased incidence in Abyssinians and Devon Rex cats.

9) Hyperesthesia Syndrome is a disorder of nerve sensation, in which normal touch or stimulation of the skin produces intense itching or pain. Affected cats may attack their own feet or tails or ripple the skin on their back, often yowling or racing through the house, trying to escape the sensation they are feeling. Skin allergies, parasites and stress all contribute to triggering hyperesthesia or making it worse. It is more frequently reported in Siamese, Burmese, Persian and Abyssinian cats. Environmental stressors have been suggested to contribute to the onset of episodes but this has not been proven.

Treatment starts with a diagnosis – we rule out other dermatologic causes such as mites and food allergy before

treating it as a neuro-behavioral problem. There are no specific diagnostic tests and skin biopsies of affected cats will be normal. Effective medications are those used for seizures, anxiety and nerve pain. It may take several trials to find the drug, or combination of drugs, that works best for a particular cat. Acupuncture may be helpful for some cats.

10) Spina bifida, or abnormal formation of the spine and spinal cord, is seen in the bobtail breeds – American bobtail, Manx, Pixie-bob, Japanese and Kurilian bobtails – and occasionally in random-bred cats. In spina bifida, the two halves of the spinal vertebra fail to fuse properly as they develop, leading to exposure or protrusion of the spinal cord. This in turn causes abnormalities in use of the hind legs, and fecal or urinary incontinence. There is variation in expression and penetrance of the bobtail trait, from short tails to absence of all caudal vertebrae, and spina bifida. Tailless to tailless matings are the most likely to lead to spina bifida. Many breeders keep “stumpy” short-tailed cats to breed to “rumpy” tailless cats to minimize risk for spina bifida.



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