THE MICROBIOME, DYSBIOSIS AND THE ROLE OF PROBIOTICS IN TREATING DISEASE

Adapted from an article called Microbiome Results Argue for New View of Animals as Superorganisms, published in Science News, Dec. 28, 2013, by Tina Hesman Saey; and material from two veterinary journal articles from Clinician’s Brief, a popular veterinary medical journal.

We are not alone. Humans’ and animals’ vast inner and outer spaces teem with a menagerie of microbes that stand poised to alter conceptions of what and who we are.

Traditionally, microbes have been viewed as insidious invaders that make people and animals sick or as freeloaders in the gut. That view is changing. In 2013, scientists amassed substantial evidence that people and other animals form a unit with their resident bacteria, archaea, fungi and viruses – the collection of microbes known as the microbiome. In fact, only about 10 percent of a person’s cells are human; microbes make up the other 90 percent! An estimated 100 trillion microbial cells live in our gastrointestinal tracts and in those of animals.

Several new studies argue in favor of considering animals as superorganisms composed of host and microbes. Some scientists even advocate lumping a host organism’s genes with those of its microbes into one “hologenome.” Treating a host, such as the human body, and its resident bacteria as a unit – or at least as an ecosystem with intimately interconnected parts – offers various benefits, scientists say. The superorganism approach may help researchers better understand how diet, chemicals and other environmental factors affect health, for instance.

Everything and everyone, including identical twins, carries a slightly different microbial mix. Strong evidence indicates that some differences stem from diet or habitat but even mice raised under uniform lab conditions still have individualized microbiomes. In October 2014, two groups presented research suggesting that host genes play a role in selecting which microbes are allowed to settle in and on the body. Immune system genes may be especially important in screening suitable microbial companions. People with immune system problems have more types of bacteria and fungi on their skin. That finding supports the idea that the immune system grants visas to friendly microbes while keeping out dangerous intruders.

The complex ecosystem that exists in our bodies and in those of our pets has a tremendous influence on its host. A balanced microbiota regulates the immune system, helps defend against infections and provides nutritional benefits. Herbivorous mammals such as cows, horses and rabbits depend on large vats of bacteria to digest the plant material they eat to the point where it is usable. Hay contains about 20% protein but without bacteria in the rumen (in cows) or cecum (in horses and rabbits) to break down the hay into smaller digestible pieces, that protein would be completely unavailable to the host animal.

Complex carbohydrates, such as starch, cellulose and pectin, are fermented by bacteria, resulting in the production of short chain fatty acids (SCFAs). SCFAs provide energy to the host, regulate the motility of the intestines as food is digested, serve as growth regulators that maintain the health of the cells that line the intestinal tract and have anti-inflammatory properties. Because intestinal bacteria effect the immune system cells in the intestinal tract lining, they also effect the immune system as a whole. (There are far more immune system cells in the intestinal tract than anywhere else in the body.)
An alteration in the health of the intestinal microbiota is called dysbiosis. Anything that disrupts the health of the good bacteria living inside us or our pets can cause dysbiosis, and have adverse consequences that extend far beyond the intestines. Conversely, an improvement in the microbiome can strengthen the immune system as a whole.

The primary weapon we have to counteract dysbiosis and to improve the microbiome is to provide “good” bacteria to the gut. Live bacteria taken orally are called probiotics. A probiotic should consist of the right species and strains of bacteria, in sufficient quantity, and those bacteria must be able to survive passage through the stomach to reach the intestine still alive and able to reproduce. This is a tall order. As with many other supplements, most commercial probiotic products don’t actually do all these things and thus do not provide health benefits. Zero of nineteen pet foods claiming to contain probiotics actually did so in one study and another found that none contained the bacteria listed on the labels, though most did have some live bacteria.

A 2011 study showed that only two brands of probiotic supplements contained what was stated on the label. Those are the two brands of probiotic that we carry here at Best Friends, FortiFlora and Proviable. We also use a couple of human probiotic products. We are using these for dozens of different disease problems.

Probiotics are especially useful for preventing and treating diarrhea caused by the administration of antibiotics or from stress, such as boarding at a kennel. Diarrhea caused by bacterial and viral infections, food allergy, inflammatory bowel disease, exocrine pancreatic insufficiency (EPI), medication administration and dietary indiscretion (i.e. eating garbage) and food poisoning may be treated in part with probiotics. Diseases involving the immune system also may be treated with beneficial bacteria, the most common of these being chronic upper respiratory infections in cats.

The use of probiotics is still in its infancy. There is a lot we don’t know about how the microbiome functions and what species of bacteria in what amounts are the most effective to modify it. In humans, the microbiome has been found to be involved in many diseases, including diabetes, asthma, obesity, metabolic syndrome and cancer but we don’t yet understand what that means or how to use or adjust the microbiome as part of treatment.

We are also still learning about prebiotics, which are food ingredients that support the growth of good intestinal bacteria. Probiotics and prebiotics often work synergistically, so diets containing prebiotics are often combined with probiotic supplements to maximize their effects. Therapeutic diets sold specifically for gastrointestinal tract diseases, such as Hill’s I/D, Purina EN and intestinal diets made by Iams and Royal Canin, usually contain one or more prebiotics.

Don’t be surprised if we dispense probiotics for your pet the next time he or she has an intestinal or immune system disorder. They are a staple of many of our treatment protocols and can make a big difference in your pet’s health and recovery.