

Probiotic Effect of Pets on Humans

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The history of probiotics dates back to very ancient times, the origin of the word is a Greek word and means “for life”.^[1] Probiotics are defined as “live microorganisms which, when administered in adequate amounts, confer a health benefit on the host” by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO).^[2] It is used as an additional supplement in the gastrointestinal system because they are involved in the digestion of foods. Foods having a probiotic impact are absorbed into the body through the ingestion of fermented dairy products such as kefir, yogurt, and cheese, as well as alcoholic beverages such as wine made from fermented ingredients. Probiotics are bacteria that have no harmful effects when they enter the body and benefit all systems.^[3,4]

The digestive system of neonates is considered sterile.^[5] Microorganisms begin to infiltrate the bodies of species as soon as they are born. The harmful microorganisms are treated by the natural passive immune elements from the mother’s colostrum or placenta, while the distinctive microflora of the species begins to form as it begins to take colostrum from the mother.^[6] It is known that the settlements

ABSTRACT

In today's world, the animal-human connection, which began with hunting in the past, has evolved into friendship and animal companionship. People's interest in pets has gradually increased. Cats and dogs are the leading animal species that people are mostly interested in keeping. People spend time with their pets and receive oral and fecal bacteria that are the natural flora of animals. Although some of these bacteria have a negative effect on human health, some are thought to have a probiotic effect on people. In this review, detailed information about the probiotic effect of pets on humans was discussed.

Keywords: Microbiota, microflora, pet, probiotic

of microorganisms in the living body are generally mouth, nose, throat, intestine, urogenital areas, skin, surfaces that are related to different paths, such as the external environment, cavity of organs, and mucous membranes. Microflora refers to bacteria and other organisms that reside in the intestines.^[7] The intestinal microflora is a structure in the gastrointestinal system that has essential functions and is composed of bacteria, protozoa, viruses, and fungi. It contains more than 1,000 microorganisms.^[8] There are six bacterial groups in the microflora of a healthy individual. These are *Firmicutes* (includes Gram-positive genera such as *Clostridium*, *Ruminococcus*, *Roseburia*), *Bacteroidetes* (includes Gram-negative species such as *Bacteroides*, *Prevotella*), *Proteobacteria* (includes Gram-negative species such as *Enterobacteriaceae*), *Fusobacterium*, *Actinobacteria* (includes Gram-positive *Bifidobacterium* genus), *Verrucomicrobia* (includes genera such as *Akkermansia*).^[9] These microorganisms live symbiotically on species. Microflora varies during species’ life as they develop and evolve. These changes might have a harmful impact on the body. Invasion of pathogen microorganisms, infectious agents, antibiotics, various drugs, heavy metals (Al, Hg, Pb), toxins, and a high-carbohydrate refined-food diet

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disrupts the body's natural microflora.^[10] Microflora impairment results in developmental delays, diarrhea, difficulty to digest food, and inability to obtain the daily quantity of nutrients required by the body, resulting in health issues in neonates. If the neonates are not treated, the health issues can result in death. Probiotics are used in this situation. The use of probiotics supports the health of species when used at the right time and in the right dosage.^[11]

Human-animal relationships have existed since the dawn of time. Humans have lived in harmony with their animal companions for over a thousand years, from cave to homes. Animals have been domesticated over time, a sedentary lifestyle has evolved from the hunting civilization, a relationship between domesticated animals and people has been established, and humans have recently begun to share their houses with animals and live together.^[12] Pets help to alleviate loneliness as a result of urbanization and the transition to modern civilization. Studies have shown that pet owners have a substantial impact on the development of their affection and character qualities. Furthermore, the probiotic impact of natural microflora in animals on humans has been a subject of discussion. Children who grow up with dogs in the family have a decreased risk of developing autoimmune diseases such as asthma and allergies, according to epidemiological research. This might be a result of the diversity of microorganisms these animals bring into the households.^[13] Probiotics have been used successfully to improve animal and human health, but limited studies have focused on the use of probiotics to improve the health of hosts of different ages. Microflora studies in pets may be similar to results in humans.^[14] Furthermore, since variations in microflora might facilitate exposure to pathogenic microorganisms and enhance the adverse effects from the environment, new methods to protect pets and humans from harmful microorganisms ought to be developed. Specific strains of probiotics or their recommended substitutes can be useful in pet nutrition, treatment, and care. Pet keeping enhances skin microflora sharing among individuals living with pets, according to recent studies on pet and human microorganism contact. Individuals who have pets share more of the "skin" microbiota with their own canines than any other dog.^[15] Studies show that infants exposed to farm animals had a lower risk of developing asthma later in life.^[16] It has been shown that exposure to pets during the prenatal period affects the intestinal microflora and protects children from acute respiratory tract infections.^[17] As a result of research, reverse zoonotic infections

were recognized. Adverse zoonotic infections are transmitted from humans to animals in the same way that zoonotic infections are transmitted from animals to humans. The existence of zoonotic and reverse zoonotic infections is certain. It is possible that there may be harmless microorganisms that can pass from animals to humans, and from humans to animals, which are even beneficial microorganisms, namely probiotics, in a microbial exchange between humans and animals.^[18] Canine microbiota studies have yielded positive results in human evaluations due to the high structural and functional similarity between canine and human microbiomes.^[19] A number of studies have confirmed that the intestinal microflora plays a crucial role in maintaining the health of the host, whether human or animal. It has been shown that intestinal bacteria affect the host's food intake, energy consumption, physiological and metabolic functions, direct the immune response, thus contributing to the health of the host. Probiotics also prevent the elimination of pathogenic bacteria entering the body and their settlement in the epithelium.^[20] While the benefits of probiotics have been widely explored in humans and animals, the precise mechanisms of probiotic-based immune modeling have not been fully elucidated. In addition, personalized intestinal microflora leads to differences in the effect of probiotics on the host.^[21] Research into the composition and therapeutic modification of microflora has attracted increasing interest in human and veterinary medicine. Probiotics are a way to regulate the microflora and have been experimented with to prevent and treat diseases. The gastrointestinal microflora of humans and animals contains thousands of microbial species. The interaction of probiotics with gastrointestinal microflora has been investigated and proven in many studies.^[22] Some microorganisms used in animal feed and human nutrition are shown in Table 1.^[23-26]

Probiotic supplementation during the prenatal and postnatal periods has been shown to improve health. Acute gastroenteritis is an important pediatric disease. *Saccharomyces boulardii* and *Lactobacillus rhamnosus*, in particular, have been shown to be useful in probiotic therapy. Studies on the effects of probiotics on constipation in adults were examined; 50% of specific probiotic strains reduce intestinal transit time by 12 hours, increase stool frequency by 1.5 stools per week, and improve some symptoms related to constipation (e.g. bloating, feeling of incomplete evacuation, formation of hard stools and ease of defecation), especially *B. lactis* strains show positive effects.^[27] In another clinical study,

Bacteria			Fungi
<i>Bacillus coagulans</i>	<i>Bifidobacterium longum</i>	<i>Lactobacillus reuteri</i>	<i>Aspergillus niger</i>
<i>Bacillus lentus</i>	<i>Bifidobacterium thermophilum</i>	<i>Leuconostoc mesenteroides</i>	<i>Aspergillus oryzae</i>
<i>Bacillus licheniformis</i>	<i>Clostridium butyricum</i>	<i>Pediococcus acidilactici</i>	
<i>Bacillus pumilus</i>	<i>Lactobacillus acidophilus</i>	<i>Pediococcus cerevisiae</i>	Yeasts
<i>Bacillus subtilis</i>	<i>Lactobacillus brevis</i>	<i>Pediococcus pentosaceus</i>	<i>Saccharomyces cerevisiae</i>
<i>Bacteroides amylophilus</i>	<i>Lactobacillus bulgaricus</i>	<i>Propionibacterium freudenreichii</i>	<i>Candida (torulopsis)</i>
<i>Bacteroides capillosus</i>	<i>Lactobacillus casei</i>	<i>Propionibacterium shermanii</i>	
<i>Bacteroides ruminicola</i>	<i>Lactobacillus cellobiosus</i>	<i>Streptococcus cremoris</i>	
<i>Bacteroides suis</i>	<i>Lactobacillus curvatus</i>	<i>Streptococcus diacetylactis</i>	
<i>Bifidobacterium adolescentis</i>	<i>Lactobacillus delbrueckii</i>	<i>Enterococcus faecium</i>	
<i>Bifidobacterium animalis</i>	<i>Lactobacillus fermentum</i>	<i>Streptococcus intermedius</i>	
<i>Bifidobacterium bifidum</i>	<i>Lactobacillus lactis</i>	<i>Streptococcus lactis</i>	
<i>Bifidobacterium infantis</i>	<i>Lactobacillus plantarum</i>	<i>Streptococcus thermophilus</i>	

Table 1: Microorganisms used in the production of animal feed and human nutrients

(The table was adapted from Sanders and Klaenhammer)^[26]

probiotic strains of *Lactobacillus* or *Bifidobacterium* improved stool health in constipation and reduced intestinal transit time by about 15 hours.^[28] Probiotic formulations containing *S. boulardii* and *L. rhamnosus* have been suggested as prophylactic.^[29] Every living thing has its own unique natural microflora, and although common microorganisms exist, strains can be different. Microflora members differ in different parts of the living body, depending on nutritional characteristics, age, personal habits, gender, and hormonal changes.^[30,31] The bodily systems of a human, a dog, a cat, or any other animal fed in a barn are all different. As a result of these variances, each animal's natural microflora is unique. Although the systems in the body are different, the bacteria in their microflora are the same; for instance, *Lactobacillus* and *Bifidobacterium* are present, but the amount of *Lactobacillus* and *Bifidobacterium* bacteria in each animal varies. In order for a bacterial strain to be considered an effective probiotic, the necessary properties, its behavior in the food system where it

will be used, and the positive effects it will have on the health of the target consumer are taken into account. Among these criteria, the strain's human origin and survival in the gastrointestinal tract, resistance to gastric acid and physiologically concentrated bile salts, and adherence to small intestinal epithelial cells are the most emphasized probiotic microorganism behaviors.^[32]

In conclusion, the use of probiotics in the treatment of many diseases is increasing day by day due to their effects on the gastrointestinal system and immune system in the protection of human and animal health. Natural probiotics should be included in the diet for a healthy lifestyle. It's critical to enhance public knowledge about the importance of consumption of fermented milk products like yogurt and kefir, which are among the probiotic nutrients in our diets, as they are some of the natural prebiotic sources. When deemed necessary, it should be known that the intensive use of artificial probiotics, especially

in intestinal diseases, has beneficial effects. As a result of the research, not all probiotic strains have the same bioavailability for all clinical indications, so only specific bacteria should be evaluated and it should be determined whether there is a common probiotic according to humans and pets. The strain should be developed specifically to promote the use of probiotics. Human, animal, and environmental health should be taken into consideration and it should be examined with the concept of "One medicine, one health". It should not be overlooked that microorganisms may transfer from pets to humans and from humans to animals, and future studies should take this into account. It should be understood that the germs that can be transmitted from healthy pets to humans do not pose a health risk to humans and that the appropriate vaccines and controls of the animal owner should be carried out by veterinarians. It should not be overlooked that microorganisms may transfer from pets to humans and from humans to animals, and future studies should take this into account. It should be understood that the germs that can be transmitted from healthy pets to humans do not pose a health risk to humans and that the appropriate vaccines and controls of the animal owner should be carried out by veterinarians. People should be taught how to care for their dogs in a healthy manner.

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