

WHAT'S NEW IN THE WONDERFUL WORLD OF THE MICROBIOME?

BY DR. NAN BOSS



I love TED talks. Every evening, while my elderly cat eats her dinner, and I am supervising to prevent my dog from eating it instead, I browse YouTube and find something interesting to watch. As likely as not, it's a TED talk. After listening to several interesting talks on the effects of nutrition and intestinal bacteria on brain function and mental health I purchased an audiobook called The Mind-Gut Connection. It's fascinating, albeit a bit disgusting here and there.

Did you know that bacteria invented most of the chemical messengers and neurotransmitters that our own bodies utilize? They don't always use these messengers in quite the way that mammals do but all the chemical signals that are the communication system for one-celled organisms send signals to our body systems as well. The bacteria in our intestines produce proteins and hormones almost identical to our own – including the neurotransmitter serotonin, which is a vital signal involved in emotion and mood; insulin, which affects the absorption of sugar by all of our cells; and gastrin, which is the chemical signal that tells us we are full and should stop eating.



Since the bacteria in and on our bodies outnumber our own cells ten to one, all these chemical messengers going back and forth between bacteria affect our own bodies – profoundly and immensely. The health of our microbiome affects brain development and aging, emotions, hunger and whether our bodies are storing or burning fat. All sorts of diseases are affected by what we eat and what microbes are living inside us, including Parkinson's disease, Alzheimer's disease, depression, autism, schizophrenia and many others.

Recent studies in humans and laboratory animals have shown that the microbial community inside the gut plays a central role in brain function and development. For example, "germ-free" mice, who are born by c-section and are raised in sterile environments, with no exposure to bacteria and no microbiome, do not have normal

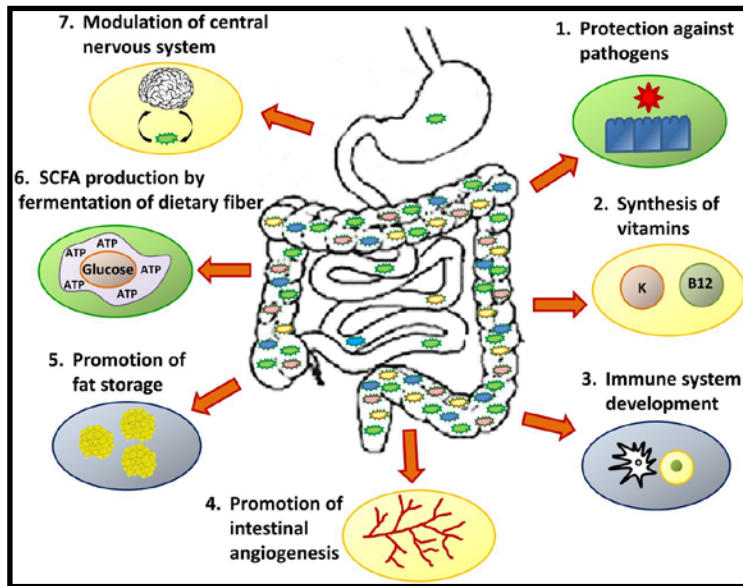
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brain development. The 'gut-brain axis' represents a multi-directional signaling system that encompasses neurological, immunological and hormonal pathways. Without these signals the brain functions differently.

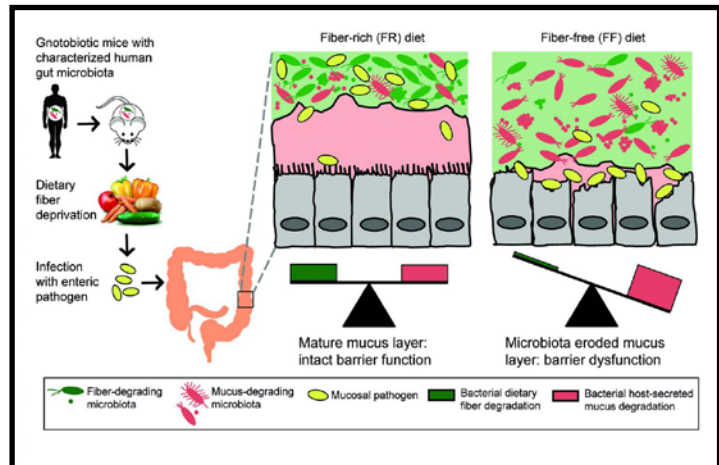


In particular, communication between the brain and the gut is tightly linked with the hypothalamic-pituitary-adrenal axis (HPA), a system that regulates stress hormone release and influences brain development and function. Experimental examination of the microbiome through manipulation of diet, infection, stress and exercise, suggests direct effects on learning and memory.

Many other body systems and functions are also influenced by gut bacteria. Mammals have more immune system cells patrolling the intestinal tract than in the rest of the immune system put together – blood, lymph nodes, bone marrow, etc. The immune system and the intestinal microbiome are in constant communication. Probiotics, which are healthy, “good” gut bacteria we introduce into our bodies via probiotic supplements, Kombucha, fermented foods, yoghurt, etc., are part of the treatment plans for more and more diseases. Upper respiratory infections, asthma, inflammatory bowel disease, all kinds of intestinal infections, allergies, chronic infections, mental illness, anxiety disorders and even arthritis pain are all problems for which probiotics might be prescribed.

Inflammatory Bowel Disease, IBD, is a disease we see frequently in cats and dogs. A great deal of research in humans shows clear evidence of the importance of soluble fiber in the diet and a healthy microbiome to the health of the intestinal lining.

Calming Care is a probiotic supplement made by Purina that has been clinically proven to reduce anxiety in about 2/3 of dogs who consume it. I am starting to think that we should be using probiotics for all dogs with behavioral abnormalities. We don't understand right now how a human's or an animal's individual, unique microbiome affects the brain and vice versa. We know that the gut-brain axis is important. We know that we do better eating a diet with more fiber and less sugar and other refined carbohydrates, in part because soluble fiber supports the growth of gut bacteria. For



now, until we have a more exact understanding of what, when and how influencing the microbiome can improve health, eating a healthy diet and supplementing with probiotics should be a blanket recommendation for everyone.

This is not as simple as it might seem. For one thing, you have no way of knowing from a pet food label how much soluble versus insoluble fiber is in the food. Insoluble fiber provides bulk to the stool but does not support healthy microbes like soluble fiber does. All you will see on a label is maximums and minimums of protein, fat and carbohydrate. Both types of fiber are part of the total carbohydrate amount. There are only a few pet food manufacturers that know and provide specific information on fiber content. Chances are good that whatever you are feeding your pets does not have an ideal amount of fiber.

Another problem is that most probiotics on the market do not contain what is stated on the label. When tested in independent laboratories, only two of about 30 different over-the-counter brands of probiotic supplements had live bacteria in the amounts stated on the label, and zero of 19 brands of dry pet food contained any live bacteria. The two brands of probiotic supplements that passed the testing were FortiFlora, made by Purina, and Provable.

Purina's research laboratory has been working on the development of probiotics for years, focused originally on the treatment of diarrhea, which is what FortiFlora is used for. In order to provide enough "colony-forming units" of bacteria to have effects beyond the intestine itself, higher numbers of bacteria are needed than are provided in FortiFlora.

Provable has increased the potency of its products recently, to keep up with newer research findings. A new probiotic called Visbiome is also a high-potency product. The other probiotic we have been using for years is a prescription human product called VSL#3. This last one has been our go-to probiotic for cat respiratory infections for years. It has recently been shown to be as effective as a combination of prednisone and metronidazole for treating IBD in dogs.

We have been modifying many of our medical protocols over the last few years to minimize our use of antibiotics. The more antibiotics, the less healthy the microbiome, and once damaged it can take months or years for normal intestinal bacteria to recover. This can have lasting effects on many body systems. If your pet has had diarrhea, you may have noticed we are trying to use less metronidazole, and a probiotic is almost always being used as part of our treatment now. Skin infections are another area where we are using more topical treatments, such as sprays and shampoos, and fewer antibiotics. We are shortening the length of treatment for urinary tract infections as well.

In summary, if your dog or cat has any sort of behavioral or anxiety disorder then Calming Care would be a good product to try, especially as it has none of the side effects sometimes seen from prescription medications. We also recommend pet foods that contain whole grains, beet pulp and/or chickory, which are all good sources of soluble fiber. Lastly, we will be minimizing antibiotic use when we can.