100 trillion residents, 1,000 different species, a battle of good versus evil... No, it’s not this year’s science fiction blockbuster; this is your inner ecosystem, the bacteria that reside in your body. And really, considering that bacteria in the human body outnumbers cells by about ten to one, it might be more accurate to say the body your bacteria let you share with them. That’s right, we have more bacteria in our bodies than cells. In fact, it’s fair to say we are bacteria. And while we’re all familiar with bacteria and gut health, did you know that the bacteria in our gut also influence immunity, brain health, joint health, and much more than we ever realized?[i][ii]

Probiotics manufacture vitamins K, B1, B2, B3, B5, B6, B12, and folic acid in our intestines and they help to increase the absorption of certain minerals.[iii] These friendly bacteria help to make our intestines, and other parts of the body such as the mouth and vaginal tract, inhospitable to bad bacteria, helping to protect us from infection and illness. They promote healthy digestion and can be used to treat most digestive issues, from diarrhea to constipation.[iv] In other words, there are plenty of reasons to promote their health and survival in the intestines. Over the last 100 years or so, that is where research has mostly stayed – in the intestines. But that is changing as new technology drives new research and our understanding of the bacteria that reside within us takes a turn into unchartered territory.

Turning Our Understanding of Probiotics Inside-Out
New research has linked an unhealthy balance of gut bacteria to a range of health conditions including: depression, obesity, diabetes, asthma, multiple sclerosis, atopic eczema, rheumatoid arthritis, lupus, and even fatty liver. So how is it possible that the bacteria that live mostly in our guts can have such wide-reaching effects? To find the answer we must start with the intimate connection between the gut and the brain, which share the same receptors and signals. Through lymphatic tissue in the gut and the vagus nerve, which connects the brain and the gut, information originating in the gut is transmitted to the brain and vice versa. This means that when the bacteria of the gut launch an immune response, that information is delivered to the brain and then systemically throughout the body.

Some psychiatrists are exploring this gut-brain connection to better understand mood disorders. It is known that when the gut releases molecules that signal infection, anxiety increases and people with depression tend to have altered levels of inflammatory markers.[v] Gut bacteria is thought to influence these two mood disorders by regulating the chemical messengers known as cytokines that are
responsible for our inflammatory and immune responses. Inflammatory cytokines initiated in the gut and sent to the brain can impact the ups and downs of mood. Additionally gut pathogens tend to thrive on tryptophan, so as a protective measure the body will block the release of this amino acid, thus starving the bacteria. But because tryptophan is a biochemical precursor to serotonin, there will be less of this feel-good neurotransmitter made. These two mechanisms combined create the perfect storm for mood disorders. Some believe that these cytokines can be positively altered by improving the bacteria in the intestines through probiotic supplementation, thus improving mood. The link between arthritis and probiotics is another interesting up-and-coming area of research. Using animal models, researchers were able to lower inflammatory cytokines and decrease cartilage and bone destruction with probiotics. Another study combined a probiotic with type II collagen and glucosamine and found that the combination decreased pro-inflammatory cytokines while it increased anti-inflammatory cytokines. The exact mechanism at work is still not fully understood, but it is quite possibly the combination of the immune-modulating effect of probiotics and the gut-brain connection.

So what else is going on in the gut that has such a far-reaching effect on the rest of the body? That is precisely what scientists are trying to find out. We know that a healthy community of bacteria in the intestines improves nutrient absorption and likewise, an unhealthy balance can inhibit absorption, so some of the wide-reaching effects may be due to an increase or decrease in nutrients delivered to the cells of the body. But there seems to be other reasons for the broad effect gut microbes have on the body. One of the major tools the immune system uses to fight invading pathogens is inflammation. The intestinal microbiota is so intricately connected to immune function, an imbalance of healthy bacteria may be driving inflammation throughout the body. It is widely accepted that low-grade chronic inflammation is a major underlying cause of nearly all degenerative diseases. In a healthy body there is a system of checks and balances to keep the inflammation in balance, but low-grade intestinal infection caused by an imbalance of healthy bacteria, can alter this ability and may lead to chronic inflammation.

Could you have a low-grade intestinal infection? Consider the things that disrupt the balance of good and bad bacteria in the gut: not being breastfed as an infant, antibiotic use, eating sugar and white flour, alcohol consumption, chemical exposure, and stress. Seems likely that all of us have at one point or another put our gut bacteria in jeopardy. Never fear though, the health of your inner ecosystem can be changed. Currently, probiotic research is extensive, looking at many different strains and types of these beneficial bacteria. It seems that for now, the best course of action is to add a high-quality, multi-strain probiotic supplement to your daily routine. You may also want to add additional probiotics from cultured and fermented foods, such as yogurt or kefir with active or live cultures, unpasteurized kimchi and sauerkraut, raw apple cider vinegar, miso, and kombucha. Try to ingest a variety of sources to get a variety of bacteria. And of course it is wise to limit or eliminate the things that damage the bacteria and put stress on our bodies in the first place. There are many health conditions that appear to improve when the intestinal microbiota is improved. In fact, one animal study found that overall longevity increased with probiotic supplementation, possibly due to a decrease in chronic low-grade inflammation. Yes, healthy gut bacteria will help with digestion, but that is really just the beginning. Our relationship with the bacteria in our bodies is more complex than we ever thought, and emerging science is proving that what we know about that relationship is just the beginning of our trek into that new frontier.
[i] The Power of Probiotics by Natasha Trenev
[ii] The Age of Immunobiotics, In Focus Newsletter, October 2009
[iii] Digestive Wellness by Elizabeth Lipski
[iv] Good Health Starts in the Gut, NGVC CLF
[v] A Novel Approach to treating Depression by Michael E. Ash, In Focus Newsletter, October 2009
[ix] Lactobacillus GG: A Potent Immune Regulator Effective in Many Disorders, In Focus Newsletter, October 2009