Biotic Blast

Helps Maintain a Healthy Digestive System◊

The past decade has seen a virtual explosion in research and new scientific understanding of the human microbiome. This term refers to the multitude of microscopic nonhuman cells that live within and throughout the human body and that are approximately equal in number to human cells (though until recently had been estimated to outnumber human cells by 10- to 100-fold). They contain about 10-fold the number of genes as our total number of human cells. The best-known parts of the human microbiome are the bacterial species, especially those that inhabit the large intestine, which is the largest concentration of them in the body (making up about 50% of the material that is eliminated by the large intestine). However, it is now understood that there are normal inhabitants of this microbiome that are made up of fungi (the "mycobiome"), viruses (the "virome"), and even the evolving understanding of protozoa and helminthic (worm) "citizens" of the microbiome, now being referred to as the "parasitome." Such parasites, when present in normal levels, have been shown to help the immune system be more tolerant and nonreactive to such things as pollens, or tissues of "self," thus decreasing allergic and autoimmune problems.

The modern lifestyles of Western countries, such as the adoption of highly hygienic habits, the extensive use of antimicrobial drugs—both therapeutic and those used in producing animal-based foods—as well as increasing globalization have dramatically altered the composition of the gut milieu. Beyond even the gut, it is now being realized that virtually all parts of the body that were previously believed to be maintained in a "sterile" condition simply because our ability to culture and grow organisms from body fluids and tissues is quite limited (only a small percentage of the organisms in the gut can actually be cultured—the rest are only known by studying their DNA with highly sensitive biochemical techniques).

Thus, we now know that there is a microbiome of the healthy urinary tract (when we can culture organisms from the urine, this indicates infection) and microbiomes of the heart, liver, kidneys, lungs, blood, and even brain! These discoveries rival in importance the discoveries over the past several hundred years, beginning with the invention of the microscope and the subsequent birth of fields such as microbiology, virology, mycology, and parasitology.

Studies of the few remaining indigenous cultures in the world, where people are still living the same way their ancestors have for thousands of years, have shown that the diversity of the microbiome of people living in close harmony with the earth is much greater than the microbiome of people living in the developed world. We have lost on average about 40%–50% of the diversity of our microbiome simply by growing up and living in the "civilized" world. Although excess parasite burden, infections, and trauma are significant health problems in such indigenous communities, the "modern" noninfectious diseases such as autoimmune diseases, high blood pressure and cardiovascular disease, obesity, diverticular disease of the colon, dementia, and cancer are extremely rare or nonexistent in such indigenous people, and those who survive infancy and don't die from trauma and/or infections associated with trauma live into old age with very few disabilities.

The human microbiome is passed from mother to child in the normal birthing process, as the child takes in secretions from the birth canal. Even when delivered breech (head last instead of first), these secretions are absorbed. When babies are delivered surgically (by Cesarean section), this normal passage of the microbiome from mother to infant is bypassed. Only recently are some hospitals beginning to take steps to introduce the maternal microbiome to the baby postdelivery. After the initial inoculation of the baby's gastrointestinal tract with the birth-acquired maternal microbiome, breastfeeding continues to build the infant's microbiome. Children who are born by Cesarean section and then are not breastfed begin life with a significant deficit in their microbiome. Children who are born by natural birth and have been breastfed begin life with a microbiome, 80% of which consists of Bifidobacterium bifidum. In the course of life, this proportion decreases as new microbiota are acquired from food, soil, air, water—from virtually anything that passes through the GI tract, into the lungs, or into and onto any body surface or body cavity. By the age of 2, the microbiome is already quite similar to that of adult humans in numbers and diversity.

Recent science has documented that the human microbiome is amazingly interactive with metabolism and epigenetics—the process that determines which genes are expressed (turned on) and which are not (turned off). This is a highly dynamic process, and it is estimated that approximately 80% of health outcomes are epigenetically determined and about 20% are genetically determined (by the genes inherited from both parents). Some people inherit a gene that can cause devastating disease if activated and can be spared from that disease ever manifesting if they never activate that gene. Epigenetics is truly powerful, and a major portion of it is under our control, based on what we eat and how we live. One of the major epigenetic mechanisms is related to substances called small interfering RNA (siRNA), which circulate in our blood, enter our cells, and deactivate certain genes. It has recently been shown that as much as 40% of siRNA come from our microbiome rather than from our own human cells!

It was discovered that the average civilized human microbiome contains about 10,000 species of bacteria (not counting fungi, viruses, helminths, and protozoa). People living in "primitive" societies typically have 15,000 or more species, thus representing a decrease in microbiome diversity in civilized microbiomes by as much as 50%.

Given the observation of increased microbiome diversity associated with greater levels of health and resilience, it has been hypothesized that developed countries' peoples' consistently reduced gut microbial diversities may account for higher chronic disease rates relative to those seen in developing countries and primitive societies, which has been termed the "disappearing microbiome hypothesis." This loss of diversity may be linked to a low-fiber, high-fat, high-refined sugars diet. Humanized mice on such a diet exhibit depletion in microbial diversity, and though this is recoverable within a generation by returning to a high-fiber diet, it becomes fixed after four generations and no longer recovers despite dietary change. Once established, dietary change has profound and rapid effects on the microbiome.

The term "probiotics" is used to describe specific bacteria, some of which are native to the microbiome (such as Bifidobacteria) and some of which are acquired from food and environmental sources and persist only as long as ingestion continues, such as many Lactobacillus species. Throughout the course of human history, people have discovered that certain foods, if fermented by exposing them to certain things, and maintaining certain conditions of temperature and humidity result in a preserved form of that food, which maintains its nutritional value far longer than the same food that has not been fermented. Gradually, people developed "starter cultures," which they passed on from batch to batch, making such fermented foods as yogurt or kefir from milk, beer, or wine, or sourdough bread from ground grains. Over 100 years ago, the Russian scientist and Nobel laureate Elie Metchnikoff theorized that the long-term intake of fermented milk by Russian peasants in certain areas was related to the very long lives with good functional abilities at 100 and beyond that he observed. Many of Metchnikoff's theories presaged our modern discoveries regarding the role of the human microbiome in health and disease, as well as the role of diet, probiotics, and the microbiome. The past 50 years have also seen a burgeoning global industry around the production of fermented milk products (though many such commercial products are very high in refined sugars), as well as probiotic products of many sorts.

When it was learned from advanced genomic analysis that the human microbiome consists of over 10,000 different species of bacteria (though we can culture and grow almost 500 of them with currently available laboratory techniques), many people began to question the value of probiotics, as there are less than 30 distinct commercially available probiotic strains. How could bacterial species that number in the dozens influence the activity of a microbiome made up of many thousands of species?

Since that time, research has begun to show that the class of bacteria called probiotics has unique abilities to interact with, coordinate, and regulate the microbiome, even those that may not be natively present within it and may not persist when intake of that species is discontinued. The relationship between certain probiotics and mood has led to the coining of the term "psychobiotics," and research on what is now termed the "gut-brain axis" is

beginning to show the mechanisms by which bacteria in the gut can influence mood, mind, memory, and behavior. Besides producing certain vitamins, including folate, B-12, biotin, and several other B vitamins, a number of probiotic bacteria actually produce human neurotransmitters, such as serotonin and dopamine. Probiotics act as influencers and modulators of the microbiome. They produce short-chain fatty acids, which are used by the intestinal cells themselves as fuel, and they can help maintain healthy intestinal permeability in the face of many of the factors that contribute to increased intestinal permeability, such as food residues of glyphosate (the most widely used herbicide in the world); antibiotic residues in commercially raised meat, poultry, and many farmed fish; medications such as aspirin and nonsteroidal anti-inflammatory drugs; and even emotional stress. Many probiotics have been shown to support multiple healthy functions of the immune system, including stimulating immune cells to make Immunoglobulin A, the first line of defense for most membranes in the body, and supporting Natural Killer cell production and stimulation and both cellular and humoral mediated immune functions, which are the two major components of the immune response.◊

Biotic Blast delivers its probiotic organisms in a patented capsule (produced and patented by CapsuGel) that is designed to release its contents in the lower small intestine (ilium), or first part of the large intestine (cecum). This protects them from stomach acid and bile as they pass through the stomach and upper small intestineand delivers them to the lower area of the intestine which contains the bulk of the intestinal microbiome."

In short, probiotics, in concert with a whole-food, high-fiber, low-sugar diet and a physically active lifestyle, may significantly contribute to building and maintaining a healthy ecosystem in the body.◊

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Supplement Facts

Serving size 2 Capsules
Servings per container 30

Amount Per Serving			% Daily Value
Calcium	120 mg		9 %
Stabilized Probiotic Blend	550 mg	10 Billion CFU	*
Lactobacillus acidophilus	4 mg	715 Million CFU	*
Lactobacillus brevis	2.5 mg	715 Million CFU	*
Lactobacillus bulgaricus	12.5 mg	715 Million CFU	*
Lactobacillus casei	2.8 mg	715 Million CFU	*
Lactobacillus plantarum	2.1 mg	715 Million CFU	*
Lactobacillus rhamnosus	2.5 mg	715 Million CFU	*
Lactobacillus salivarius	2 mg	715 Million CFU	*
Lactobacillus lactis	0.75 mg	715 Million CFU	*
Bifidobacterium bifidum	3 mg	715 Million CFU	*
Bifidobacterium breve	1.5 mg	715 Million CFU	*
Bifidobacterium lactis	1.4 mg	715 Million CFU	*
Bifidobacterium longum	3.9 mg	715 Million CFU	*
Streptococcus thermophilus	1.5 mg	715 Million CFU	*
Bacillus coagulans	79 mg	715 Million CFU	*

*Daily Value not established. CFU – Colony-Forming Units

INGREDIENTS: Stabilized Probiotic Blend (consisting of 715 million beneficial CFU each of Lactobacillus acidophilus, Lactobacillus brevis, Lactobacillus bulgaricus, Lactobacillus casei, Lactobacillus plantarum, Lactobacillus rhamnosus, Lactobacillus salivarius, Lactococcus lactis, Bifidobacterium bifidum, Bifidobacterium breve, Bifidobacterium lactis, Bifidobacterium longum, Streptococcus thermophilus, Bacillus coagulans), Calcium Carbonate, Capsule Shell (Hydroxypropyl Methylcellulose, Gellan Gum), and Magnesium Stearate.

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As with all supplements, please consult your physician prior to taking if you are pregnant or attempting to become pregnant, breast-feeding, under a doctor's care or taking prescription medication.

This product is processed in the same facility as products containing fish, shellfish, soy and dairy.

Not tested on animals.

Suitable for Vegetarians.

DIRECTIONS: 2 capsules once per day with 8-12 oz (240-360 ml) of water or your favorite beverage.

◊These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

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