The Whole Dog Journal™

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A monthly guide to natural dog care and training

JUNE 2012

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The Whole Dog Journal™

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EDITOR'S NOTE

Summer Reading

This is the traditional time of year for lengthy books, right? We hope you'll enjoy some long articles, too!

BY NANCY KERNS

I've remarked, many times, that I always enjoy it when an issue of WDJ contains *just* the article that I need, or that a close friend or relative needs, to deal with a beloved dog's urgent health or training issue.

This month, as I was putting the finishing touches on the issue you are reading right now, I happened to see a childhood friend announce (on Facebook) that she was at her veterinarian's office on an emergency with one of her three Rat Terriers. I wrote to ask what was wrong, and she said that Miley (one of the three) had diabetes, and that his glucose level dropped too low; they needed veterinary help to get him stabilized.

I knew that Maggie was a WDJ subscriber at some point, but I didn't want to take it for granted that her subscription was current; I asked her if she wanted me to send her a long article that we had just published in the May issue about diabetes. She replied, "No, thank you. I already have it. It was very helpful, especially last night . . . ." Later that night, though, she must have been reading the May article again, because she wrote me back and asked whether there was any way she could get an advance copy of the *June* article on diets for diabetic dogs – the one that appears in this issue.

Don't get any ideas! It's not something I can normally do! But in this instance, I *could* release the information a tad early, and I felt good knowing that the information in the article was sound, and detailed enough to provide concrete advice to a longtime friend who was doing everything in her power to help her sick little dog.

Here's the thing about our long, in-depth articles: They do more than provide a starting place for a dog owner's research; they thoroughly equip a motivated, more-than-usually dedicated owner with *all* the information he or she needs to deal with a crisis, and prevent one in the future.

That said, of course we wouldn't want *all* of our articles to be quite so pithy. And yet, there are *two* long articles in this issue. So I'm declaring this the "summer reading issue" – the one you can take with you to occupy and distract you on that cross-continent flight, cross-oceanic cruise, or cross-state drive!

In the next issue, we'll get back to our usual mix of several shorter articles and one long article; the long one is about hypothyroid in dogs – an increasingly common condition that often goes undiagnosed. In the meantime, if you need a short shot of canine information, or a quick dog-related diversion, check WDJ's Facebook page. We're having a lot of fun, and providing links to lots of good past articles there. Happy reading!

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.

Pet Food Research

Many pet lovers are wary of any research that involves animals. But today's animal nutrition studies benefit our pets in many ways.

BY NANCY KERNS

Nine years ago, PETA launched a campaign against the Iams brand. The campaign alleged that the pet food company contracted with an independent, contract laboratory, to conduct unnecessary research on dogs and cats in cruel and unsanitary conditions. PETA released 26 video clips, filmed by an undercover investigator at the lab, showing distressed dogs in small cages, recovering from surgery, anesthetized dogs, and a bag said to contain the body of a dog who died following surgery in an Iams-related test. Thousands of people boycotted Iams pet food to express their outrage at these allegations, and some still associate the Iams brand with cruel animal research.

Iams' parent company, Procter & Gamble, issued denials about some of the claims made in the PETA campaign – but it also acknowledged that the conditions shown in some of the video clips represented violations of its animal welfare policies. P&G severed its relationship with the lab shown in the videos and with all other contract labs. The company moved all the animals it owned to its pet food research facility in Ohio, and greatly expanded that facility, so that *all* animals used for P&G research would be under their own supervision and care.

But in some ways, the damage was done. Whether due to exposure to the PETA campaign or to people who learned something (accurate or not) about it secondhand, many pet owners now possess a mental association between "pet food research" and substandard living conditions (if not actual cruelty) for animals involved in pet food research.

This is unfortunate for several reasons. Foremost is that the incident confirmed the instincts of most pet food executives that they should hide (or at least never discuss) any research they do in support of their products, lest they inadvertently expose their companies to criticism (fair or not) or activism.

For years, the pet food companies that had the most extensive animal nutrition research programs routinely denied requests for tours of their facilities or detailed information about their research, citing either concerns about the potential for pathogenic infection for the research animals or the need for security from infiltration of animal activists.

The "top secret" status of most corporate pet food research results in obscurity for many nutritional studies that may be of interest or value to pet owners. And people with genuine concerns about or interest in the welfare of the research animals have been largely unable to gather reliable, independently verified information about conditions for the animals in research labs. *Is* Iams cruel? Pet owners had to decide for themselves which public relations campaign to believe: PETA's or P&G's. Some of us were frustrated that those were the only two options!

TRANSPARENCY IS THE NEW BLACK

In recent years, however, the pet food industry has discovered the benefits of sharing more information about its products, manufacturing, research, and development with consumers. In a highly competitive market, it's advanta-

Dr. Becky Stone, a veterinarian with Hill's Pet Nutrition, visits with one of the Hill's Pet Nutrition Center's "cage-free" research dogs in Topeka, Kansas.

geous to project a confident image of full transparency – as long as the company is doing everything they say they are doing.

There are two companies that have embarked on relatively high-profile public relations campaigns to inform consumers about their pet nutrition research. One is P&G. It would be understandable from just a PR standpoint that the company is motivated to improve its image on this front. But after making considerable investments in a total makeover of its research goals and facilities, P&G found itself with a good story to tell. The company began reaching out to pet industry journalists and inviting them to tour its research facility in Lewisburg, Ohio; I accepted its invitation and was a sole tourist, with a half a dozen or so guides, in June 2009.

More recently, Hill's Pet Nutrition began taking a similar tack, inviting pet-related journalists and bloggers to tour its research facility in Topeka, Kansas. I toured the Hill's Pet Nutrition Center in March with a group of a dozen or so other dog- and cat-related writers.

I was curious. What sort of research, exactly, are they doing at these facilities? Where do they get their animals? What is the quality of life for the animals? Here's what I observed and learned.

PROCTER & GAMBLE'S PET HEALTH & NUTRITION CENTER (PHNC)

A public relations person for Eukanuba contacted me for the first time in May 2009, saying that she and a Eukanuba

WHAT SORT OF "RESEARCH" ARE WE TALKING ABOUT?

Pet food companies that are the size of Hill's Pet Nutrition (a subsidiary of Colgate-Palmolive Company) and Iams and Eukanuba (both owned by Procter & Gamble Pet Care) can afford to conduct a variety of research and development studies, as well as conduct their own feeding trials to meet regulatory requirements for nutritional adequacy. The following are the types of studies that large pet food companies typically conduct.

✔ **AAFCO FEEDING TRIAL.** The protocols for these tests were developed by the Association of American Feed Control Officials, an advisory (not regulatory) body comprised of state feed control officials (the voting members) as well as representatives from the pet food industry, the Food and Drug Administration (FDA), the United States Department of Agriculture (USDA), and other interested groups and individuals. There are specific protocols for trials that confirm the nutritional adequacy of foods for adult maintenance, gestation/lactation, growth (puppy or kitten food), and "all life stages." The trials range in duration from 10 weeks (growth) to 26 weeks (adult maintenance). A food intended for "all life stages" needs to pass the gestation/lactation trial (about 13 weeks) followed by the growth trial, back to back.

In all of these trials, a number of dogs are fed the test diet (and nothing but the test diet) and a certain percentage of them must finish the trial in a condition such that they pass some basic tests: not too much weight loss, no significant illness, adequate blood test results (hemoglobin, packed cell volume, serum albumin, and alkaline phosphatase, a liver enzyme). For more information about AAFCO feeding trials, see "On Trial," WDJ April 2005.

Many people consider AAFCO feeding trials as the "gold standard" for confirming the nutritional adequacy of a canine or feline diet. However, because the products that met the "feeding trial" test of nutritional adequacy do not have to meet the "nutrient levels" criteria, there is the possibility that these products may contain excessive, deficient, or unbalanced nutrient levels that may contribute to the development of health problems if fed as a sole diet for periods that are in excess of the testing period. An ideal test would encompass *both* a feeding trial and meeting the AAFCO nutrient profiles, but no such standard currently exists.

✔ **AAFCO METABOLIZABLE ENERGY PROTOCOL (ALSO KNOWN AS "METABOLIC STUDY").** In these tests, a dog (or cat) is maintained on a specific diet for a period of 10 days, and the amount of food the animal consumes is precisely recorded. During the final five days, every bit of urine and feces eliminated from the animal is collected, so the amount of energy lost through elimination can be calculated (subtracted from the gross energy consumed) and thus, the total energy in the diet that was utilized by the animal can be determined. It used to be routine that these studies required the test subject to be housed for the final five days in a cage with a slatted floor – uncomfortable for any animal. However, in recent years, alternatives have been developed to help researchers collect urine and feces from an individual in a comfortable environment. For example, with cats, Hill's fills the cat's litter box with tiny, unabsorbent plastic beads; urine and feces can be collected from this material with little loss.

✔ **PALATABILITY OR "TASTE PREFERENCE" STUDIES.** Pet food makers know that owners repeatedly buy products that their pets prefer and eat quickly and enthusiastically, so they use a tremendous amount of their resources on these studies – more so for cat food than dog food (cats are notoriously finicky about food flavor, odor, and even the "mouth feel" of kibble). The animals used in these tests are given special training to teach them how to assess their options and make a "real" choice – not just fill up on the food they happened to select first, or always eat from the left-hand bowl. Animals that appear to reliably consider their options and make clear, consistent choices are prized, and may be delegated to a lifelong career in these studies.

✔ **DIGESTIBILITY STUDIES.** How well a food is digested, and the resulting quality of a dog's stool, are of utmost importance to most dog owners – and, of course, to the health and comfort of the dog. Pet food makers are always tweaking their formulations, based on ingredient availability, price, and popularity; they use these studies to ensure the resulting innovations are digestible.

✔ **BIOASSAY STUDIES.** These studies are conducted in search of diets that target and improve the function or health of a given body system or ability. Bioassays could include mobility, skin and coat, immunology, GI health, or nutritional requirements based on life-stage or lifestyle. Diets that address certain health conditions, whether "prescription" or over-the-counter, have become increasingly popular with pet owners – and as a result, they are popular with the large pet food companies, too.

brand manager would like the opportunity to meet with me and tell me about Eukanuba's pet foods and the direction the company (P&G Pet Care) is taking with its product development. We exchanged a number of emails, and shortly, they invited me to visit the P&G Pet Care corporate offices in Dayton, Ohio, as well as the PHNC in Lewisburg, an hour away.

I was excited. I had failed to wangle an invitation to see the facility in 2005, when I was writing an article about feeding trials, which included a long sidebar about the PETA/Iams dustup ("On Trial," April 2005). At that time, I had tried to make the case to a PR person for Iams that if the company was confident that the PHNC and living conditions for the resident research animals were as they described, they should welcome the opportunity to prove it. No dice.

Four years later, however, P&G Pet Care offered to pay for my airfare and hotel and provide transportation to its Ohio facilities. WDJ's publisher, Belvoir Media Group, disallows any such gifts or "sponsorship" – though it will allow me to accept a free meal or two. With my publisher footing the bill, I combined the travel to the P&G sites in Ohio with some other WDJ research-related travel (a tour of a duck processing plant and the WellPet dry pet food manufacturing plant in Indiana).

I arrived in Dayton, Ohio, in the late afternoon. I met the corporate PR person who had first contacted me about Eukanuba, and she drove me to a nearby restaurant for dinner with, oh, 10 or so people from the P&G Pet Care division. There were people who were involved with the animal nutrition research, people who worked with the P&G customer service/technical support staff, and of course, marketing and PR people. Everyone seemed very familiar with WDJ and our dog food selection criteria – including the fact that we've never been particularly kind to P&G's Iams or Eukanuba foods – but they all seemed sincere in wanting to learn more about our readers' interests and the development of our food selection criteria.

The next morning, I again met the PR person in the hotel lobby and she drove us to one of P&G Pet Care's corporate buildings in Dayton. (P&G relocated these offices and employees to a larger facility encompassing other P&G divisions in Mason, Ohio, in October 2009.) There, I was introduced to some of the brand managers and marketing staff for Iams and Eukanuba products, and was able to speak at greater length with the clinical veterinarian who oversaw the healthcare provided to the dogs and cats involved in developing many of the Iams and Eukanuba products.

Iams and Eukanuba dog and cat food products are formulated, tested, and promoted by the same people. It's up to the P&G marketing teams to decide whether new products that are developed will roll out under the Iams or Eukanuba label. Each brand has a slightly different identity in the marketplace, so as new products are conceived, at some point, they are pointed toward one brand or the other.

I also got to talk to some of the customer service/technical support people who answer the toll-free numbers for both consumers and veterinarians who have questions about Iams or Eukanuba pet foods.

One thing I noticed right away about this multi-story office building: there were a *lot* of dogs accompanying employees to work (I lost count after meeting 15 or so), and it clearly wasn't a setup on my behalf; there were baby gates and tethers permanently installed in cubicles and office doors, and the carpets showed signs of a pet-friendly history (hey, they were moving out of the building soon). Best yet was the fact that almost every dog I met turned out to have been adopted from the P&G PHNC after he or she was retired from research duties. *Cool.*

Finally, we got back into cars and drove for a little under an hour to the PHNC. The 250-acre site where the research animals are kept is tucked behind a P&G extrusion (dry pet food) manufacturing plant. The facility has capacity for roughly 350 dogs and 350 cats.

One of the research dogs at P&G's PHNC demonstrates the unique saloon-style doors between the dogs' indoor kennels and outdoor runs. The doors are a good example of the care that was taken to make the entire facility safe and comfortable.

LET'S SEE THE ANIMALS

One of the charges made by PETA about dogs at a contract laboratory in Missouri (which Iams hired for some research) was that there were dogs who were surgically de-barked (had their vocal cords severed) to make them less noisy. You have to read PETA's website *very* carefully to ascertain that PETA did *not* allege that these debarked animals were Iams research animals. Nevertheless, I was immediately suspicious when the first group of Beagles we passed by in their outdoor runs failed to start barking at our little tour group. When I realized they were neither barking nor making the hoarse sound produced by debarked dogs, I actually stopped in my tracks and squinted hard (they were 100 feet or so away); were they wearing antibark shock collars? A colony of 20 or so Beagles, with only one or two barking? Something is wrong!

My guide for the tour, the manager of the PHNC, was patient. "Those are young dogs, who are still in training to enter the actual research program," he explained. "Also, they are thoroughly habituated to the sight of people passing by their runs. They also receive lots of exercise, individual attention from staff, and enrichment in their environments, so they aren't desperate for stimulation or interaction."

The PHNC is laid out a bit like a cross between a commercial farm and a university veterinary school campus, with a dozen or so buildings connected by paved paths and separated by grassy paddocks. The aroma of pet food is in the air, thanks to the nearby extrusion plant. Dogs are in view nearly everywhere, passing through dog doors into their outdoor runs, disappearing back into their indoor kennels, playing under the watchful eyes of attendants in one of several fenced "playgrounds," or being walked on-leash by "animal welfare specialists," as the staff members who care for the dogs and cats are called.

We passed through at least half of the buildings on the campus, viewing the indoor housing areas for dogs and cats, the clinical care rooms (where animals are taken for routine veterinary exams,

blood draws, dental cleaning, and so on), as well as facilities where advanced veterinary research tools are located – things like strikeplate treadmills and high-speed cameras (to analyze changes in stride length, for example, in the maturing or aging dog) and body composition densitometers (an xray-like machine that can analyze an animal's bone density as well as determine his percentages of body fat and muscle mass).

I was genuinely impressed with the thought and care taken with the housing for the animals. The indoor runs for the dogs are climate-controlled. When staff members noticed that a number of the long-term canine residents had neck or shoulder pain, P&G started researching dog doors that would swing open in such a way that the dogs didn't have to muscle the doors aside with their necks or use a strained posture to pass through; they finally settled on doors that are split vertically down the center, like saloon doors in old Western movies. Dogs essentially pass straight through these doors, and the incidence of neck injuries dropped.

For the most part, the dogs are pair-housed with a compatible same-sex partner (though they have a daily opportunity to play in a larger social group). Each dog has a name (not just a number), and the front of each run has a whiteboard with notes about the dogs' individual preferences or challenges. I saw notes like, "Cherry is blind, so talk to her before you touch her so she doesn't get startled," and "Pardner does not get along with Jake! Make sure they do not go to the playground together!"

The runs and indoor kennels were spotlessly clean, with staff members in constant attendance to clean up any poop or pee. The air-conditioning kept the indoor temperature comfortable, and I didn't wrinkle my nose once; I never noticed an odoriferous room. All the dogs had raised beds and toys were present in every kennel. I didn't see a single dog or cat pace with stereotypic distress or leap at its kennel or cage door for attention. All the animals seemed calm and well adjusted. And the handlers who were walking dogs outside all had clickers, and were using play with toys as rewards.

I know this is a *dog* magazine, but the cat housing facilities were equally impressive. The cats are kept in larger social groups in large, airy rooms with a ton of places to hide, climb, perch, and nap. All the cats have access to sun porches, a wealth of toys, and clean litter boxes.

A research dog at the P&G PHNC lounges in an indoor kennel area. Each dog is named and familiar with the handlers.

CAREER PLANNING

Here is what I found most impressive of all: P&G plans each animal's career from the time it is born to the time it will be retired from research; each animal is then admitted to an adoption program dedicated to placing retired research animals with P&G employees. (With about 2,300 P&G employees in nearby Mason, Ohio, and many thousands more in P&G's Cincinnati headquarters, there is said to be a waiting list for the well trained, well socialized retired research dogs and cats.)

Dogs are typically retired at age 6, and cats at age 8, although a small senior population in support of research into P&G life-stage diets. In addition, "There are a few dogs and cats who will retire with us for their natural lives, as they aren't suitable for adoption due to either behavioral or medical conditions," explains Jason Taylor, manager of external relations for P&G Pet Care. These animals will also continue to test (consume!) senior diets – a sort of working retirement.

Puppies and kittens born into the P&G research program are extensively handled and socialized in preparation for their emergent careers. "We begin preparing our dogs and cats for adoption the moment they come to us," says Taylor. "We do this by working with them at an early age – in puppy and kittenhood – to acclimate them to both home and kennel environments. New puppies are initially introduced to cars and vans, a variety of off-campus home environments, selected parks, and many new people, in order to support early cognitive development. Our training team and staff work hard at familiarizing every animal to common household items in our spacious Home Environment Room and by continuing their training in general obedience and manners throughout their lives. Dedicated 'animal welfare specialists' socialize, exercise, and groom them daily."

P&G breeds some of the animals currently used in its research program and buys some from commercial breeders. I saw a variety of dog breeds, including the ubiquitous laboratory Beagles, as well as Golden Retrievers and Greyhounds.

P&G also conducts "in-home" palatability, taste preference, and clinical studies through the recruitment of dog owners via their veterinarians. According to Taylor, "More than 70 percent of the animals participating in our studies are pets living in private homes or pets from organizations where animals already live (such as service dog organizations)." And of course, all of the animal nutrition research conducted or overseen by P&G adheres to the company's animal study policy (available in its entirety at tinyurl.com/pganimalpolicy and excerpted on page 6).

P&G maintains a facility in Cincinnati, called the Winton Hill Discovery Center, as a "headquarters" for pet owners and pets participating in in-home studies. The Center offers pet owners the ability to drop off biological samples, pick up food, and discuss concerns with the animal care technicians and veterinarians. P&G Pet Care also hosts consumer research studies with pet owners at the Winton Center.

P&G'S OTHER FACILITIES

When P&G acquired Natura Pet Products in early 2010, a small-scale animal nutrition research facility in Fremont, Nebraska, adjacent to the Natura dry food production plant, was part of the package. I toured the production plant and research facility years before the P&G purchase, in November 2005. At that time, the research facility housed maybe 30 or so mixed-breed dogs (I didn't look at the cat facilities), who were used in informal palatability and taste preference studies.

Today, the facility is known as the Fremont Health & Nutrition Center, and has the capacity to serve 30 dog and 30 cat residents. According to Taylor, "The Center is an extension of the PHNC, and follows the same P&G Pet Care animal studies policies. Studies taking place at the Center include palatability, digestibility, and bioassay studies. Every detail at the Nebraska Center is focused on the pets who live there, including oversized indoor and outdoor runs with large out-

side play yards, substantial ventilation systems for climate control, home-like environment settings with social rooms, regular and frequent daily exercise with animal care technicians and routine top-notch veterinary care."

P&G does not conduct studies involving dogs and cats in any locations other than the three (Ohio, Nebraska, and in-home studies) mentioned above.

HILL'S PET NUTRITION

Even as I toured the P&G PHNC campus three years ago, I wondered how it compared with other pet food research facilities. I was particularly curious about Hill's Pet Nutrition; nutritional research is the signature characteristic of the company that makes Science Diet and Prescription Diet pet foods.

So I was particularly pleased when I was contacted by a public relations person for Hill's just a couple of months ago, and invited (along with a bunch of other journalists and bloggers with an interest in pet food) to tour the facility where Hill's Pet Nutrition conducts its dog and cat food research and development work, the Hill's Pet Nutrition Center in Topeka, Kansas. I negotiated a bit and pressed to see whether I could also tour some of Hill's pet food production facilities in the area, and this was soon arranged.

Like P&G, Hill's offered to pay for all of the invited journalists' airfare and hotel accommodations and arrange for meals and transportation. As always, WDJ's publisher paid my way instead.

A shuttle bus took us to the 170-acre Hill's Pet Nutrition Center (PNC). We reorganized ourselves in a conference room, and were introduced to a number of Hill's executives, including Kostas Kontopanos, the President of Hill's USA since 2011; and Neil Thompson, President and CEO of Hill's Pet Nutrition since 2009.

Hill's is a $2.2 billion, global subsidiary of Colgate-Palmolive, and is headquartered in Topeka. The Hill's product line includes more than 80 Prescription Diet brand pet foods and more than 90 Science Diet brand pet foods, which are sold in more than 90 countries. Hill's employs more than 150 veterinarians, nutritionists, and food scientists to collaborate on its pet food product development and research.

HILL'S HISTORY

It wasn't always so . . . global. Hill's was founded by a veterinarian in New Jersey, Mark L. Morris, Sr., who developed his first canine diet in 1939 for a client, a blind man named Morris Frank, whose guide dog, Buddy, was suffering from kidney failure. Dr. Morris speculated that manipulating the dog's diet could slow the progression of the kidney disease, and he began formulating and testing diets, with the help of his wife, in their home kitchen. They canned the food the old-fashioned way, in Ball jars. Mr. Frank and Buddy were touring the country, promoting and demonstrating Seeing Eye dogs, so Dr. Morris mailed the jars of food to Mr. Frank on his tour. After seeing some success with the diet, and having the jars break in transit, Dr. Morris bought a hand-operated canning machine and his staff canned the food.

Dr. Morris began studying various canine and feline diseases and formulating diets that would complement disease treatment. Throughout the 1940s, he developed diets for canine gastrointestinal disorders and obesity (it's not new!). Eventually, Dr. Morris contracted a commercial cannery, the Hill Packing Company in Topeka, and licensed the company to produce his pet food formulas. He also gave the diet that he formulated for Buddy a formal name, Canine k/d.

In 1948, Dr. Morris established a charity for small animals that would later become known as the Morris Animal Foundation. The Foundation funds independent research into small animal disease to this day. Dr. Morris also established a research laboratory in Topeka in 1951.

In the 1950s, Hill Packing Company established canneries in six more states, and Dr. Morris continued to develop diets for treating sick animals. Eventually, Dr. Morris was joined in veterinary practice and then veterinary nutrition research and diet development by his son, Dr. Mark Morris, Jr. Their products were marketed under the name Hill's Pet Nutrition. In 1968, Dr. Morris Jr. created the Science Diet line of pet foods for *healthy* pets. Dr. Morris Jr. also coauthored the first

EXCERPTS FROM P&G PET CARE'S ANIMAL STUDIES POLICY

We fully support the internationally accepted principles: replacement of animal studies with non-animal alternatives, reduction in the numbers of animals involved in studies, and the refinement of methods to enhance animal welfare. We involve animals only if there is no valid non-animal option.

We do not fund studies that require the loss of life of cats or dogs. We only conduct dog and cat studies that are the veterinary equivalent of nutritional or medical studies acceptable on people, including: urine, feces, blood and immune cell analysis, allergy tests, and skin and muscle biopsies.

Effective November 1, 2006, we conduct studies in just three kinds of locations: pet owners' homes, our Pet Health & Nutrition Center, and locations where dogs and cats are already living (e.g., assistance dog organizations, kennels, etc.). We test our foods with healthy pet cats or dogs in their homes or with pets who already have specific diseases or conditions.

All of the dogs and cats in our feeding programs who are not already private pets remain in our program, are adopted into private homes or are placed in our retirement center.

We ensure the humane treatment of all species and provide for their well being, socialization and husbandry in a manner compatible with the company's philosophy.

Our studies are monitored by our own staff and independent experts with the goal being to create enriched environments for the cats and dogs. If there is the potential for pain or distress, we do whatever we can to prevent or eliminate it.

We do not fund any activities outside our company that may be inconsistent with our Policy. We do not use, in any studies, cats or dogs who are already induced with disease or surgically altered through other research; nor does the company conduct such studies under the auspices of any industry association or group.

publication of *Small Animal Nutrition*, a clinical nutrition textbook, in 1983. The text has been updated many times and is used in veterinary colleges worldwide.

The Colgate-Palmolive Company bought Hill's Pet Nutrition in 1976. Dr. Morris Sr. passed away in 1993 at the age of 92. Hill's Pet Nutrition reached $1 billion in net sales in 2000. When Dr. Morris Jr. passed away in 2007 at the age of 72, he was still actively involved with Hill's, and his presence is still strongly felt at the Hill's Pet Nutrition Center.

GET TO THE ANIMALS

Our tour guide of the Hill's PNC was Scott Mickelsen, DVM, a Diplomate of the American College of Laboratory Animal Medicine, and Manager of Pet Nutrition Resources for this campus (meaning he manages the animal colony). Four hundred and two dogs and 485 cats were reported to be living on the Hill's PNC campus on the day of our tour – all of them kept according to the conditions laid out in Hill's animal welfare policy (excerpted below and available in its entirety at tinyurl.com/hillspolicy).

The buildings that house the animals are all connected, with a total of 80,000 square feet of housing and treatment rooms, as well as kitchens and food preparation rooms. A 3,000 square foot veterinary hospital, where prophylactic care and urgent care (if needed) is provided, features everything you'd see in any modern veterinary hospital, including surgical suites and xray and ultrasound rooms. There are multiple rooms containing laboratory analysis equipment for blood and urine tests.

Unlike the P&G program, where the majority of research animals are retired from studies and adopted into homes, the animals at Hill's typically live their entire natural lives on the Hill's campus. They are adopted out of the program (almost always by a Hill's employee) only if they develop a behavioral incapacity for the campus lifestyle. If they develop medical conditions, they are treated as thoroughly as any pet dog or cat at home as long as they have a good quality of life; if they need to be retired from participating in any studies as a result of treatment, they are – though they are likely to continue to be fed a Hill's diet appropriate for their condition, and will continue to be monitored via blood and urine tests and physical examinations.

While dog lovers might be expected to admire the P&G model of retiring *most* of its research animals (at age 6 for dogs), and perhaps be critical of Hill's for keeping almost all of its "pet partners" throughout their lifetimes, Hill's points out that studying life-stage nutrition is critically important to the company. "A 13-year-old dog or cat may have different nutritional requirements than a 7-year-old dog or cat," explains Dr. Mickelsen. "Disease frequency increases with age. If we adopted them out at 7 or 8 years, many of our foods designed to benefit older dogs and cats may not have been developed."

The housing for the animals is provided in a series of wings, which are laid out in a repeating pattern; we could see all of the outdoor recreation areas for the dogs extending away from us into the distance. We were able to view the interior of one wing, representing one third of the total canine housing facility; we were told that the parts we didn't see were identical to the parts we did view.

As one might guess in a nutritional research center, the feeding rooms function as the nerve centers of each wing. In the dog wings, four housing areas, each with a capacity of 20 dogs, are attached to each feeding room; a mirrored arrangement is located across a central hall that connects each of these wings.

The total capacity of the dog housing area is 480, but the actual numbers are usually less than that. The dogs eat their meals in a sort of stanchion; their food (including the amount they eat or decline to eat) is precisely recorded by scales that are built into the food bowl platform. (Entire conferences could probably be held to explain all the technology that has gone into the way the animals' food is presented to them and recorded.) For the most part, they sleep in pairs in cubicles that line a large playroom; each group of 20 is released during the day into a large group room, outfitted with a plethora of toys. Swinging dog doors keep the climate indoors comfortable, and allow the dogs to pass outside and recreate or snooze in a large *outdoor* play area.

The outdoor play areas are carpeted in artificial turf; a pergola shelters part of the area from weather and heat, although an uncovered area is available to them, if they prefer. Toys abound outside, too, and handlers are constantly present, playing with and petting the dogs – and

EXCERPTS FROM HILL'S ANIMAL WELFARE POLICY

All pets cared for by Hill's Pet Nutrition live in a loving, safe, playful, and clean environment. We use only non-invasive, humane research methods. Hill's does not participate in studies that jeopardize the health of dogs and cats. No study that requires euthanasia will be performed on dogs or cats.

When studying how a nutrient is absorbed, distributed, stored, used and released by a dog's or cat's body, we use only research methods that are the veterinary equivalent of human nutritional or medical studies. Hill's does not support or conduct studies that cause pain or hurt the dogs or cats. This is based on the belief that what is painful to humans is also painful to dogs and cats.

We continually strive to find ways to reduce dependence on animal research. A substantial number of dogs and cats participating in our feeding studies are involved in in-home tests.

To assure pet owners that our therapeutic foods are safe and effective, we support studies using pets with naturally occurring diseases or conditions. We do not participate in studies in which surgical or non-surgical methods are used to create or simulate disease conditions.

The Hill's Pet Nutrition Center and any external facility Hill's supports must meet or exceed all industry regulatory standards for animal care.

We publish the results of our studies to advance the knowledge of nutritional health care and to help prevent the unnecessary repetition of studies involving dogs and cats. Hill's only uses data from animal studies that are in the public domain, either previously published or were conducted under this Global Animal Welfare Policy.

Veterinarian Patricia A. Burriss and some group-housed cats at the Hill's PNC. The devices against the wall are the high-tech feeding stations; microchips identify the cat who enters and records how much food he or she consumes.

cleaning up after the dogs – as you'd see in any good dog daycare facility. On the day of our tour, the animal care staff (for the dogs *and* cats) was said to consist of 55 employees.

The toys are rotated as a set a couple of times a week, both so they can be cleaned and to provide novelty when they are reintroduced. To prevent disputes over "favorite" toys, all the toys that are put out at any given time are the same kind.

All of the outdoor runs are connected by gates to much larger dog park-type facilities. Each group of dogs is allowed out for play in one of these large areas at different times of day.

Most of the dogs we saw were Beagles; historically, the dog of choice for laboratory research (because Beagles are almost always content when living in a pack). However, Hill's is slowly integrating other breeds (including mixed-breeds) into its research colonies, but only at the rate that the senior animals pass away, so it might take a decade or more to see a non-Beagle majority on campus.

Each animal is microchipped, and computers located in the lobby area of the feeding rooms can identify each animal, show photographs of him or her for identification purposes (for new employees, mostly), and display his or her complete health history, information on the dog's participation in studies, and of course, current diet.

All of the dogs we saw looked comfortable and well adjusted. As at the P&G site, I was surprised when groups of dogs playing in the Hill's "Bark Parks" or in their outdoor runs failed to react in any way to the sight of our group passing by. I observed none of the stereotypic stress behaviors that are so common in shelter dogs or commercial breeding operations –although I did see one Beagle make a large, gloppy poop, and another immediately start to consume the poop (but that can happen anywhere with any breed, though most of us dog journalist witnesses remarked, "Ugh! Beagles!").

The group housing rooms for cats are appointed like cat palaces – so many scratching posts, beds, hammocks, platforms, skywalks, toys, and tunnels. The cats in each group room have access to "sun porches" via tunnels – and the tunnels all have openings into *alternate* tunnels, in case a cat wants to get to the porch and another cat is blocking the way. (Look, that's how cats *are*.)

We saw the entire cat housing area, encompassing some 60 separate rooms. The majority of the cats are housed in groups of 8 to 12 cats per room, although we saw some cats in individual housing units – referred to as "kitty condos." These individual spaces are about 150 cubic feet of space (a little bigger than 5 feet by 5 feet by 5 feet) with multiple climbing perches and windows, including a bay window that allows the cats a panoramic view of their environment. These spaces are also individually ventilated.

According to Dr. Mickelsen, cats are housed individually for one of three reasons: "First, we have about 7 or 8 cats who are not behaviorally comfortable in a group housing setting, period. So they get their own housing. Second, in some studies, we need to collect biological samples, such as stool or urine, for a short period of time, so those cats will be individually housed for short periods. Third, cats with medical conditions, such as inflammatory bowel disease, might be individually housed so we can monitor every occurrence of elimination."

Dr. Mickelsen pointed out that all the individually housed cats have the opportunity daily to enjoy themselves in large playrooms, and have daily access to the sun porches, just not 24/7 like the group housed cats.

We also saw one room that was decorated with several comfortable couches, chairs, and desks and contained no cats; we were told that it was a lounge that can be used by Hill's employees from anywhere on the campus. The lounge is equipped with Wi-Fi, and cats can be "checked out" by the employees who need a cat break. (Employees can also check out a dog and take him or her for a walk or jog around the Hill's campus.)

One of the innovations used by Hill's to conduct metabolic studies (in which all urine and stool needs to be collected) or any study that requires the collection of all the animal's urine, is the use of nonabsorbent beads in litter boxes, and other innovations for collecting dog urine (in old-fashioned labs, the test animal is required to live for a short time in a cage with a slatted floor, so that all the urine and feces can be collected in a pan underneath the cage. "We haven't used cages with slatted floors for years," says Dr. Mickelsen. "We devise things as needed. We found once that we had a hard plastic ball in the kennels that the dogs never played with, but were always urinating on. So we put that ball in the middle of a tray, like a lunch tray, and found that the dogs would urinate on the ball and we could capture all the urine in the tray."

TYPES OF TESTS

According to Dr. Mickelsen, at any given time, about 50 percent of the dogs on the Hill's PNC campus are participating in palatability or taste preference studies of some kind. In these studies, the dogs are given two or four foods to choose from, and allowed to make a choice of which to eat. A lot of technology goes into preventing them from overeating, however; the food bowls are on scales in a sort of little cubby. After the scales detect that an appropriate amount of food is consumed,

the dog is warned (with an automated tone) to stop eating so that the bowls can be removed. Though most dogs heed the warning tone, if one doesn't, a puff of air is blown into his face until he backs up, at which point the apparatus detects that he is safely out of the way and the doors to the cubby close.

The next largest group of dogs – about 30 to 40 percent of the population – are participating in "ad hoc" studies, typically designed to gather data or research an issue in support of the development of new products or formula changes.

Dogs participating in some sort of AAFCO feeding trial make up the smallest percentage of the canine research population at any given time, perhaps just 10 percent.

One of the "bark parks" at the Hill's PNC. Each group of dogs has daily access to its own park, with handlers facilitating play.

Which dogs go into which studies? Dr. Mickelsen describes this as an ever-changing puzzle. "We try to be as efficient as we can be, given the population. Some dogs are generalists, but we've trained some for specific tasks, such as urinating in a special setting or picking out different aromas, and those dogs tend to get assigned repeatedly to studies that require those skills. It takes several months to train dogs to detect certain aromas, for example, and to validate their abilities; it doesn't make sense to pull that dog away from that work."

Dogs who develop disease are treated for their conditions, and might be assigned to a study of diets that address their condition. For example, if a dog develops kidney disease, he would likely be placed on a diet of k/d, and his blood and urine samples used in tests in support of the ongoing refinement of kidney diets.

However, the bulk of Hill's research on diets for animals with medical conditions does not happen at the Hill's PNC; it happens in people's homes. The company partners with veterinarians in practice and with vet schools all over North America, "recruiting" a pool of patients through their vets. "For example, when we developed j/d, we had some dogs with arthritis on our campus, but not in large enough numbers to do a big clinical study. By partnering with veterinarians, we can find many more patients to participate in these studies."

Hill's declines to state exactly how many pets might be participating in Hill's clinical trials of diets at any given time (this is considered proprietary information), but Dr. Mickelsen would say that "the number of pets we touch outside of our facility is far larger than the number we have here." In a trial of this kind, typically the owner and veterinarian both are "blinded" to the food, which is sent to them in a plain wrapper. The veterinarian takes any biologic samples needed (blood, urine, stool) and sends them to Hill's labs, and also performs whatever physical exams and evaluations Hill's asks for.

Ordinary dogs and owners also participate in palatability studies conducted by Hill's. Of course, neither these dogs nor their handlers are specially trained for these tests, but the data they provide (in terms of their preferences) are used to validate and cross-check the Hill's PNC findings in "real world" environments.

I asked Dr. Mickelsen if he had anything else he wanted WDJ to know about the Hill's animal research. He said, "I would like people to know that we are genuinely passionate about the health and welfare of our animals, and we treat them like we would treat our own pets at home. When an old dog or cat gets sick, and we have to make a decision about his quality of life – that's always a tough day for the people who have been caring for that animal for a long time. Those are the challenging days. And we are lucky to work for a company that shares the passion for animal health and welfare that our customers possess."

IN CONTRAST

There are a few other large pet food companies that conduct research on this sort of scale – Purina and Royal Canin, for example – but it has to be noted that few, if any, of the manufacturers of the foods on WDJ's "approved foods" lists invest this much in either feeding trials or nutritional research.

Most (if not all) small-scale pet food companies conduct informal palatability and digestibility studies, on small numbers of dogs belonging to employees, local shelters, or breeders. Others may employ the services of a contract laboratory to feed the product to a population of dogs and record the results. The latter is an expensive step, and a tad risky from a public relations standpoint – remember that undercover video footage? In today's competitive market – and with the white-hot, blazing speed of social networks – an undercover video of mistreatment of dogs or cats in a research lab could really damage a pet food company's reputation and sales. A company executive better have solid faith *and* evidence that the contract lab takes the provision of animal welfare as seriously as a funeral.

While we're sure that a pet food company executive could gain access to a contract lab to verify conditions and the quality of life for the resident test dogs and cats, it's pretty difficult for anyone else to do so. Summit Ridge Farms, located in Susquehanna, Pennsylvania, is perhaps the highest profile and largest contract lab in operation in the U.S. that does feeding trials for pet food companies. The company routinely takes out full page ads in pet food industry magazines, describing its animal welfare and enrichment programs and picturing its "puppy parks" and "feline community living." But the company strictly restricts access to the facility, and though I haven't bothered in recent years, when I did try to contact the lab to discuss the possibility of a tour, my calls and emails went unreturned.

If it's so expensive (and a potential public relations risk) to use contract labs to conduct a feeding trial, why not just skip this step? Even well manufactured products made of good ingredients and formulated to meet the AAFCO nutrient levels for a "complete and balanced" designation can turn out to cause digestive issues when fed to real dogs! You'd hate for your new product to hit the market and hear about dogs with killer gas or dangerous diarrhea. Feeding trials are a valuable source of critical information for pet food companies. It would be nice if the entire industry was doing them as thoughtfully and with as much attention paid to the quality of the animal subjects' lives as Hill's and P&G.

Nancy Kerns is Editor of WDJ.

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HEALTH

Diet and Diabetes

Finding the right diet for a diabetic dog is a key part of managing this disease.

BY CJ PUOTINEN AND MARY STRAUS

As discussed in "Canine Diabetes," WDJ May 2012, dogs with this disease require blood sugar monitoring, daily insulin injections, carefully planned meals, and scheduled exercise. Fortunately, most cases can be managed at home, and once their medication and diet are stabilized, affected dogs live just as long and actively as other dogs. The most important factor in choosing a diet for a dog with diabetes is that he likes the food and eats it willingly every day.

We'll say it again: There is no single "best" diet for dogs with diabetes. Most diabetic dogs do fine on a diet formulated for adult maintenance. And most do not require a high-fiber prescription diet. However, it *is* important to maintain *consistent* carbohydrate levels, and a diet moderately low in fat may be safest. The nutritional needs of any concurrent disease should take precedence.

Dogs with diabetes can thrive on diets that are dry or canned, prescription, frozen raw, home-prepared (cooked or raw), and combinations of any of these. See the samples below (starting with "Prescription Diets") for a variety of diets that have worked well for diabetic dogs and their caregivers.

To help determine your diabetic dog's best diet, consider the following guidelines. (See "Calculating a Diet's Protein, Fat, Carbs, and Fiber," page 14, to learn how to figure out how much of each macronutrient you're feeding.)

For best results, dogs with diabetes should be fed the same type and quantity of food every 12 hours just before or after their insulin injections.

■ **FAT –** Because undiagnosed pancreatitis is common in diabetes patients, many veterinarians recommend feeding diabetic dogs less than 30 percent of their calories from fat. This is equivalent to about 14 percent fat on a dry matter (DM) basis, or 35 grams of fat per 1,000 calories (GFK). These guidelines are appropriate for dogs with Cushing's disease, or whose blood tends to be lipemic (fatty), or who are prone to digestive upset.

For some dogs with chronic pancreatitis or persistent fasting hyperlipidemia (high blood triglycerides or cholesterol), fat may need to be reduced to less than 20 percent of calories (about 9 percent fat DM, or 23 GFK).

Underweight dogs usually need more fat. Higher fat foods also reduce postprandial glycemia (rises in blood sugar after meals), probably because they slow gastric emptying. Diabetic dogs without concurrent illness requiring limited fat may be fed up to 20 percent fat DM (40 percent of calories from fat; 47 GFK).

Since dogs love the taste of fat, it's often added to food to improve palatability, but for dogs with diabetes, flavoring agents like low-fat chicken or beef broth are better choices.

If your dog requires a low-fat diet, see

"Healthy Low-Fat Diets," WDJ December 2008, for more details.

■ **PROTEIN –** It is important to feed enough highly digestible, high-quality protein – at least 18 to 25 percent on a dry matter basis – to reduce muscle catabolism (breakdown). Such diets do not appear to increase the risk of diabetic nephropathy (kidney disease). There are no negative effects associated with providing at least 30 to 45 percent of calories from protein (about 35 to 50 percent protein DM).

■ **CARBOHYDRATES –** Carbs are key ingredients in any diabetic dog's diet. The amount of carbohydrate should remain consistent so that the dog's insulin needs remain stable. Complex carbs, especially barley and sorghum, are recommended, while simple carbs such as white rice and corn syrup should be avoided.

Starch (the digestible portion of carbohydrates) is best limited to less than 50 percent of calories (about 55 percent DM), and diabetic dogs may do better when starch is less than 30 percent of calories (about 33 percent DM). If the amount of starch in the diet changes, the amount of insulin will need to be adjusted as well.

■ **FIBER –** There are two types of fiber, soluble and insoluble. Both types slow gastric emptying and carbohydrate digestion, reducing postprandial glucose spikes. Soluble fiber feeds the body's beneficial bacteria and supports the immune system, but it can also cause gas and loose stools. Insoluble fiber (roughage) increases stool volume, regulates intestinal transit time, is generally well tolerated, and may help with glucose control.

Whole grains are decent sources of both soluble and insoluble fiber. Barley, bulgur wheat, long-grain brown rice, whole wheat pasta, rolled oats, quinoa, beans, and peas are good choices for providing starch and fiber. The flesh of vegetables and fruit also supply soluble fiber, while the skins are a good source of insoluble fiber. Sweet potatoes with skin offer a particularly high nutrition and fiber content without sending blood sugar soaring.

If you are feeding a maintenance (non-prescription) diet and having poor glycemic control, try feeding more insoluble or mixed fiber. Many dogs have improved glucose control with more fiber, while some do better with less. Too much fiber can lead to gas, diarrhea or constipation, weight loss, poor coat, and an unwillingness to eat. Recommendations vary, but generally 8 to 15 percent DM, or 25 to 35 grams of fiber per 1,000 calories, would be considered a moderate amount of fiber.

Note that dietary fiber is *not* the same as crude fiber shown on dog food labels, which is not a useful measure. Most foods contain a lot more fiber than the labels indicate. Unfortunately, there is usually no way to know how much dietary fiber non-prescription foods contain. You can only look for ingredients known to supply fiber.

- Bran, cellulose, pea fiber, tomato pomace, and hulls of any kind (including "soybean mill run") supply mostly insoluble fiber.

- Fructo-olicosaccharides (FOS), guar gum, and pectin provide soluble fiber.

- Beet pulp has both types of fiber.

Fiber supplements can be used to add fiber if needed. Benefiber (wheat dextrin) and Hydrocil (psyllium) contain mostly soluble fiber, while Citrucel contains insoluble fiber (methylcellulose).

CUSTOMIZING THE DIET

Preparing your dog's food at home is the easiest way to feed a customized diet, but many owners obtain good results by mixing wet and dry foods or by combining fresh foods with commercially prepared diets.

For example, many low-fat commercial diets are also low in protein, with high levels of carbohydrates. Ingredients such as lean meat, skinless poultry, fish, eggs, and yogurt can be used to replace a portion of the commercial diet to increase protein and reduce carbohydrates in the overall diet. If you're feeding a high-protein, low-carb, low-fiber commercial diet, adding high-fiber fresh foods or fiber supplements may help with glycemic control.

Dry food decreases hyperglycemia (high blood sugar) after eating because it takes longer to digest, while wet food may encourage the dog to eat well and increase fluid intake. Do not feed commercial moist or semi-moist foods or treats, as they almost always contain added sugars (e.g., propylene glycol).

In some patients, dry food takes too long to digest, so that its assimilation does not coincide with the insulin's peak effect. In that case, presoaking the food or grinding it to a powder before feeding, or reducing the amount of fiber in the diet, will speed digestion.

If a too-thin dog fails to gain weight, you may need to feed more food, increase the amount of fat, or decrease the amount of fiber in the diet.

If the patient suddenly refuses food, see your veterinarian to check for a concurrent illness. Do not continue to give insulin to a dog who is not eating.

TEXTBOOK RECIPES

Two sample recipes provided in the *Encyclopedia of Canine Clinical Nutrition* (Pibot et al., 2006) each provide about 1,700 calories, the amount needed for a typical active 70-pound dog. Each 1,000-gram (2.2-pound) recipe uses:

- 500 to 600 grams of low-fat meat and dairy (fish, skinless turkey breast, creamed cottage cheese)

- 250 to 270 grams (dry measure) of starchy carbs (whole wheat pasta, rolled oats)

- 60 to 150 grams of cooked carrots

- 50 to 60 grams of wheat bran (insoluble fiber)

- 10 grams pectin (soluble fiber)

- 10 to 15 grams canola oil

- plus a multivitamin and mineral supplement (including about 2,500 mg calcium)

These recipes are 33-34 percent protein, 10-11 percent fat, 38-41 percent starch, and 12-14 percent fiber on a dry matter basis.

PRESCRIPTION DIETS

Commerical prescription diets meant for dogs with diabetes work for some dogs, with or without added foods. These diets are generally low in protein and fat, and high in fiber and carbohydrates. They are unsuitable for dogs who need to gain weight, but the high fiber can help some dogs whose diabetes is difficult to regulate. These diets can be combined with other foods to increase protein and fat.

CALCULATING A DIET'S PROTEIN, FAT, CARBS, AND FIBER

It is not easy to figure out how much fat and other nutrients are ***really*** in the food you feed, whether it's kibble, canned food, or a home-prepared raw or cooked diet. Here are some tips that can help.

METHODS OF MEASUREMENT

There are three different ways of measuring amounts of protein, fat, carbohydrates, and fiber in foods:

- ✔ Percentage of dry matter
- ✔ Percentage of calories (does not apply to fiber)
- ✔ Grams per 1,000 calories

Dry matter percentages are easiest to use for commercial foods. Grams per 1,000 calories or percentage of calories are simpler ways to measure nutrients in a homemade diet.

❖ COMMERCIAL FOODS

Pet food labels give you some, but not all, of the information you need in order to really know the nutritional composition of your dog's diet.

✔ **The percentages of protein, fat, and fiber** shown on dog food labels are guaranteed minimums and maximums, ***NOT actual amounts.*** The real amount of fat in particular may be much higher than what is shown on the label of some canned and raw diets. If your dog needs a low-fat diet, look for products that are lower in calories than similar foods.

For more accurate information, contact the company that makes the food you're interested in and ask them for a nutritional analysis showing the ***actual*** amount of protein, fat, fiber, ash, and moisture, as well as the number of calories in the food. ***Editor's note:*** Some pet food makers (particularly small companies) may not have a complete nutritional analysis of their products. In our opinion, this reflects a lack of adequate research and investment in the product. When feeding a special needs dog, we'd look to a company who has this current information on hand.

✔ **The percentage of carbohydrates** is not included on most labels or nutritional analyses. To calculate the percentage of carbohydrates in a commercial diet, subtract the percentages of protein, fat, moisture, crude fiber (an indigestible part of carbohydrates), and ash from 100. This percentage may be shown as "nitgrogen-free extract (NFE)" on a nutritional analysis.

✔ **Total dietary fiber** is likely much higher than the crude fiber shown on the label. If dietary (soluble plus insoluble) fiber is not shown on a complete nutritional analysis, there is no way to calculate it.

❖ FRESH FOODS

When feeding a home-prepared diet comprised of fresh food ingredients, it can be a bit more challenging to calculate some of the nutrient values that you'd like to know when feeding a diabetic dog.

✔ **To calculate the caloric content of the food,** look up the ingredients or enter a recipe on NutritionData.com. The number of calories from protein, fat, and carbohydrates, along with the total calories, are given in the "calorie information" section, and the calorie percentages are shown in the "caloric ratio pyramid."

✔ **To calculate the grams of protein, fat, etc., per 1,000 calories,** divide grams of any nutrient by total number of calories, then multiply by 1,000 to get grams per 1,000 kcal. For example, raw skinless chicken breast contains 6.5 grams of protein, 0.3 grams of fat, and 30.8 calories per ounce:

6.5 ÷ 30.8 x 1,000 = 211 grams of protein per 1,000 kcal

0.3 ÷ 30.8 x 1,000 = 9.7 grams of fat per 1,000 kcal (GFK)

❖ "AS FED" VERSUS "DRY MATTER"

The percentages of protein, fat, etc., shown on a pet food label are expressed "as fed" – meaning, as the food is delivered in its package. Some percentage of the food is comprised of moisture (water), which of course contains no protein, fat, fiber, or other nutrients. Kibble generally contains about 10 percent moisture; wet foods (canned, frozen, or fresh) contain as much as 80 percent or more moisture.

So, think about it: When a label says that a food contains (for example) 4 percent fat, in order to *really* understand how much fat you are about to feed your dog, you also have to know how much moisture is in the food. What you *really* want to know is how much fat (in this example) is in the *food* part of the food – the "dry matter." Any serious discussion of nutrition, or comparison of dry and wet diets, then, requires the conversion of the nutrient values from "as fed" to "dry matter." Don't worry; it sounds technical, but it's easy to do.

✔ **To calculate dry matter (DM) percentages,** first determine the amount of dry matter by subtracting the percentage of moisture from 100. Then divide the "as fed" percentage by the amount of dry matter to get the dry matter percentage. For example, if a canned food has 75 percent moisture and 4 percent fat:

100 - 75 = 25 percent dry matter

4 ÷ 25 = 16 percent fat on a dry matter basis

Genny and **Buster** are two diabetic dogs who eat prescription diets.

■ **GENNY,** a 10-year-old Bichon Frise, has lived with Cathy Briody in Jewett City, Connecticut, since Genny was given up for adoption at age 15 months because of diabetes. "She spent her first few days with me at Tufts Veterinary Hospital getting regulated," says Briody. "Her vet recommended Hill's Prescription Diet w/d canned food twice a day, 12 hours apart, followed by an insulin shot 30 minutes later. I did a glucose curve on her at home every two weeks, then faxed the results to her vet at Tufts, and he would call to let me know what changes to make in her amounts of food and insulin."

Regulating Genny's condition took two months, at the end of which Briody, a rescue volunteer, realized she couldn't let the pup go to anyone else. Genny's foster home became her permanent residence.

"She celebrated her tenth birthday last November," says Briody. "She still eats w/d, only now she gets three meals a day because her glucose tends to get low in the afternoon, and she won't eat breakfast unless Parmesan cheese is sprinkled on her food. Genny has had two hypoglycemic crashes. The first was in 2005, when she had a seizure. She got lots of Karo syrup and food before going to her regular vet and spending the rest of the weekend back at Tufts. Her second crash happened last August, and her recovery was a long process, but she has been fine since October."

Genny is a Delta Society Pet Partners therapy dog who visits a hospital and two group homes every month, as well as a Reading Education Assistance Dog (R.E.A.D.) who is read to by first-graders once a week. "Although I would like to feed her a better food," says Briody, "the w/d works fine for Genny, and she eats it willingly. She does not take any supplements and seems to be doing well."

Genny was given up for adoption at 15 months, after she was diagnosed with diabetes. Cathy Briody first cared for Genny as a rescue volunteer, but adopted her after falling in love with the cheerful little dog more than eight years ago.

■ **BUSTER,** a 13-year-old, seven-pound Maltese (pictured taking agility jumps in last month's article on diabetes), also eats a prescription diet, with some raw food added to it. Buster lives with Mary Butler in Northern California. "As soon as he was diagnosed three years ago," says Butler, "I consulted a nutrition specialist at the University of California, Davis, veterinary school, who took a detailed history and calculated Buster's nutritional needs. In addition to including my little guy's favorite snack (Nature's Variety Instinct raw beef medallions), he recommended a diet of high-fiber Hill's Prescription Diet w/d." Like most commercial raw diets, Instinct raw foods are high in protein and fat and low in carbs, a good complement to w/d's low protein and fat and high carbs.

Butler feeds Buster the same thing every morning and evening. "He gets less than ¼ cup of dry w/d chicken plus half of a beef medallion," she says. "The vet told me the most important thing is to be consistent with his diet, and I have been. Buster has been stable ever since his diagnosis. He gets insulin twice a day, and the dose has remained the same as the day he was diagnosed. It has never had to be adjusted."

Buster loves his meals and always eats every bite, says Butler. "He hops and spins when I say, 'Supper!' I will not change a thing I'm doing as he is so stable and healthy."

NON-PRESCRIPTION DRY AND CANNED FOODS

Diabetic dogs *don't* require a prescription diet. Adult maintenance diets with moderate amounts of fiber work well for most dogs with diabetes. **Penny** and **Silkie** are great examples of dogs who thrive on high-quality commercial diets.

■ **PENNY,** a 35-pound, 6-year-old Brittany belonging to Melba and Curtiss Lanham of Fulshear, Texas, is a diabetes success story. "We took Penny in as a foster when she was six months old," says Melba. "She was the most full-of-energy Brittany we had ever fostered and was also the smartest little girl. It wasn't long

Penny developed diabetes after being fostered and then adopted by two Texas licensed paramedics, who were able to stabilize her health and diet.

before she was a permanent member of our family."

But at nine months, Penny's personality changed. "She did not like to be around the other dogs and kept them away from her. Normally a very playful puppy, she would often hide under a desk or wrap herself tightly in a little ball. Her trips outside to void urine increased but with no noticeable increase in water intake. Off to our favorite veterinarian she went."

Penny was diagnosed with a urinary tract infection, but antibiotics didn't change her behavior or symptoms. Back she went for more tests, only this time Penny wasn't allowed to leave until her very high blood sugar stabilized. She had diabetes.

"Curtiss and I were both licensed Texas paramedics," says Melba, "so drawing blood, using a glucometer, giving injections, and even understanding the disease were the easy parts of the journey. Managing Penny's diet became the biggest challenge."

After experimenting with different diets, the Lanhams found that Penny had most consistent results with Nature's Logic Chicken dry kibble, which has 38 percent protein and 18 percent fat DM according to the analysis posted on the company's website. "We have over four years of blood draws and glucometer readings for Penny to show the consistency this food has provided. We add 1 tablespoon of canned Nature's Variety Instinct Venison to her moistened kibble each feeding." Instinct grain-free canned foods are 95 percent meat and liver, high in protein and fat, and very low in carbs.

Penny's insulin dose may need adjusting if her meals are served later than usual or if she hasn't gotten her normal exercise because of inclement weather. "Heaven forbid if we have company and it's someone who doesn't understand that Penny is not allowed snacks, as she is just too darned cute not to feed!" says Melba. "But because we monitor so closely and know all of her pre-crisis signs, we are able to avoid the most drastic swings in her blood sugar level.

"This little juvenile diabetic is now almost six years old. She is a very fit Brittany, still full of energy and extremely active. She is bright-eyed, plays hard with our other three dogs, runs the ¼ acre we have fenced in the back, and watches squirrels with a passion. She is still the smartest Brittany we have ever had."

■ **SILKIE,** a 14-year-old, 18-pound Silky Terrier belonging to Meri Binette of Delray Beach, Florida, has lived with diabetes since November 2010. He was also diagnosed with hypothyroidism. Cataract surgery with lens implants followed in April 2011 and, because of demodectic mange, he had to be treated with high doses of ivermectin.

"Silkie also has on-and-off colitis," says Binette, "so we consulted with a holistic nutritionist for animals. We try to keep Silkie's protein levels high, with carbs lower, and keep treats to a minimum. We give him fish oil and digestive enzymes. We do home blood glucose tests because his insulin dose requirement always changes." Silkie was switched from Humulin to long-acting Levemir because he has been difficult to regulate.

Silkie eats Natural Balance "limited ingredient" venison, bison, or fish (canned and dry), plus Stella and Chewy's freeze-dried duck or lean ground beef or turkey as a treat. Natural Balance limited-ingredient diets are formulated for dogs with food allergies. They are mostly grain-free, low in fat, with limited protein, and high carbs. As with most commercial foods, the canned versions have more protein and fat than the dry. Stella & Chewy's frozen and freeze-dried foods are high in protein, high in fat, and low in carbs.

All of Silkie's foods are low in fiber, so Binette recently began adding 2 tablespoons of Hill's r/d high-fiber canned food. "It makes his poops more solid, and more frequent, so less gas," says Binette, "His glucose levels have also been more stable. At age 14, we just want his quality of life to be good. So far, it is. We take it day by day."

Fourteen-year-old Silkie has had diabetes for just a year and a half, and has other health issues as well. He gets a combination of commercial canned and dry foods to stabilize his blood sugar and promote a healthy stool quality.

COMBINING HOMEMADE AND COMMERCIAL DIETS

Commercial diets can be improved with the addition of raw or cooked foods, while feeding part kibble or canned in addition to home-prepared can make preparation easier. **Scout, Henry, Buddy,** and **Kodi** each receive a customized diet containing all kinds of foods – a diet that was found by trial and error to work well for each individual.

■ **SCOUT,** an eight-year-old Bichon/Shih Tzu mix, who lives with Diane Di Salvo of Madison, Wisconsin, was diagnosed with diabetes two years ago.

"That's when I joined the Yahoo 'DiabetesPet' group (groups.yahoo.com/group/diabetespet)," says Di Salvo. "The great people there have a wealth of knowledge gained over many years of trial and error. The basic recommendation for homemade food is ⅓ protein (lean chicken breasts, lean ground beef, lean turkey), ⅓ veggies (green beans, cauliflower, summer squash), and ⅓ complex carbohydrates (brown rice, barley, quinoa, oatmeal). In addition, a multivitamin, calcium, and fish oil are recommended."

After six months, Di Salvo found the food preparation too time-consuming, so she replaced the diet's complex carbs with Wellness CORE Reduced Fat dog food, which is popular among group members. "I used equal parts kibble and our original chicken/veggie mix. This worked very well for Scout, and I had no difficulty controlling her blood glucose. But after a month, she decided she didn't like the CORE food and would only eat her chicken and veggies. So we made another switch, this time to Orijen Senior, which we fed half-and-half with her chicken and veggies. Scout needed a higher dose of insulin with this mix, but she was soon under control once again."

Di Salvo continues, "Scout gets very hungry and can't wait the full 12 hours between meals, so she gets a heaping teaspoon of canned pumpkin topped with a small piece of sardine about halfway through the day. The pumpkin helps increase the fiber in her diet." Scout also gets low-carb treats as a reward each time her blood glucose levels are checked.

Late in 2011, Scout developed a serious urinary tract infection and struvite urinary stones. "At this point we knew that once again we were going to have to change her diet," says Di Salvo, "but neither I nor our vet had any idea what to feed her. The Hill's prescription diet meant for dissolving struvite stones was way too high in fat for a diabetic dog."

Di Salvo contacted the School of Veterinary Medicine at Tufts University in Massachusetts and worked with a veterinarian who specializes in dietary nutrition for dogs and cats. "Her recommendation was Royal Canin Veterinary Diet Urinary SO Moderate Calorie kibble, a new low-fat option. Although I wasn't thrilled with this, I knew it was best for Scout. She has been on this diet for two months, and it works very well with her diabetes, plus she loves it. She actually needs less insulin on this diet, and her blood glucose readings have been wonderful. The specialist said that once her stones are gone along with her urinary tract infection, we'll be able to go back to a more economical diet, as the prescription food is expensive." (See "Is Your Dog Stoned?" WDJ April 2010 for information on struvite bladder stones.)

■ **BUDDY,** a Rottweiler living in Winnipeg, Manitoba, Canada, with Glenda Furkalo, was diagnosed with diabetes just before his ninth birthday in February 2011. Buddy also had hypothyroidism, many allergies, and at the time of his diagnosis was recovering from pancreatitis. Because of his allergies, he was on prednisone for many years, which may have

contributed to his diabetes. "These complications made his treatment more of a challenge," says Furkalo. "We had many ups and downs."

At first Buddy was prescribed Royal Canin Veterinary Diet Gastrointestinal Fiber Response HF dry food. "The food part was a roller coaster because of his allergies," she says. "We had tried raw food a few years ago, and he was finally transitioned back to a home-prepared diet in April 2011."

Buddy thrived on twice-a-day meals of 12 ounces of Spring Meadows whole ground raw chicken (including skin, organs, and bone), ½ cup cooked buckwheat or lentils, ½ cup rehydrated Sojo's Grain-Free dog food mix, plus ½ cup Orijen 6 Fish kibble.

"We wanted to keep him grain-free," says Furkalo, "but we needed carbohydrates to help regulate his blood sugar, thus the buckwheat and lentil choices." These also provided fiber and low-fat calories, to help balance out the very high fat in the ground chicken. Buddy's supplements included high doses of chromium, which Furkalo feels helped with his glucose levels, plus fish oils and vitamins B-complex, C, D, and E.

As his condition improved, Buddy's weight, which had fallen to 75 pounds, increased to 89 pounds. "I was excited because he was doing so well," says Furkalo, "but then we got devastating news. In January 2012, a week before the one-year anniversary of his diabetes, Buddy was diagnosed with bone cancer. We lost him to that disease in February, four days after his tenth birthday. He was a special soul, so full of love, and a joker up until the day before he passed away."

■ **HENRY,** an eight-year-old Cardigan Welsh Corgi belonging to Carol Albert of Kensington, Maryland, was diagnosed with diabetes four years ago.

"He was very draggy for a while," she says. "About a year ago I switched his food to Blue Buffalo kibble and soon after that started combining it half-and-half with Pawgevity, a commercial raw diet (the company is owned by my sister-in-law). His energy has increased tremendously and he recently started herding the other dogs at the park again. He gets Pet Botanic Training Reward Treats after his shot and occasional Charlie Bear Treats. He also loves carrots. Since his diet was changed, Henry's insulin requirement has gone down slightly." (Pet Botanic treats contain glycerol, which is not ideal for a diabetic dog.)

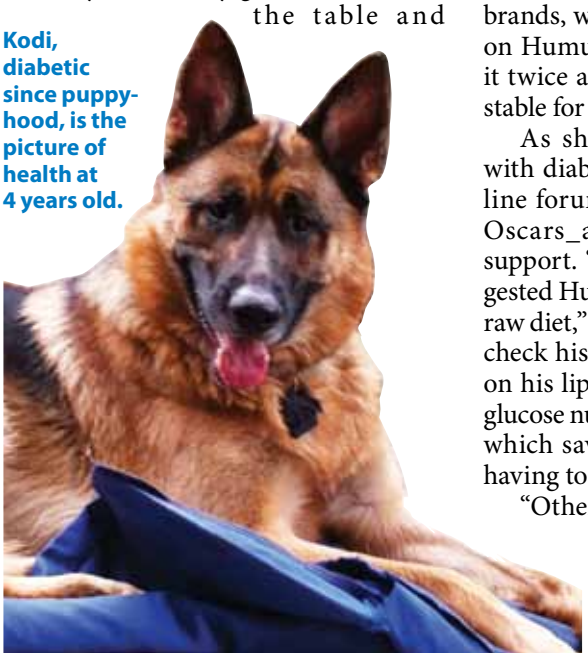
Henry is large at 50 pounds and would be healthier at 45, Albert says. "Unfortunately, I have MS and can't take him for long walks like I used to. We usually hit the park at the end of the street for canine companionship and for the fascinating smells."

■ **KODI,** a German Shepherd Dog belonging to Judy White in San Antonio, Texas, was diagnosed as a young pup. "I tried everything my vet told me to do," says White, "until I took it into my own hands and researched everything I could get my hands on. I am a registered nurse and was determined to manage his disease. Kodi was a challenge to raise due to his large breed, ever-changing metabolism, and youth. The dry foods my vet gave us and the amount of insulin prescribed did not serve his growing body and instead forced him into diabetic crises."

White found a product containing raw chopped bison, elk, and venison (including bone) with vegetables (from LoveYourPetBakery.com) and began feeding Kodi 1 pound of these mixtures plus 1 cup Merrick B.G. (Before Grain) salmon kibble divided into morning and evening meals. The dry food helped keep him stable and prevent hypoglycemic episodes. Kodi also eats a raw egg twice a week and gets organic chicken strips as treats. "He was fed a larger quantity while he was growing," she says, "Now, at four years old, he is a stable, 130-pound gorgeous, shiny, muscled GSD."

As White explains, "All of the time and effort we have spent with Kodi has been well worth it. And he's smart. One day he actually grabbed a fork off the table and tossed it at me. As I tried to figure out what that was about I thought he looked a little funny, so I checked his blood sugar, and sure enough, it was dangerously low. Now I can look at him and guess what his blood glucose is, and I'm usually pretty close.

"In my opinion, the key to managing a diabetic dog lies mostly in a clean raw diet, knowledge of the disease's pathology, and commitment to your animal."



Kodi, diabetic since puppyhood, is the picture of health at 4 years old.

LOW-CARB RAW DIETS

Homemade diets allow you to control all the variables, but be aware that most raw diets, whether commercial or homemade, are high in fat. While some diabetic dogs do fine with these diets, they could cause serious problems for dogs who suffer from pancreatitis, hyperlipidemia, or Cushing's disease. **Gryffin, Sunny,** and **Zachary** are perfect examples of how well raw diets can support diabetic dogs.

■ **GRYFFIN,** a Cavalier King Charles Spaniel, was four years old – and obese at 30 pounds – when he was diagnosed with diabetes and given up for adoption. "We were his foster family," says Alise Shatoff of San Diego, California, "and he wormed his way into permanent family member status."

Now nine years old and a healthy 23 pounds, Gryffin eats Nature's Variety raw frozen patties (95 percent meat, bone, and organs, and 5 percent vegetables and fruits) with digestive enzymes, salmon oil, and milk thistle extract to support his liver. Nature's Variety, like most commercial raw diets, is quite high in fat.

Shatoff checks Gryffin's blood sugar twice a day with an Aviva human test monitor and writes the result in his notebook. "After experimenting with other brands, we found that Gryffin does best on Humulin N for his insulin. He gets it twice a day after meals. He has been stable for four years now."

As she learned to care for a dog with diabetes, Shatoff turned to an online forum (groups.yahoo.com/group/Oscars_animaldiabetes_support) for support. "They were the ones who suggested Humulin N for him, based on his raw diet," she says. "I also learned how to check his blood glucose with the meter on his lip, and how to translate human glucose numbers into the dog equivalent, which saved us a ton of money by not having to buy the pet meter test strips.

"Other than his diabetes and hypo-

thyroidism," she says, "he is very healthy and his lab tests always come out well. He has no trouble keeping up with our Cavalier puppy and 95-pound German Shepherd. He still has his eyesight, which is uncommon after five years. I give him Natural Ophthalmics' homeopathic Cineraria Eye Drops once a day, which I think in combination with the low carb raw diet has really helped save his vision. He has a partial cataract in one eye and the other is fine. Fortunately, cataract surgery is very successful, and we have a fund saved up for Gryffin in case he ever needs it."

Every night after dinner, Gryffin and his canine companions chew on Leo and Mike toys stuffed with grain-free treats like Merrick dehydrated lamb lung, PureBites dehydrated cheese or beef liver, or Kong Stuff'N IQ baked salmon treats.

■ **SUNNY,** a 12-year-old Greyhound, like many dogs these days, was adversely affected by the economy. "In April of 2011, I picked up this very sick dog to foster from loving owners who could no longer care for him," says Cynthia Wilber of Catonsville, Maryland. "He was 15 pounds underweight and could barely stand. Because Greyhounds rarely get diabetes, I thought his symptoms stemmed from kidney disease, but his glucose levels were off the charts, and he responded well to fluids and insulin."

Wilber left Sunny at her veterinarian's clinic for three days to stabilize his condition, and he was well-regulated within six weeks.

"Initially I had him on Orijen 6 Fish and he did very well and put some weight on," she says. "Then one day he and my Greyhound Hope ate each other's dinners – Sunny ate Hope's raw food and Hope ate Sunny's kibble. I had a rough night thinking both would be sick from the mix-up, but they were fine! A month later I took the plunge and switched Sunny to raw. He went from 'doing fine' to 'doing great,' and his insulin dose decreased two full units. But that change required that I be more conscientious about giving

Sunny was so weak he could hardly stand when his now-owner picked him up to foster. He was quickly diagnosed and stabilized and today, on a raw diet, he looks and feels GREAT.

snacks at regular times (midday, evening before his walk, and bedtime). If I fall asleep on the couch and he doesn't get his bedtime snack, he can be confused or weak with low blood sugar in the morning." Snacks include bully sticks, beef tendons, and dehydrated, fresh, or frozen chicken/duck feet, liver leather, and sometimes dehydrated sweet potatoes.

Wilber feeds a home-prepared raw diet that includes a wide variety of low-fat raw meaty bones, meat, and organs, plus vegetables, eggs, and dairy. Starchy vegetables, including sweet potato and winter squash, are cooked.

Because diabetic dogs can be prone to urinary tract infections, Wilber gives Sunny cranberry capsules. She also gives him a glucosamine/chondroitin supplement, salmon oil, ester C, vitamin E, and selenium. Wilber adds carrot juice or kefir to one meal a day.

"His cataracts have not gotten significantly worse since diagnosis," she says. "He's gained muscle, but because our walks are never more than a mile at a time, he's not as fit as he should be. But exercise burns glucose, so even though I carry carbs on walks, I don't push things with him because he's too big to carry home, and I really just want him to be as happy and comfortable as possible. Despite his diabetes, Sunny is living a good life. And yes, he landed in the right home. I decided to adopt him."

■ **ZACHARY,** a Lab/Shepherd mix belonging to Sheila Laing of Lansing, Michigan, lived with diabetes for four years after being diagnosed at age 11.

For the first six months, Laing followed her vet's advice and fed Zachary Hill's Prescription Diet w/d food. "It wasn't helping Zachy, so I stopped the kibble and switched to a home-cooked diet for six months. Then I switched to a completely raw diet for the remainder of his life."

Zachary's meat selections included beef, chicken, turkey, and pork, with beef

Gryffin's owners think a raw diet has helped save the diabetic dog's vision. Despite having diabetes for five years, he has only a partial cataract in just one eye.

or pork hearts and beef tongue twice a week, plus kidney, liver, spleen, or tripe, and slightly cooked green beans or sweet potatoes. Liang also added bitter melon (an herbal supplement that may lower blood glucose), fish oil, parsley, eggs, and occasionally coconut oil to his food, and gave small amounts of colloidal silver periodically, which she feels helped Zachary avoid urinary tract infections.

"We have a 10-acre yard for our dogs, so Zachy had lots of exercise," says Laing. "My husband mows a path around the inside perimeter, so in addition to all the running around he did in his big yard, I would walk him regularly on the path."

Laing created a chart that she kept on the refrigerator door for easy access. "I'd keep a month of charts – one page held a week of activity – and file the rest where I could easily get to them," she says. "I noted the time and his blood glucose level, the time his insulin shot was given each morning and evening, whatever supplements I gave him, and anything that was abnormal, such as diarrhea, vomiting, low activity, etc. I highly recommend charting for anyone with a dog or cat that has diabetes. Not only does it help with remembering what you do in a day, but it's handy to refer to when needed.

"Zachy was a healthy, happy dog for most of the four years that he had diabetes. He was 15 when he passed away. I feel blessed that I was able to help him lead a healthy normal life in his senior years despite the diabetes."

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. She lives with her Norwich Terrier, Ella, in the San Francisco Bay Area.

Fear Not, Wee One

Prevention and modification of fear-related behaviors in puppies.

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

The intent of puppy socialization is to convince the part of the puppy's brain that reacts emotionally to his world (the amygdala) that, in general, the best/most appropriate emotional responses are calm, relaxed, and happy. These days, the importance of puppy socialization is well-known and widely accepted. Interesting, then, that some behavior professionals (myself included) report seeing an increasing number of canine clients with fear-related behaviors.

There are several reasons for the apparent increase in fear-related behaviors in dogs, including:

❖ Less "natural socialization," as responsible owners keep their puppies safely at home, rather than allowing them to roam the neighborhood.

❖ The availability of more behavior professionals who are willing and able to work with dogs who display fear-related behaviors, and the awareness of more dog owners that behaviors can be modified.

❖ A lack of understanding among dog owners who recognize that socialization is important, but don't realize that key to good socialization is positive exposures to the world. A pup who has negative experiences during the primary (3 to 14 weeks) socialization period is very likely to grow up fearful, unless prompt remedial action is taken.

❖ A lack of awareness of the existence of secondary fear periods which, according to various information sources, can occur for a dog anywhere between the age of 4 to 11 months, or perhaps as late as 2 years of age. A fear-causing event any time during this period, when a dog is more sensitive to aversive stimuli, can also have far-reaching fear behavior implications.

❖ The emergence of puppy mills over the last 30 years. Puppy milling only began to boom in the late 1970s and later. Puppy mill puppies do not receive adequate socialization – if any. They are also likely to be shipped to retail outlets during the very significant early fear period (8 to 10, maybe 12, weeks)

❖ The emergence of the so-called "no-kill" movement, which promotes the placement of behaviorally questionable dogs who, in the past, would more likely have been euthanized.

❖ A growing number of hoarder case investigations by animal protection agencies that result in the seizure of hundreds of undersocialized/fearful dogs who are then rehomed.

GENETICS V. ENVIRONMENT

An often-asked question is, "Is my dog's fearful behavior genetic, or did someone or something cause it?" The answer is *always* "both." Genetics as well as life experiences always have a combined influence on behavior.

In the case of genetics, what is actually heritable is a dog's propensity to be reinforced by (or to find aversive) a particular behavior. Border Collies are genetically programmed to find running after things to be very reinforcing – so they are good at herding; while Labradors Retrievers have a propensity to be reinforced by putting things in their mouths – hence they are good at retrieving. Conversely, a dog who has a genetic propensity to find new and/or unusual stimuli aversive might be said to be genetically fearful – a common problem for dogs produced by breeders (including puppy mills) who don't deliberately make an effort to breed for sound temperament.

If you take two puppies of similar age and expose them to a novel stimulus, given equal amounts of proper socialization,

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Don't forget that there can be genetic diversity even between full siblings. One may inherit a fearful temperament, while the full sibling is confident and cocky.

COUNTER-CONDITIONING AND DESENSITIZATION (CC&D)

Counter conditioning and desensitization (CC&D) involves changing your pup's association with a scary stimulus from negative to positive. The easiest way to give most pups a positive association is with very high-value, really yummy treats. I like to use chicken – canned, baked or boiled.

Here's how CC&D works:

1 Determine the distance at which your pup can be in the presence of the stimulus and be alert or wary but not extremely fearful. This is called the threshold distance.

2 While holding your pup on leash, have a helper present the stimulus at this threshold distance. The instant your pup sees the stimulus, start feeding bits of chicken, non-stop.

3 After several seconds, have the helper remove the stimulus, and stop feeding chicken.

4 Keep repeating steps 1-3 until the presentation of the stimulus at that distance consistently causes your puppy to look at you with a happy smile and a "Yay! Where's my chicken?" expression. This is a conditioned emotional response (CER) – your pup's association with the stimulus at threshold distance is now positive instead of negative.

5 Now increase the intensity of the stimulus. You can do that by decreasing the distance slightly; by increasing movement of the stimulus at the same distance (a child walking, skipping, or swinging her arms); by increasing the number of stimuli (two or three children, instead of one); increasing the visual "threat" (a tall man instead of a short one, or a man with a beard instead of a clean-shaven one); or by increasing volume (if it's a stimulus that makes noise, such as a vacuum cleaner). I prefer to decrease distance first, in small increments, by moving the puppy closer to the location where the stimulus will appear, achieving your CER at each new distance, until your pup is happy to be very near to the non-moving stimulus, perhaps even sniffing or targeting to it.

6 Then return to your original threshold distance and increase the intensity of your stimulus (move the vacuum a little; have two children instead of one; have the man put on a hat or a backpack), gradually decreasing distance and attaining CERs along the way, until your puppy is delighted to have the moderately intense stimulus in close proximity.

7 Now, back to your original threshold distance, increase intensity again, by having your helper turn the vacuum on briefly, feed treats the instant it's on, then turn it off and stop the treats. (Or turn up the volume, or add more children, etc.)

8 Repeat until you have the CER, then gradually increase the length of time you have your pup in the presence of the increased-intensity stimulus, until he's happy (but not aroused) to have it present continuously.

9 Begin decreasing distance in small increments, moving the pup closer to the stimulus (or the stimulus closer to your puppy), obtaining your CER consistently at each new distance.

10 When your baby dog is happy to have the higher intensity stimulus close to him, you're ready for the final phase. Return to the original distance and obtain your CER there with a full intensity stimulus – a running, moving vacuum; multiple children laughing and playing; a tall man with a beard wearing a hat, sunglasses, and a backpack. Then gradually decrease the distance until your dog is happy to be in the presence of your full-intensity stimulus. He now thinks the stimulus is a very good thing, as a reliable predictor of very yummy treats. In the case of a human stimulus, you can gradually work up to actual interaction with the human(s) at this stage, by having the person(s) drop treats as they walk by, then letting him take treats from their fingers – without direct eye contact, and eventually working up to normal interaction.

GET BACK ON THE HORSE

The more complex the stimulus, the more intense the fear or arousal response; the longer the pup has had a fear response to the object, the more challenging the behavior is to modify. Studies show that when rats are exposed to a fear-causing stimulus, they recover from that fear much more easily and quickly if rehabilitative efforts happen sooner (within 24 hours) rather than later (days, weeks, or months down the road). For this very reason, fans of horseback riding have long heard the admonition to get back on the horse after falling off; getting back on immediately and having a good experience will diminish the likelihood of a deep-seated lifetime fear of horses.

The same is true for puppies who have fear-causing encounters. The sooner they are re-exposed to the scary thing at sub-threshold intensity, and counter-conditioning is effectively done to give them a new, positive association to the stimulus, the easier it is to accomplish, and the less likely the pup will suffer from a longtime – or lifetime – negative association with it.

Strenuously avoid making the mistake of flooding. *Flooding* is exposing your pup to the full intensity of a scary stimulus and making your pup endure it until he loses all hope of escape and gives up. Proper behavior modification strives to keep the exposure sub-threshold.

Flooding is considered to be very inhumane, and is not a recommended behavior modification technique for dogs. Although it is sometimes used in behavior modification with humans, it is always with the consent of the human subject, and the human has access to a "shut-off" signal of some kind, so she can turn off the stimulus if it becomes unbearable. A dog forced to undergo flooding isn't asked for consent and has no relief switch to turn it off.

the puppy who is of genetically sound temperament will likely be calm and/or curious, while the genetically less-stable pup is more likely to exhibit a fear response. Genetically less-stable pups need much more socialization if they are to develop into normal, stable dogs – but since it's virtually impossible to tell how genetically stable a pup may be, the solution is to super-socialize all pups. The stable ones can only benefit from the extra experience as well.

Environmental impact can begin very early. For example, if a pup is genetically sound for temperament but his mother exhibits fearful behavior toward people approaching the whelping box, the pup can learn from this to be fearful of people at a very young age – as young as 3 weeks. Additionally, fear-causing events during sensitive periods, as well as significantly traumatic events at any time, can cause environmentally induced long-lasting fearful behavior.

PREVENTING FEAR

Fear is one of the primary causes of aggression. It also badly degrades a dog's quality of life, as well as the lives of the humans who love him. Therefore, it's in everyone's best interests for you to take steps to prevent your puppy/young dog from becoming fearful. One might think that would mean keeping him safe at home where no bad things can happen to him, but the opposite it true. Undersocialization is likely the leading cause of fear-related behaviors. (See "Vaccinations and Socialization," below.)

When you are socializing your pup, take care to fill his environment with happy experiences. When you do this, you are giving him a positive classical association with his environment; you are programming his brain to see the world as a fun and happy place. Be extra sensitive to your pup's perspective on the world, and watch closely for low-level signs of stress that will tell you he's not enjoying himself. These might including avoidance (trying to move away from something), lip licking, yawning, shutting down (absence of behavior) and more. (For more information about identifying these behaviors, see "Stress Signals," June 2006.)

If you see any of these signs, identify what is worrying him and increase his distance from that stimulus. Then carefully work to give him a positive association with that thing, using counter-conditioning to pair the stimulus with something wonderful, like chicken – baked, broiled, or canned. (See "Counter-Conditioning and Desensitization," page 20).

VACCINATIONS AND SOCIALIZATION

A veterinarian's first priority is the physical health of her clients. As a result, sadly, some veterinarians still issue the out-of-date edict to their puppy owners to not take their baby dog anywhere until he is fully vaccinated – age 4 to 6 months. This, of course, totally overlooks the very real concern for a pup's mental health, and the vital need for proper socialization to occur well before the pup is fully vaccinated. As mentioned in the accompanying article, the primary socialization period is early and short – when the pup is 3 to 14 weeks of age. At 4 months, the earliest age a pup will have received all his first-year shots, the undersocialization damage is done, and the owner must now modify the fearful behavior that could have been avoided had her veterinarian given her better advice.

In fact, the need for the "puppy series" of vaccinations is widely misunderstood by many puppy owners. It's not that your pup needs a series of shots to boost his immune system to a protective level. What actually happens is this:

When a puppy is born and begins to nurse, he drinks colostrum – milk produced during the first day or two after birth, that contains a high antibody count. By drinking colostrum, the pup gains an early level of immunities from his mother, which protects him until his own system can produce immunities.

At some point between the age of 8 and 16 weeks, the mother's immunities start to fade. If given too soon, a vaccine is ineffective, because mom's immunities are still at work. If vaccinated too late, the pup is unprotected for a while, because mom's immunities are gone and the pup's haven't yet been triggered by the tardy vaccination. However, as long as a pup is vaccinated in a timely manner during the puppy series, he should be adequately protected, especially if the owner doesn't foolishly expose him to very high risk environments such as dog parks, dogs or puppies known to be sick, or places sick canines are known to frequent.

The American Veterinary Society of Animal Behavior's "Position Statement on Puppy Socialization" says: "In general, puppies can start puppy socialization classes as early as 7 to 8 weeks of age. Puppies should receive a minimum of one set of vaccines at least 7 days prior to the first class and a first deworming. They should be kept up-to-date on vaccines throughout the class." It goes on to say, "In fact, behavioral problems are the number one cause of relinquishment to shelters. Behavioral issues, not infectious diseases, are the number one cause of death for dogs under three years of age."

In other words, a pup is more likely to die from behavior problems – including fear and aggression often related to lack of socialization – than he is from getting sick at a puppy socialization or training class.

PUPPY SOCIALS

With a little (okay – a lot) of luck and a good socialization program, you may never need a counter-conditioning program for your pup; he'll grow up mentally stable and free of fear, and be exactly the happy canine companion you're hoping for.

Recognizing the importance of early socialization, more and more positive reinforcement trainers are offering puppy socialization classes. In these classes, rather than (or in addition to) the routine teaching of basic good manners, pups are gently exposed to a variety of stimuli, below threshold, in a safe environment, where any early fears can be identified and tended to. Pups encounter a variety of people wearing strange costumes, listen to odd noises from "sound desensitization" CDs, walk on and through a variety of surfaces and obstacles, see a vacuum cleaner at a distance, and more. My own puppy social class recently got to meet Olivia, our miniature horse!

With efforts such as these from trainers and owners who understand the vital importance of early socialization, along with an increasing awareness of how to effectively help dogs who do have fear-related issues, we can hope to see the trend reverse, and start seeing fewer dogs in our practices – and our society – with fearful behavior.

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.*

SHOCK COLLARS AND PUPPIES

Naturally, we regard shock collars as absolutely unnecessary and inappropriate in any training program, but particularly so in training puppies and young dogs. Given the potential for an exceptionally strong fear response during the early fear period – as well as during the secondary fear period – it pains us greatly to see trainers who market their shock collar training even for very young puppies. Of course they mask the aversive nature of shock collars by calling them "electronic" or "e" collars and "electronic fences." Some even go so far as to ride on the popularity and reputation of the well-known gentle handling technique of "TTouch" by calling their shock training "E-Touch."

Our preference would be to see shock collars outlawed, as they are in several European countries, or at least restricted to the hands of a few very skilled professionals who must demonstrate the need for shock on those very rare occasions that all other more positive efforts have been exhausted, including referral to a veterinary behaviorist. But until that happy day arrives, we implore you to resist anyone's attempt to buckle a shock collar on your pup for training or confinement purposes. Your pup shouldn't have to live in fear of his own collar and his own backyard while you're working to convince him that the world is a safe and happy place.

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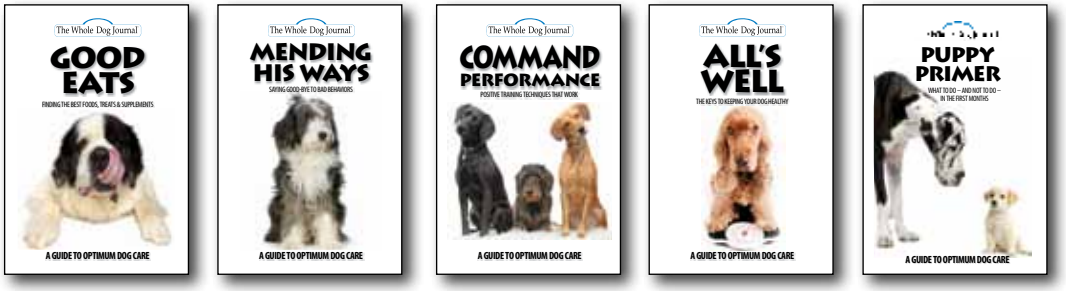

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- **Sandi Thompson,** CPDT-KA, Bravo!Pup Puppy and Dog Training, Berkeley, CA. Classes for puppies, adolescents, and adult dogs, "puppy socials," private lessons, and group classes. (510) 704-8656; bravopup.com

BOOKS AND DVDS

- WDJ Training Editor Pat Miller is author of ***Positive Perspectives: Love Your Dog, Train Your Dog; Positive Perspectives 2: Know Your Dog, Train Your Dog; Power of Positive Dog Training; Play With Your Dog;*** and ***Do Over Dogs: Give Your Dog a Second Chance at a First Class Life***. Available from Dogwise, (800) 776-2665 or dogwise.com
- ***The Encyclopedia of Natural Pet Care*** and ***Natural Remedies for Dogs and Cats***, by WDJ contributor CJ Puotinen, are available from Dogwise, (800) 776-2665 or dogwise.com. Puotinen is also author of several books about human health, including ***Natural Relief from Aches and Pains***, available from your favorite bookseller.

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