Dr. David Williams

For the Health Conscious Individual VOLUME 21 • No. 12 • DECEMBER 2018

Alternatives

Key Characteristics of Truly Powerful Probiotics

hen I first started this newsletter in 1985, I wasn't involved in the formulation of supplements. In fact, at that time, taking vitamins was something only "health nuts" did, and the selections were limited compared to today's options.



do this today.

However, I did evaluate and recommend some supplements. Whenever I found a product that I felt was safe and effective, I had no problem

no problem recommending it, detailing the research behind it, and explaining exactly how to use it. Nothing has changed in that respect, as I still

Likewise, in those early days (and still today), I spent a lot of time and effort searching the world to source bulk herbs, extracts, amino acids, and other natural compounds and nutrients. I have to admit that my initial efforts were focused on finding the best and most effective tools to improve my own health and wellbeing. In that sense, I've been the ultimate guinea pig. I also have a group of friends and family members who test out some of my finds.

In the beginning, the funds I received from my newsletter subscriptions allowed me to source and utilize the best ingredients and compounds available. Over time, more and more subscribers and personal friends and family members began to ask exactly what supplements I took, and they expressed their desire to take the same things. Not long after, I got the opportunity to actually formulate my own line of supplements.

This opportunity was wonderful for many reasons. First, I no longer had to spend hours mixing single batches of bulk ingredients just for my own use. The formulations could be made in large batches and everyone who wished to try them out could benefit. Second, as new discoveries, research, and technology became available, I was more easily able to modify, reformulate, and improve my products.

One of the best examples of this is probiotics, which have greatly evolved over the years.

I think I can safely say that I was one of the first people to talk extensively about the importance of beneficial bacteria in the colon and the profound effects they have on our health. More than 30 years ago, I devoted two entire newsletters to the topic. This was decades before probiotic supplements became popular, and not too long after the term "probiotic" was first coined (in 1965). My article was titled "The Key to Solving a Thousand Problems" and the information is just as relevant today as it was back then.

I am sharing this not to pat myself on the back, but rather to emphasize just how passionate I have been about the study of probiotics over the years. I have gone to great lengths to learn everything possible about this topic, and I still research and read about it every single day.

Changing Perceptions

Years ago when I discussed gut bacteria, the first thought most people expressed was concern, because bacteria were largely considered dangerous and diseasecausing. After all, the miracle of antibiotics is rooted in their ability to kill bacteria that cause illness.

It took a while for the medical community and general public to differentiate between beneficial and pathogenic bacteria, and to accept the notion that wholesale elimination of bacteria in the

body can suppress the immune system and open a Pandora's box when it comes to disease.

Fortunately, attitudes started to change when researchers discovered that the bacteria and other microbes in the intestinal tract are responsible for up to 80 percent of our immune health. Today, this is accepted as fact—but 30 years ago, it was hard to convince anyone.

Studies continue to regularly come out supporting the idea that practically every single aspect of our health and immunity is directly influenced by the microflora that reside in our body. Based on that research, I believe every single person should be consuming probiotic supplements and a variety of probiotic-rich fermented foods on a daily basis.

The Microbiome: More Than Bacteria

Also in the early years, the term "probiotics" referred only to various forms of bacteria. To a large degree, this is still the case.

However, research has progressed and we now understand that the microorganisms that inhabit a healthy gut take on many forms. We refer to this community of organisms as the "microbiome." A healthy microbiome includes not only numerous types of bacteria, but also fungi, viruses, yeasts, and archaea.

Much like the misconception that all bacteria are diseasecausing, many people still feel that all viruses, yeasts, and other microorganisms are harmful. But it's important to remember that the microbiome describes an overall environment—not just independent organisms. If we want to achieve and maintain optimal health, a healthy balance of all these inhabitants is required. When that balance is disrupted, significant health consequences can result.

We've started to experience some of these consequences such as antibiotic-resistant superbugs that have arisen from the improper use of antibiotics. However, we still don't have enough knowledge to understand the long-term damage that can occur from the widespread use of other drugs, as well as daily exposure to various chemicals and environmental pollutants. Antibiotic resistance is likely just the tip of the iceberg.

Disruption of the microbiome has now been linked to allergies, autoimmune diseases, obesity, depression, diabetes, atherosclerosis, heart disease, nonalcoholic fatty liver disease, and even cancer. Additionally, it is considered one of the most important contributing factors in the development of gastrointestinal conditions, including inflammatory bowel disease, irritable bowel syndrome (IBS), chronic constipation, diarrhea, and colorectal cancer.

Research shows that nourishing and caring for your gut microbiome is essential for restoring your health and preventing disease. This is accomplished by following a diet that not only contains a wide variety of beneficial "bugs," but also the nutrients and other compounds that allow them to multiply and flourish.

If modern science actually realizes that bodies have the innate ability to restore and maintain health when supplied with the right environment and raw materials, we may have finally reached a turning point.

How to Achieve a Healthy Microbiome

The healthiest people have the greatest diversity of intestinal bacteria and other microorganisms. That's why a quality probiotic supplement is the foundation to good health.

In a perfect world, we wouldn't need supplements. We would get everything our bodies required from our diet. But realistically,

Alternatives。 Author: Dr. David Williams; Editor: Larissa Long

ISSN# 0893-5025. Published monthly for \$69.99/yr. by Mountain Home Publishing at 6710-A Rockledge Dr. Ste. 500, Bethesda, MD 20817. Editorial Office: 6710-A Rockledge Dr. Ste. 500, Bethesda, MD 20817. Periodicals postage paid at Bethesda, MD, and at additional mailing offices. Postmaster: Send address changes to *Alternatives*, PO Box 11, Montoursville, PA 17754. © Healthy Directions, LLC. All rights reserved. Photocopying or reproduction is strictly prohibited without permission from the publisher.

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Dr. Williams works with Healthy Directions, LLC, to develop his unique formulations that supply many of the hard-to-find nutrients he recommends. Dr. Williams is compensated on the sales of these nutritional supplements and health products, which allows him to continue devoting his life to worldwide research and the development of innovative, effective health solutions.

that's no longer possible for many reasons.

For one, the water most of us drink has been treated with chlorine to destroy pathogens—but the chlorine also kills beneficial microorganisms. The other things we drink are often pasteurized for the same reason, or to increase shelf life.

Most of us don't eat directly from a garden anymore. Even if you do, many vegetables straight out of the garden have been chemically treated, altering naturally occurring organisms.

Additionally, the large majority of our population takes one or more drugs on a regular basis. I suspect that every medication influences the microbiome to some degree. As I stated earlier, this is an area of study that has just begun, and if it's up to the drug companies, most of this research will never see the light of day because it wouldn't be positive.

Unless you live in the wild, drink pure rainwater, have a diet that consists primarily of raw, uncontaminated plants and game meats, regularly consume a wide variety of fermented foods, don't take any medications, have no stress, sleep perfectly, and have an in-sync circadian rhythm, I'm convinced that a quality probiotic supplement should be part of your daily routine.

Delivery Method Is Important

When it comes to probiotics, don't get too hung up on the bacteria count listed on the label. Some would have you believe that the higher the number, the better the product. That's not true. The numbers on a label are a very small part of the story. In the right environment (such as the moist, warm gut), bacteria and other microorganisms multiply exponentially in just a few hours. Even small numbers of bacteria will reproduce extremely fast.

For this to happen, though, the product has to have an efficient encapsulation method to protect the bacteria from the harsh journey it takes the second you swallow the pill. The right encapsulation allows the microorganisms to actually reach the lower intestine without dying along the way.

Over the years, I've tested and evaluated many forms of technology used to make probiotic supplements. Early on, I worked with the bottling department of an Australian beer brewer trying to develop a way to package a live probiotic drink.

After a year or so, that experiment came to an abrupt end. As the living bacteria fed, they produced gas continuously. As the pressure built, the caps exploded off the bottles, creating a neverending mess. The experiment was a disappointment, but having a steady supply of free beer helped me deal with the failure.

Eventually, my journey led me to a Japanese company that had the technology to encapsulate into a tiny sphere a limited number of probiotic strains, along with the food those bugs needed to survive.

This worked for a while, until I wanted to include more strains of bacteria in the product. Don't get me wrong, the technology was, and is, great. It just had limitations. Since the goal is to deliver live, viable organisms to the lower intestine, the bacteria have to be encapsulated in such a manner that they survive various pHs of their journey through the gut. The bacteria strains also need to be compatible and work synergistically once released into the gut. The pill also has to provide food to sustain the organisms throughout their shelf life and journey.

You also have to account for external factors like oxygen, temperature variations, and exposure to moisture, which can either destroy the microorganisms or allow them to be prematurely activated and released before they reach the lower intestine.

And if that wasn't enough, the encapsulation must also allow the bacteria to survive both the extreme acidity of the stomach and the alkalinity of pancreatic enzymes.

Very few products and delivery methods fully achieve these goals. I'm sure that's why many people never truly experience the enormous benefits that can come from taking a probiotic supplement. But formulating a product using protective DRcaps may come close.

DRcaps is a specialized plantbased, vegetarian capsule. It is one of the very best and latest technologies when it comes to encapsulation and delivery of beneficial microbes.

Detailed human clinical studies were performed in Glasgow, Scotland, showing just how effectively this product performs. While regular capsules begin to release their contents within five minutes, disintegration of DRcaps

starts at around the 45-minute mark, and complete release of the contents occurs within 20 minutes afterward.

Call me a probiotic nerd, but I see this as an exciting breakthrough that allows us to take advantage of the latest findings in microbiome and probiotic research. Advanced delivery technology supplies the necessary foundation for developing an advanced probiotic.

Bacteria Strains You Should Be Taking

Research shows there are specific families and species of bacteria that can help form an optimal microbiome environment. The first are lactic acidproducing probiotics. (Lactic acid is the byproduct of fermentation.) These native *Lactobacilli* bacteria mainly cover and support parts of the small intestine and upper parts of the large intestine (colon). The following are the strains of *Lactobacilli* to look for in a probiotic supplement, and why.

Lactobacillus acidophilus

L. acidophilus is the bedrock of any probiotic supplement. It is one of the most researched and wellknown organisms, widely used for decades in commercial yogurts and other dairy products.

Not only does it improve the health of the entire gastrointestinal tract, research has shown it can prevent cardiovascular disease, heal gastric ulcers, reduce bowel inflammation, restore the microbiome after antibiotic use, reverse diarrhea and constipation, improve liver function, boost immunity, mitigate allergies, help with arthritic conditions, clear up vaginal and urinary tract infections, and fight cancer.

L. acidophilus is also essential in maintaining the wall of the small intestine. Integrity of the small intestine is paramount to ensure the proper absorption of nutrients.

Lactobacillus rhamnosus GG

L. rhamnosus GG is undoubtedly another one of the most widely used probiotic strains. It has the backing of 30-plus years of research and more than 1,000 clinical studies detailing its health benefits.

It was originally isolated from fecal samples of healthy adults by Barry Goldwin and Sherwood Gorbach (which explains the letters GG) in 1983. You may have heard of the probiotic product Culturelle. This supplement has only one ingredient—*L. rhamnosus GG.*

L. rhamnosus GG has a strong resistance to both stomach acid and bile, which makes it a very hardy organism that can survive passage through the gastrointestinal tract much better than others. It also easily adheres to the outer layer of the intestine.

It has been effective in treating diarrhea in both children and adults. It can help reduce the risk of turista or traveler's diarrhea (affectionately referred to by those of us in Texas who have experienced the problem after visiting Mexico, "Montezuma's Revenge").

This probiotic strain can be a godsend to women and men alike. Research has shown that in women, it helps decrease vaginal infections and improves vaginal health. In both women and men, it helps maintain overall bacterial balance throughout the urinary tract, protecting against urinary tract infections.

Animal studies have shown it can help restore proper liver function and protect against both alcoholic and nonalcoholic liver damage. It can also help combat obesity and reduce fat mass in women.

Finally, *L. rhamnosus GG* can be beneficial for people with milk allergies. It lessens intestinal permeability and diminishes inflammatory responses.

Lactobacillus plantarum

L. plantarum produces by hydrogen peroxide—one of the primary tools the immune system uses to destroy pathogenic bacteria. These could be harmful bacteria in food or water that leads to food poisoning. Or they might be bad bacteria that gain enough of a foothold in the colon to trigger acute or chronic inflammatory bowel disease. *L. plantarum* helps destroy both.

Hydrogen peroxide-producing bacteria have also been directly linked to decreased rates of HIV after exposure to the virus, preterm births, and bacterial vaginal infections. (*Sex Transm Dis 2015 Jul;42(7):358–63*)

Furthermore, *L. plantarum* produces bacteriocins—antimicrobial proteins that work like natural antibiotics—and other compounds that inhibit or kill pathogenic bacteria and fungi.

Bifidobacterium lactis HN019

Bifidobacterium should also be included in a quality probiotic. Unlike *Lactobacilli*, which

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provide coverage in the small intestine, *Bifidobacterium* primarily provides coverage in the large intestine.

B. lactis HN019 is an important strain that can have a profound effect on modulating the immune system. It improves overall intestinal health by working to stabilize and balance bacteria in the gut. It also reduces all types of gastrointestinal symptoms, normalizes stool transit time, and has been shown to correct both diarrhea and constipation, while not adversely affecting those with normal bowel function. (*Nutr J 2014 Jul 24;13:75*) (*Gut Microbes 2018;9(3):236–51*)

Additionally, *B. lactis HN019* has been shown to protect the body from various infections and reduce the severity of others.

A quality probiotic isn't just for correcting existing health issues. Granted, it can do that very well. However, I believe one of the greatest attributes of a probiotic supplement is its ability to prevent disease.

Along with all the abovementioned benefits, one of the reasons I really like this particular strain is that it has demonstrated the potential to prevent many of the metabolic disorders that are now so widespread. Some of the most common ones we face today include obesity, thyroid dysfunction, and diabetes. Unaddressed, each of these can eventually lead to inflammation, cardiovascular disease, and cancer.

Metabolic syndrome is typically characterized by symptoms like increased weight or waist circumference (having a "beer gut"), elevated blood sugar, cholesterol levels, and blood pressure, chronic fatigue, inflammatory joint problems, blurred vision, and increased thirst and urination.

If someone exhibits at least three of these classic symptoms, they are considered to have metabolic syndrome.

Researchers have found that taking *B. lactis HN019* can significantly reduce body mass index, total cholesterol (more significantly, low-density lipoprotein or LDL) tumor necrosis factor, oxidative stress, and pro-inflammatory compounds. It has also been shown to improve carbohydrate metabolism, natural killer cell function, and overall cellular immunity, particularly in older adults. (<u>Nutrition 2016</u> Jun;32(6):716–9) (Br J Nutr 2018 Sep;120(6):645–52)

As such, *B. lactis HN019* on its own has the potential to reduce obesity, harmful blood fats, and inflammation. Making these changes significantly reduces the risk of cancer, cardiovascular disease, diabetes, arthritis, thyroid disease, and premature death.

Bifidobacterium longum

B. longum is another probiotic that produces bacteriocins, which are essential to a strong immune system as we get older. Its strong influence on immunity, however, is just one of the reasons I consider it so important.

B. longum facilitates in the breakdown and digestion of carbohydrates. This is a huge bonus considering one-third of our population currently has diabetes. I guess you could say that "longum" correlates with "long life," in many ways, since this probiotic also exhibits a high level of antioxidant capability, latching onto harmful free radicals associated with heart disease, dementia, and accelerated aging.

Bifidobacterium bifidum

B. bifidum is considered one of the more dominant key members of the gut microbiome. This becomes most obvious in the first year or two of life. *B. bifidum* is the second most prominent species found in breastfed infants. (*B. breve* is first and *B. longum* is third.)

B. bifidum has remarkable physiological and genetic features. It plays a crucial role early in life, particularly in the evolution and maturation of the immune system.

B. bifidum is better able to survive the gastrointestinal challenges of acid and bile than many other species of bacteria. And after it reaches the intestines, it has superior adhesion properties and helps inhibit the attachment and growth of pathogenic forms of bacteria.

Consuming probiotics that can adhere to the intestinal walls is crucial when it comes to avoiding food-borne illnesses. Foodborne illness occurs when one consumes food contaminated with pathogenic organisms like Salmonella, Shigella, Escherichia coli, or Listeria.

Our intestinal mucus and epithelial cells, which line and protect the integrity of the intestinal walls, are particularly susceptible to the attachment of these dangerous microorganisms, resulting

in their active proliferation and colonization.

The beneficial probiotics in the gut naturally compete for these attachment sites and prevent pathogens from attaching. Differences in probiotic concentrations help explain why some people fall victim to food poisoning while others who consume the same contaminated products experience no issues.

B. bifidum also has been shown to suppress the expression of various virulent genes in two of the most common forms of bacteria that cause food poisoning—*Salmonella typhimurium* and *E. coli*.

Unfortunately, while the concentration of *B. bifidum* is high in the early years of life, it decreases significantly as we age. This is one reason food poisoning can be lethal in the elderly. Increasing levels of *B. bifidum* by taking a probiotic supplement that contains it can help provide protection from this.

Drinking the fermented drink kefir is another way. Kefir is actually one of the best natural sources of *B. bifidum*.

Beyond Bacteria

As I explained earlier, the microbiome is a community that contains more than just bacteria. Research indicates part of this mix consists of, and is dependent upon, beneficial yeast, fungi, and other compounds.

With new delivery technology like DRcaps, it's now possible to incorporate these additional probiotic organisms into supplements. There are two specific yeast-based probiotics that help balance the microbiome...

Saccharomyces boulardii

S. boulardii is more accurately a type of fungus. It has been utilized for some time to treat and prevent gastrointestinal disorders. In Europe, S. boulardii is actually registered as a pharmaceutical treatment for several types of intestinal diseases.

The research is compelling. Here's a short list of what it has been shown to do:

- Inhibits the growth of pathogenic bacteria and parasites
- Reduces the translocation of pathogens
- Makes pathogenic bacteria less virulent
- Interferes with pathogenic colonization in the gut
- Blocks the effects of toxins (even the toxin associated with cholera)
- Destroys the toxins produced by pathogenic *E. coli*
- Stimulates the production of antibodies (the body's natural antibiotics)
- Produces protein enzymes that destroy pathogenic bacteria and their toxins, rendering them inactive (particularly *Clostridium difficile*)

When given to patients with diarrhea who had previously taken antibiotics, *S. boulardii* allows the normal microbiome to reestablish rapidly. This is a really important attribute in today's world, where we all have a high risk of exposure to antibiotics in our food and water supply.

Many times in the past, I've discussed studies that have shown that a single round of antibiotics can disrupt the microbiome for a year or longer. During this period, the immune system is compromised, which makes you more susceptible to infections, free radical damage, nutritional deficiencies, and possibly the development of more serious diseases. (*Therap Adv Gastroenterol* 2012 Mar;5(2):111–25) (*Clin Exp Gastroenterol* 2015 Aug 14;8:237–55)

Saccharomyces cerevisiae CNCM I-3856

S. cerevisiae CNCM I-3856 is a proprietary, patented strain of probiotic yeast. It is related to brewer's or baker's yeast, which has been instrumental in brewing, baking, and winemaking since ancient times.

In the early days, brewer's yeast was utilized by those in the health field as a protein supplement, energy booster, immune system enhancer, and source of vitamin B. You may recall an article I wrote years ago about a product called EpiCor, which is made by fermentation using yeast. When taken on a regular basis, even very small amounts of EpiCor were shown to prevent colds and flu.

Specific strains of this yeast have now been shown to have other unique health-promoting properties. This proprietary strain of *S. cerevisiae* comes from France. It is unusual in several ways and has been patented based on these distinctive properties. For one, it has excellent stability since its pelletlike shape consists of a natural outside shell of inactivated yeast, which surrounds the active yeast component inside. (*Pharm Res* 2012 Jun;29(6):1444–53)

Numerous large-scale human studies have demonstrated its

DECEMBER 2018

safety and effectiveness as a solution for abdominal pain, bloating, and discomfort associated with intestinal disorders, particularly IBS. (*World J Gastroenterol 2017 Jan 14;23(2):336–44*) (*Dig Liver Dis 2015 Feb;47(2):119–24*)

One of the challenges with IBS and other inflammatory bowel diseases is finding a way to overcome the discomfort. And this is just one of the benefits of this particular strain of *S. cerevisiae*. In study surveys, 96 percent of 1,161 individuals suffering from abdominal discomfort reported significant improvement in gut comfort after just 15 days of use.

The alleviation of IBS symptoms is only one of the many health benefits this probiotic yeast provides. It works in conjunction with the other probiotic organisms I've been discussing to promote the overall diversity and health of the gut microbiome.

Soil-Based Organisms

New research has led to a new subcategory of bacterial probiotics called soil-based organisms (SBOs).

SBOs are much like seeds. Their spore structure preserves the bacteria in a dormant stage and protects it against both the terrestrial environment and the harsh acidic environment of the stomach and alkalinity of the upper intestines.

And just like seeds, once SBOs reach the warm and moist environment of the lower intestines, they germinate and emerge from dormancy.

These two characteristics (resistance to the outside environment and the harsh areas of the gastrointestinal tract) differentiate SBOs from other probiotics. They don't require special coatings or delivery systems to reach the large intestine, where they can be effective.

As the name suggests, these bacteria are soil-based. Bacteria are present on practically every surface on Earth, from the tops of volcanoes to the deepest ocean trenches and into the Earth's mantle. Soil in the pre-agricultural, pre-pesticide, pre-herbicide era was teeming with these microbes.

As hunters/gatherers, our ancestors were exposed to these forms of bacteria and naturally consumed these microorganisms on a daily basis. They readily became part of their healthy microbiome. Modern farming and food preservation/sterilization practices have destroyed our contact with this natural ecosystem and, as a result, our health has suffered.

Studies have shown that playing outside and getting dirty stimulates and strengthens the immune system. Our obsession with destroying germs and the general over-sterilization of our environment has compromised the immune systems of several generations.

The explosion in the incidence of asthma, food and pollen allergies and sensitivities, and bowel disease are just some of the more obvious consequences that our germaphobic society is experiencing.

Although some farming practices are beginning to change and the soil is being allowed to rebuild, I'm not sure these health-giving organisms will ever be able to flourish in our food supply again. Like depleted soil minerals, SBOs need to be supplemented to ensure they are available. That's why I now believe specific *Bacillus* bacteria, like those found in traditional foods and ancestral diets, should be part of quality probiotic program.

The three forms I now recommend, based on the latest research, are *Bacillus clausii*, *Bacillus subtilis (DE111)*, and *Bacillus coagulans* (LactoSpore).

In case you're wondering, commercial soil-based organisms are not harvested from the soil. Instead, to ensure their safety, and in order to isolate and concentrate specific beneficial strains, they are produced in controlled environments.

In Conclusion...

Each of the probiotic organisms I've discussed in this newsletter issue exhibit a combination of unique mechanisms to influence our health and protect us from pathogens:

- 1. By flourishing and competing with harmful bacteria for nutrients, they exert a greater presence in the overall microbiome. They crowd out harmful bacteria, yeasts, fungi, and other pathogens, helping to keep them in check. (*Adv Food Nutr Res 2009;56:1–15*)
- 2. Probiotic bacteria produce hydrogen peroxide, bacteriocins, organic acids, fatty acids, and other compounds that destroy or inhibit the proliferation of pathogenic bacteria.
- 3. Some probiotic bacteria absorb toxic molecules produced by food-borne bacteria—like those

that cause dysentery, traveler's diarrhea, and cholera—and prevent them from acting on the host.

- Probiotic bacteria and yeasts down-regulate the expression of virulence-associated genes in pathogens. In simple terms, they can keep pathogens from becoming more destructive and dangerous. (<u>Appl Environ Microbiol</u> 2007 Jul;73(13):4259–67) (<u>Virulence 2018;9(1):954–66</u>)
- They can also stimulate or modulate the immune system. (<u>Immunol Cell Biol 2000</u> <u>Feb;78(1):67–73</u>)
- 6. Probiotic bacteria also can strengthen and enhance the barrier function of the intestinal walls. Pathogens adhere to the mucosal layer of the epithelial cell surface of the intestinal wall. This is the mechanism used by pathogens to colonize and eventually invade the tissues, leading to leaky gut syndrome. Probiotics can help prevent and reverse this adhesion and the subsequent invasion, which eventually leads to the flood of toxins that enter the bloodstream and spread disease and wreak havoc throughout the body. (J Appl Microbiol 2008 Apr;104(4):1082–91) (Curr <u>Nutr Food Sci 2013 May</u> 1;9(2):99-107

The latest research has clearly revealed that the various microorganisms that inhabit our environment and bodies determine our health and survival. This entire field of study is constantly changing and evolving. It is an area that that I find fascinating, to say the very least.

These microorganisms are instrumental in our health, beginning at birth and throughout our entire life. In large part, they can determine the positive or negative effects we experience from the foods we eat, the supplements we take, the drugs we ingest, the toxins to which we are exposed, and so on.

The most exciting aspect of these findings is we're learning that, through developing and nourishing the proper microbiome environment, we have more control over our health than was ever thought possible.

This is why I will continue to follow the latest research and explain how it can be used to restore, improve, and maintain your health. I hope you stick with me throughout the journey, and I want to thank you for all your continuing support.

In closing, I would like to wish you a very happy holiday season. May 2019 bring you the best in health, happiness, and prosperity. (Remember, taking a probiotic every day can help you achieve at least one of those! If you are still looking for a New Year's resolution, and you don't yet take a probiotic supplement, then there's your resolution for 2019!)

Until next month,

Dr. David Will

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DECEMBER 2018