The Whole Dog Journal™

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A monthly guide to natural dog care and training

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EDITOR'S NOTE

Inter Nyet

When the stakes are high, it may be unwise to trust the information you find on the World Wide Web.

BY NANCY KERNS

This issue contains, among other things, an in-depth article about canine diabetes. WDJ's ace team of canine health researchers/writers, CJ Puotinen and Mary Straus, have spent months researching this vexing (and increasingly common) disease in dogs. What causes diabetes? What's the best treatment for it? What should I feed my diabetic dog? They've reviewed veterinary texts and reference materials, analyzed the latest studies, and have distilled what they learned into sound, practical information for you.

One of the things they did *not* do was repeat information they found on the Internet. Why? Because on certain complex topics, there is so much contradictory information – with at least half of it wrong! – that it's almost impossible for someone to determine which information is reliable. Matters are made worse when the topic is freighted with a higher-than-average amount of popular "knowledge" and a lot of emotional baggage.

Diabetes is perhaps the perfect example of what I'm talking about. Almost everyone knows someone who has diabetes. Almost everyone knows that obesity puts people at higher risk of diabetes, and that diabetics need to be extremely careful about what they eat. So, as just one example, you will find site after site stating that fat dogs are at a higher risk of developing diabetes than thin dogs – but they are *not!* If you go to more solid sources, such as the veterinary reference book *Encyclopedia of Canine Clinical Nutrition,* you will read statements like, "Although obesity causes insulin resistance in dogs, there are no published data clearly indicating that obesity is a risk factor for canine diabetes." And, "Despite the evidence that obesity causes impaired glucose tolerance, it appears that very few dogs develop overt diabetes as a consequence of obesity-induced insulin resistance."

Here's another example: On the Internet, author after author states that diabetic dogs will require an expensive prescription diet for the rest of their lives, as an important part of their disease control. Not true! In diabetic cats and humans, diet plays a critical role in reducing insulin resistance, so that additional treatment may not even be needed; in *dogs* with diabetes, no diet can eliminate the need for insulin.

The further you drill into the details, the more erroneous information can be found online. I can't tell you how many writers – even veterinarians! – discuss canine and feline diabetes as if they should be treated the same way (not!) or discuss type 2 canine diabetes (dogs don't get this form of the disease).

Everyone makes mistakes. But when I'm looking for reliable information to help with my dog's health or treatment, I count on Puotinen and Straus – that is, after I've driven them both crazy with fact-checking and double-checking and rewriting and reorganizing and checking it all again!

MISSION STATEMENT: WDJ's mission is to provide dog guardians with in-depth information on effective holistic healthcare methods and successful nonviolent training. The methods we discuss will endeavor to do no harm to dogs; we do not advocate perpetrating even minor transgressions in the name of "greater good." We intend our articles to enable readers to immediately apply training and healthcare techniques to their own dogs with visible and enjoyable success. All topics should contribute to improving the dog's health and vitality, and deepening the canine/human bond. Above all, we wish to contribute information that will enable consumers to make kind, healthy, and informed decisions about caring for their own dogs.

Dry It Yourself!

Five things to do to make irresistible, safe treats.

BY GINA SPADAFORI

Making meals from scratch is the only way I know to have exactly what I want for my dogs – no ingredients from places with spotty records for quality assurance, no multi-syllabic additives making a label longer than I like. After I covered the pet-food recall in 2007, I changed the way I eat and the way I feed my pets. For my dogs, that meant commercial products from companies I trusted, along with raw-food meals from regional sources of meat, grains, and vegetables.

It wasn't a huge shift from raw to cooked when my Flat-Coated Retriever, McKenzie, started chemotherapy for soft-tissue sarcoma a few days after her seventh birthday. At the suggestion of her veterinary oncologist, I dropped the carbs, rebalanced the diet with the help of some expert advice, and started feeding "McKenzie Meatloaf" to all three of my dogs. The canine "cancer diet" is essentially carb-free, and cooked to reduce the load of potential pathogens that trouble many veterinarians about diets with raw meat, especially when a dog's immune system is suppressed by medication.

While it was easy to turn a good raw diet into a good cooked one, I ran into a challenge when it came to treats. The solution? A dehydrator. Allow me to share what I've learned about making healthy and irresistible dog treats.

1 IF YOU'RE SERIOUS, BUY A BIG ONE. Dehydrators come in all sizes and price ranges; I went with a fairly large home model from Excalibur. I've been very happy with it, although if I were to do it again, I'd spring for the model with a timer, adding $25 to the cost.

Dehydrators start about $30, and the large one I bought was $250 retail, but I paid $200 online. Check eBay or Craigslist and you can get an even better deal if you are patient; I'm generally not!

For cubed or stripped meats/organs, my nine-tray model will easily dehydrate 20 pounds of meat at once. Because some parts are large (beef hearts are 10 pounds, and livers are large, too) and because I buy even small items in bulk (such as turkey, chicken, or duck hearts packaged in 10-pound bags) I got a large dehydrator so I can process a lot at once.

2 FIND QUALITY MEATS. Join a raw food buyer's group or co-op if one is anywhere near you; then you should be able to get meat from humanely cared-for, local animals at a good price. I buy bulk bags of hearts (chicken, turkey, and beef), liver (chicken and beef), and beef trachea from a raw feeders' co-op about 100 miles from where I live. Other parts are on order, including poultry feet and what are euphemistically called "pizzles" – cattle penis. Even if you don't have access to a buyer's group, a custom butcher should be able to hook you up with products you'll never see in your supermarket.

The biggest surprise? Beef trachea. Raw cattle windpipes – they can be two or more feet in length with a diameter of 3 to 4 inches – are a little hard to handle if you're squeamish. Tracheas are awkwardly shaped, and require the removal of every other tray in my dehydrator to accommodate their height, so I can dry only five of these at a time. But after eight hours in the dehydrator they dry into perfect chews that are easily cut with a bread knife into two pieces that are just right for chewing by my retrievers.

3 READ THE CLEANING AND SAFETY INSTRUCTIONS. You're ready to go after reading the booklet that comes with the machine. Precise drying isn't a problem, since dogs are pretty happy even if you overshoot the "chewy" stage of jerky preferred by humans.

4 SET IT UP SOMEWHERE . . . ELSE. I don't dehydrate in the kitchen; the smell of liver drying at low heat was gag-inducing for me – and hard to ignore for my drooling dogs. After the first batch was done, the dehydrator found a permanent set-up in the garage.

5 PREPARE THE MEAT. This is easy. I rinse the meat, cut it to double the size I want to end with, put it on the racks, and turn on the machine for a few hours. That's it! When it's reached the level of dryness I want, I store the treats in plastic bags or containers in the freezer, taking out a little at a time for freshness.

So what do my dogs think? They love the treats. The poultry hearts and liver are good for training, and the trachea sections are every bit as popular as store-bought chews.

No matter what the future brings for McKenzie, I suspect I'll be using the dehydrator to make treats for my dogs for years to come. It's only been a few months since I bought it, but the dehydrator is nearly paid for in what I've saved by not buying organic, top-quality treats.

A resident of Northern California, Gina Spadafori is a syndicated pet-care columnist and the author of more than dozen books on animals and their care. She is also the writing partner of "Good Morning America" veterinarian Dr. Marty Becker.

Clockwise from top left: Raw beef heart, raw beef trachea, dehydrated turkey hearts, dehydrated beef trachea. "Yum!" says your dog.

Canned Controversy

Consumers are demanding BPA-free cans, but industry isn't ready with an alternative.

BY NANCY KERNS

On March 30, the U.S. Food and Drug Administration announced that it had rejected a petition from environmentalists that would have banned bisphenol A (BPA) from all food and drink packaging. The scientific evidence at this time, said the FDA, does not suggest that the "very low levels of human exposure to BPA" afforded through our diets are unsafe.

"The agency has performed extensive research on BPA, has reviewed hundreds of other studies, and is continuing to address questions and potential concerns raised by certain studies," the news release continued. "The agency takes all concerns about BPA seriously and is evaluating them as part of the agency's ongoing oversight of food safety."

This release generated a tornado of disbelief, skepticism, and contempt from environmental and health activists, who frequently fear that BPA may be poised to kill all of us and our little dogs, too. In recent years, many pet owners have expressed concern about feeding canned food to dogs and cats due to the potential for exposure to BPA. How valid are these concerns?

WHAT IS BPA?

Bisphenol A was first synthesized (with acetone and phenol) by a Russian chemist in 1891. In the 1930s, the substance was found to have the ability to mimic human estrogen in the body, and it was tested as an estrogen replacement therapy for women. In the 1950s, chemists at Bayer and General Electric pioneered its use in plastic manufacturing; its ability to harden plastics – while retaining enough flexibility to keep the material from shattering – made it a wildly popular material.

Over the past 60 years, the industrial use of BPA has become pervasive in the human environment. In addition to its use as a microfilm lining inside food cans (preventing food from chemically interacting with the metal can), it's used in plastic food and beverage containers, baby bottles, dental sealants, CDs and DVDs, medical equipment, sports equipment, eyeglass lenses and more. It's also used to make carbonless copy paper and thermal paper – the kind used in many cash register and ATM receipts.

BPA readily enters our bodies via any contact we have with it. Humans ingest BPA that has leached into foods and beverages that are packaged with it. It can be absorbed through the skin by simple contact with products that contain it. (The amount found to be absorbed through the skin by briefly holding cash register receipts made with BPA is higher, in fact, than the amount that typically leaches into food and beverages from BPA-based packaging.) It also can enter the human body through respiration; studies have found BPA in soil and house dust.

BPA is rapidly metabolized and excreted by the body; its transit time in our bodies is quick. But it can be detected in about 95 percent of the population at any given time. This persistent test result demonstrates that we are subject to *constant* exposure to the substance.

HEALTH EFFECTS

Despite the fact that BPA has been known to be an estrogenic substance since the 1930s, no concerns were raised about its potential for causing health problems as an endocrine disrupter until 1997, when adverse effects of low-dose exposure to laboratory animals were first reported. It has been extensively studied since then, with the varied results one might expect from such a widely used product upon which so much industry relies. Some studies conclude that BPA at the currently accepted levels presents no threat to human health; others warn that the average levels found in humans are above those that cause harm in animals used in laboratory research.

In general, endocrine disrupters cause the greatest harm to animals in the earliest stage of their development, i.e., in utero and as infants. In 2006, a U.S. government panel of experts reviewed the scientific literature available on BPA and concluded that "BPA at concentrations found in the human body is associated with organizational changes in the prostate, breast, testis, mammary glands, body size, brain structure and chemistry, and behavior of laboratory animals." (The U.S. Environmental Protection Agency considers exposures up to 50 µg/kg/day to be safe for humans. No limits for dogs or cats have been established.) Other studies have reported that BPA has adverse effects on thyroid hormone action.

BPA AND CANS

Canned pet foods are probably one of the most likely sources of BPA in our dogs and cats (their diets are far less varied than ours).

Both steel and aluminum (the two most common can materials) must be lined with a barrier material to prevent interactions between the metal and food acids, enzymes, vitamins, minerals, and other substances. Once upon a time, tin was used to line steel cans; this wasn't perfect, either, as it imparted a distinctive "tinny" taste to foods. But for the past 30-plus years, the liner of choice has been BPA. The North American Metal Packaging Alliance (NAMPA) boasts that since the complete industry adoption of BPA-based epoxy resin liners in food and beverage cans, there has not been a single incidence of foodbourne illness resulting from the failure of metal packaging. Unless you're 40 or more years old, you may not even be aware that such a thing was possible!

This reliability would be terrific news, if only BPA didn't leach into the consumable products it was supposed to protect. But it *does* get into the food, and scientists don't even fully understand which chemical reactions are responsible; patterns that completely explain the wide range of BPA levels found in food and beverages do not exist. According to one FDA report, "Large variations in BPA concentrations were found between different products of the same food type and between different lots of the same product." In other words, one brand of green beans may have high BPA levels while another brand of the same type of beans will have low levels. It's even been observed that BPA levels can vary from lot to lot of the same product from the same brand.

THE SEARCH FOR A RELIABLE ALTERNATIVE

According to NAMPA, the industry has made *some* progress in identifying alternatives to BPA, with four materials currently being explored: vinyl, acrylic, polyester, and oleoresins. The organization is not bursting with pride over any of these alternatives, though. "While each offers some of the needed characteristics for use as an interior can coating," NAMPA states, "none of them meet all the performance and safety characteristics currently met by BPA-based epoxy resins . . . . Like BPA epoxy resin coatings, these coatings allow some migration of materials into the food product. Unlike BPA epoxy coatings, however, these alternatives have significant limitations.

"These other can coatings can impart odor and taste to the food product, have less flexibility, cannot withstand high temperatures required for sterilization, and compromise shelf-life, resulting in potentially higher costs and less choice to the consumer. For example, although often cited as the BPA-alternative of choice in the media, oleoresinous enamel is not viable for most food or beverage items. It represents a very small fraction of the overall canned vegetable market because of its limited performance."

Companies that compete in the natural or holistic food niche have called the loudest for alternatives to BPA-based can liners. Eden Foods was a pioneer in this regard; about 10 years ago, when Mike Hall, the founder and president of Eden Foods, learned that oleoresinous enamels were used to line cans before the development of BPA, he asked his can suppliers to go back to that material. Until recently, BPA-based liners were still used for Eden's tomato-based canned foods, because only BPA has been proven to resist deterioration caused by high-acid products. Eden finally gave up the wait for an alternative, though, and now packages all of its high-acid tomato-based products in glass jars.

Pet food companies (especially those that, like Eden Foods, are marketing "holistic and natural" products) are *also* begging canning material suppliers for alternatives to BPA-based liners. But safe and effective alternatives for pet food cans are simply not yet available. It's proving much more difficult to find a reliable can liner for a chemically complex product like pet food than for vegetables. Dog and cat diets need to be "complete and balanced," containing all the proteins, fats, vitamins, and minerals that our pets need. All of these ingredients, as well as the carriers, binders, thickeners, and other "functional" ingredients, have the potential for chemical interactions with the can liner. Formulating such a barrier material requires the testing of hundreds if not thousands of different chemical reactions. Many products have showed early promise, but failed "shelf life" tests.

RELATED ALTERNATIVES

Note that several of BPA's close chemical relatives, including bisphenol A diglycidyl ether (usually abbreviated as BADGE but sometimes seen as DGEBA), bisphenol F, bisphenol F diglycidyl ether (abbreviated as BFDGE), and bisphenol sulfonate (bisphenol S), are also used for lining food and beverage cans; these other products are more frequently used on aluminum cans.

Today, almost all small cans – those that hold 3 to 5.5 ounces of wet food – are made of aluminum and lined with either BADGE or BFDGE. These cans are stamped out of a sheet of aluminum and don't require a welded seam on one side the way steel cans do. A stronger material than aluminum, steel is used for larger cans, and BPA is still considered the most reliable coating for steel. If another coating *is* used in a steel can, the welded seam is almost always coated with a strip of BPA, and then the alternative coating is applied over that.

Unfortunately, like BPA, *all* of these chemicals are estrogenic, and all of them have demonstrated their ability to leach into food and beverages. Further, even less is known about these newer chemicals than about BPA.

MARKETING

The lack of BPA-alternatives for safe, reliable canned pet food liners hasn't kept pet food companies from attempting to competitively describe and market their products. We've seen companies describe their use of BPA as minimal, miniscule, or "less than the amount allowed by the FDA." Some say that they have "discontinued the use of BPA" in their small cans or that "our small cans are already BPA-free." They may state they "are actively seeking out alternatives to BPA," "testing substances to replace BPA," or "phasing out BPA" as soon as they can find a feasible alternative. (Campbell's Soup recently made national headlines with this last claim.)

The thing is, ***all*** of these statements could be said by ***any*** maker of canned foods, and they all mean the same thing. Virtually *all* canneries use only a small amount of BPA-based can lining material, it *all* leaches less than what the FDA allows, and the entire industry is frantically researching and testing alternatives.

Watch also for statements to the effect that "our raw can materials" or the cans themselves have no BPA. Technically, these statements are true of *every* can, too; it's the can *liners* that contain BPA. Tricky!

DECISION TIME

As the FDA recently stated, it's not clear that the amount of BPA present in our (or our pets') diet is a certain health hazard. But for some pet owners, the decision to avoid this particular chemical exposure is easy; they don't or won't feed canned food to their pets.

That's fine if their alternative to canned food is a fresh home-prepared or commercial frozen diet. But it would be unfortunate for pets whose owners won't use these alternatives and who would benefit from a wet diet, such as dogs with kidney disease, senior dogs with poor appetites, and *all* cats (researchers are starting to suspect that many feline health problems are due to eating dry food). And given the ubiquity of this chemical in the modern environment, one can't even be assured that avoiding canned foods will prevent your pet's exposure to BPA.

Teaching Peace

How to raise kids who get along well with dogs and dogs who love kids in return.

BY DENISE FLAIM

I've had my share of litters – and not just canine ones. You see, I'm the mother of triplets. When Stephen, Allie, and Krista came into my life – in that order, a couple of minutes apart – I had two middle-aged Rhodesian Ridgebacks. Blitz and Diva had certainly met children before, and didn't mind them, but the arrival of the babies rocked their world.

Pre-kids, when my husband Fred and I went to work, the dogs lazed around our suburban Victorian, maybe getting exorcised over the occasional oil delivery or Fed Ex dropoff. But post-kids, there was a literal village tromping through the house – grandmothers, babysitters, visiting aunts – and these . . . *creatures*.

Diva, an old hand at motherhood herself, decided avoidance was the best option. Anytime I sat down next to her with a baby in my arms, and a tightly balled fist or bootied foot grazed her, she got up without so much as a sidelong glance and, well, left. It was as if she had concluded that I didn't appreciate her messing with *my* litter any more than she would appreciate me messing with hers.

Blitz, on the other hand, was a basket case. Like many intact males, he had what one behaviorist I talked to eloquently called Old Bachelor Uncle Syndrome. He reacted to my newborn children the same way he did to newly whelped puppies presented under his nose for inspection: "Uh, what *are* these things? Ew, they smell weird. I *thought* I wanted to know, but – actually – no . . . " *Backing away . . . backing away . . . .*

When my triplets started to toddle, he looked at them whale-eyed, just as he did with newly weaned puppies barreling around the room, running in between his legs, millipedes with fur: "What *are* these things? They *still* smell weird. Is one of the going to grab my testicles?" (A concern that proved prophetic.) *Growling . . . growling . . . .*

It was a little unnerving having a 90-pound intact male Ridgeback vibrating like a tuning fork around my little swathed bundles of pinkness. But with my favorite remedy – tincture of time – and some hard-earned experience, we eventually overcame this reluctance. That first year of mixing dogs and babies was stressful, but it taught me more than any *What to Expect...* book could.

In fact, nobody really tells you what to expect when you bring a new baby home to an older dog. The advice books tell you what to do to prepare your dog for the arrival, but there's not much information about how to prepare yourself for what happens when things get a little bumpy.

Here is some hard-earned advice about *both* sides of the fence: acclimating dogs to little kids, and teaching little kids to share a home with four-legged siblings. And while it goes without saying, I'll of course say it: If at any time you are concerned about your dog's behavior, consult a qualified trainer or behaviorist.

DON'T EXPECT PERFECTION

The advice books are only a starting point. Walk around the house with a doll and talk mindlessly to it. Yes, do the whole blanket-from-the-hospital shtick. But it's no guarantee that your dog is going to seamlessly transition from life before baby to the new nuclear-family reality.

Let's face it: Dogs are smart. They know the doll isn't a baby. They also know that everything in their world is changing: As your pregnancy progresses, everything about you starts to morph, from your gait to your hormones to your routine. New furniture shows up. Rooms get rearranged. Your anxiety level peaks.

Any major life change requires an adjustment period, and dogs are no different. Just assume that this will be the case, and provide your dog the space – both mental and physical – to figure things out. When things get hectic, or out of control, give your dog crate time with a good chewie. Don't expect the Norman Rockwell painting out of the gate; for the first few months, it may be more paint by numbers.

Don't change the rules on your dog the day the baby comes home. If she's used to spending time with you on the couch, there is no reason she shouldn't join you *and* the baby. Tell Grandma to look away.

Relax! A few dog germs aren't going to hurt the baby. In fact, studies have shown that very early and regular exposure to dogs and cats prevents allergies later in life!

■ **LISTEN TO THE DOG PEOPLE.** Babies and kids make people emotional – no way of getting around that. Fledgling grandmothers who in other aspects of their lives are unflappable turn into frantic Oracles of Delphi when your pooch so much as looks sideways at the new arrival.

Amid all the confusion and exhaustion of a new baby, it's easy to let other people get into your head. If it's an experienced dog person, that's one thing. But if it's someone whose sum total exposure to canines is a collection of German bisque Dachshunds, then keep that in perspective. People who understand dogs understand canine body language and instincts; people who don't are liable to misinterpret even friendly gestures – "He's LICKING HER! Oh, my God, HE'S LICKING HER!" – and can offer some rather insane advice.

Last week, on a visit to the periodontist, the chairside chatter turned to the assistant's newborn granddaughter, who was coming home from the hospital later that week. Concerned that the family dog was not going to accept the baby readily, the plan was to tranquilize him. I almost swallowed my cotton batting, and as soon as I could come up for air I pointed out that this was a supremely bad idea; in fact, being woozy and out of control of his own body likely would put the dog *more* on edge, not less.

■ **CENTER YOURSELF.** Dogs read your body language, your pheromones, and the animal communicators would say, your thoughts. If you are anxious and worried about your dog's reaction to the baby, you are in a sense encouraging him to be anxious and worried, too. Find that sweet spot between vigilant and freaked out. Practice *feeling* it. Practice breathing normally and not holding your breath when the two are in the room together – that's the first sign to your dog that there is something to be worried about.

Don't run film loops in your head about the worst-case scenarios. Do try to envision a calm, serene encounter. This sounds simple, and in theory it is, but in practice it can be the most daunting hurdle you face, especially if you have a dog who's having difficulty with the new-baby transition.

■ **TAKE BABY STEPS.** The most important thing to remember with anything involving dogs or kids – or dogs and kids together – is that you can't expect a finished product right out of the gate. Plan out your encounters between dog and child (no matter what the age) and start simple: Create tiny successes and build from there.

In my Blitz's case, he exhibited a whole spectrum of emotions, starting with excitement, leaping, and snuffing. When he smelled the babies through the bars of the crib, he breathed in their scent so deeply he sounded like an Electrolux. Once the novelty wore off, and the babies became a fixed part of our routine, bewilderment set in. He was fine as long as they didn't touch him. If they did, panicked looks and grumbling ensued.

We dealt with his behavior in a number of ways. To help center his emotions gently and without drugs, I added some appropriate flower essences to his water, like Walnut for dramatic life changes, Mimulus for fear, and Rescue Remedy to kick it up a notch. (In my experience, when I have found the individual essences that work, adding Rescue Remedy often amplifies their results.) Whenever Blitz was around the babies and he reacted without fear or concern, he'd get a click and a treat. To encourage him to make contact with them, I'd balance a piece of string cheese on, say, the baby's blanket-swaddled feet. (He was the gentlest dog when taking food; don't try this with a chomper.)

Corrections don't work when fear or anxiety is at the root of the problem; they only make things worse. But if I heard a grumble when I sat beside Blitz on the couch with a baby and bottle, he was calmly but firmly ejected from his spot.

Fast forward five years. Blitz was asleep in the parlor; our babysitter was playing a boisterous game of tag with the kids, chasing them around the kitchen island. When their delighted screams reached his ears, he bounced off the couch, trotted to the babysitter, and took her forearm gently between his powerful jaws. She stopped, the kids' screaming died down, and he released her without so much as a tooth mark. Rather than being taken aback, she was pleased: He told her, eloquently but wordlessly, that he was worried about his children, and the screaming needed to stop. *Now.*

When those babies first came home, I would have never thought that scenario possible. But many dogs, like people, just need an adjustment period.

PHOTO BY DENISE FLAIM

The author's son Stephen and Ridgeback Blitz. The big dog wasn't wild about the babies when they first arrived, but clearly learned to relax around them – and eventually came to love and protect them.

■ **CRATE EXPECTATIONS.** The books all say it, and its importance cannot be understated: Your dog's crate needs to be his sanctuary, and it is off limits to kids. I can tell you from experience that preschoolers think a crate is the coolest

kind of playhouse; it's small, it's snug, it's forbidden, and therefore irresistible.

I reserve the sternest kind of rebuke for any kind of messing around with the dogs' crates – not only going in them, but opening them without permission. My children grew up understanding that letting a dog out of his crate at the wrong time could have serious consequences. Being a multi-dog household with frequent visitors who don't always get along with the resident dogs – or who are in various states of reproductive readiness – there are cases where having the wrong two dogs out together could potentially result in disaster. I don't sugar-coat it: If you do this, this and this could happen, and that would be A Very Bad Thing.

Kids aren't the only ones who can mess up in this regard: If you have babysitters, nannies, or visiting relatives who take on dog care as part of their household helping, you can't rely on them to be as vigilant as you would be. In those cases, a snap lock on the crate with a note – "Do not let out!" – reminds them in your absence.

■ **TRAIN THE HUMAN PUPPIES.** Just as dogs need to be trained, so do children. At the earliest age, you can begin to teach the fundamentals of respecting animals and their boundaries. A staple around our house was *Tails Are Not for Pulling*, by Elizabeth Verdick, whose title is a handy catchphrase to repeat when a yank of any body part looks imminent.

In my house, however, the anatomy did not generalize. One day I found 3-year-old Allie crouched beside Blitz, who was sprawled out on his side, long past his initial trepidation about the kids; in fact, as the babysitter story shows, he now fancied himself their personal mascot. As I walked by, Allie reached out to Blitz, who jerked his head up suddenly, then sighed and dropped it to the ground, resigned.

"What did you do?" I asked Allie, who looked very pleased with herself.

"I squeezed his butt," she announced proudly, pointing at his dangly bits.

That occasioned an impromptu "Testicles Are Not for Tugging" discussion, which in turn led to an exploration of physiological gender differences. That's the great thing about having dogs: Being naked all the time, they are great springboards for the "birds and bees" discussions that make some adults so very nervous.

■ **REALITY CHECK.** As Allie's game of tug demonstrates all too clearly, potentially dangerous situations between kids and dogs happen. Even the best-behaved child disobeys now and then, even the most trustworthy decides to see what it feels like to break the rules. I was fortunate that I had a well-temperamented dog with a high tolerance about his personal space among his "pack."

I remember several years back, covering a tragic story for the newspaper that I worked for at the time. A little girl had been strangled to death in the backyard by the family Golden Retriever. The dog was playing tug with her scarf; it was a complete freak accident.

I interviewed experts and behaviorists at the time, one of whom announced definitely that parents should ensure that children and dogs are *never* left unsupervised. I asked if she had kids. Of course, she didn't.

If you have kids, you know that sometimes it's just unavoidable to leave the two species together – if only for a minute to run some laundry to the basement, or check the dinner on the stove. Life happens. Constant supervision is the ideal, but sometimes you just can't be in control of everything. That's not resignation – that's reality.

And 99 percent of the time, things go absolutely perfectly. But then there are those rare, tragic events that remind us that there are two parts to the term "companion dog." Love them as we do, these are animals, with sharp teeth and instincts that we sometimes cannot predict. Always err on the side of caution. You do both your children and your dog a favor in being as conservative as possible, and supervising as much as you can, especially with visiting children in the house. When in doubt, use the crate. A bell cannot be unrung, an egg cannot be unscrambled – and some "mistakes" on the part of an otherwise stable and loving dog can exact a heavy toll.

■ **TEACH KIDS TO SPEAK DOG.** At every age, kids will have new questions about their interactions with the family dog, and you need to keep your antennae primed for them. Just this week, Stephen, now 8, woefully informed me that our newest puppy, Gigi, no longer liked him because she was nipping at him. When I told Stephen that Gigi was getting mouthy because she had been playing with her visiting brother Duke, and dogs wrestle with their mouths just as he and his sisters do with their hands, he broke into a big grin. Gigi not only liked him, he realized; she was trying to play with him.

At an early age, I taught my kids the command "Seek high ground." This is useful when they are nibbling on a cheese stick and are surrounded by a throng of red fur; standing on the couch, mozzarella held aloft like Lady Liberty's torch, they have a chance of keeping it. But the "high ground" cue also works when dogs are playing and the action is intense, or a new dog comes over and is introduced into the pack. The children now understand that when there is a lot of excitement among the dogs, they need to get out of the way, lest they get mixed up and inadvertently hurt if things escalate.

MORE WDJ ARTICLES ON KIDS & DOGS

"Family Planning" – How to protect everyone in the family (the dog, too!) by selecting a good family dog and getting him ready for kids. **August 2009**

"Dog Training Is Child's Play" – How to involve your kids in your dog's training, for best results (and loving bonds). **February 2009**

"Oh Baby!" – Expecting a child? Don't wait until she arrives to work with your dog. **June 2005**

"The Value of Training the Kids" – How to positively train your kids to positively train the family dog. **January 2002**


PHOTO BY THRUMARZENASLENS.COM

Another thing they learned was how their behavior could elicit unwanted reactions from the dogs. If they squealed and ran, chances are the new puppy would pursue, and seek to engage them with those pin-sharp baby teeth. They learned how to redirect puppy nips by offering a toy, and, as they got older, how to dissuade a humper. (Issue a loud, deep, "NO!" and bop on the head, more than once if necessary. I'm all for positive reinforcement, but when I have a 90-pound male Ridgeback looking for a hormone hug with a 70-pound second-grader, we do what works. And that works.)

HARNESS THE HELPFULNESS. Younger children love to be helpers, and mine vie to do even the most mundane tasks: stuffing Kongs with peanut butter; wetting, wringing, and freezing washcloths when teething is going full tilt; filling the water bowl up – and up, and up!

Because I feed raw, I won't let the children help with mealtime. And until they were four or so, I cooked the dogs' food, because I was worried about cross-contamination. The kids have learned to ask, "Have the dogs eaten yet?" which is a signal they are debating whether to permit a doggie kiss on the lips. Our home rule is no face contact for one hour after the dogs have eaten.

When I have a litter, I could not ask for better puppy socializers. My kids are in the whelping box constantly. They delight in handling the puppies, naming them, noting their differences in appearance and temperament. They are never present without adult supervision, and have been taught to be gentle; if they break any rule, they lose their "box" privileges. The frequent contact with the kids results in puppies who are programmed to love children; as adult dogs, when they see a little human, even on the horizon, their bodies waggle and wiggle in delight.

It's important to remember, though, that kids, like dogs, are individuals. My youngest daughter, Krista, could take the dogs or leave them. I suspect both nature and nurture have a hand in being "doggie" – some kids are just more drawn to these furry folk than others, and that's okay.

CHICKEN OR THE EGG? What's the better approach: Get your dog first, and then add the kids? Or acquire the dog as a puppy once the children are old enough, so that there are no adjustment issues?

Tough call, and a very individual one. Your mileage may vary, but, having done both, I have to say – with younger children, at least – the former worked best for me, hands down. I have added three Ridgebacks to my household since I had my kids, and I can honestly say that the amount of time I spent training and socializing them was significantly less. Not to say that my later dogs are hooligans, but in the push-me-pull-you that is parenthood, you can't do it all.

Let your kids know that it's a privilege to enjoy the most fun parts of having dogs, like getting to hang out in the "puppy box." And revoke those privileges if they can't control themselves or play nicely.

Stephen had grown into a loving, caring, knowledgeable dog person! At eight years old, he and his sister Allie have begin to handle dogs in the show ring.

Having dogs first gives you a chance to enjoy them fully, learn their quirks and idiosyncrasies, and lay the relationship groundwork for the challenges that come with kids and an expanding household.

Another advantage to bringing kids into a household with dogs is the immune-system benefit. Studies show that children who grow up with dogs (and cats) are less likely to develop asthma and allergies to a wide variety of allergens, but – here's the clincher – exposure during the first year of life is key. After that, the preventive benefits are severely decreased.

KNOW YOUR BREED. Ridgebacks are the consummate family dog, and once mine recalibrated their definition of our family, we were in for smooth sailing. My babies were foreign things to Blitz until, over time, he came to realize they were ours. Once he understood that, he became their companion, their protector, and their dear friend.

Other breeds may have different default settings. Mastiffs, for example, are hard-wired to adore women and chil-


PHOTO BY DENISE FLAIM

The author and most of her family. Plenty of space is given to the daughter who is not dog-crazy, and quiet crates are always available for dogs who need time away from kids.

dren, even ones they do not know; they may be quicker than my Ridgebacks to embrace new human pack members. Terriers, by contrast, sometimes have less patience with small children. Your breeder or a reliable trainer can help you sort out some of these questions, or give you an in-depth evaluation if your dog is a mix or a rescue of any breed or combination whose history you may not know.

■ **TAKING IT TO THE NEXT LEVEL.** Because I spend so much time at dog shows, I wanted to make them a family affair. I have a special "dog-show bag" in the car that contains games and books that can be played with only at a dog show. This not only keeps the kids distracted when I am showing – frantic calls of "Mommy! Mommy! He hit me!" do not do much for my ring presentation – but also provides incentive to go in the first place.

Stephen and Allie have started to go to handling classes, and I try to reward them with positive reinforcement: A trip for a celebratory smoothie, or a chance to interact with (and sometimes do a few laps with) other dogs in class, including "exotic" breeds like Leonbergers and Bernese Mountain Dogs. The biggest pay-off for them, however, is being told by the instructor that they have done a better handling job than I have. *Ahem.*

Learning the mechanics of any dog sports, from agility to obedience, can be overwhelming – so many nuances to master – and in this the basics of dog training apply: Break the task up into small pieces. Teach the pieces backward. Reward every accomplishment. Don't fixate on the imperfections. Don't drill. Make it fun.

■ **STEP BACK.** Kids and dogs are a lot of work, both can make spectacular messes if not supervised properly, and it takes a lot of time to raise them properly. They bring to the surface all your shortcomings, and in the crunch of bringing them up you confront old patterns and programming that makes you work on yourself, too.

But their gift is their visceral delight in the world that many of us adults lost sight of long ago. When you watch a relationship between a child and her dog – the whispered confidences, the gleeful playbowing, the sheer joy of running in the grass together – you rediscover what it's all about.

And as the dogs turn gray and then white and then are no more – Blitz passed last year, and Diva grows older by the minute, it seems – I don't have any better explanation for the children than the one I give myself: The dogs leave to make room for the new ones to follow, to give us a fresh infusion of joy and wonder at this marvelous, unfolding miracle called life. 🐾

Denise Flaim of Revodana Ridgebacks in Long Island, New York, shares her home with three generations of Ridgebacks, three 8-year-olds, and a very patient husband.

Canine Diabetes

Diabetes in dogs is increasingly common – but it can be controlled and quality of life maintained.

BY CJ PUOTINEN AND MARY STRAUS

For years public health officials have reported a diabetes epidemic among America's children and adults. At the same time, the rate of diabetes in America's pets has more than tripled since 1970, so that today it affects about 1 in every 160 dogs. But while many human cases are caused and can be treated by diet, canine diabetes is a lifelong condition that requires careful blood sugar monitoring and daily insulin injections.

The medical term for the illness is diabetes mellitus (mellitus is a Latin term that means "honey sweet," reflecting the elevated sugar levels the condition produces in urine and blood). Diabetes occurs when the body is unable to produce sufficient insulin to metabolize food for energy, or when the body's cells fail to utilize insulin properly.

The pancreas's inability to produce insulin is known in humans as type 1 (formerly called juvenile or insulin-dependent) diabetes. This is analogous to the type that affects virtually all dogs. Dogs can also develop gestational diabetes during pregnancy.

Type 2 (formerly adult onset) diabetes, which is the result of insulin resistance often linked to diet and obesity, is the most common form of diabetes in humans. Most diabetic cats have type 2 diabetes, but there is no evidence that this form occurs in dogs.

SYMPTOMS

The classic symptoms of diabetes are excessive thirst, increased urination, and weight loss despite normal or increased food consumption. Acute-onset blindness resulting from cataracts can also be a sign.

The diagnosis is easy to confirm with simple tests for glucose (sugar) in the blood and urine.

Other test results linked to diabetes include ketones in the urine, increased liver enzymes, hyperlipidemia (elevated cholesterol and/or triglycerides), an enlarged liver, protein in the urine, elevated white blood cells due to secondary infections, increased urine specific gravity resulting from dehydration, and low blood phosphorus levels.

Canine diabetes may be complicated or uncomplicated. Complicated cases, in which the patient is ill, not eating, or vomiting, require hospital care. Fortunately, most cases are uncomplicated and can be treated at home.

DOGS AT RISK

Diabetes is one of the most common endocrine diseases affecting middle-aged and senior dogs, with 70 percent of patients older than seven at the time of diagnosis. Diabetes rarely occurs in dogs younger than one year of age, and it is more common in females and neutered males than in intact males.

Keeshonds, Pulis, Cairn Terriers, Miniature Pinschers, Poodles, Samoyeds, Australian Terriers, Schnauzers, Spitz, Fox Terriers, Bichon Frise, and Siberian Huskies may be at higher risk. Because of these breed connections, researchers speculate that the development of diabetes may have a genetic component.

An estimated 50 percent of canine diabetes cases are likely linked to pancreatic damage caused by autoimmune disorders. These disorders have many possible causes, including genetic predisposition and environmental factors. Many holistic veterinarians

Six-year-old Penny, who developed diabetes as a puppy, receives her evening insulin shot, one of two she receives each day from owners Melba and Curtiss Lanham. "We move the injections around; we never use just one spot over and over again for the insulin injection," says Melba.

Buster, a 13-year-old Maltese, was diagnosed with diabetes at age 10, after suddenly going blind. Cataract surgery completely restored his vision.

speculate that they may be linked to overstimulation of the immune system from multiple vaccinations, processed foods, and other environmental insults.

Extensive pancreatic damage resulting from chronic pancreatitis (inflammation of the pancreas) may contribute to diabetes in 30 percent of canine cases. Pancreatic disease can also cause exocrine pancreatic insufficiency, or EPI, resulting in a deficiency of digestive enzymes. When a dog develops both EPI and diabetes, the diabetes typically appears several months before symptoms of EPI. (See "Starving, Not Starved," WDJ March 2009, for more on EPI.)

An estimated 20 percent of canine patients develop insulin resistance from other conditions, such as Cushing's disease and acromegaly (too much growth hormone), or from the long-term use of steroid drugs, such as prednisone. (See "Too Much Cortisol," November 2011, for more on Cushing's disease.) In females, insulin resistance may accompany the heat cycle, or gestational diabetes may occur during pregnancy. In these cases, symptoms may disappear when the heat cycle or pregnancy ends. Diabetes may also resolve when steroids are discontinued or Cushing's disease is treated.

Though many people assume otherside, there is actually no clear evidence that obesity causes diabetes in dogs. However, obesity *can* contribute to insulin resistance, making it more difficult to regulate overweight dogs with diabetes. Obesity is also a risk factor for pancreatitis, which can lead to diabetes.

CATARACTS

Cataracts are a clouding of the lens of the eye. Diabetic cataracts are a leading cause of blindness in humans, and the same is true for dogs. The majority of canine patients with diabetes develop cataracts within six months of diagnosis, and 80 percent do so within 16 months. The risk of cataract development appears to increase with age regardless of blood sugar levels, so that even well controlled diabetic dogs can develop cataracts.

Surgery has saved the sight of many dogs. Cataracts treated in the early immature stage have the highest success rate and fewest surgical complications.

Hypermature cataracts create inflammation (uveitis), causing pain, eye redness, and pupil constriction. When uveitis is seen prior to surgery, the success rate for pain-free vision six months later is only 50 percent, as opposed to 95 percent for those with no pre-surgical uveitis.

Phacoemulsification to remove the lens is the preferred surgical method for diabetic dogs. After surgery, an artificial lens is installed for optimal post-operative vision. Although cataracts typically affect both eyes, treating just one can reduce costs (estimated between $1,500 to $3,000 per eye) and still restore vision.

Other potential complications from diabetes include decreased corneal sensitivity, and keratoconjunctivitis sicca (dry eye).

COMPLICATIONS

Concurrent disorders that can make diabetes more difficult to control include hyperadrenocorticism (Cushing's disease), infections, hypothyroidism, renal insufficiency, liver insufficiency, cardiac insufficiency, chronic inflammation (especially pancreatitis), EPI, severe obesity, hyperlipidemia, and cancer.

Diabetic nephropathy, a kidney problem, occurs in 40 percent of human patients and takes many years to develop. The percentage of canine patients with diabetic nephropathy is unknown (it's more common in cats), but its earliest sign is hyperalbuminuria (high albumin levels in urine) followed by an increase in the urine protein-to-creatinine (UPC) ratio and hypertension (high blood pressure), which may contribute to kidney damage. Early changes may be reversed if blood sugar levels improve.

Infections – especially urinary tract infections (UTIs) – are common among dogs with diabetes because sugar in urine makes the bladder an ideal incubator for bacteria. In one study, half of the diabetic dogs tested had occult or hidden urinary tract infections that were not detected by urinalysis. The possibility of UTIs in dogs with diabetes is so great that their urine should be cultured periodically to detect infections. A long course of antibiotics (lasting six to eight weeks) can be administered if needed. Follow-up cultures and frequent retesting are recommended.

Dogs with diabetes are also susceptible to infections of the mouth and gums. Diabetic pets should have their teeth checked regularly and cleaned if necessary. Dental tartar seeds the body with bacteria, and when blood sugar levels run high, infections in important organs can take root. The kidneys and heart are particularly vulnerable. Brushing your dog's teeth daily or at least twice a week helps to prevent and detect early signs of dental disease.

Liver (hepatic) disease is another common problem, resulting from altered fat metabolism caused by diabetes. In one survey of 221 dogs with diabetes, over 70 percent had elevated liver enzymes. Ultrasound tests and biopsies help differentiate between primary hepatic disease and secondary complications of diabetes.

Pancreatitis affects an estimated 40

percent of dogs with diabetes. See "A Pain in the Pancreas," November 2008 for information on this disorder.

Hyperadrenocorticism, or Cushing's disease, is another complication. In one study, 23 percent of dogs with diabetes tested positive for Cushing's. Most canine patients with both disorders develop Cushing's disease before the onset of diabetes. About 10 percent of dogs with Cushing's are also diabetic.

Hypothyroidism (an underactive thyroid) may coincide with diabetes. In the study mentioned above, 9 percent of diabetic canines were hypothyroid. While the glucose intolerance caused by hypothyroidism could lead to the development of diabetes, it's unlikely to be a major factor because the two don't often occur together. However, thyroid hormone deficiency can result in insulin resistance, complicating glycemic control. Thyroid hormone replacement should be instituted gradually in dogs with diabetes since their insulin requirements will decrease and, without dosage adjustments, severe hypoglycemia may occur (see "Hazards of Hypoglycemia," next page).

It makes sense to test diabetic dogs for hypothyroidism and hyperadrenocorticism, but only after their diabetes is controlled. Otherwise, the diabetes will affect test results.

Hyperlipidemia usually improves as blood sugar levels are controlled. Persistently elevated triglycerides may be linked to Cushing's disease and can increase the risk of developing acute pancreatitis. Reducing fat in the diet can help to lower triglyceride levels. Elevated cholesterol is often linked to hypothyroidism.

Insulin resistance can be caused by hypothyroidism, Cushing's disease, infections, pancreatitis, drug therapy (corticosteroids), obesity, acromegaly, estrus (heat cycle), and anti-insulin antibodies. Insulin resistance should be investigated in patients who need doses of 1 unit or more of insulin per pound of body weight.

SURVIVAL STATISTICS

With proper treatment, dogs with diabetes have survival rates very similar to those of non-diabetic dogs of the same age and gender, though their risk is greatest during the first six months of treatment, when insulin therapy is introduced and glucose levels are being regulated. Diabetic dogs are more likely to die of kidney disease, infections, or liver/pancreatic disorders than of diabetes itself. But once their condition stabilizes, diabetic dogs can lead happy, healthy lives.

Consider Buster, a 13-year-old Maltese belonging to Mary Butler in Northern California. Buster was diagnosed with diabetes three years ago after suddenly going blind due to cataracts.

"He had lens implants within a month

HAZARDS OF HYPOGLYCEMIA (LOW BLOOD SUGAR)

Hypoglycemia is a serious risk factor in diabetes management. Recent studies suggest that approximately 10 percent of diabetic dogs experienced hypoglycemic episodes that required hospitalization. One large survey found that the majority of diabetic dogs presented for hypoglycemia were receiving high doses of insulin (0.7 units or more per pound of body weight).

Overdosing, double-dosing, and persistent dosing despite weight loss or reduced food intake are common iatrogenic causes of hypoglycemia. (Iatrogenic diseases are caused by medical treatment.) Strenuous exercise or maldigestion caused by EPI, bacterial overgrowth, inflammatory bowel disease, or other digestive disorders can also lead to hypoglycemia in diabetic dogs.

If you're ever uncertain about whether insulin was administered, the safest option is to withhold the injection. The consequences of missing a single insulin dose are negligible, while overdosing can be fatal. Never add more if you are unsure, including if some insulin spills while you give the injection.

Changes in body weight may require insulin dosage modifications. Dietary changes, particularly reduced carbohydrates, may require a reduced insulin dosage to prevent hypoglycemia.

Severe hypoglycemia resulting from too much insulin can cause seizures, irreversible brain damage, and death. Warning signs include nervousness, hyperexcitability, anxiety, vocalization, muscle tremors, lack of coordination, wobbliness (the dog may appear drunk), and pupil dilation.

If these signs are seen, the dog should be fed immediately. If the dog can't or won't eat, rub Karo syrup, pancake syrup, honey, or even sugar water on her gums before calling your veterinarian. If immediate improvement is not seen, transport your dog to the vet after feeding for further care, such as intravenous glucose. Don't give any more insulin until you have consulted with your vet, as insulin may need to be reduced for a few days, or long term.

When your pet's condition stabilizes after a hypoglycemic episode, a glucose curve can help to determine why this happened and what a more appropriate insulin dose might be. A glucose curve is a series of blood sugar measurements made after insulin is given. Typically, blood samples are taken every 1-½ to 2 hours for 10 hours, or until the effects of the insulin injection can be determined. For ease of understanding, measurements are plotted on a graph whose points usually form a curve. Glucose levels can be monitored at home, improving the accuracy of the data.

Cerebral edema caused by insulin overdose can result in temporary blindness or behavior changes. These signs often resolve over several weeks or months.

If a concurrent illness causes prolonged loss of appetite, the patient should be hospitalized for blood glucose concentration monitoring and treatment with rapid-acting insulin and intravenous fluids supplemented with glucose and potassium.

Five years ago, Gryffin, then age 4, was diagnosed with diabetes and given up for adoption. Since he got on the right brand of insulin for him and his raw diet, he's been thriving.

and has had perfect vision ever since," says Butler. "My little guy has been stable ever since his diagnosis. He has lots of energy, his coat is thick and shiny, his stools are formed and regular, and his teeth sparkle. I do brush his teeth three times a week, which I am sure helps."

TREATMENT AND MONITORING

Your veterinarian is your best advisor when it comes to medication. There are many different insulin products, and individual responses vary. Finding the right insulin for your dog may require experimentation.

Insulin varies in terms of onset, peak, and duration of action. Most dogs do well with intermediate-acting insulin, such as Humulin N, though some do better with long-acting insulin or mixtures that combine different types. It's important to use only fresh insulin, switching to a new bottle every 6 to 8 weeks, and to use the correct syringe, which will vary depending on the type of insulin.

Alise Shatoff of San Diego, California, adopted her dog Gryffin five years ago at age four, when he was surrendered after developing diabetes. She feeds a commercial raw diet and says, "We have found that Gryffin does best on Humulin N. This one works really well for dogs on a raw diet. Gryffin has been nice and stable on the Humulin N for four years now."

Porcine (derived from pigs) and recombinant human insulin most closely resemble insulin produced by dogs, so they usually work best. Although beef insulin was successfully used before the advent of other choices, it is no longer recommended for dogs because it may result in the production of anti-insulin antibodies, leading to poor glucose control.

Diane Di Salvo of Madison, Wisconsin, whose dog, Scout, developed diabetes two years ago, notes that, "Walmart sells Humulin insulin for *way* less than vets and other pharmacies. It is the exact same insulin that Eli Lilly makes for all pharmacies, but it is packaged for Walmart under their ReliOn brand."

Insulin is typically administered twice a day, immediately before or after a meal. Feeding just before giving insulin may be safer, to be sure that the dog eats, because without food the insulin's effect would be dangerous. Assuming your dog is a chow hound, feeding her after administering insulin can be a reward for submitting to the injection.

However, most dogs don't mind the injections, which are done with very thin needles. Carol Albert of Kensington, Maryland, has a Cardigan Welsh Corgi, Henry, who developed diabetes four years ago. "Henry gets insulin shots twice daily after meals," says Albert. "He knows he will get a treat after the injection so he comes looking for me after he eats to get his shot."

Henry, a four-year veteran of diabetes, doesn't mind his insulin injections, since they're always followed by a treat!

It is important to give insulin injections properly. One of the most common reasons for problems in achieving regulation is that the owner doesn't inject the dog correctly. If possible, have your veterinarian observe you giving insulin to your dog. Also see the links to information on giving insulin in "Resources," page 17.

When a dog is first diagnosed, frequent monitoring, such as every one to two weeks, may be required until the patient is stable and doing well. After that, monitoring every three to six months (veterinary exam, blood test, urinalysis, and urine culture) is recommended.

Scout, who developed diabetes two years ago, also suffered from urinary tract infections, a common problem in diabetic dogs.

Measuring fructosamine (glycated serum protein) is a helpful way to monitor glucose control. If it's not possible to run glucose curves, this test would be the next best option. Blood glucose fluctuations leave a metabolic mark that lasts a week or two, and fructosamine reflects the average blood glucose over that time span. Because fructosamine looks at averages, it will not distinguish excellent control from wide swings of high to low glucose readings, but even with this limitation, fructosamine is worth including in periodic monitoring tests.

Ketones are water-soluble compounds produced as by-products when fatty acids are broken down for energy in the liver and kidneys. Dangerously high levels of ketones, called ketoacidosis, can lead to diabetic coma or death. Symptoms include nausea, lack of appetite, and lethargy. Ketoacidosis is often linked to concurrent pancreatitis, urinary tract infection, Cushing's disease, or other types of infection or inflammation.

Ketostix are used to detect ketones in urine and can be obtained at any pharmacy. Finding ketones occasionally is not a problem, but a positive dipstick three days in a row requires a veterinary visit.

THE RIGHT DIET

In *humans* and *felines* with type 2 diabetes, diet is a major component of the illness's cause *and* treatment. Because the culprits are carbohydrates and obesity, weight loss and a high-protein, low-carb diet are sometimes all the treatment that is needed.

But for dogs with type 1 diabetes, *there is no single recommended diet.* The most important factor is that the dog likes the food and eats it willingly. Most diabetic dogs can be well managed with an adult maintenance diet. A prescription diet is not required. If the

dog has another illness, feed a diet appropriate for that illness.

Try to feed the same amount of the same type of food at the same time each day, ideally in two meals 12 hours apart. Any change in carbohydrates will affect the amount of insulin needed. Some dogs may need a snack between meals to keep glucose levels from falling too low.

Fiber and carbohydrates are controversial topics in diabetes treatment, and recommendations are changing. Only a few nutritional studies have been done on dogs with diabetes. Different dogs respond differently to varying amounts of fiber and carbohydrates, and dietary needs vary depending on whether a dog is underweight or overweight, so there is no "best diet" for this disease.

Diabetic dogs may not need a low-fat diet unless they have concurrent pancreatitis, Cushing's disease, elevated triglycerides, elevated cholesterol, or lipemia (fatty blood). However, since the majority of diabetic dogs do have one or more of these concurrent diseases, and since pancreatitis can occur at any time (and chronic pancreatitis may cause problems before it is diagnosed), the majority of diabetic dogs will do better on a diet that is moderately low in fat. To be safe, avoid feeding high-fat diets.

The amount of protein in the diet should be normal or increased, especially for overweight dogs and for underweight dogs with muscle wasting or EPI. Protein should be increased when fat is decreased, to avoid feeding too many carbohydrates.

UNDERSTANDING CARBS

Carbohydrates are responsible for the greatest changes in postprandial (after-eating) blood sugar levels. There is a strong association between the insulin dosage requirement and the carbohydrate content of the meal, regardless of carbohydrate source or type. Keeping the amount of carbohydrates in the diet steady is the best way to keep insulin needs stable.

The *glycemic index* measures the effects of carbohydrates in food on blood sugar levels. It estimates how much each gram of available carbohydrate (total carbohydrate minus fiber) in a food raises blood glucose level following consumption of the food, relative to consumption of glucose. Glycemic index charts that list hundreds of human foods are widely published.

Low-glycemic foods release glucose slowly and steadily, while high-glycemic foods can cause a more rapid rise in blood glucose levels. Low-glycemic foods include most fruits and vegetables, legumes, some whole grains, and fructose. Medium-glycemic foods include whole wheat products, brown rice, sweet potatoes, potatoes, sugar (sucrose), and honey. High-glycemic foods include white rice, white or wheat bread, and glucose.

Simple carbohydrates (sugars, such as corn syrup or propylene glycol, which is found in semi-moist foods) should be avoided, as they cause rapid glucose spikes.

Complex carbohydrates (starches) are digested more slowly so that the rise in glucose is spread out and there are no quick spikes. Processing can affect how quickly carbohydrates are digested.

Carbohydrates are digested faster than fats and proteins, and they have the most effect on postprandial glycemic response and insulin needs. Depending on when the insulin effect peaks, it may be important to include a certain amount of carbohydrates in meals so that the peak effect of injected insulin will coincide with the rise in glucose and not contribute to hypoglycemia.

Highly digestible diets designed for dogs with sensitive stomachs can contribute to higher blood glucose levels after eating, which is not the best thing for a diabetic dog.

THE FIBER FACTOR

Dietary fiber or roughage is the indigestible portion of plant foods. Fiber slows gastric emptying and the digestion of carbohydrates, which also slows the release of glucose, blunting its postprandial rise (blood sugar increases less after meals). Diabetic dogs do not necessarily need more fiber than healthy dogs, and most do well with moderate amounts of fiber. Dogs with poor glycemic control may benefit from increased fiber, but *some* diabetic dogs do better with less.

There are two types of fiber. Soluble (also called viscous) fiber ferments in the colon, creating gases. Insoluble fiber is metabolically inert, absorbing water as it moves through the digestive tract. Unlike soluble fiber, insoluble fiber does not produce intestinal gas.

Examples of soluble fiber include fructo-oligosaccharides (FOS), pectins, guar gum, lactulose, and psyllium. Most soluble fiber, with the exception of psyllium, is also fermentable. Beet pulp provides mixed soluble and insoluble, moderately fermentable fiber.

Prebiotics are fibers that are both soluble and fermentable (see "Praise for Prebiotics," April 2012). Prebiotics feed probiotics, the beneficial bacteria that live in the digestive tract and make up an important part of the body's immune defenses. As it ferments, soluble fiber also produces beneficial short-chain fatty acids (SCFAs).

Too much soluble fiber can cause diarrhea and gas, and can actually speed postprandial glucose absorption. Gas is most likely to develop when the fiber is first introduced or when the dose is suddenly increased. To help prevent this side effect, start with small doses and increase gradually.

Insoluble fiber, such as cellulose and bran, regulates intestinal transit time, speeding it during constipation and slowing it during diarrhea. Insoluble fiber increases stool volume, is generally well tolerated even in high doses, and may help with glucose control.

However, in large quantities, insoluble fiber can decrease the diet's nutrient value by binding minerals. Other side effects associated with diets high in insoluble fiber include weight loss, a lack of interest in food, poor coat quality, vomiting, voluminous feces, flatulence, diarrhea, and constipation. Increased fiber is not recommended for underweight dogs, dogs who refuse to eat because of the fiber's taste or texture, or dogs who experience adverse side effects.

It is important to provide ample fluids when adding fiber because they pull water from the body, which can lead to constipation and other problems if fluid intake is insufficient.

Examples of products that contain soluble fiber include Benefiber (wheat dextrin) and Hydrocil (psyllium). Citrucel is an example of a product that contains insoluble fiber (methylcellulose).

GENERAL GUIDELINES

The amount of starch in the diet is not as important as making sure it's consistent and properly balanced with insulin. Dogs fed diets containing more starch may need more insulin or a different type of insulin than dogs fed a low-carb diet.

Limiting carbohydrates may reduce postprandial hyperglycemia (high blood sugar), but if the dog continues to have

wide glucose level swings throughout the day on a low-carb diet, he might do better with more carbohydrates. If dietary protein is reduced for any reason, carbohydrates will usually increase, especially if fat is restricted. Dogs with gestational diabetes may benefit from a diet that is high in protein with restricted carbohydrates and fats, as long as their nutritional needs are met.

If a thin dog fails to gain weight once there is good glycemic control and the food intake is adequate (and not too high in fiber), concurrent EPI may be interfering with digestion. Overweight dogs who fail to lose weight once their diabetes is controlled may be getting too much insulin.

"We know that in both dogs and cats, obesity in general is a problem," says David Bruyette, DVM, DACVIM, medical director at VCA West Lost Angeles Medical Hospital, "and obese dogs and cats tend to be resistant to the effects of insulin, so we want to have animals at an ideal body weight. If they are too heavy, they can develop insulin resistance, and if they are too thin, they can develop ketoacidosis."

Next month we'll review diabetes diets in detail, but for now:

- The most important factor is that your dog likes his food and eats it willingly every time.
- Most diabetic dogs can eat a typical moderate-fiber maintenance diet. They don't need a high-fiber prescription food.
- It is fine to feed a high-protein diet, but that is not a requirement.
- The diet must be consistent, particularly in the amount of carbohydrates, and should be fed in the same quantities at the same time each day.
- Not every diabetic dog requires a low-fat diet, but because of the disease's strong links to pancreatitis and other fat disorders, a diet moderately low in fat may be safest, even for dogs who have not been diagnosed with pancreatitis, Cushing's disease, or hyperlipidemia.

EXERCISE

Exercise has a dramatic effect on blood sugar levels. In humans with type 2 diabetes, exercise reduces blood sugar so effectively that patients who walk or jog reduce their need for added insulin.

But for those with type 1 diabetes, including dogs, exercise can be both a blessing and a complication. Exercise can reduce insulin resistance in obese diabetics, but too much exercise can lead to hypoglycemia (see "Hazards of Hypoglycemia," page 13).

Exercise should be consistent in terms of the type of activity and time of day, avoiding intermittent or unplanned strenuous exercise. One good approach is to exercise the dog for 20 to 30 minutes before the evening meal and its administration of insulin. Additional exercise can be added to the day's activities if the insulin dose is adjusted. For example, if a strenuous hike is planned, the morning insulin might be skipped or only half of the usual insulin administered in order to avoid exercise-induced hypoglycemia.

RECOMMENDED SUPPLEMENTS

Some supplements may help your diabetic dog while others should be added with caution or not at all. Anything that helps lower blood glucose levels may change insulin needs.

When using human supplements, give the full human dose to large dogs, half that much to medium-sized dogs, and ¼ the adult human dose to small dogs. Tiny dogs require even smaller doses.

L-Carnitine, a conditionally essential amino acid, plays a pivotal role in fatty acid metabolism. It may help control diabetes, improve fat metabolism, maintain lean body mass, and protect muscles from catabolism during weight loss. As little as 50 mg milligrams per kilogram (2.2 pounds) of dry food may make a beneficial difference. Note that beef is a particularly good source of l-carnitine, with about 80 mg per 3-ounce portion.

Chromium supplements are often recommended for human diabetes patients (especially those with type 2 diabetes), but don't seem to benefit a dog's type 1 diabetes. This supplement is recommended only for dogs with a chromium deficiency.

Zinc is an important mineral for diabetic patients, but it's toxic to dogs if too much is given. Supplementation should be limited to a standard human or canine vitamin-mineral supplement daily.

The **omega-3 fatty acids EPA** and **DHA** may help to reduce blood lipid levels (hyperlipidemia) and inflammation as well as regulate the immune system. Human studies show, however, that too much may reduce glycemic control in some patients. EPA and DHA are found in fish, most fish oils, and some algae supplements. An appropriate dose might be 300 mg combined EPA and DHA per 20 to 30 pounds of body weight daily (or per 10 pounds of body weight for hyperlipidemia or kidney disease), preferably split between meals.

Probiotics and **cranberry extract** can help to prevent urinary tract infections. D-mannose works the same way as cranberry, by preventing bacteria from adhering to the bladder wall, but it is a sugar and some research has found that it may make blood sugar levels harder to control in humans with diabetes.

Digestive enzymes may be helpful for some dogs, particularly those who have had pancreatitis (dogs with EPI need prescription-strength enzymes). See "Improving Digestion," page 22, for more about enzymes.

Some products affect blood sugar levels and so should be avoided or used with caution. **Licorice** can elevate blood sugar, while **devil's claw, ginger,** and **marshmallow** can lower it. **Amitraz,** the active ingredient in **Preventic** collars, **Certifect** (new flea and tick control product), and **Mitaban** (used to treat demodex), can

What you can do . . .

- **If your dog shows symptoms of diabetes, seek veterinary care at once.**
- **Work with your vet to determine the right type of insulin and the right dose.**
- **Take your dog for frequent veterinary checkups.**
- **Learn how to give insulin injections and reward your dog for accepting them.**
- **Consistently feed your diabetic dog the same type of food at the same time of day.**
- **Report any unusual symptoms or reactions to your vet.**

cause elevated blood sugar and should not be used in diabetic dogs.

Glucosamine, on the other hand, should be safe for diabetic dogs. Early research suggested it might raise blood sugar, but more recent and reliable studies refuted those findings. Monitor blood sugar levels after starting to be sure.

TREATS

Between-meal treats are important, whether they're training tools, blood sugar stabilizers, afternoon snacks, or rewards for submitting to blood tests and insulin injections.

Avoid treats that are high in carbohydrates or sugar, including all semi-moist commercial foods and treats that use propylene glycol or similar ingredients.

Dehydrated meats make excellent treats, but be sure to avoid those made in China. Chicken jerky treats (also called tenders or strips) manufactured in China have been linked to kidney failure in dogs. Check package labels carefully.

Because dried meat or poultry treats made in the U.S. can be expensive, many pet owners make their own. Simply cut meat or poultry into thin slices for drying in a food dehydrator or baking in a slow oven (250 to 300 degrees F) until they reach your dog's preferred state of crunchiness.

Other between-meal treats that are safe for diabetic dogs include green beans – raw, cooked, canned, or frozen – or fresh, crunchy snap peas or carrot sticks; sardines or tuna packed in water; small amounts of canned pumpkin (plain, not the pie mix); freeze-dried liver; dried salmon; hard-boiled eggs; cheese (be careful of too much fat); bully sticks; dried beef tendons; chicken feet; and most low-carb treats formulated for dogs or cats.

Despite four years of diabetes, Zachary enjoyed life to age 15, thanks to holistic care and careful charting of his blood glucose levels, insulin injections, and food.

RESOURCES

- **GLYCEMIC INDEX**
  Revised International Table of Glycemic Index (GI) and Glycemic Load (GL) Values – 2008: mendosa.com/gilists.htm

  University of Sydney Glycemic Index (searchable database): glycemicindex.com
- **CANINE DIABETES (INFORMATION FOR OWNERS OF CANINES WITH DIABETES MELLITUS):** caninediabetes.org
- **PET DIABETES EASY REFERENCE LIST**
  petdiabetes.com
- **INSTRUCTIONS FOR GIVING INSULIN INJECTIONS**
  veterinarypartner.com/Content.plx?A=631
  www.vetmed.wsu.edu/cliented/diabetes.aspx
- **DAVID BRUYETTE, DVM, DACVIM, VCA WEST LOS ANGELES ANIMAL HOSPITAL, LOS ANGELES, CA**
  (310) 473-2951; vcahospitals.com/west-los-angeles
- **SUPPORT GROUPS**
  DiabetesPet (associated with caninediabetes.org and petdiabetes.com): groups.yahoo.com/group/diabetespet

  Oscar's Animal Diabetes Support Group: groups.yahoo.com/group/Oscars_animaldiabetes_support

  DiabetiCritters: groups.yahoo.com/group/diabeticritters

  K9 Diabetes: k9diabetes.com/forum

  Canine-Diabetes Forum: forum.caninesupportgroup.com

  Blind Dogs: groups.yahoo.com/group/blinddogs

IT'S AN EFFORT

Caring for a dog with diabetes can be time-consuming, expensive, and stressful. In fact, the initial diagnosis can be overwhelming.

According to Dr. Bruyette, "Several studies have shown that euthanasia is a common cause of death in diabetic dogs and cats mainly as a result of the owners' concerns, real or perceived, regarding the care of pets with diabetes. It is very important that we emphasize to pet owners that while diabetes is a chronic disease, it can be well controlled with minimal disruption of their lives while maintaining their pet's quality of life."

Sheila Laing of Lansing, Michigan, cared for her Lab/Shepherd-mix, Zachary, for four years after he was diagnosed with diabetes at age 11. "Zachy was my soulmate and my teacher," she says. "I am so lucky that I was able to help him lead a healthy normal life in his senior years in spite of the diabetes. People need to know that diabetes doesn't have to be a death sentence. It can be managed!"

Coming next month: Diabetic diets in action; menu planning; and success stories.

CJ Puotinen lives in Montana. She is the author of The Encyclopedia of Natural Pet Care *and other books and a frequent contributor to WDJ. See "Resources," page 24 for book purchasing information.*

Mary Straus is the owner of DogAware.com.

Mean on Leash?

Why otherwise friendly dogs may behave aggressively when on-leash.

BY PAT MILLER, CBCC-KA, CPDT-KA, CDBC

If you hang around with other dog owners, you've no doubt heard the same comment I have, over and over again: "My dog is fine with other dogs when he's off-leash; he's only dog-aggressive when his leash is on." You may have even said it yourself.

The reason it's an often-heard comment is that it's a common behavior: A lot of dogs who are fine with other dogs when left to their own devices become aggressive if they are leashed when they meet other dogs.

We know that aggression is caused by stress. (See "A New Threshold," WDJ October 2010.) Clearly, there is something about being on a leash that a lot of dogs find stressful enough that it prompts aggressive behavior. There are several reasons for this. Let's take a look at each of them.

LEASH INTERFERENCE WITH NORMAL SOCIAL INTERACTION

Picture in your mind two dogs meeting and greeting, off-leash. They engage in a social dance – advancing, retreating, moving around each other, sniffing various body parts, giving body language signals intended to keep the interaction civil. Sometimes the movements are slow; sometimes they are quick. If one dog is cautious or fearful of the other, he can retreat as he wishes, using social distance to keep himself safe.

Now picture those same two dogs meeting on-leash. The dance is stilted, inhibited by the restraint of the leash. One dog tries to circle the other, and the leash tangles around his legs. The cautious dog would like to retreat to safety, but knows the leash restricts his movement, and elects to act out his second option to increase distance – a growl and a snap to signal to the other dog to move away – who cannot, because he is leashed. The fight is on.

In the future, the cautious dog will offer a growl and snap before he's close enough for the other dog to make contact. The best defense is a good offense. Alarmed, owners move away from each other, and the fearful dog's aggression is reinforced by the increased distance. Behaviors that are reinforced repeat and increase, and the cautious dog's aggression escalates as he realizes that it's a successful behavior strategy for him – it keeps other scary dogs away. You now have a leash-aggressive dog. Absent the leash, he still chooses to move away from the other dog – his first behavior choice.

The tense, tall, forward posture of the Labrador – caused by his pulling on the ineffective choke chain – looks very similar to an aggressive posture, and could cause the other dog to be defensive.

Again, the impression that is given to other dogs (and nervous owners of other dogs) by the posture created by the dog's frustrated pulling on the leash is one of aggression, whether the dog is aggressive (yet) or not.

As much as possible, keep your leash (and body language) loose. Keep breathing, and reward your dog for breathing, too!

LEASH RESTRAINT FRUSTRATION

This is the dog who would love to visit with other dogs, on- or off-leash. In fact, you have reinforced his "I wanna go see the other dog!" behavior by frequently allowing him to greet other dogs on-leash, being careful to keep the leash loose, as your instructor showed you in class, to avoid having the leash interfere with the dogs' normal social interaction. However, sometimes owners of approaching dogs give a clear indication that they don't want to allow their dogs to greet yours. You politely comply, restraining your dog with his leash to hold him back.

Your dog, who suffers from low impulse control and low tolerance for frustration, becomes highly aroused when his desire to greet the other dogs is thwarted. His frustration and arousal turn into aggression, and your dog is labeled as "reactive." Absent the leash, he would have happily greeted other dogs without any frustration or aggression.

OWNER PRESENCE AS A STRESSOR

Stories abound of dogs who are ferocious if the owner is in the room, or holding the leash, yet turn into pussycats when the owner leaves or hands the leash off to someone else. One possibility is that the dog is protecting his owner. Another more likely one is that the owner's presence gives a fearful dog enough confidence to act aggressively, but the dog shuts down when the owner leaves. Yet a third and perhaps most likely explanation, is that the owner is stressed in anticipation of the dog's behavior in the proximity of other dogs, as well as other coming events – such as obedience ring competition. The stress of the human is an added stressor for the dog who is well aware of his owner's emotional distress (they are masters at reading human body language, remember?) and that's enough to put him over his aggression threshold.

PRIOR NEGATIVE ASSOCIATION WITH EVENTS THAT HAPPENED ON-LEASH

If you ever made the mistake of punishing your dog for inappropriate behavior toward other dogs on-leash, you may have given him a negative association between the leash and the presence of other dogs. Verbal corrections, a jerk on the leash or, horrors, a zap from a shock collar, are all stressors that your dog might now associate with the presence of another dog when he's on his leash. That added stress can cause him to be aggressive when he otherwise might not have been.

Perhaps he was attacked by another dog when he was on his leash. Attacks can create very strong negative associations; you will often see a dog who is on-leash-aggressive toward a particular breed, type, or color of dog that reminds him of a prior aggressor.

TIGHTENING OF THE LEASH AS A STRESSOR/TRIGGER

Sometimes introductions seem to be going well until one owner turns to leave, and pulls on the leash to get her dog to come along. Suddenly a fight breaks out for no apparent reason other than the leash tightening.

If things were already a bit tense between the dogs, the tightening of the leash can easily trigger an aggressive outburst. For one thing – it's a stressor. Imagine if you were engaged in conversation with someone, and someone grabbed your arm – or worse, your shirt collar – and tried to pull you away. Annoying, yes? Well, annoying equals stress – perhaps enough stress to trigger an outburst.

For another, picture two dogs standing nose-to-nose, with some tension between them. Now envision the dog's body language when his owner pulls back on the leash. The opposition reflex (scientifically named "thigmotaxis") causes him to lean forward, tighten his muscles and stand a little taller – all of which mimic an assertive, perhaps aggressive body posture in a dog. If the annoyance-stress isn't enough to trigger aggression in that dog, his offensive body language is likely to trigger an aggressive response from the other dog. You can find an excellent example of this phenomenon on this YouTube video: tinyurl.com/krl2zv.

WHAT TO DO

Each of the causes for on-leash aggression has its own remedy. Some require preventative action – proactive steps that reduce the likelihood of future aggression. Others respond well to intervention in the actual moment of

CALM, SLOW BREATHING

Radio talk show psychologist Dr. Joy Browne offers her listeners a stress-reducing "Square Breathing" technique. To relax before or during any potentially anxiety-producing experience, try square breathing: Inhale to the count of four, hold to the count of four, exhale to the count of four, and hold for four. With practice, you can increase each side of the "square" to a count of eight or even 20; the longer the count, the slower and more calming the breathing.

Meanwhile, Dr. Karen Overall, veterinary behaviorist at the University of Pennsylvania, teaches a similar behavior for stressed canines. Teaching a dog to take a breath works exactly the same way that it does for us. The intake of a deep breath gives both species a chance to take in oxygen and pause long enough for our brains to begin to work instead of react.

(Editor's note: Dr. Overall talks both about asking the dog to "hold his breath" and to "breathe." Obviously, he can't do both at the same time. When he stops panting and closes his mouth, he is "holding his breath." Then, when you see his nostrils flare, he is breathing. Both help to stop his panting, slow his respiration rate, and decrease his stress.)

According to Overall:

"Dogs, like humans, cannot learn new behaviors if they are distressed. In fact, we all best produce the needed brain chemicals to make lasting memory if we are attentive enough to watch carefully but not so attentive that we are overly concerned. Most dogs about whom clients are concerned and/or who have truly pathological behavior are not calm enough to learn and use new information, especially if part of that information is learning to be calm.

"Heart rate, attentiveness, and respiratory rate are all linked. If we can teach a human or a dog to take slower, deeper breaths, they relax, their heart rate decreases, and they can be more attentive to focusing on the task at hand. These responses are all coupled to changes in hormonal and other chemical signals that shift the brain's and body's reactivity from a system ready to act on a threat to one ready to focus on learning, not reacting.

"The first step for dogs is to teach them to hold their breath as a way to learn deep breathing and focus, as follows:

"1. Start to teach the dog to take a deep breath by asking the dog to sit and 'look' at you for a food treat held near your eyes.

"2. Next, quickly move the treat from your eyes to a point a few inches in front of the dog's nose, without giving the treat. Say the word 'breathe.' Watch carefully here to ensure that the dog remains calm. If the dog becomes more agitated, you will benefit from working with a trained, certified dog trainer or trained veterinary professional who can help you to desensitize the dog to food moving toward his nose.

"3. The dog's nostrils will usually flare as he smells the treat, and because he cannot sniff something and pant at the same time, the dog will hold his or her breath.

"4. As soon as you see that the dog has held his breath and/or flared his nostrils, immediately deliver the treat and praise your dog.

"5. Practice for a few minutes until you are certain that you know what you are looking for and that your dog is giving it to you. It can be difficult to see nostril flares in dark-faced dogs, but once you learn what a nostril flare looks like on your dog, you will know it.

Practice calm breathing with your dog at home, and as you and your dog gain competence, practice in gradually more distracting environments.

"6. As your dog gets better at responding to the 'breathe' request, start to delay the delivery of the treat a few seconds at a time.

"7. Within a short while you will have a dog who holds his breath and slows his heart and respiratory rate, and so becomes more focused and relaxed. If you only reward the most focused and relaxed states, your dog will progress nicely.

"It does not usually take more than five minutes to teach a dog to hold his or her breath, even if the dog is very hairy or the nose is dark, making the nose tough to see, but it may take longer for you to recognize and encourage the behavior. You will need to be observant and quick, and not linger with presenting the food as an olfactory stimulus."

potential aggression. They all require that you keep a cool head when you identify possible trouble spots.

LEASH INTERFERENCE WITH NORMAL SOCIAL INTERACTION

I make it a pretty strict rule not to introduce dogs while still holding leashes. My dog-to-dog introduction routine involves letting the dogs see each other from a distance and, if all appears copacetic as the dogs near each other, dropping leashes and letting the dogs interact normally, without human interference. If the meeting unravels, we can grab leashes and separate the dogs without risking a close encounter with flashing teeth. If all goes well, however, we remove leashes after a moment or two of greeting, and allow the dogs to play freely.

LEASH RESTRAINT FRUSTRATION

My rule about "no greetings on-leash" works well to proactively prevent leash-restraint frustration. Because my dogs aren't in the habit of routinely greeting other dogs on-leash, they don't develop that expectation, and therefore don't become frustrated when it doesn't happen. I teach my dogs that when they are on leash, they are with me, and their job is to pay attention to me. Only when and if I drop the leash and give them the "Go play!" cue do they expect to interact with an approaching dog.

For this reason, we do not teach an on-leash greeting exercise in our good manners classes (greeting humans, yes; greeting dogs, no). We aim to convince our students of the value of the no-greeting rule from Day One of their first class, in part to decrease the potential for on-leash frustration-aggression. (If your class instructor wants you to participate in an on-leash dog-to-dog greeting exercise, feel free to politely decline.)

OWNER PRESENCE AS A STRESSOR

This one might be more about you than it is about your dog. I generally counsel my clients not to leave their dogs in the hands of strangers – even veterinarians. Without you there to protect your dog, some may resort to inappropriate use of force to coerce your dog into cooperating. Forcible restraint is likely to exacerbate your dog's stress and resulting aggression. Your veterinarian may be able to get the job done, but your dog's behavior could escalate and worsen with each subsequent encounter.

You need a two-pronged approach to this behavior – modification protocols for your dog and you. Meditation, yoga, biofeedback, and other self-calming procedures are useful to train and remind yourself to stay calm during interactions that might otherwise cause your dog to react to your stress with aggression. "Square breathing" is one simple technique you can use to calm yourself and reduce your own stress. You can also teach your dog to breathe, and then ask him to breathe on cue – reducing his stress – and giving you something to think about and do, which also reduces your stress. (See "Calm, Slow Breathing," opposite page.)

PRIOR NEGATIVE ASSOCIATION WITH ON-LEASH EVENTS

The greater the intensity of the prior negative association, the harder you will have to work to overcome it.

If your dog has perceived that the presence of another dog causes pain or discomfort to his neck – from the shock of an electronic collar, the pinch of a prong collar, or even the choking of a flat collar – start by changing the equipment.

Then implement a counter-conditioning and desensitization program to other dogs. Dog at a distance makes chicken happen (the other dog needs to be far enough away ("sub-threshold") so as not to elicit an aggressive response to your dog). Let him look at the other dog; feed him chicken. Let him look again; feed chicken. Look – feed. Look – feed. Over and over, until, when he sees another dog his brain thinks "Chicken!" – and he no longer stresses over the presence of the other dog.

Then gradually decrease the distance between your dog and the other dog, and increase intensity of the stimulus in other ways: multiple dogs, more movement from the dogs, direct eye contact with the other dogs, offset walking (walking in the same direction but not right next to each other); parallel walking (next to each other, dogs on the outside humans on the inside); offset approaches, and finally, direct approaches.

If your dog was actually attacked by another dog on one or more occasions, the negative association may be even more intense, and modification even more of a challenge. If the mere presence of another dog is a very strong stressor for your dog, you may want to seek the assistance of a behavior professional for your modification program, and a veterinary behavior professional, for a discussion of behavior modification medication.

LEASH TIGHTENING AS A STRESSOR

The solution for this is absurdly simple: just teach your dog that the tightening of the leash reliably predicts wonderful stuff. You need your dog, on-leash, and a large supply of his favorite treat, cut into pea-size pieces. Now pull gently on his leash – and feed him a treat. Do this multiple times, until a tug on the leash prompts your dog to turn happily to you in anticipation of a goodie. Then increase the pressure on the leash, and the duration of the pressure. Next, practice the "leash pressure equals treat" game in the presence of increasing distractions, and finally in the presence of other dogs.

Identify and address the specific cause of your dog's on-leash aggression; manage his on-leash behavior to prevent the frustration, arousal, stress, and fear that are the root causes of his undesirable behavior; give him new associations with the presence of other dogs; and keep him safe from inappropriate social interactions (canine *and* human), and he will be well-positioned to succeed.

Pat Miller, CBCC-KA, CPDT-KA, CDBC, is WDJ's Training Editor. She lives in Fairplay, Maryland, site of her Peaceable Paws training center, where she offers dog training classes and courses for trainers. Pat is also author of many books on positive training, including her newest, Do Over Dogs: Give Your Dog a Second Chance at a First-Class Life. *See page 24 for more information.*

What you can do . . .

- **Avoid dog-dog on-leash greetings to prevent frustration aggression.**
- **Identify the motivation for your dog's on-leash aggression and address it accordingly.**
- **Teach yourself and your dog to do deep breathing to reduce both your stress levels.**

Improving Digestion

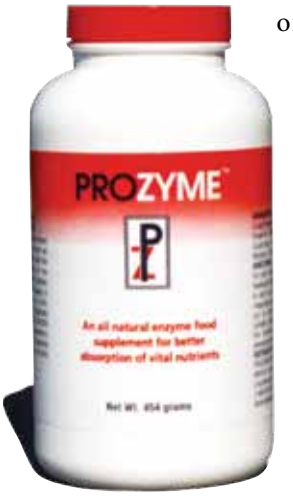
Digestive enzyme supplements provide a variety of benefits, especially for older dogs.

BY MARY STRAUS

All dogs need digestive enzymes in order to break down their food, making the nutrients available for absorption. In most cases, the pancreas produces ample enzymes and no supplementation is required. Older dogs and dogs with digestive disorders may benefit from enzyme supplementation. Dogs with exocrine pancreatic insufficiency (EPI), where the pancreas is no longer able to produce enzymes, require prescription-strength enzymes in order to survive. Digestive enzymes might also help dogs with food allergies and intolerances.

■ **BENEFITS:** Digestive enzyme supplements can benefit dogs who are unable to produce enough of their own enzymes due to pancreatic damage linked to acute or chronic pancreatitis, EPI, or diabetes. Older dogs produce fewer enzymes as they age, and may also benefit from the addition of digestive enzyme supplements, especially if they are underweight. If your dog suffers from gas, borborygmus (rumbling noises from the gut), frequent diarrhea, soft or voluminous stools, or stools that contain a lot of mucus, digestive enzymes may help.

Enzyme supplements are derived from plant, animal, and microbial sources. Animal-source enzyme supplements contain pancreatin from the pancreas of pigs or cows. Pancreatin provides protease, lipase, and amylase, used to digest protein, fat, and carbohydrates, respectively. These supplements may work best for dogs with pancreatic damage.



Microbial and plant-derived enzymes are frequently used together. Microbial enzymes are usually synthesized from fungal sources via fermentation, and have strange-sounding names, such as various *Aspergillus* fermentation products, *Trichoderma longibrachiatum,* and *Rhizopus oryzae.* Plant-derived enzymes include papain (from papaya) and bromelain (from pineapple). These enzyme products often supply lactase (used to digest lactose), cellulase (cellulose), and other enzymes in addition to protease, lipase, and amylase. Microbial and plant-derived enzymes are often combined with probiotics (beneficial bacteria) for more complete digestive support, and are usually less expensive than pancreatin products.

Digestive enzyme supplements may help reduce coprophagia (eating feces), both by making the stool less attractive, and by increasing nutritional absorption so that the dog may no longer seek to eat stools.

■ **CAUTIONS:** While many dogs benefit from the use of digestive enzymes, they can also cause undesirable side effects. If you give your dog a digestive enzyme product that causes loose stools, gas, vomiting, or signs of discomfort after eating, discontinue right away. You might try a different type of enzyme product to see if that works better for your dog. Problems are more common with pancreatin products; microbial and plant-derived enzymes are less likely to cause any adverse effects.

Enzymes are deactivated by temperatures above about 120 degrees, so do not warm foods after adding digestive enzymes, or add enzymes to hot foods.

Enteric-coated products made for humans might pass through a dog's shorter digestive tract without being utilized.

■ **DOSAGE:** There are no specific dosage recommendations for digestive enzymes other than the prescription-strength enzymes needed for dogs with EPI, which are often highly concentrated (for example, 6x means it is 6 times stronger than plain pancreatin). These products should not be used for healthy dogs. Follow label instructions when using products made for dogs, or adjust the dosage of human products for the size of your dog (e.g., half the human dosage for a dog weighing 50 to 60 pounds).

■ **RECOMMENDED SOURCES:** There are many different brands of digestive enzyme supplements. Here are a few examples:

- **Animal Essentials' Plant Enzymes and Probiotics** (888-551-0416; animalessentials.com)
- **In Clover's OptaGest** (877-987-7387; inclover.com)
- **NaturVet Digestive Enzymes** (888-628-8783; naturvet.com)
- **PetLabs360's DigestAbles** (888-738-7360; petlabs360.com)
- **ProZyme's ProZyme Original** and **ProZyme Plus** (800-522-5537; prozymeproducts.com)
- **Thorne Veterinary's DipanVET** and **Similase** (800-228-1966; thorne.com)

■ **MORE INFORMATION:** See "Starving, Not Starved," WDJ March 2009, for more information on EPI.

Mary Straus is the owner of DogAware.com. Straus and her Norwich Terrier, Ella, live in the San Francisco Bay Area.

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