

Your complete guide to natural dog care and training

Whole Dog Journal™



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Signs of Progress

Every once in a while, you meet people who are doing absolutely everything right with their new pup – and it gives you hope.

I got a little whiny in one of my blog posts recently (tinyurl.com/WDJwhine). I was feeling a little depressed by my latest foster project: a mixed-breed mama and her nine teeny puppies. They were surrendered to my local shelter in sad shape: thin, infected with coccidia, and infested with fleas. The mom knows absolutely not one cue, not even “sit,” though she is super sweet and friendly – how can someone let such a nice dog get into such bad shape, and pregnant to boot? Ugh! Some days it just feels like we humans are making no progress in our ability to care for and manage our dogs.



Days after I wrote that post, my husband and I drove 100 miles south to spend the weekend with one of his cousins and the cousin’s wife. A death in the family reconnected the cousins, and after lamenting the fact that it shouldn’t take a funeral to schedule a visit with one another, my husband’s cousin invited us to come and stay with them.

I’m not going to lie; I had work to do, it was a hassle to arrange care for my chickens, my two dogs (in separate places), and the foster family (who are all receiving medication twice daily for the kennel cough they picked up in the shelter), and I had met the cousin only once and his wife never. I wasn’t looking forward to it.

But my husband’s cousin greeted us at the door with a 12-week-old miniature Schnauzer in his arms, and before really even saying hello, he handed us each a treat and asked us to feed it to the puppy. I *instantly* cheered up; this was going to be a *great* visit!

It would take more space than I have to list all the things that they were doing just right for their new puppy, Callie – and that’s in addition to wisely managing greetings to prevent the puppy from alarm barking. Just a few of the most important ones: They had purchased Callie from a reputable breeder they had known for decades and had waited years after their last beloved Schnauzer had passed, so they were really ready for a whole new dog (not just mourning the last one). They had appropriately sized treats and a variety of toys stashed all over, so they could reward the puppy quickly for any good behavior they wanted to reinforce. They had an exercise pen with a comfy bed and a water bowl set up in the kitchen, so the pup could be safely contained while they were busy cooking and eating. They also had a soft crate with a super thick, warm bed set up in the living room, where Callie already put herself to bed when she was tired.

I could go on, but the point is this: It did my heart so much good to meet people who procured and were caring for their new dog in such an educated, intentional, loving way, that the weekend really did end up relaxing and recharging me, and gave me hope that there *are* people out there doing it all right. Thanks, John and Karen, for restoring my temporarily lost faith in dog owners.

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Bad Dog Breath? Maybe Not!

Learn about a lesser-known cause of foul facial odors.

The odor was there. Not overpowering, but “off” and definitely not normal. My six-year-old Bouvier Atle’s breath simply never, ever stank. Yet here it was. Some kind of skanky odor emanating from his sweet little face. Was it time for a dental cleaning?

If you detect a stench coming from what you think is your dog’s mouth, and you chalk it up to dirty teeth, you may want to think again. While the bad breath could be the result of dental disease, the foul odor could be the result of another condition.

WHEN THE MOUTH SMELLS

We often consider dental disease – the buildup of plaque and calculus on the teeth and inflammation of the gums (gingivitis) – as the main cause of bad breath in a dog. While the seriousness of dental disease shouldn’t be minimized, there are lots of other reasons why your dog’s mouth might smell off. Other causes of unpleasant odors include:

- The tongue
- Metabolic diseases, such as diabetes and renal disease
- GI issues from excessive licking or swallowing, creating excess gas in GI tract
- GI upset caused by megaesophagus, food allergy, bacterial overgrowth, neoplasia (cancer of the stomach or intestines), or a foreign body (bones, rocks, toys, socks)
- Dietary (fish-based diets, oral fatty acids, coprophagia, consumption of other fetid foodstuffs)
- Maldigestion
- Respiratory disease (rhinitis, sinusitis, neoplasia)
- Non-periodontal oral disease (orthodontic, pharyngitis, tonsillitis, neoplasia)
- Autoimmune disease
- Oral cancer
- Trauma (oral foreign bodies, damaged palate from stick chewing, electric cord injury, caustic agents)

Understanding the origin of the smell is your first assignment and may require the expertise of your veterinarian, or veterinary specialist, to pinpoint. T-cell lymphoma, for example, is a rare but deadly disease that can present on the face. It mimics many other conditions and can be difficult to diagnose without a specialist’s intervention.

Like most Bouviers, Atle (pronounced “OUGHT-lay”) has a lot of hair, facial and otherwise. The beard, his time at the beach, and an early-season exposure to a high pollen count all likely contributed to his lip-fold dermatitis.



ATLE'S ODOR

I became obsessed with examining Atle's face, closing his mouth, taking a whiff, opening his mouth, taking a whiff...

I thought maybe his beard was the culprit and became zealous about daily beard washing; this didn't eliminate the stink.

He's a dog who has allergies, and while I hadn't noticed him excessively licking any body parts, he can be a "closet" licker; we tried a short trial of Apoquel (a prescription drug for dermatitis) but the odor remained.

Next, we experimented with a course of Pepcid, along with a probiotic, to see if mild GI issues were at the root of his ills, or if licking had thrown off the bacterial balance in the gut. Still no resolution.

We visited our veterinarian, who reported that his teeth and gums looked pretty good, with just a tiny bit of tartar buildup, but maybe a cleaning was in order. She mentioned that some dogs retain moisture on their faces, but didn't pursue that issue; his face looked great.

The odor lingered for a few months without any noticeable pimples or growths on his face or in his mouth, until we took a road trip south to Georgia in April. The further south

we got, the itchier Atle got. Within a day, there were hotspots on each side of his lower lip.

I sent a photo to his board-certified veterinary dermatologist, Tiffany Tapp, DVM, DACVD, and she quickly diagnosed "lip-fold pyoderma." She told me how to treat it using topical products and – voila! – by the next day, the odor that had lingered for a few months was completely gone. We'd found our answer.

DERMATOLOGIC CAUSES

Lip folds, facial skin folds, and even a dog's ears can produce odor that appears to be coming from the mouth – but isn't. Skin folds and ears: I know what those are! But the lip fold completely escaped me. In many dogs, it's a tiny, barely perceptible crevice on the lower jaw, on each side of the mouth, in the area where lip mucosal tissue meets haired skin.

Lip-fold pyoderma is a form of skin-fold pyoderma (intertrigo complex) and, guess what – it *stinks!* Wet and warm, lip (and facial) folds provide everything that pathogenic bacteria and/or yeast need to take up residence. The condition is more prevalent in dogs with loose jowls, droolers and slobbers, and those with deeper lip and skin folds on their faces, like brachiocephal-

ic dogs. Spaniels, German Shepherd Dogs, Bulldogs, Mastiffs, and Newfoundlands are just a few of the breeds prone to the condition. But it may also present in dogs who swim or whose lip folds tend to stay wet.

That, evidently was Atle's issue: daily beach trips and frequent face washes (without drying), combined with normal water consumption, set the stage for bacteria to thrive in his lip folds. When I pushed Dr. Tapp to tell me how, at six years of age, Atle could suddenly develop lip-fold dermatitis, she said he may have experienced cumulative changes in his skin barrier or an increase in allergen exposure. And, horrors – his lip could be getting droopier with age, or he may have undergone subtle anatomic changes, creating a lip-fold issue.

Likely, she thought, it was a number of things, with the most common predisposing changes being moisture and heat. Allergy produces inflammation which leads to heat; daily beach trips, every day slobber, and water bowls contributed moisture to complete the recipe for this stinky, unhealthy issue.

AN OUNCE OF PREVENTION

If your dog fits into one of the above categories, prevention is your best friend for keeping lip-fold (and skin-fold) pyoderma at bay. Some dogs do well if the hair on their lip folds is kept trimmed short. For dogs whose lip and face folds retain moisture, daily wiping of the folds helps. Dr. Tapp likes a 50/50 solution of white vinegar and water or an over-the-counter astringent such as Domeboro (available over the counter in most pharmacies).

Dr. Tapp has had good success (and so have we) with veterinary-prescribed Vetericyn VF spray, a pH-balanced, super-oxidized hypochlorous acid (HOCl) solution that is non-toxic, non-irritating, and shows microbial inhibition. The spray is safe to use on



Atle's lip-fold pyoderma worsened when we traveled south, to the point where we finally able to see something, which helped solve the mysterious malodor!

This tiny little crease, the lip fold, is an oft-overlooked source of foul odors, caused by a bacterial infection and overgrowth.

the face, lips, and around the eyes; the product mimics the killing power of neutrophils (that produce HOCl during their “oxidative burst”) and works well for maintenance to clean, reduce odor, and kill bacteria without developing resistance since it isn’t an antibiotic.

Wiping with a chlorhexidine wipe or spray such as the pet product Douxo Chlorhexidine may work for your dog, too.

As with any kind of infection, advanced lip-fold pyoderma may require an oral or topical antibiotic and/or anti-yeast medication to treat. Your veterinarian can do a simple cytology test to diagnose whether an infection is bacterial or yeast-based and then prescribe the appropriate treatment.

As a last result, for dogs with chronic lip-fold infections, a fairly simple surgery (cheiloplasty) to eliminate the skin fold may be the best intervention, as it essentially makes the problem go away forever. Yep, your dog may get a face lift before you ever do!

SMELLY EARS?

I had a hard time believing that a dog’s ears could be the source of an offen-



Photo by Lisa Rodier

sive odor that could be attributed to a dog’s mouth. Dr. Tapp was quick to tell me that often, only more severe ear disease is visible to us; early ear disease may not be visible but can omit an “off” odor that’s hard to pin down. Dr. Tapp’s own Golden Retriever’s head sometimes smells, and she says, “Sometimes it’s yeast in his ears, sometimes something gross he ate, and sometimes an inflamed lip fold.” Good to know we are not alone!

SMELLING IS BELIEVING

In Atle’s case, what was so mysterious was that I saw nothing that looked amiss on his chin or lip fold to indicate a problem. In hindsight, I now realize that the mucosa attached to his lip was inflamed and bright red at times, as opposed to a more subdued, quiet pink.

Atle most likely will continue to be prone to lip-fold dermatitis, but with dedication to keeping the area clean and dry, we’re less likely to see a full blown bacterial infection that would require oral medication.

If you smell “bad breath” there is a good chance that help from a general-practice veterinarian or specialist may be needed to locate and diagnose the problem. Serious signs such as bleeding, redness, oral discharge, unusual eating habits or anorexia are clear signs of a problem. But don’t discount the importance of getting to the root of subtler, stinky issues. Your dog – and your nose – will thank you. 🐾

Groomer’s advice: shave and dry the lips

Amy Stempel (seen here) grooms dogs at Pawsh Dog Boutique & Salon in Boston. She has groomed thousands of dogs over her 16-year career, winning multiple awards in professional grooming competitions along the way. And she is familiar with lip-fold dermatitis!

Stempel says she tends to see lip-fold issues in the spring and fall, when allergy season is in full swing. Dogs whose faces tend not to ever dry out – those with hairy damp faces, those who swim a lot, excessive droolers – are the most likely to show up at the salon with lip-fold issues. Like me, most of her clients assume the dog has bad breath or a wet beard smell!

To help with prevention, she routinely shaves hair off of her clients’ lips and recommends keeping beards clean and dry.



Lisa Rodier, CNWI, lives in southern Rhode Island with her husband and Bouvier. When she’s not at the beach, she competes with Atle in scent work trials, and teaches K9 Nose Work classes. You also might find her riding her bike or rowing.

Photo courtesy of Amy Stempel



The Allure of the Lure

Luring is a quick and effective way to teach new behaviors to your dog; just be sure to “fade” the lure as quickly as possible.

Luring means using something the dog wants, most often a food treat, to draw her or guide her into doing what you want her to do. With her nose glued to the treat like a magnet, you can lure her to sit, lie down, jump up on a surface, spin or twirl, and perform a very long list of additional behaviors by slowly moving the treat in the appropriate direction. Hence the “allure of the lure” – you can use this training technique to easily entice your dog to perform a behavior that you can then reward and reinforce.

There are, however, a couple of potential hazards of using a lure to train your dog. The first is that both you and your dog can become dependent on the presence of the lure. If you don't quickly fade its use (stop using the lure as soon as the dog learns the behavior), the dog may learn to wait until the lure is produced to perform the behavior, because that's how she thinks it's supposed to happen.

The second hazard can occur if you try to lure your dog to do something she really isn't comfortable doing.

If you avoid these potential pitfalls, luring is a valuable and effective training technique.

DO FADE AWAY

Since you probably don't want to go through the rest of your life having to stick a piece of

cheese in front of your dog's face to get her to do what you ask, how do you get rid of the lure? It's easier than you might think. Here's how to “fade” the lure so your dog will offer the correct behavior on your verbal cue, without a treat on her nose. Let's say “down” is the behavior you want to teach your dog.

1 JUST LURE. Without using a verbal cue, lure your dog into a down position from a sit, by putting a treat in front of her nose and moving it slowly toward the ground. Aim for her front paws; if you move it away from her, she might stand up to follow it. You may need to mark and reward (i.e., click a clicker or use a verbal marker, such as the word “Yes!” and then feed her a treat) your dog several times on the way down, until she figures out what you are asking of her. (We call this lure-shaping.)

2 CUE AND LURE. When your dog will follow the lure easily into a down position with just one click and treat, add the verbal cue. With your treat out of sight (I put it behind my back), say “Down” clearly and happily, just one time. Pause briefly, and lure your dog down. Click and treat. Repeat this step a half dozen times. It's as if you were saying, “Dog, the word ‘Down’ means the same thing as me putting the treat on your nose and luring you to the floor.”

Thanks to Jacob Paxson of The Canine Connection in Chico, California, for demonstrating with his dog, Kitty.



Put the treat right under the dog's nose, and move your hand in the direction you want her nose, head, and body to go.



If she stops following the lure, you may have to mark and reward (click and treat) her halfway-there efforts to encourage her to keep trying.



Mark (with the click of a clicker or a verbal marker such as the word “Yes!”) and reward her when she completes the desired behavior.

3 VARY THE PAUSE. Now, say “Down” as in Step 2, but vary the amount of time you pause before luring. This gives your dog more time to process what you are asking of her and more time to offer a response. In this step, you may see her look to the ground, or make a slight movement, as if she is saying, “I know I’m supposed to do something, but I’m not quite sure what...” Sometimes it’s almost as if she’s asking you the question, “Is this right?” If you see her do any of those things tell her, “Good girl!” and quickly lure her the rest of the way – then click and treat.

4 GETTING LUCKY. Some dogs will begin to offer the down on your verbal cue during Step 3. Woohoo! This is a nice shortcut; click and treat and keep practicing. (Just because she does it once doesn’t mean she’s got it; you still need to practice to make it a solid, reliable response.)

5 FADING THE LURE. Most dogs need some additional steps before they really understand what you are asking of them and begin offering the down on the verbal cue alone. For these dogs, you need to fade the lure. Start by luring as in Step 3. As you move the treat to the floor, watch your dog closely. When she appears to be committed to lying down, whisk the treat quickly away parallel to the ground, and hide it behind your back. If she finishes the down, click and give her a treat. If she

Luring can be used to teach the dog many fun behaviors, such as spin (seen here), “sit pretty,” and bow.

doesn’t finish, bring the treat back out and lure her the rest of the way. Click and treat.

Next time, lure her a little farther toward the floor before whisking the treat away. Continue to vary the amount of time you wait after giving the cue and before luring.

6 MORE FADING. Gradually whisk the treat away sooner and sooner, until you are barely luring at all.

7 SUCCESS. At some point your dog will begin to offer to lie down when she hears the verbal cue, without you luring at all. Congratulations, you are almost done fading the lure!

8 GENERALIZATION. Now you need to practice with your dog in other locations, and with you in other positions, until she will lie down on your verbal cue whenever and wherever you ask her to do so. Remember, even though she does it in the comfort of your own home, she is likely to need some additional coaching in new places and around distractions until she realizes she can do it anywhere. Anytime (for the rest of her life!) that she doesn’t do it when you ask, do a quick refresher session by returning to Step 3, until she is able to respond.

You will use the same procedure to fade the lure for other behaviors as well. Determine how to use your lure to explain to your dog what you want her to do. As soon as she will lure easily into position, begin fading the lure following the steps above, until she will do the behavior on just the verbal cue. Then generalize it so she can do it anywhere, anytime.

Notice that I don’t do any intermediate hand signal or other body prompt in this process, like pointing at the ground or using “air cookies” (where you pretend to have a treat in your hand). If you do, your dog still



hasn’t learned the verbal cue, and you still have to go through the process of fading the hand signal or prompt. In my opinion, it’s easier to skip the extra step.

LURED TOWARD FRIGHTENING THINGS?

This is where people get in the most serious trouble with luring, and all with good intentions: trying to use a lure to get a reluctant dog to do something she doesn’t want to do. The most common example is a dog who is afraid of scary strangers, men, kids, or anything else.

The owner thinks, “My dog is afraid of strangers, so I will give people treats to give to my dog so she will know that strangers make treats happen, and she will like them!”

It seems to make sense – associating scary strangers with treats, counter-conditioning – it should work, right? *Wrong!* At least wrong if it’s done this way. The problem with this scenario is that the scary person is luring the dog “over threshold” (too close) because the dog really wants the treat. But when the treat is gone and the dog looks up to see the stranger right there in front of him, he is way too close, and the dog may bite the person. If she doesn’t bite, she is still likely to be more sensitized, and more fearful of strangers in the future.



To start fading the lure, give the cue, start the luring motion, but whisk the lure away when your dog will lie down without it.

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The same holds true for any situation where you try to lure the dog to do something that is fear- or anxiety-producing for her, like getting in the car. You may succeed in that moment, but when the car ride proves to be as unpleasant as she anticipated, she will just be more reluctant, more fearful, and less trusting of you the next time you need her to get in the car.

In general, shaping is a better process for getting a dog to willingly offer behaviors that she's not sure about. True counter-conditioning – working below threshold, with *you* feeding the treats, not the scary person – is a far more successful (and safer) approach to

helping her become comfortable with things that are scary for her.

Meanwhile, don't let any naysayers get you down. Properly used, with attention paid to fading the presence of the treat, luring can be a very valuable and effective training technique. Just be sure you do it right. 🐾

Author Pat Miller, CBCC-KA, CPDT-KA, is WDJ's Training Editor. She and her husband, Paul, live in Fairplay, Maryland, site of her Peaceable Paws training center. Miller is also the author of many books on positive training. Her newest is Beware of the Dog: Positive Solutions for Aggressive Behavior in Dogs. See "Resources," page 24.

Historic Bias Against Using Food Lures

Twenty-plus years ago, when positive reinforcement-based training was in its infancy, those of us who were committed to this style of training took a lot of heat from trainers who were still wedded to their choke, prong, and shock collars. We were accused of being "treat-slinging weenies" and were told that dogs were supposed to do what they were told because they *knew* they had to do it – or else. We defended ourselves staunchly. A group I hung out with at conferences even came up with a song, "I Wish I Were a Treat-Slinging Weenie" – proudly sung to the tune of "I Wish I Were an Oscar Meyer Wiener."

Now, some 20 years later, using food as a reinforcer in training is widely accepted in much of the training world and supported by the scientific community. There are a number of studies that indicate that positive reinforcement training is not only highly effective, but also avoids many of the pitfalls inherent in coercion training, including a significant risk of eliciting aggression from dogs trained using force and pain.

There are certainly some challenges that we face in the force-free training world – and there are effective solutions for these challenges. We are far more likely to see "demand barkers" in our classes if we aren't careful to inform our students how to avoid this undesirable behavior. (Hint: Don't reinforce it, and instead, reinforce an incompatible behavior.) Some dogs who are on restricted diets may not have access to the higher-value treats often used in effective training programs. (A creative trainer can often find effective treats within the dog's allowed food groups, and there are other reinforcers besides food.) A dog who takes treats too eagerly can bloody the fingers. (We can teach her to take treats gently or use other delivery methods, such as a camping food tube, or tossing treats on the floor.)

One of the challenges that can be more difficult to resolve is dependency on the food lure. We can avoid this problem by using the training technique called "shaping" instead of luring (see "Shaping Your Dog's Sit" WDJ April 2018, and "Shaping Up" January 2017), but shaping requires more patience and very good timing and skill at observing the dog's body language. Less-experienced handlers tend to get quicker, more encouraging success with luring – as long as they fade the lure as quickly as possible, as described in the article above.

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Canine Influenza

*Should you have your dog vaccinated against the “dog flu”?
It depends on his lifestyle.*

You just picked up your dog from boarding after a lovely vacation. Everything seems fine – and then your canine companion starts coughing. He has some nasal discharge. He feels warm, and he doesn't want to eat. You remember that you just saw on the news that canine flu was causing problems. Oh no! You panic. Has he contracted the flu during his stay at the boarding facility?

It's certainly possible; boarding kennels and other places where high numbers of dogs congregate are the most common place for dogs to come into contact with one of the flu viruses.

Currently, two strains of flu have been identified in dogs within the United States: H3N2 and H3N8.

The initial outbreak in 2003-2004, identified as H3N8, was restricted to Greyhounds in Florida and had a high mortality rate (38 percent). There was then a lull in cases until 2015; then, in Chicago, another outbreak occurred and was later identified as a new strain of canine flu: H3N2.

The most recent flare-up starting in mid-2017 and into spring of 2018 included both strains, though H3N2 was more prevalent and found to be more virulent. As of now, canine influenza has been reported in 40 states.

WHAT TO LOOK FOR

Symptoms of flu include sneezing, coughing, runny nose, fever, lethargy, and loss of appetite. About 80 percent of the dogs who are infected with the virus will have only mild symptoms, with about 20 percent of infected dogs showing no symptoms whatsoever (these dogs, however, are still able to spread the virus). Most dogs recover in two to three weeks.

In severe cases, however, the flu can progress to pneumonia. Symptoms of pneumonia are high fever; thick, purulent nasal discharge; and difficulty breathing. In severe cases, the illness can be fatal.

Unfortunately, flu represents a diagnostic challenge. The clinical symptoms cannot be distinguished from those of other common canine respiratory diseases such as bordetella bronchi-septica, parainfluenza, respiratory coronavirus, and distemper virus.

Further, there are no point-of-care tests currently available to veterinarians. Unlike in human medicine, where a quick bedside test can be conducted to diagnose flu, testing for canine flu can be difficult. Careful specimen collection and handling is essential, and tests must be sent to outside laboratories. Due to the expense and difficulty of this, often canine influenza is not definitively diagnosed; instead, it's treated like other canine respiratory diseases.

TREATMENT

There isn't a specific treatment for the flu; rather, general supportive care is given, especially if your dog is only mildly affected.

If your dog has more severe symptoms or evidence of pneumonia, he may be treated in the hospital with antibiotics (in case of secondary bacterial infection), intravenous or subcutaneous fluids, oxygen therapy, and fever-lowering NSAIDs. Your dog may also be isolated in a low-stress environment to prevent further spread and to help minimize his anxiety.

TRANSMISSION

Influenza is highly contagious and spreads rapidly in social situations. Transmission is via aerosolized droplets (coughing, sneezing) and direct contact. It can also be spread on contaminated objects such as food or water bowls, leashes, and kennels. The flu virus can live up to 48 hours on these surfaces, so proper disinfection is a critical part of prevention.

The most common places for a dog to catch the flu virus include dog parks, grooming facilities, kennels, and daycares.

This dog has mucopurulent discharge, likely secondary to pneumonia. Dogs who are vaccinated for the flu generally have less severe symptoms and a shorter period of illness.





Places where dogs congregate, such as dog shows and dog-sports events, boarding and training facilities, and dog parks, pose a greater risk of influenza transmission. Note that there is no “flu season” for the canine flu; it can infect your dog at any time of the year.

PREVENTION

Could you have prevented your dog from contracting the flu? There are vaccines available that protect against both strains. All of the canine influenza vaccines contain killed viruses.

As with the human influenza vaccine, it is important to remember that the flu vaccine doesn’t always prevent your dog from getting sick. In the event that he *does* contract the flu, the vaccine helps lessen the duration and severity of symptoms, including pneumonia and lung lesions. Dogs who were vaccinated against the flu but still transmitted the disease will shed the virus into their surroundings for a shorter period of time than unvaccinated dogs.

Side effects of the vaccine are uncommon and generally similar to other vaccine reactions: lethargy, low-grade fever, a lump at the site of injection, hives, and itching. In very rare cases, severe reactions can occur.

Puppies and immune-compromised dogs can quickly progress from a minor case of the flu to pneumonia, and require emergency veterinary care if they are to have any hope of recovery. Intravenous fluids, antibiotics, and fever-relieving NSAID medication pulled this puppy with pneumonia through.

Pregnant dogs should not be vaccinated against the flu.

The influenza vaccination has been described by the American Veterinary Medical Association as a “lifestyle” vaccination, not a “core” vaccine (core vaccines are recommended for *all* dogs). A lifestyle vaccine is recommended for dogs who are at a higher risk due to their increased exposure to other dogs – such as dogs who attend daycare, boarding, or group classes, or frequent dog parks or dog shows. The first vaccine can be given as early as six weeks of age, and in all cases, it is critical that a booster is received two to four weeks later.

Don’t wait until a few days before boarding to get the vaccine. The dog

should not be considered protected from disease until two weeks after his *second* vaccination. After the initial series, the flu shot is given annually.

If your dog is not in social situations or flu has not been reported in your state, the flu vaccine is not necessary. If you’re uncertain whether your dog should receive the vaccine, your veterinarian can help guide you.

CONCLUSION

Overall, while canine influenza can be serious, in *most* cases the symptoms are mild and self-limiting. Even in severe cases, the mortality rate is low – but some dogs *do* die from the illness. Vaccination is very effective and should be pursued for dogs in highly social environments. 🐾

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Housetraining 101

Ready, set, teach your new dog or puppy when and where to GO!



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HOUSTRAINING FOR THE NEVER-HOUSTRAINED DOG

Perhaps you have a brand new pup or a newly adopted teen or older dog. One thing that is vitally important to building a happy interspecies household is that your new dog becomes housetrained as quickly and reliably as possible. You should be equipped and ready to start housetraining your new dog from the moment that you bring him home.

Housetraining involves more than just learning *where* to potty; dogs and puppies must also learn to “hold it” until they get to an appropriate potty location and how to notify you to get them there. To help dogs build these skills and to help keep us on track with our housetraining responsibilities, I encourage people to think of housetraining in terms of CRAP. Each letter of the acronym stands for an important part of the housetraining program.

CONFINEMENT. Preventing your dog from pottying in the wrong place is the first and most important housetraining task. Since most of us cannot keep our eyes on our dogs every minute, having a safe, comfortable confinement area is key to housetraining success. Most dogs naturally avoid going potty in their sleeping areas, so confining your dog in a small enough area that is more bed-like than room-like not only prevents unwanted accidents but also will help him develop bowel and bladder control.

What are appropriate confinement areas? I am a huge fan of crates, used appropriately, once dogs are comfortable with them. An area that is fenced off with a portable exercise pen or a smaller room (such as a bathroom or laundry room with a baby gate across the door) can also serve as a confinement area.

The key is that any confinement area should be small and cozy enough for your dog that he

Set up your new dog or puppy for housetraining success. When you are still trying to teach him to pee only outdoors, it will be counterproductive to freak out when he pees on your roses. Either fence off areas where you do not want him to eliminate outdoors, or use a leash to prevent him from reaching those areas.

For the past 16 years, I have been teaching puppy kindergarten and adolescent-dog classes at The Canine Connection, my training center in Chico, California. The number of graduates of my classes is likely more than 1,000 puppies – but it feels like I’ve answered client questions about potty training at least a million times. What’s one more time, if it helps someone live more happily and harmoniously with their new dog or puppy?

Potty-training situations are of three types: (1) dogs who have never learned the appropriate place “to go,” (2) dogs who were once housetrained but are having a training regression, and (3) dogs who are pottying involuntarily – that is, they have no control over their urination or defecation. It just happens without any intent and often without the dog even realizing it is happening at all. Let’s look at these in order.

will choose “holding it” over potty-ing in it. When confinement is in place and used appropriately, there will be a decrease in potty accidents and an increase in bowel and bladder control.

As your dog enjoys continued success at pottying outdoors appropriately and *not* pottying indoors, you can increase the size of the area where he is confined when not being supervised. Don't go too far, giving him whole-house freedom after he hasn't had an accident for a few days. Instead, use an exercise pen to expand his confinement area by, say, 50 to 100 square feet more per week of success.

ROUTINE. Both dogs and humans benefit from a predictable, consistent housetraining routine. This routine should account for confinement time, potty breaks, meal times, play time, training time, walks, and all the other enriching activities that are part of your dog's daily life.

I recommend my clients create a written routine that includes potty breaks a minimum of every hour or two, depending on the age and situation of the dog. The general rule for “holding it” in a crate or pen is that dogs *should* have the ability to hold their bowels and bladder, in hours, the number of months they are plus one. So, a three-month-old pup ought to be able to hold his urine and poop for four hours. However, there are so many exceptions to this rule; most notably, that activity often makes a pup have to “go.” The best routines, then, are based on a solid understanding of your dog.

Some important notes about potty breaks:

1 You must go *with* your dog to the potty area so you can reward the deed when it occurs. By delivering an immediate reward, your dog quickly comes to understand that “Oh my gosh, going pee or poop in *this* location is nothing short of brilliant!”

2 It can be very useful to teach your dog a cue for pottying behavior.

Some people use the simple phrase, “Go potty!” Others use a euphemism such as “Get busy!” Whatever phrase you use, say it once just before he starts to potty (don't say it over and over again), and then reward and praise him mightily when he's done. Soon, he will understand that the phrase is a cue – an opportunity to earn rewards for doing what he now knows it means: going potty. This will help him understand what you want when you take him to

go potty in a new environment, or under distracting conditions he has not yet experienced.

3 If you expect your dog to potty on- and off-leash, your potty outings with your dog should sometimes be on-leash and sometimes off-leash. Why? From a dog's point of view, pottying while on- versus off-leash can be a very different experience. Familiarizing him with both will pay off in the future.

Essential Tools for Housetraining

It makes the whole housetraining task a million times easier if you are prepared in advance of your new dog or puppy's arrival with all the things you will need to manage his whereabouts and support his progress. Here are the essentials:

- A crate, portable exercise pen, or small room equipped with a baby gate, so you can create an appropriate confinement area for your dog. This will prevent unwanted accidents from occurring. Preventing unwanted accidents ensures our dogs don't rehearse pottying in inappropriate places *and* keeps the non-potty places from becoming infused with those potty scents that can trigger a dog into making a mistake.
- Some good clean-up products to eliminate potty smells from your home should an accident happen (as it might, since we're only human and we *do* make mistakes). While there are many on the market and recipes for potty clean-up concoctions can be found online, my personal favorite is unscented Anti-Icky Poo by Mister Max (available in some pet supply stores and online). It contains enzymes that help destroy the odor-causing compounds in urine.
- A ready supply of high-level (as defined by the dog) rewards to dole out to your dog when he or she gets it right. Appropriate pottying is not a minimum wage activity; consider it a canine act of genius when your new dog gets pottying right and reward with the stuff (food treats, toys, and play) that your dog *really* values.
- In some cases, potty pads may be helpful, though I personally prefer to exclude them from my housetraining protocols (it's one less step to fade out to get to the final goal of the dog pottying in a specific spot).
- For some, it's helpful to create an indoor toilet area – a litter box for dogs, so to speak. If an indoor toilet area for your dog would be helpful for you, the “litterbox” should be available as a potty destination from the get-go.



- In cases involving urine marking, belly bands can be a very helpful tool. They don't prevent marking but they do prevent house soiling, and many dogs seem to refrain from marking when the belly band is on. Belly bands are available in various sizes from pet supply stores and online.

4 While it might seem convenient to have a dog who will potty *only* in your yard (I call these private potters), it's important that your dog learns to potty in other outdoor places, too. Indeed, I want dogs to be *public potters* (with responsible guardians who will clean up after them) so that day and even overnight outings are comfortable for all. I pity the poor dog who has learned to potty only in the privacy of his home when his family decides to bring him on a long vacation!

5 Also in the interest of adaptability to new environments, dogs should be exposed to different surfaces as part of housetraining. Dogs can develop "substrate preference," the willingness to potty only on specific surfaces, such as grass or concrete.

While your dog's inclination to develop a preference for pottying on certain substrates can be helpful in creating a defined toilet space in your yard, it can also limit your dog's adaptability to new environments if he is not allowed the option to potty on different substrates.

6 Potty outings should be mission-driven. If your dog tends to fiddle and frolic prior to pottying, restrict your dog's access to play until the deed is done. Fiddling and frolicking can then become part of the reward.

7 If you are away from your home for extended periods of time during the day, you *must* have a plan for getting your dog to his potty spot in your absence. Sometimes it takes a village to housetrain a dog, with friends, family, and neighbors, perhaps assisted by professional pet sitters, dog walkers, or trainers helping with the potty outing shifts.

ATTENTION. The *first* question I ask when a client asks me a question about a difficulty with their dog's housetraining is: "Are you catching your dog in the act of pottying inappropriately or just finding the evidence after the fact?" More often than not, people sheepishly confess

Potty Pads: Yay or Nay?

I am not a fan of introducing potty pads as part of a housetraining regime. If the goal of housetraining is for your dog to potty outside, then potty pads create a middle step that must eventually be phased out as part of the overall housetraining plan. I would rather start focusing a dog's attention immediately on the final destination. Why create an extra step if we don't have to?

Some people, however, plan for their dogs to have an indoor toileting spot, with potty pads as part of their dogs' lifelong scenario. This can be convenient, so you don't *have* to make that trip outside, by giving a dog a legal potty place indoors. However, they don't magically attract dogs to eliminate on them; dogs need to be taught to use them, just like they need to be taught to go outdoors. Either task can be accomplished by following the rules of Housetraining 101.

People sometimes decide to use potty pads because they have to leave their dogs alone indoors for longer periods of time than their dogs can hold it. If this is the case with your dog, make sure you leave her in a larger long-term confinement area than the aforementioned crates or cozy confinement area. Make an area for sleeping and hanging out, and a separate space for eliminating on the potty pads.



that they usually find the mess after the fact – and this *always* means their attention needs to be improved.

There are two huge benefits to maintaining a laser focus on your dog when he is not confined. First, you can start to recognize and reward your dog's "gotta go" signals. When your dog begins to pace, circle, and sniff, you can applaud his signaling ("Awesome doggie! Let's go, go, GO!") and rush him to his potty place. Rewarding "gotta go" signals will encourage your dog to become more demonstrative when he feels the urge – communication that is as helpful to us as it is to our dogs.

Second, when we catch him in the act we can provide immediate feedback. A simple "Hey, hey!" while hustling him to his potty spot will make the point that there's a difference between the spot where he started and that special place you want him to go.

PLATINUM REWARDS! When housetraining a new dog (puppy or adult) I make sure I know what my dog considers "platinum level

rewards." Housetraining is a big deal, and it requires that we acknowledge our dog's success with a fitting outcome for his or her achievement. High-value food rewards should be stored on a shelf or table by the door so you can grab them on the way out with your dog. And the rewards of praise and play should be abundantly part of the potty party that celebrates your dog's success at pottying in the proper place.

HOUSETRAINING REGRESSION

It is distressing when you believe housetraining has been achieved, only to find improperly located puddles or poops. Here are some reasons your dog's housetraining might unravel:

■ **Urinary tract infections or other medical concerns can result in potty accidents.** If your fully housetrained dog begins to potty in the house, your first stop should be your veterinarian. Physical problems must be ruled out before assuming the problem is a behavioral one. Prior to your visit, assess your dog's water and food intake so

you can report any changes that might be part of the picture.

■ **Recognize that a dog’s housetraining may not transfer to new environments.** I have had many clients whose dogs’ housetraining fell apart when visiting the home of a friend, after a move, or even in a public place (how embarrassing!).

Just because a dog is housetrained in *one* environment does not mean he is housetrained in all environments. When you change environments, assume your dog is *not* housetrained until you have helped your dog understand that the habits learned in one place can also apply to the new setting. To do this, take your dog back to Housetraining 101.

■ **Seasonal challenges.** Just as your dog may need to relearn housetraining in a new environment, so may he need to relearn housetraining in different seasons. I have had many clients discover that their summer puppy’s housetraining unraveled at the first fall rain or winter snow.

I always advise clients to be proactive weather-watchers. If your dog’s potty place is outdoors, consider that potty habits can and might change with the season, and you may have to consider creative and proactive ways to keep your dog’s potty habits strong. For dogs who detest rain, the erection of a portable canopy might just ease the pain. A snow shovel goes a long way in helping small dogs deal with deep snow. Some indoor-outdoor carpet can buffer the heat of summer pavement.

■ **Differentiate between relieving oneself and marking.** Marking behavior can develop in dogs after their housetraining is concluded, as dogs mature and hormonal levels change. Marking is a natural behavior of both male and female dogs, though more pronounced in male dogs.

I approach marking like all housetraining problems, taking dogs back to Housetraining 101, with the emphasis on keen attention, since it is important to interrupt the urge to mark before

actual house-soiling occurs. For dogs who are chronic markers, a belly band that prevents house-soiling may be a helpful management tool.

■ **Consider the possibility of fear or anxiety being a contributing factor.** One of my clients was dismayed when her Newfoundland started pottying in the house. As it turned out, the dog was pottying inside because he had become frightened of venturing into his yard following a neighbor’s home being re-roofed. The barrage of blasts from the nail gun had so traumatized the poor dog that he became housebound, leaving him no choice but to potty in the house, causing further anxiety.

In this case, we established an indoor potty area that was used while we worked on rebuilding positive associations with his backyard environment.

POTTY PROBLEMS THAT ARE NOT HOUSTRAINING PROBLEMS

Involuntary urination and defecation can occur for a number of reasons with the common denominator to all being that the dog simply has no control over it. Here are some common reasons for involuntary pottying:

■ **Excitement urination.** Some dogs, especially young dogs, will involuntarily produce a puddle during happy

Dog Doors: Yay or Nay?

As the proud guardian of both a brand new Aussie puppy and a “sudden urge” Greyhound senior, I am grateful for my dog door. My dogs go in and out at will, never needing to call on me to use my opposable thumb to turn the handle to open that door. At my house, there’s no need to find the attendant to get the restroom key; the bathroom door is always unlocked. My dogs go out, my dogs come in. There’s nary a potty accident or worry.

(Note: Some people worry about things that can happen to their dogs outside in their yards if the dog is unattended. The yard that is available to my dogs through my dog door is super dog-proofed and double-fenced. That said, there are more dangers to an unattended dog outdoors than indoors, but this is a risk I have taken with my dogs for many years without a problem. You may make a different choice.)

Without a doubt, my new pup has learned to go outside to potty and I am thrilled that she has learned to use the dog door. When nature calls she hops through and out. There hasn’t been an accident in weeks and I’m off the hook as door attendant. But is my new puppy *fully* housetrained? The answer is ... no!

Besides learning *where* to potty, our dogs need to learn to “hold it” when they can’t get access to the potty place. And they need to learn how to inform us that they need our help to get from here to there. Without these lessons, housetraining is incomplete and potty mishaps are bound to occur when dog doors aren’t available – perhaps when the dog door is inadvertently left closed or when we’re visiting the home of a dog-door-deficient friend.

My new pup will be traveling with me soon and I don’t think the dog-friendly hotel has a dog door (that’s a bit too friendly). I’d better get going with Housetraining 101, rather than letting my dog door allow me take the lazy way out. And, as an adjunct to the basic training, I’ll be teaching my new pup to ring a “Hey, I gotta go!” bell. It’s pretty simple to train a dog to ring a bell (I think of this as a call for room service) and in terms of my learned response (jump up and attend to her), I’m a pretty quick study. (For instructions on teaching a dog to ring a bell on the door, see “Right on Target,” WDJ March 2001.)



homecomings and other joyful situations. Since most trigger situations can be predicted, the best way to reduce excitement urination is to downplay greetings and other emotionally charged situations by ignoring or only casually greeting your dog.

It also sometimes helps to give your dog something else to do in the moments when he is excited. For example, you might enter your home with one of your dog's toys in hand, toss it away from you, walk past your dog while he retrieves it, then greet your dog several minutes later once the initial excitement worn off.

Because the trigger for excitement urination is a really big deal to the dog, it's helpful to set up and practice mock greetings repeatedly so the trigger becomes less exciting – perhaps even a little boring.

■ **Submissive urination.** This form of involuntary urination is about social signals. It occurs when your dog's emotional reaction to a trigger (e.g., a stranger or a family member) is one of appeasement, perhaps even fear. Submissive urination can be distressing to friends and family members who trigger it; they may think it suggests they have been threatening or unkind toward the dog, even when they have not. More often than not, the dog may be responding to the human's body posture and size, voice volume and tone, or other characteristics that trigger an innate submissive response.

Submissive urination problems can be often be resolved by downplaying greetings, counter-conditioning the presence of the individual (building a positive emotional association with the trigger), coaching individuals who trig-

ger the submissive urination to avoid provocative body language (such as direct eye contact with the dog, looming over or reaching for him, direct frontal approaches, and loud body language and voices).

I have also found that teaching the dog a cue that means someone is about to approach (such as, "Hello, I'm Here!") can reduce submissive urination by removing the element of surprise from the interactions.

■ **Incontinence.** Age and illness can produce urinary and/or fecal incontinence in our dogs. Ill or elderly dogs may leak urine or expel feces while sleeping or may experience sudden urges to potty and be unable to make it out the door. Female dogs with hormonal changes may leak urine, too.

While many people accept incontinence as an inevitable part of their dogs' health or aging, both western and eastern medicine offer remedies, so a visit to your veterinarian is a must. The use of belly bands, doggie panties, and potty pads in sleeping areas may help lessen the burdens of clean-up.

Houstraining Problem-Solving

Amber was a darling Golden Retriever pup who had graduated from my Puppy Kindergarten with honors. She had a strong foundation in socialization and training, which had resulted in her having a happy and positive worldview and good puppy manners. Most importantly, Amber had mastered houstraining. At the time of her graduation, her parents proudly noted that Amber had not pottied in the house in weeks, and when she had to go, she let her parents know by whining at the door.

I next heard from Amber's mom when Amber was a little over six months old. Completely unexpectedly, Amber had started peeing in the house! While the peeing was problem number one, a second problem was that Amber had started to ignore her owners and seemed generally more "out of control." The appearance of these two behaviors together led her dad to one conclusion: Amber's inappropriate peeing, along with her inattentiveness and unruliness, all coming at this teenage moment, was proof positive that she wanted to exert her dominance on her family. Oh, boy.

I had *another* thought that I shared with Amber's mom: When a fully houstrained dog starts urinating and/or defecating in the house, one must get thee and thine dog to a veterinarian to rule out a medical cause! Urinary tract infections are a very common reason that a formerly houstrained dog

might start urinating in the house; the painful condition causes an urgency that few dogs can resist.

Sure enough, Amber's medical work-up showed just that. After a course of antibiotics – and her owners' renewed training practice sessions – Amber's "dominance problem" fully disappeared.



PERHAPS NO BETTER INVESTMENT OF TIME

This might all sound like a ton of work; it isn't necessarily so. If you observe the CRAP guidelines (Confinement, Routine, Attention, and Platinum rewards) from the very first day with your new dog or pup, he should quickly figure out when and where to "go" (perhaps on cue!), and how to "hold it" at all other times. His success at these tasks may make or break your happiness at living together, so give it your very best! 🐾

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Dogs and Carbs: It's Complicated

Have you heard the battle cries? Carbs for dogs! No carbs for dogs!

The question of how best to feed dogs stimulates great debate and evokes strong emotions among dog folks. (Yes, this an intended understatement.) One of the most contentiously defended viewpoints in recent years is that dogs should not be fed diets that contain digestible carbohydrate (starch).

Two primary arguments are used to defend this position. These are:

- Dogs are carnivores and have no dietary requirement for carbohydrate.
- Dogs are unable to efficiently digest starch. Therefore, including starch-providing ingredients in dog foods is unhealthy and provides no nutritional value.

Like many persistent beliefs, there is some truth and some falsehood in both of these blanket claims. Let's start with the first.

PROPOSED ↓

Dogs are carnivores and have no dietary requirement for carbohydrates

The first bit is false; the second bit is true. Dogs are classified within the taxonomic order of Carnivora, but like many other species within this order, dogs are omnivorous.

The term omnivore simply means that an animal consumes foods that are of animal and plant origin (dogs do this) and can derive essential nutrients from both animal and plant foods (ditto). Based upon this definition, animal nutritionists consider the dog to be an omnivore. By contrast, the domestic cat, along with other felid species, is classified as an obligate carnivore. This classification means that cats cannot derive all of their essential nutrient needs from plant foods and therefore have an obligate need for foods of animal origin in their diet.

The fact that dogs are omnivorous does not



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signify that they are not predatory (they are), nor that they do not seek out and enjoy eating meat (they do). All that it means is that dogs can consume and derive nutrients from both animal and plant matter.

If we consider the dog's feeding behavior, it is clear that the majority of dogs enjoy and probably prefer to consume meat in their diet. However, they also scavenge and ingest a wide variety of food types, including starch-containing foods. Nutritionally, just like bears, who also preferably seek out animal source proteins, dogs are omnivores.

Personally, I am baffled as to why "omnivore" has become a fighting word among dog people. This label does not turn the dog into a carrot-munching, Birkenstock-wearing, canine hippie. Rather, it simply describes what the dog eats and is capable of deriving nutrients from: meat and plant matter. That's all. Time for us all to calm down about this one.

Let's move on.

So what about carbs? It's *true* that dogs have no dietary requirement for carbohydrates; they can derive all the nutrients they need from protein and fat.

That said, *cooked* starch can provide a

Not only do dogs enjoy eating many plant-sourced foods, they can benefit nutritionally from eating them. In addition, many carbohydrate sources are even more beneficial for dogs when they are cooked.

highly digestible energy source to dogs when included in their diet. From a nutrition standpoint, dietary carbohydrate spares protein. This means that when a body uses carbohydrate to provide needed energy, dietary protein is conserved from being used for this purpose and continues to be available for use to provide essential amino acids, build and repair body tissues, and support a healthy immune system. Therefore, including at least some digestible carbohydrate in the diet of dogs is generally considered to be beneficial.

The controversy about starch in dog foods revolves more around *how much* starch is in the food and *the source* of that starch, rather than its absolute presence or absence. Dogs can thrive on low-carbohydrate diets provided such diets are balanced and contain all of the essential nutrients. Diets formulated in this way are often highly palatable because of their high proportions of protein and fat. These foods are also generally very energy dense (lots of calories packed into a small volume of food), which means that portion control is important to ensure that dogs maintain a healthy weight.

Now for the second persistent statement that is often made about the dog's nutritional requirements:

PROPOSED ↓
Dogs cannot digest starch

It should be obvious from the vast majority of dogs who survive on carb-heavy kibbled diets that this is unequivocally false. Dogs efficiently digest cooked starch, just like humans. However, they cannot digest *raw* starch (and neither can we).

Cooking results in the expansion of the small granules that make up starch, which allows digestive enzymes better access and increases digestibility. This is true for humans as well as for dogs, and this fact explains why we generally do not munch on raw potatoes.

We actually know the exact degree to which cooking increases digestibil-



Dogs prefer diets that are high in animal protein and fat – but we have no proof that eating only protein and fat is beneficial.

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ity of various starches. Ground grains such as rice, oats, or corn are about 60 percent digestible when fed raw to dogs. Cooking these ingredients increases the dog's ability to digest them to almost 100 percent! This means that if you feed your dog 100 grams of uncooked oats or rice, only 60 grams will make it into his body to nourish him; 40 grams ends up in the large intestine where microbes ferment some of it, and a lot of that 40 grams ends up in your yard, as feces.

Conversely, when cooked, almost the entire 100 grams are digested and absorbed to nourish your dog. Again, not to put too fine a point on this, but the same holds true for humans.

MEET AMY2B

Like humans, dogs have an enhanced ability to digest starch-containing ingredients, a change that has been directly tied to domestication. In 2013, a ground-breaking paper by Erik Axelsson of Uppsala University in Sweden identified a host of genetic changes that occurred as dogs evolved from their wolf ancestors.¹ Three of these changes were alterations of key genes that code for enzymes involved in starch digestion, most notably and consistently, one labeled AMY2B.

This gene codes for the production of pancreatic amylase, an enzyme that functions to digest dietary starch. Although variation exists among individual dogs and breeds of differing geographic origin, the increased copies of the AMY2B gene correlate with

higher levels of circulating pancreatic amylase in a dog's blood, which means that higher AMY2B leads to more efficient starch digestion.^{2,3,4}

On average, dogs have a sevenfold higher copy number of this gene when compared with present-day wolves. These changes in the dog's genetic makeup coincide with the expansion of human agricultural practices and increased reliance upon starch-providing plants in both human and dog diets.

DIET SELECTION

It is a fact that domestic dogs are better adapted to scavenging and to a diet that is higher in starch-containing foods than were their wolf-like ancestors. However, just because dogs *can* consume and digest starch, it does not necessarily follow that a diet that contains a high proportion of digestible carbohydrate is the healthiest way to feed them. One way of determining how much protein, fat, and carbohydrate dogs should have is to ask the dogs directly.

Historically, nutritionists have viewed diet selection in animals principally from the standpoint of energy balance. The basic assumption was that all animals, including dogs, eat to meet their energy (caloric) needs first. However, in recent years this premise has been challenged.

There is evidence that a wide range of species, including many birds, fish, and mammals, will self-select diets containing consistent proportions of the three major macronutrients –

protein, fat, and carbohydrate – and that they regulate and balance their nutrient intake to maximize lifespan and reproductive fitness.

The recognition that macronutrient selection can be a driver for appropriate diet selection has led to several new studies with dogs and cats.

Domestic cats were studied before dogs and were found to consistently select a diet that was high in protein and fat and low in carbohydrate.⁵ This profile is consistent with that of other obligate carnivores and with the cat's wild feline cousins. Interestingly, a recent study found that cats preferentially balanced their diets to a set protein:fat ratio, even when offered foods of different flavor preferences and containing animal- or plant-based protein sources.⁶ Although flavor and smell were important influences, the strongest factor for food selection appeared to be the total amount of protein in the food, rather than its source.

To date, only two controlled studies have been completed with dogs. In both, dogs have also demonstrated a

similar talent to their feline friends for self-selecting the macronutrient content of their diets.^{7,8} The studies were conducted by different research teams and used somewhat different methodologies, but both reported that dogs preferentially selected diets that were low in carbohydrate and high in fat and protein.

When expressed as a percent of energy, dogs gravitated to a general distribution of 30 to 38 percent protein, 59 to 63 percent fat and 3 to 7 percent carbohydrate. Interestingly, wolves self-select diets that are even lower in carbohydrate: only about 1 percent. Initially, the dogs in these studies were attracted to very high fat diets, but over a period of several days reduced the proportion of fat and moderately increased protein.

An important finding of the most recent study was that when dogs were allowed to choose these dietary proportions over a period of 10 days, they substantially over-consume calories. Because of this, on average the dogs gained almost 3.5 pounds in just 10 days of feeding.

IT'S COMPLICATED

At this point in time, we know that dogs can better digest starch in their diet compared with their wolf ancestors (and with present-day wolves). This increased capability is at least partially due to an increase in the production of pancreatic amylase.

We also know that, like us, dogs digest cooked starches very efficiently, but cannot utilize raw starch. The inclusion of at least some level of starch in a dog's diet provides an efficient source of energy (calories).

Finally, most recently, we have learned that when given the choice, dogs preferentially select a diet that is low in starch and high in protein and fat. However, self-selection of this type of diet (if fed without portion control) may lead to overconsumption and weight gain.

Still, none of this information provides evidence for the healthfulness of a diet containing *some* starch versus a diet that contains very low (or no) starch in terms of dog's vitality, ability to maintain a healthy body weight and condition, development of chronic health problems, and longevity.

This has not stopped proponents of low-carb or carb-free diets from making such claims, however. The fact that dogs gravitate to a diet that is high in protein and fat and low in starch is not to be confused with evidence that such a diet has been proven to be healthier or is capable of preventing illness. *We simply do not know.*

What we need is *evidence* of whether or not dietary carbohydrate is harmful, beneficial, or, well, neither. Dogs are generalists after all. It is quite possible that they, like many animals, are capable of thriving on a wide variety of diet types, including those with some level of starch.

Like I said. It's complicated. 🐾

Linda P. Case is the owner of AutumnGold Consulting & Dog Training Center in Mahomet, Illinois. Linda is the author of Dog Food Logic, has a new book, Dog Smart, and writes The Science Dog blog at thesciencedog.wordpress.com. See page 24 for contact and book information.

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CONSUMER
ALERT

Mixed Results

DNA tests that purport to identify the breeds in your mixed-breed dog are still a work in progress – but the technology improves daily.

On a gorgeous spring day in Montana, I was heading back from a romp in the mountains with my three dogs when we stepped out of the woods into a meadow, replete with song birds and a smattering of open range cows grazing peacefully. My trail companions quickly discovered, to their absolute delight, fresh, delicious cow pies.

It occurred to me, however, that I didn't know the MDR1 (multi-drug resistance gene) status of the newest member of my three-dog crew, Hap. MDR1 is a genetic predisposition to adverse drug reactions to more than a dozen common veterinary drugs, and the gene is found predominantly in herding breeds. Hap looks to be mostly Border Collie with maybe, just *maybe*, a pinch of Australian Shepherd, so having this predisposition could put him in danger in this situation. Cows are often given ivermectin as an anti-parasitic agent, and the drug can be found shortly afterward in their droppings; eating these droppings can cause a fatal reaction in a dog with the MDR1 mutation. So, I put a moratorium on the afternoon's pie sampling, much to the dismay of my crew, and off we strolled into the sunset.

What breed is Hap, and does he have the MDR1 mutation that would make it unsafe for him to consume ivermectin? His adoptive owner, author Kathryn Socie-Dunning, wanted to find out, as much for fun as for Hap's health and safety.

When we got home and I began looking up information on MDR1 testing, I learned that many of the genetic tests for breed-typing now also include genetic health screens, including testing for the MDR1 mutation. I thought, why not solve the mystery of Hap's breed-mix and get health information at the same time? It sounded like fun!

HOW THEY WORK

While some of the early mixed-breed identification tests used a blood sample, all of the products on the market today extract DNA from cells swabbed by the dog's owner from the inside of the dog's cheek. The swab is sealed in a container provided by the company and mailed off to the company's lab. There, technicians extract your dog's DNA from the swab, and use computers to identify and compare specific bits of it to bits taken from dogs of known lineage.

The genome of a dog contains about 2.5 billion nucleotides (the building blocks of DNA); researchers focus on "only" about 200,000 of these individual genes – or rather, microsatellites or repeating sequences of DNA called single-nucleotide polymorphisms (SNPs, pronounced "snips") that form signatures particular to various breeds.

Researchers must have enough SNPs from enough purebred representatives of each breed in order to have an adequate array of SNPs to which they can compare your dog's SNPs. The larger the company's database of samples from purebred dogs, the better. When a company fails utterly to suggest ancestors of candidate breeds that are remotely likely, it's probable that it lacks enough breeds in its databanks to find good matches for your dog's SNPs.

LOOKS CAN BE DECEIVING

That said, when dogs of various ancestry reproduce, the resulting pups may visually resemble other breeds entirely



Photo by Kathryn Socie-Dunning



Clara most resembles a black Labrador, and her tests results indicated that she does have some Labrador ancestors. But these results also suggest she is more Golden Retriever than any other breed.

– but the genetic signatures inherited from their parents are more telling than the most dog-savvy eye. Take Clara, for example. Clara is a shelter rescue dog, adopted as a young adult, who was presumed to be mostly a Labrador, with a little something more medium-sized in the mix. Her owners, Gianna and Kip Savoie, guessed she had a herding breed somewhere in her lineage, given a lot of Border Collie-like behavioral characteristics they'd seen. They sent a swab of her cheek to Embark for analysis. What came back was mostly what they had suspected: Labrador Retriever, a splash of Border Collie, but with a few smaller surprises and one very big one. This short-haired black dog was, in fact, declared to be more Golden Retriever (38 percent!) than anything else.

Based on the sharpest visual assessment, this may seem like an error, but it is in fact highly feasible.

Golden Retrievers carry a black gene that is expressed in their nose, the pads of their feet, their glamorous thick, black eye-liner, but not their coat. The black is blocked by the yellow gene, which is recessive, as is their characteristic luxurious long locks. A Golden Retriever bred to a dog lacking genes for yellow coloration and long coat, like a black Labrador, therefore, would result in a black dog with a short coat – a dog that looks a lot like Clara.

IN SOME CASES, THOUGH...

On the more comedic end of the spectrum, Hap, my happy, hoppy, flying

Border Collie/mystery-breed cross was declared by Wisdom Panel to be 88 percent Border Collie and 12 percent – ready for this? – Boston Terrier! Having never even seen a Boston Terrier in Montana in my 20 years living here steeped in all things dog, this struck me as highly unlikely.

Since I live in a rural, ranch-heavy area and the shelter from which I acquired this chap is small and more like a herding dog rescue than a general open-door shelter, I struggled to

imagine where Boston Terrier genes could have possibly come from. On the other hand, Hap is definitely the most playful, gregarious dog I've known and these qualities fit the personality type of the Boston Terriers I've met, so maybe. Perhaps there was a Boston Casanova passing through that visited a ranch at just the right time. Strange things *can* happen.

But sometimes, the results do test the bounds of credulity. Take, as a case in point, the results returned by DNA My Dog from a sample from Otto, a highly-mixed breed dog belonging to WDJ's editor, Nancy Kerns. Otto has been tested by several companies (see "Otto's Results," next page). The two companies with the largest breed databases returned fairly similar results. But DNA My Dog, a much smaller company, returned results that were not just completely dissimilar to the results from the two larger companies, but also incredibly improbable. The breeds suggested are highly unlikely to be present in Otto's geographic area of origin, and even less likely to be present in the identified combination.

Companies That Offer Mixed-Breed ID

DNA MY DOG, DNAMYDOG.COM

- DNA My dog Dog Breed Identification Test, \$69. Identification of 92 breeds.
- DNA My Dog Breed Test *plus* Wolf-Coyote Hybrid Test, \$89.
- DNA Breed Identification Test *plus* Full Genetic Screening, \$189. Health screening identifies more than 100 diseases.

EMBARK VETERINARY, INC., EMBARKVET.COM

- Embark Dog DNA Test, \$199. Identification of more than 175 breeds and more than 160 diseases. "We test 20 times more of your dog's genes than other dog DNA tests."

WISDOM PANEL, WISDOMPANEL.COM

- Canine Breed Detection, \$85. Identification for 250+ breeds, plus MDR1 and Exercise-induced Collapse (EIC) screening for drug and exercise sensitivities.
- Canine Breed Plus Disease Detection, \$150. Identification for 250+ breeds, plus MDR1 and Exercise-induced Collapse (EIC) screening, plus advanced health screening for more than 150 genetic health conditions.

WHEN THE ANSWERS DON'T MAKE SENSE

The companies that offer this service have a few standard explanations for results that don't seem to make sense.

None of the companies would admit that their reference databases are of an inadequate size to accurately identify the SNPs from your dog – but they might suggest that this could be true of their competitors.

All of the companies will be quick to explain that there are hundreds of thousands of genes that are responsible for a dog's appearance, and that many breed combinations result in dogs who look very different than what you would expect from that mix of breeds.

Also, genes in mixed breeds do not always combine in the same ways within all litter-mates, so size and physical and behavioral characteristics in the same litter of pups can and often do vary, sometimes wildly.

They also explain that the complexity of your dog's mix will affect the accuracy of the results. First-generation crosses between two purebred parents are relatively easy to identify, but dogs who don't have any purebred ancestors within several generations are much harder to identify with much certainty, as the length of the inherited SNPs that are unique to purebred dogs become much shorter with each generation of mixed-breed progeny.

Problems with identification can also arise when there is a lot of divergence within a specific breed-type, like in the case of Australian Shepherds and Border Collies, where you have field-bred lines and show-bred lines. The genetic signatures in the companies' databases usually correspond with show-bred lines, so field-bred Aussies and BCs might even get assigned to a different breed altogether.

Both Embark and Wisdom Panel make it easy for consumers to contact them and ask questions about their dogs' results. I called and asked a representative from Wisdom Panel to review Hap's results with me and was told that the statistical confidence in the Boston Terrier finding was marginal, meaning there is a high probability this result is

Otto's Results

■ 2009: Wisdom Panel

- German Shepherd Dog
- Basenji
- Chow Chow
- Border Collie

■ 2016: DNA My Dog

- Level 3 (20%-36%): Collie, Nova Scotia Duck Tolling Retriever
- Level 4 (10%-20%): English Setter, Norwegian Elkhound

■ 2016: Wisdom Panel

- 12.5% American Staffordshire Terrier
- 12.5% Australian Cattle Dog
- 12.5% Border Collie
- 12.5% Chow Chow
- 12.5% German Shepherd Dog
- 37.5% (mixed)

■ 2018: Embark

- 21.3% American Pit Bull Terrier
- 14.1% Australian Cattle Dog
- 13.2% German Shepherd Dog
- 12.3% Chow Chow
- 10.3% Labrador Retriever
- 8.0% Border Collie
- 4.3% Rottweiler
- 16.5% ("Supermutt")



Otto's results have morphed over the past eight years, with the unlikely Basenji disappearing and a bully breed and Australian Cattle Dog appearing in the mix. Note that the results provided by the two leading mixed-breed test providers are pretty darn similar – and that the results from the smallest company offering this service border on fantasy. (Those breeds are highly uncommon in Otto's area of origin, and would be even more uncommonly seen in the same dog.)

not correct. Hap *could* have 12 percent of something not represented in the Wisdom Panel database (such as field-bred Australian Shepherds), but since this unique signature does not currently exist in the database, he was assigned to the breed with the closest matching genetic signature. I was told that updates will be made to Hap's report as new information is added to the database.

IS ONE BRAND BETTER?

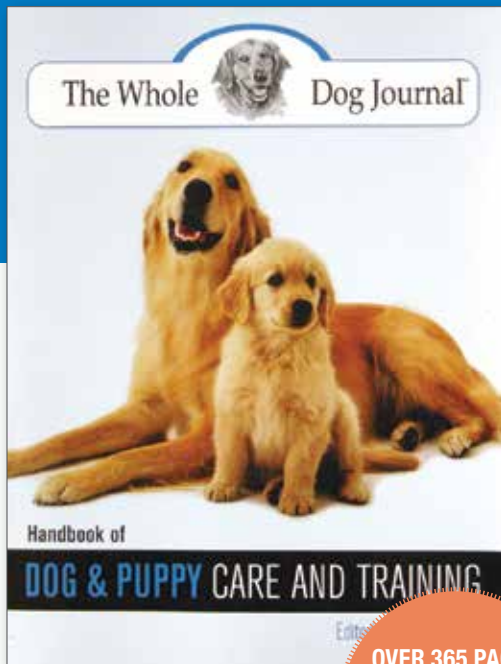
Of the brands available, Embark and Wisdom Panel appear to be the most transparent about their methodologies and about the information available in their databases. They both make frequent updates to their products, while also being accessible to answer consumer questions. This makes them both rise to the top in my book. Note, however, that the basic Wisdom Panel

4.0 Breed Detection test costs less than half the price of the Embark test.

Other companies, like DNA My Dog, has a relatively small database with 92 breeds, very scant information available about their methodology, and I found it difficult to even find contact information to ask questions.

While commercial genetic breed-typing is still evolving, it is interesting and ridiculously fun, which is worth something. More companies are offering genetic health screens as well, which may prove useful for the long-term health care of your dog. A lot of it may not be applicable to your particular four-legged friend, so before shelling out the money, be sure to consult your veterinarian to find out what she or he recommends. 🐾

Kathryn Socie-Dunning lives with her husband and three dogs in Montana.



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