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Dog Tips

Gut Clues Reveal Why Some Dogs Stay Itchy

The next time your dog can't stop scratching, remember that the problem might not just be skin deep. Here's what the research shows.

Reviewed by Dr. Elizabeth Hardoon

STORY AT-A-GLANCE

- Chronic itching in dogs may start in the gut, where imbalanced bacteria disrupt immune function and trigger allergic skin inflammation known as atopic dermatitis
- Dogs with atopic dermatitis have fewer beneficial gut bacteria and lower microbial diversity, reducing natural anti-inflammatory compounds that normally protect skin and immune health
- Antibiotic use, while sometimes necessary, can worsen gut imbalance by killing beneficial bacteria, possibly heightening allergy risks and prolonging chronic skin irritation in sensitive dogs
- Diet strongly shapes the gut microbiome. Dogs eating minimally processed or raw foods develop different bacterial patterns than those fed kibble, influencing inflammation and immune response
- Understanding the gut-skin connection opens doors to new treatments — using diet, probiotics, and microbiome therapy — to help dogs heal from the inside out and stop the endless itch

If your dog just can't stop scratching, you already know how frustrating and heartbreaking it can be. You've tried every special shampoo, hypoallergenic diet, or prescription cream, yet the itch keeps coming back. But what if the real answer doesn't lie on your dog's skin at all, but deep inside their gut?

Recent studies are beginning to reveal a powerful link between your dog's digestive system and their skin health. Scientists now believe that differences in the bacteria living in your dog's intestines (the gut microbiome) may help explain why some dogs are prone to chronic itching, redness, and allergies, while others stay smooth and comfortable.

The Hidden World Inside Your Dog's Gut

Your dog's gut is home to trillions of microscopic organisms — mostly bacteria, but also yeasts and other microbes. Together, these tiny residents form what's called the gut microbiome.

Far from being freeloaders, these bacteria play vital roles in digesting food, training the immune system, and keeping harmful germs in check. Think of them as your dog's invisible health team. They produce vitamins, break down fibers into short-chain fatty acids that nourish intestinal cells, and even send chemical signals that influence the skin, brain, and immune function.

When the balance of these gut microbes is disturbed, a condition known as dysbiosis, the immune system can go off track. This can make your dog's body react to harmless things like pollen, dust, or food proteins, leading to atopic dermatitis, one of the most common causes of chronic itching in dogs.

A Common but Complicated Skin Problem

Atopic dermatitis (AD) isn't just another rash — it's a chronic allergic skin disease — similar to eczema in people — that affects up to 15% of dogs worldwide.[1] Dogs with AD often lick, bite, or scratch their paws, ears, face, or belly. Their skin may become red, flaky, or infected, and their quality of life can drop dramatically.

Until recently, veterinarians mainly focused on the skin barrier (how well the outer skin layer protects against irritants) and the immune system (how the body reacts to allergens). But new research suggests there's a third player in the mix: the gut-skin axis, or the communication link between intestinal bacteria and the skin's health.[2]

Gut Bacteria and the Itchy Dog — What the Science Shows

A study published in the journal Animals explored the connection between gut bacteria and itching in dogs. The researchers compared the gut bacteria of three dogs with atopic dermatitis and four healthy dogs who lived together, ate the same food, and shared the same environment.[3]

Even though the group was small, the results were striking. Dogs with atopic dermatitis had significantly lower bacterial diversity, meaning fewer types of bacteria living in their guts, than their healthy companions.

Low diversity is often a warning sign of an unhealthy microbiome. Just like a forest with only one kind of tree is more vulnerable to disease, a gut with too few species is more likely to let inflammation take over.

But it wasn't just about numbers — the types of bacteria also differed dramatically. The researchers found that healthy dogs had higher levels of beneficial bacteria from families such as Lachnospiraceae, Ruminococcaceae, and Peptostreptococcaceae, as well as genera like Faecalibacterium, Fusobacterium, and Lachnospira. These microbes are known for producing short-chain fatty acids (SCFAs) — compounds that reduce inflammation, strengthen the intestinal barrier, and help regulate immune responses.

In contrast, the allergic dogs had more different types of bacteria such as Conchiformibius, Catenibacterium, Ruminococcus gnavus, and Megamonas. Some of these species are linked to gut inflammation or mucus breakdown, weakening the intestinal lining and allowing unwanted substances to "leak" into the bloodstream, a process sometimes called "leaky gut syndrome."

Even after a month of treatment with the anti-itch medication oclacitinib (brand name Apoquel), the atopic dogs' gut microbiomes didn't change significantly. That means the imbalance wasn't just a short-term side effect of medication or flare-ups — it appeared to be a more stable, underlying difference.

> *"The reduced diversity and differences of specific bacterial taxa suggest that the gut microbiota may play a role in the pathogenesis of canine AD," the researchers concluded.*

> *"The herein identified potentially beneficial and pathogenic bacterial targets should be further explored in large-scale studies as possible disease or therapy monitoring biomarkers."*[4]

A Larger Study Confirms the Gut-Skin Connection

A succeeding study conducted by another team of researchers provided more insight. Published in the journal "Royal Society Open Science" in 2023; the team analyzed 155 pet dogs — a mix of Labrador Retrievers and Finnish Lapphunds; two breeds with very different allergy risks.[5]

Like the previous study, they found that dogs with atopic dermatitis had a gut microbiome that looked distinctly different from that of healthy dogs.

Healthy dogs tended to have more Prevotella, a group of bacteria associated with carbohydrate digestion and fiber fermentation. Meanwhile, atopic dogs had more Escherichia shigella, a bacterial group linked to inflammation and antibiotic use.

Here's where things get interesting — half of the atopic dogs had received antibiotics, compared with only 3% of healthy ones. Antibiotics, while sometimes necessary, can wipe out beneficial gut bacteria and allow harmful species to thrive. This pattern suggests that antibiotic use might worsen (or even trigger) long-term imbalances in the gut, increasing the risk of allergies.

The Role of Diet — Raw vs. Kibble

Diet turned out to be another major player. The 2023 study classified each dog's food as one of three types:[6]

1. **Non-heat-processed raw diets —** High in animal protein and fat, low in carbohydrates.
2. **Heat-processed dry food (kibble) —** High in carbohydrates.
3. **Heat-processed moist food —** Canned or cooked diets.

They found that diet had the strongest influence on the makeup of the gut microbiome, even more than where the dog lived (urban or rural).

Dogs eating mostly raw diets had more bacteria such as Bacteroides and Lachnospiraceae, while those eating kibble had more Prevotella and Faecalibacterium. Both groups included bacteria that can be beneficial, but the balance depended on what they ate.

Interestingly, dogs eating raw diets had lower bacterial diversity, which might sound bad at first, but it's not necessarily unhealthy — it just reflects a different microbial pattern linked to higher protein and fat intake.

What's clear is that diet directly shapes which microbes thrive in your dog's gut, and those microbes can, in turn, influence how the immune system responds to allergens.

Antibiotics — A Double-Edged Sword

Both studies confirmed that antibiotic use has a major, long-lasting impact on the gut microbiome.

Antibiotics can be lifesaving when your dog has a serious infection, but they don't discriminate between good and bad bacteria. Repeated or early-life exposure may tip the balance of the gut ecosystem, sometimes for months or even years.

In the 2023 study, antibiotic use was strongly linked to the presence of Escherichia shigella, the same bacteria that appeared more often in itchy, allergic dogs. This pattern supports what human research has shown — that antibiotics can increase the risk of allergic conditions like eczema and asthma by disrupting the normal gut flora early in life.[7]

This study highlights the importance of protecting gut health after undergoing antibiotic therapy through feeding a healthy diet with enough protein and fiber, as well as probiotics (in the form of supplements or foods such as kefir).

In severe cases a FMT (fecal microbiota transplant) may be recommended to replace beneficial microbes that have been lost and to restore gut function. Your holistic vet may offer microbiome testing to further evaluate your pet's current microbiome status. Microbiome test results will also include recommendations for your pet's diet such adding fiber or protein to help strengthen gut health.

From Gut to Skin — How the Connection Works

So how can bacteria in the gut affect your dog's skin? Scientists believe the gut and skin are connected through a network of immune signals and chemical messengers — often referred to as the gut-skin axis.

When the gut microbiome is balanced, it helps regulate inflammation and teaches the immune system to tolerate harmless substances. But when it's disturbed, the gut may send out distress signals that cause the immune system to overreact, even in distant tissues like the skin.

Short-chain fatty acids (SCFAs) like butyrate, acetate, and propionate play a big part in this story. Produced when gut bacteria digest fibers or resistant starches, SCFAs act like peacekeepers — they reduce inflammation, support healthy intestinal cells, and may help prevent allergic reactions.

In both humans and dogs, low levels of SCFA-producing bacteria have been linked to allergic skin diseases. For example, Faecalibacterium prausnitzii, one of the key butyrate producers, was nearly absent in allergic dogs in the 2022 study.[8]

This loss of "friendly" bacteria may allow more harmful species to multiply, leading to chronic low-grade inflammation that eventually shows up as red, itchy skin.

The Urban Factor — City Life and Allergies

You might think dogs living in the countryside, with all that mud, grass, and fresh air, would have fewer allergies than their city-dwelling counterparts. And this is correct; at least partly.

Researchers found that urban lifestyle was associated with a higher rate of atopy, although it didn’t have a strong effect on the gut microbiota itself. This suggests that other factors of city living, such as indoor environments, less exposure to diverse microbes, and higher stress levels, could also play a role in atopy and inflammation. Letting your dog explore nature, get fresh air, sniff the dirt and giving them playtime outside can help expose them to a richer mix of beneficial microbes.[9]

What This Means for You and Your Dog

These two studies impart a powerful message — Gut health matters. And while genetics, environment, and immune factors all contribute to your dog's itchiness, supporting gut health can be a key part of prevention and care. Here's what you can take away from this emerging science:

1. **Prioritize a balanced, whole-food diet —** Diet shapes your dog's microbiome more than almost anything else. Choose high-quality, minimally processed food — such as a raw or home cooked diet. Include appropriate amounts of protein and fiber to help support beneficial bacteria. Consider adding probiotic rich foods such as kefir and goat milk. If you need help with your pet's diet, consult with a holistic veterinarian or nutritionist.
2. **Be cautious with antibiotics —** Use antibiotics only when prescribed by your vet, and follow directions carefully. After a course of antibiotics, support your dog's recovery with probiotic-rich foods such as kefir or goat milk or veterinary-grade probiotic supplements that help rebuild the gut flora. If your dog is repeatedly prescribed antibiotics, ask your vet to do further testing for an underlying cause of infections or look for a holistic vet who may utilize natural herbal remedies or acupuncture treatments to minimize repeated courses of antibiotics.
3. **Support the gut-skin connection —** If your dog struggles with chronic itching or allergies, consider that the gut may be part of the picture. Work with your vet to explore dietary changes, allergy testing, microbiome testing or supplements that target gut balance. Sometimes FMT (fecal microbiota transplants) may be used to replace missing bacteria in dogs with an unhealthy gut, especially in severe cases.
4. **Encourage natural microbial exposure —** Regular time outdoors, especially in grass, woods, or natural areas, helps diversify your dog's microbiome. Avoid over-sanitizing your home and let your pet experience the environment (within safe limits).
5. **Look beyond the skin —** While medicated shampoos and allergy drugs can ease symptoms, they don't address the root cause. Healing often requires a whole-body approach that includes the gut, immune system, and environment.

Why This Matters for the Future

These two studies highlight how new discoveries can change how veterinarians treat atopic dermatitis. Instead of focusing only on topical skin based treatments; future care may include microbiome based diagnostics and therapies — like microbiome testing and customized probiotics or diets that restore the natural balance of gut bacteria.

In human medicine, similar approaches are already being tested, with fecal transplants and probiotics showing promise for eczema and food allergies. Dogs may help pave the way for such breakthroughs.

A New Way to Think About 'Itch'

Your dog's gut is a living ecosystem that talks constantly to their immune system — and when that conversation goes wrong, it can show up as itch, redness, or infection. By understanding and caring for this inner world, you're not only helping your dog's belly — you're helping their skin, comfort, and overall health, too. The message from science is clear — To help your dog stop itching, start by listening to their gut.

Sources and References

[1,2,3,4,8,9] Animals (Basel). 2022 Sep 12;12(18):2377

[5,6,7] R Soc Open Sci. 2023 Apr 26;10(4):221104