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**Dog Tips**

# Simple New Tool for Eradicating Resistant Lyme Disease

New study proves them better at killing resistant Lyme bacteria in people than meds, which could spare you long-term suffering. For pets, ask your vet to run this test to differentiate exposure from infection. As a preventive, spritz this homemade repellent on your pet daily.

**Analysis by Dr. Karen Shaw Becker**

## STORY AT-A-GLANCE

- A new study shows that certain essential oils are more effective than pharmaceuticals at killing Lyme bacteria in people with “post-treatment Lyme disease syndrome”
- These study results are encouraging given the overuse of antibiotics in both human and veterinary medicine, and the resulting scourge of antibiotic resistance
- Fortunately, in dogs, while exposure to Lyme bacteria is common, infection (Lyme disease) is not
- It’s important to ensure dogs aren’t given antibiotics for exposure to the Lyme bacteria, but only for an active Lyme disease infection
- If you live in a Lyme-endemic region, take nontoxic, commonsense steps to help your dog avoid infection

***Editor's Note: This article is a reprint. It was originally published July 10, 2019.***

A new study by researchers at Johns Hopkins University's Bloomberg School of Public Health suggests that oils from several common herbs and medicinal plants are effective against the bacteria that causes Lyme disease (Borrelia burgdorferi), and even better — they may be especially beneficial in relieving persistent symptoms that don't respond to antibiotic treatment.[1]

The study, published recently in the journal Antibiotics,[2] tested 35 essential oils pressed from plants or their fruits that contain the plant's essence (fragrance). The researchers found that 10 of the 35 oils "showed strong killing activity against dormant and slow-growing 'persister' forms of the Lyme disease bacterium."

> *"We found that these essential oils were even better at killing the 'persister' forms of Lyme bacteria than standard Lyme antibiotics," reported study senior author Dr. Ying Zhang, professor in the department of Molecular Microbiology and Immunology at the Bloomberg School.*

## Essential Oils Kill Lyme Bacteria Cells Better Than Drugs

In about 10% to 20% of human cases of Lyme disease, patients are diagnosed with "persistent Lyme infection" or "post-treatment Lyme disease syndrome" that can be with them for months or even years, causing symptoms such as joint pain and fatigue.

Scientists have discovered that Lyme disease bacteria can enter a "stationary phase" in humans characterized by cells that divide slowly or not at all, called "persister" cells. These cells appear during periods of "nutrient starvation" or stress and are more resistant to antibiotics. Thankfully, some researchers have gone in search of drugs or medicinal compounds beyond antibiotics to see if they are more effective against lingering Lyme symptoms.

In a 2017 study, Zhang lead a team of researchers who found that essential oils from oregano, cinnamon bark, clove buds, citronella and wintergreen killed stationary phase Lyme bacteria more effectively than the best-performing pharmaceutical.

As noted above, in the most recent study, Zhang and his team extended their testing (using lab dishes) to include 35 other essential oils and discovered 10 that show significant killing activity at concentrations of just 1 part per thousand. At this concentration, five of these oils — from garlic bulbs, allspice berries, myrrh trees, spiked ginger lily blossoms and may change fruit — successfully eradicated all stationary phase Lyme bacteria in seven days, with no bacteria growing back in 21 days.

> "*Another method to confirm the complete eradication of the bacterial cells is to carry out sub-culture experiments," explains Bhavana Achary, Ph.D, writing for the Medical News Bulletin. "Sub-culture experiments involve taking a small portion of the bacterial cells, rinsing off the old culture medium that contains the drugs, and next add fresh culture medium to the cells.*
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> *The hypothesis is that if the initial treatment does not completely wipe out the bacterial cells, then they will regrow in the new medium. The subculture experiments in this study identified that five out of the ten essential oils (garlic, allspice, myrrh, hydacheim, and Litsea cubeba) had completely eradicated the B. burgdorferi persister cells with no new growth observed."*[3]

Other oils that performed well in the lab-dish tests were from thyme leaves, cumin seeds, amyris wood and cinnamaldehyde, which is the fragrant main ingredient of cinnamon bark oil. Lab dish tests are considered an early phase of this research, but Zhang and his colleagues hope to conduct tests in animals next, including mice with persistent Lyme infection. If all goes well, the researchers will move on to tests in humans, and hopefully dogs.

It's also important to note that this study focused only on non-growing "persister" Lyme bacteria cells; additional studies could help determine if essential oils are also effective against actively growing, replicating B. burgdorferi cells. Of course, more research is needed, but these results are promising for all animals that are at risk of acquiring Lyme disease or have not been helped by antibiotic therapy.

## Lyme Exposure Is Common in Dogs, but the Disease Is Not

In a 2006 study on canine Lyme disease, Beagles were observed after exposure to B. burgdorferi.[4] None of the adult dogs became ill and none showed any symptoms of the disease. Not one of the adult Beagles developed a fever, flu symptoms or cardiac or neurologic issues.

A few months after exposure, the Beagle puppies in the study developed transient symptoms such as fever and lameness for about four days. By the fifth day the symptoms were gone, indicating the pups' bodies cleared the infection quickly. The results of the Beagle study correlate closely to what veterinarians see in their practices.

Ninety-five percent of dogs that test positive for Lyme disease live in about dozen U.S. states (you can view a parasite prevalence map **here**). These are states in which Lyme disease is endemic (pervasive) — states with heavy infestations of deer ticks. There are cases of Lyme in other states, but in locations where the infection is rare, dogs aren't routinely tested for it unless they are symptomatic.

In areas of the country where Lyme is prevalent, veterinarians test regularly for the disease even in healthy dogs. The results show that a large percentage of dogs are seropositive, meaning they have Lyme-related antibodies in their blood from exposure to the disease. However, they have no clinical symptoms of infection.

The take-home message: While exposure to B. burgdorferi in dogs is common, Lyme disease infection is not. In fact, in some areas of New England, the vast majority of healthy dogs carry high Lyme antibodies — they "glow" positive on the screening test (a 4DX or Accuplex blood test). These are not sick dogs, but dogs who've been exposed to the bacteria that causes the disease.

"Exposure" means dogs' bodies have encountered the bacteria (just as our bodies encounter thousands of different bacteria that we don't become infected with) and have mounted an appropriate immune response: They made antibodies and fought off the foreign invader effectively.

Antibodies are a lasting response you can measure after your pet's body has waged and won a successful battle with a pathogen. These dogs become "seropositive" for Lyme, meaning they've been exposed to the bacteria and won the battle. Even though they test positive, they do not become sick with the disease, and they do NOT need antibiotics.

## Before Giving Antibiotics to Your Dog, Insist on This Test

Unfortunately, many veterinarians don't know to test for exposure versus disease, so they hand out unnecessary antibiotics that can destroy your dog's microbiome and set up issues for months and even years down the road. That's why it must be your job to know when they're needed and when they're not.

Many dogs in both the U.S. and Canada are showing routine "positives" on 4DX tests (the heartworm and other tick diseases test I recommend everyone use), but this doesn't mean they need antibiotics, it means they need to be tested for infection. Too many veterinarians are seeing these preliminary screening tests and immediately prescribing doxycycline (an antibiotic) unnecessarily. My advice is to decline these drugs if your vet offers them without confirming your dog is actually infected using a QC6 test.

A quantitative C6 (QC6) test discerns exposure from true infection, and over 90% of dogs who test positive on the screening test (4DX) do not need treatment, as their immune system did exactly what it was supposed to do — fight off the disease. The follow-up QC6 test is the only responsible option and the one you should insist on.

The vast majority of dogs are negative when testing infection (CQ6) versus exposure (4DX). If your dog truly is infected and antibiotics are required, you can create a microbiome restorative plan to minimize damage. The QC6 test should be rerun at least every three months until levels return to normal.

I also recommend consulting an integrative or functional medicine veterinarian if the levels don't continue to drop, since there are effective options for resistant infections (including specific essential oils), but most conventional vets have no knowledge or training in this area.

## Commonsense Steps to Help Your Dog Avoid Lyme Disease

- In the spring, summer and fall, avoid tick-infested areas.
- If you live where **Lyme disease** is endemic or you inadvertently wind up in a tick-infested area, check your dog for ticks twice each day. Look over her entire body, including in her ears, under her collar, in the webs of her feet and under her tail.
- Use a tick deterrent. You can make an all-natural pest deterrent for your dog very easily at home. It will help him avoid a good percentage of the pests he encounters, though not all of them. The recipe: mix 8 ounces of pure water with 4 ounces of organic, unfiltered **apple cider vinegar** and 10 drops of neem oil.

  Neem oil is effective because fleas and ticks hate it. It's also great for animals who are very sensitive to smells. Catnip oil can also be used as a pest deterrent, since it has been proven to be as effective as diethyltoluamide (DEET), the mosquito and tick spray humans use that has a number of toxic side effects.

  If you want to add some extra punch to your dog's pest deterrent recipe, go with five drops of lemon, lemongrass, eucalyptus or geranium oil. I use geranium oil quite a bit because I find it very effective. In fact, I use it in my Dr. Mercola natural flea and tick products. If you have a dog who comes in contact with ticks, adding the extra punch of one of the essential oils I listed can be very beneficial.

  **Important note —** If you've heard or read dire warnings about essential oils for dogs like **this one**, and you're concerned about them as a result, it's important to realize there's a lot of mis- and disinformation floating around, due in part to the fiercely competitive market for all-natural pet products. Again, I recommend consulting an integrative veterinarian about appropriate essential oils and other nontoxic, natural remedies.

  You can store your homemade pest deterrent in the fridge, which is what I do. Before my dogs head out in the morning, I mist them with it, being careful to avoid their eyes. The active ingredients, especially the oils in the recipe, dissipate in about four hours, so you may need to reapply it several times throughout the day. If you live in a Lyme endemic region of the U.S., chances are your veterinarian will recommend you use a chemical pest repellent.

  It's important to investigate the risks and benefits of any medication (or in this case, pesticide) before you give it to your pet, as most have side effects. If you use these preventives, consider a detox protocol for a week after administration. Many pet parents living in tick endemic areas are able to rotate chemical preventives with natural deterrents throughout the summer, minimizing the amount of pesticides needed to prevent external parasites.
- There is a vaccine available for Lyme disease, but I don't recommend it for a couple of reasons. Number one, this vaccine is known to send the immune system into overdrive, which can trigger a number of serious secondary reactions including autoimmune disease. Number two, the vaccine doesn't prevent ticks from attaching, so a topical tick repellent is also necessary.

## Sources and References


[1] Johns Hopkins Bloomberg School of Public Health, December 3, 2018

[2] Antibiotics 2018, 7(4), 89

[3] Medical News Bulletin, January 5, 2019

[4] Journal of Veterinary Internal Medicine. 2006 Mar-Apr;20(2):422-34