

Pets Are Germ Carriers – but Is That a Blessing or a Curse?

A couple of large studies looked at this — one with 746 people and another with over 1 million. They wanted to find whether pet germs helped or hurt the people who lived with them. Results? This was by far the most helpful time to own a pet in terms of their germs.

Reviewed by Dr. Becker

STORY AT-A-GLANCE

- According to the hygiene hypothesis, living in semi-sterile environments can create health problems because the immune system remains immature without adequate exposure to a variety of microbes
- Studies show that babies living in homes with dogs have more diversified gut bacteria — an indicator of immune system health — than kids who live in pet-free households
- Studies also show that school-age children who grow up with dogs have a lower incidence of allergies and asthma
- Evidence is mounting that early exposure to pets primes infants' immune systems to learn the difference between harmful pathogens and harmless environmental irritants
- Another method of transmission occurs when dogs track bacteria in from outdoors and humans in the household pick it up

Editor's Note: This article is a reprint. It was originally published May 17, 2017.

Given the time and passion most of us devote to cleaning our surroundings, our two- and four-legged family members and ourselves, it's hard to imagine a situation in which we might be too clean. However, there's a very intriguing theory called the hygiene hypothesis that suggests we could be overdoing it.

The theory of the hygiene hypothesis, born in the late 1980s, is that the huge increase in allergic disorders in the last century is due in part to our somewhat obsessive cleanliness standards.

Since the advent of antibacterial products for every conceivable use, we've become hyper-vigilant in trying to avoid every germ in the environment.

On the surface this might seem like a sensible approach, but not everyone is convinced. It is thought that early exposure to bacteria and parasites prepares immature immune systems to fight dangerous infections.

Further, this "priming" of the immune system also helps it learn the difference between serious health hazards like a pneumonia infection, and harmless irritants like pet dander and pollen.

When the immune system remains naïve from lack of exposure to real pathogens, it's more likely to mount attacks against benign environmental triggers.

Babies in Homes with Dogs Have More Diversified Gut Bacteria

There's a growing body of research that seems to support the hygiene hypothesis. For example, multiple studies over the last 20 years suggest that children raised in households with dogs have less allergies and asthma than kids who grow up in homes without pets.

In 2013, a team of researchers led by pediatric epidemiologist Anita Kozyrskyj, Ph.D., of the University of Alberta in Edmonton, Canada, evaluated the fecal samples from two-dozen 4-month-old babies, including 15 who lived with at least one dog or cat.¹

The researchers observed that the babies living with pets had a wider assortment of gut microbes than those without pets (which is a good thing). The development of the immune system is directly impacted by the gut microbiome, which is the vast population of bacteria that live in the digestive tract.

Children who grow up with inadequate exposure to microbes, for example, the bacteria found on a pet dog's coat or tracked in on his paws, are more likely to have immune systems that view such harmless bacteria as foreign invaders and mount an attack, which manifests as allergies and/or asthma.

Kozyrskyj has published the results of an expanded study involving 746 babies, half of which lived in homes with pets (primarily dogs).² Confirming the findings of her smaller study, she found that 3-month-old infants living with pets had a greater diversity of gut microbes than babies in homes without animal companions.

Also interesting was that the babies living with pets had higher levels of two types of microbes linked to a lower incidence of both allergies (*Ruminococcus* bacteria) and obesity (*Oscillospira* bacteria).

School-Age Kids with Dogs Have Significantly Lower Rates of Asthma

In a 2015 study, a team of Swedish researchers set out to try to quantify the reduced incidence of asthma in kids who grow up with dogs.³ The researchers looked at the medical records of over 1 million children born in Sweden between 2001 and 2010.

There were around 275,000 school-age children included in the 1 million, and the researchers found that school-age kids who had dogs at home had a 13% lower rate of asthma than the children from homes without dogs. According to Sujata Gupta writing for the journal *Nature*:

*“The idea that pets can enhance the microbiome makes even more sense when viewed in light of the **old friends hypothesis**, a refinement of the hygiene hypothesis. In this view, humans' co-evolution with livestock and animals has made us dependent on their microbes for our health and even survival.*

Losing contact with these 'old friends' might tip the delicate evolutionary balance.”⁴

Some researchers speculate that because humans and canines have such a long history working and living together, our microbiomes may be somehow intertwined. It could be that a baby without a dog — or a puppy without a human — is on some level incomplete, according to Gupta.

Human Members of Dog-Owning Families Have Similar Skin Bacteria

So how, exactly, is friendly bacteria exchanged between dogs and humans? No one's really sure yet.

A study conducted at the University of Colorado-Boulder demonstrated that dog owners have both more and different skin bacteria than non-dog owners.⁵ The microbes in question are a blend of harmless bacteria from doggy tongues (betaproteobacteria) and paws (actinobacteria).

Study participants included 159 people and 36 dogs from 60 families, separated into four groups, including families with children aged 6 to 18, families with no children but one or more dogs, families with both children and dogs and families with no kids and no dogs.

The researchers collected samples of skin (from the forehead, palms or paws and tongues) and stool samples from all the participants (two- and four-legged) to determine what bacteria were present in each location.

Analysis of the samples showed that human family members share similar microbes in the stool, on the skin and in the mouth.

The researchers found that the skin microbiota of people in families with a dog were more similar to each other than the microbiomes of members of dog-free homes. This suggests it was the dogs spreading friendly microbes around.

The researchers noted that much of the common bacteria shared between humans and their dogs happens through licking. Another method of transmission occurs when dogs track bacteria in from outdoors and humans in the household pick it up.

The paws and foreheads of dogs are a rich source of a great number of diverse microbes.

Does Having Dogs Around Benefit Adult Gut Bacteria?

Whether or not the microbiomes of dogs influence not just children's but also adult microbiomes is unclear. A small study conducted by psychiatrist Dr. Charles Raison of the Raison Research Group suggests there is no effect once a person has reached a certain age.⁶

Raison's study involved 20 adults between ages 50 and 80 who were given shelter dogs to care for over a three-month period (with the option to adopt at the end of the study). The study participants' blood, skin, saliva and stool samples were tested before they received the dogs, and again at one-month intervals for three months.

Interestingly, while the temporary dog guardians experienced a number of emotional and physiological benefits from having the dogs around, their microbiomes were unaffected. "The dogs clearly impacted people's emotions and immune systems, but not through the microbiome," said Raison.⁷ These findings align with prior studies showing that in humans, the gut microbiome forms within the first few years of life.

Sources and References

¹ [Allergy Asthma Clin Immunol. 2013 Apr 22;9\(1\):15](#)

² [Microbiome 2017 5:40](#)

³ [JAMA Pediatr. 2015 Nov;169\(11\):e153219](#)

^{4, 7} [Nature 543, S48-S49 \(30 March 2017\).](#)

⁵ [eLife.com April 16, 2013](#)

⁶ [Raison Research \(Archived\).](#)

^{4, 7} [Nature 543, S48-S49 \(30 March 2017\).](#)

⁵ [eLife.com April 16, 2013](#)

⁶ [Raison Research \(Archived\).](#)