

DNA and DIET

Is the key to your dog's health the new science of nutrigenomics?

BY DIANA LAVERDURE

In May 2011, Elaine Dinges of Newport Beach, Calif., brought her 9-month-old Nova Scotia Duck Tolling Retriever, Brandy, to her veterinarian for spaying. The only side effect was some residual itching, which Dinges assumed resulted from a belly shave to facilitate the laparoscopic, or minimally invasive, procedure. She bought Brandy a T-shirt to protect the area until the hair grew back, which it soon did. But the itching continued.

“At first, we thought Brandy was just an itchy dog,” Dinges says. “But soon it became clear that her condition was not normal. She would wake us up four or five times every night scratching.”

When Brandy's veterinarian found nothing wrong with her, Dinges posted her problem on a Duck Tolling Retriever forum. A response from a breeder in Vancouver, British Columbia, Canada, led her to Jean Dodds, D.V.M., founder of Hemolife testing laboratory in Garden Grove, Calif. In May 2011, Dodds introduced NutriScan, a genetics-based test that measures IgA and IgM antibodies in saliva, which are produced by the body in reaction to long-term intolerance of certain foods. By detecting IgA and IgM antibodies, NutriScan is able to differentiate between chronic food hypersensitivity and

a food allergy, which involves a more immediate response that requires the presence of IgE antibodies.

Dinges ordered the test kit, swabbed Brandy's mouth for saliva, and returned it for evaluation. Two weeks later the results were in: Brandy was intolerant of just about everything in her diet.

"I immediately eliminated all of the reactive foods, and within about two weeks her itching had virtually disappeared," Dinges says.

The NutriScan test that pinpointed Brandy's food sensitivities is just one example of how recent advances in genetics research have led to a deeper understanding of the connection between the foods our dogs eat and their long-term health. The result is a new scientific field called nutrigenomics — also called nutritional genomics — that examines the relationship between nutrition and the genome, which is the total genetic material in an organism. It is, in effect, how food affects us at a molecular level.

Although nutrigenomics for dogs is still in its infancy, Dodds says it represents "the future of pet foods. By altering genetic expression, nutrigenomics-based foods have the potential to cure, mitigate, and even to prevent complex diseases."

A brief background

Nutrigenomics looks at how diet affects the response of genes as they relate to disease. The field emerged after the mapping of the canine genome in 2005. "The canine genome has been mapped extensively because of its close relation to the human genome," says Kelly Swanson, Ph.D., associate professor in the department of animal sciences at the University of Illinois at Urbana-Champaign. "Once the genomic sequences of dogs were known, the effect of diet on gene expression could be studied."

A dog's body contains approximately 20,000 genes, which hold all of his biological information, including his physical characteristics, blood type, and predisposition to disease. Since the mapping of the genome, scientists have discovered that certain nutritional components can "talk to" specific genes, changing the way they behave — a process called gene expression — and causing them to "turn on" or "turn off" a predisposition to a disease.

While improper nutrition often results in chronic disease by sending the genes "unhealthy" signals, optimum nutrition in the form of functional foods

— biologically active food components contained in some herbs, botanicals, amino acids, vitamins, and phytochemicals — can act as nutritional therapy, promoting a state of optimum health.

Improving your dog's health

"Tests that unveil genetic markers to complex conditions such as diabetes, cancer, and cardiovascular disease are still in development," Swanson says. In the meantime, Dodds has seen results with pet owners who have applied nutrigenomics' principles to treat and even reverse traditionally diagnosed complex diseases — even though the genetic markers for these diseases had already been "turned on."

In April 2009, Lilly, Kathleen Hedges' 7-month-old Mi-Ki, was diagnosed with elevated liver enzymes due to an anatomical congenital liver defect common in the breed. Hedges, of Eagle River, Wis., consulted with Dodds, who placed Lilly on a homemade nutrigenomics-based liver cleansing diet that included Atlantic cod, white potatoes, sweet potatoes, zucchini, celery, yellow squash, and peas. Within a year, Lilly's liver enzyme levels had dropped to the normal range, and they remain normal today. "It was amazing," Hedges says. "I was even able to discontinue Lilly's prescription medication, which was upsetting her stomach."

Dodds advises the following steps for creating a nutrigenomics-based diet:

- **Identify food sensitivities and intolerances.**
- **Formulate a balanced, basic basal diet free of all aggravating ingredients.** "The base diet should be devoid of common allergens such as wheat, corn, and soy," Dodds says.
- **Add functional foods and supplements** (see sidebar on page 14) to enhance health or treat chronic conditions.

Susan Lauten, Ph.D., a canine nutritionist and owner of Pet Nutrition Consulting in Knoxville, Tenn., says the prospect of having a tool that can help her step in with dietary recommendations before a disease presents itself is exciting. "As tests that identify complex genetic diseases such as diabetes and cancer become available, we will be able to know what we're dealing with before clinical symptoms occur," she says. "This means canine nutritionists like me can become proactive rather than reactive in our treatment protocols."

How does the test work?

NutriScan is currently the only genetics-based food sensitivity test for dogs. Using a 2-milliliter sample of the dog's saliva, the test detects IgA or IgM antibodies to food. Traditional blood and fecal exams test for IgE and IgG antibodies, which are products of a different immune response.

With food sensitivity and intolerance, the body has a more delayed response to offending foods and produces IgA and IgM antibodies that can be detected in saliva.

"Blood and fecal tests assess acute reactions typical of food allergies, but not long-term sensitivities," Dodds says. "Saliva testing measures antibodies to foods that are present on the bowel's mucosal surface. Since these antibodies appear in saliva several months before clinical symptoms of gastrointestinal disease emerge, it can reveal the underlying, or pre-clinical, form of food sensitivity."

NutriScan offers two food panels, each consisting of 10 common food antigens. Foods tested include beef, corn, wheat, soy, cow's milk, lamb, venison, chicken, turkey, white fish, hen's egg, barley, millet, oatmeal, salmon, rabbit, rice, quinoa, potato, and peanut butter.

Regina Schwabe, D.V.M., of Pamplin Animal Wellness Services in Pamplin, Va., uses NutriScan to identify food intolerances in her patients. "The sampling technique is simple, involving an absorbent cotton rope that is placed in the cheek pouch for two minutes and then in the sample tube," she says. "Results are available in about two weeks and are very specific. NutriScan enables us to quickly modify the diet without the prolonged trial and error period we normally have when trying to find a food that works for a particular dog."

Schwabe notes that, although food intolerances are often only part of the itching problem and can occur concurrently with environmentally triggered allergies, "if we can eliminate the food-induced sensitivities, the animals are often easier to manage. Essentially, we raise the threshold before itching occurs by having an optimal diet."

Is there a downside?

Dodds says the only downside to nutrigenomics is explaining the process to clients and veterinarians. "It is complex and testing is relatively costly at \$130 for one panel of 10 foods," she says. "It

will save money in the long run, however, as the animal's health and longevity are enhanced and sustained."

Swanson agrees that nutrigenomics' complexity often leads to a misunderstanding of how biologically active ingredients interact with genes. "Some people think that if you feed an ingredient that changes the behavior of a gene, you are mutating the DNA," he says. "This is completely false. Functional foods do not alter the DNA, but may affect how genes are expressed."

Ultimately nutrigenomics could hold the key to increasing our dogs' athletic performance, improving their mental cognition, or staving off chronic disease.

"It is empowering to realize that neither we nor our companion animals must succumb to the genetic hand we were dealt," Dodds says. "By applying the science of nutrigenomics to change the expression of genes, we can change this hand for the better." **ND**

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Functional Foods

Jean Dodds, D.V.M., recommends the following functional foods and supplements for specific canine conditions:

- **Bee pollen:** Rich in B-vitamin complex; helps protect against colds and infections.
- **Colostrum:** Stimulates and regulates immune system.
- **Curcumin (in turmeric):** Anti-inflammatory, anti-tumor antioxidant used to treat arthritis pain; possible anti-carcinogenic.
- **DGP (Dog Gone Pain):** Herbal remedy for pain.
- **DLPA (D,L-phenylalanine):** Endorphin stimulant for chronic bone and muscle pain.
- **Ginger:** Aids in digestion.
- **Green leafy and yellow-orange vegetables, broccoli:** Help combat cancer.
- **Medicinal mushrooms (dried reishi and maitake):** Have antimicrobial, anticancer, and immune-support properties.
- **MSM (methylsulfonylmethane):** Anti-inflammatory; used for joint health.
- **Oils (wild salmon, coconut, hemp, olive):** Skin and coat conditioners that provide fat.
- **Silymarin (in milk thistle):** Supports liver cleansing.
- **Transfer Factor:** Immune enhancement and stress control product.
- **Yuca (cassava):** Gluten-free, used for irritable bowel syndrome.