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Your Gut Bacteria – Probiotics – Play a Major Role in Maintaining Your Health

Back in 1990, Gerhard Pulverer, MD, of the University of Cologne, Germany, discovered that some species of intestinal bacteria secrete protein-like substances that enhance our immunity. He also found that taking antibiotics, while sometimes lifesaving, destroys gut bacteria and reduces our native ability to fight infections.

Our digestive tracts contain 10 times as many bacteria as all the cells in our body. (Try to do the math: 70 trillion cells multiplied by 10.) We know that our gut bacteria can help protect against diarrhea and gut and vaginal infections. But the latest research suggests that these good bacteria may do far more.

In one recent study, Thomas R. Abrahamsson, MD, PhD, of Linköping University, Sweden, and his colleagues analyzed bacteria in the stools of 40 infants. Half the babies had signs of allergies – eczema and immunoglobulin E (IgE) antibodies – while the other babies did not. The nonallergic infants had a greater diversity of gut bacteria species, suggesting that a healthy mix of bacteria might reduce the odds of developing allergies.

A healthy population of gut bacteria might also reduce the risk of autoimmune diseases, such as inflammatory bowel disease and rheumatoid arthritis, along with allergies, according to another recent report. Kenya Honda, MD, PhD, of the University of Tokyo, Japan, According to Honda, intestinal bacteria help program the body's production of at least two specific immune cells, called Th17 and Foxp3, involved in regulating immunity and maintaining normal intestinal barriers. According to Honda's article, people are more likely to develop abnormal immune responses when their gut bacteria are unbalanced or damaged.

Two other studies recently linked gut health to mood and behavior disorders. In a mouse study, Timothy G. Dinan, MD, PhD, of Cork University Hospital, Ireland, and his colleagues found that *Lactobacillus rhamnosus*, one of the 500 species of

bacteria normally found in the gut, can boost brain levels of GABA (gamma aminobutyric acid). GABA is neurotransmitter that regulates mood and helps prevent anxiety and depression.

Finally, Laura de Magistris, PhD, of the Second University of Naples, Italy, and her colleagues, found abnormal intestinal permeability – also known as leaky gut syndrome – in 37 percent of patients with autism and 21 percent of their relatives. They found the problem in only 5 percent in normal subjects. The results were significant because gut bacteria form a natural barrier in the gut, and poor gut health and gluten sensitivity increase the risk of leaky gut.

References: Abrahamsson TR, Jakobsson HE, Andersson AF, et al. Low diversity of the gut microbiota in infants with atopic eczema. *Journal of Allergy and Clinical Immunology*, 2011: doi 10.1016/j.jaci.2011.10.025. Atarashi K, Honda K. Microbiota in autoimmunity and tolerance. *Current Opinion in Immunology*, 2011;23:761-768. Gremham S, Clarke G, Cryan JF, et al. Brain-gut-microbe communication in health and disease. *Frontiers in Physiology*, 2011: doi 10.3389/fphys.2011.00094. De Magistris L, Familiari V, Pascotto A, et al. Alterations of the intestinal barrier in patients with autism spectrum disorders and in their first-degree relatives. *Journal of Pediatric Gastroenterology and Nutrition*, 2010;51:418-424. □

Perspectives

Diet and Cell Phone Addiction

I was trained in sociology and psychology before I became serious about nutrition. This combination has provided a unique perspective: Instead of just writing about the nuts and bolts of nutrition, I also understand and often write about the psychosocial factors (e.g., stress, advertising) that shape our eating habits. Conversely, I also know how poor nutrition can negatively influence our behavior. After all, nutrition is really about biochemistry, and the biochemistry of the brain affects our behavior.

Over the past 20 to 30 years, work pressures have led to increases in multitasking and stress, forcing many of us to do more and more in less and less

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time. Meanwhile, the nutritional quality of the American diet has hit new lows, with fast food, convenience food, and other types of junk food being widely consumed. Who makes the time for nutritious meals these days? And who really believes that a soft drink and a sweet (i.e., dessert for breakfast) offers the best fuel for the body and mind?

As a result, many of us start the day nutritionally deficient, and lunch and dinner don't usually provide much more in the way of wholesome, nutritious meals. As a consequence, our brains and bodies function at a subpar level. When we are deficient in B vitamins and omega-3 fats (fish oils), we are more likely to feel depressed and anxious and become more impulsive in our behavior.

Now add cell phones to the mix, with the ping of text messages and emails. We become anxious if we do not immediately respond to their beckon call, and our responses reflect a new type of impulse-control disorder. That won't hurt anyone sitting in front of the television. But texting, tweeting, or emailing while driving a car, riding a bicycle, or crossing the street is simply stupid and dangerous.

Many experts have pointed out that such behavior reflects the addictiveness of personal technologies, and cell phones often seem like the current version of Pac Man or Space Invaders. Whenever we interact with addictive and impulsive ways, we enjoy a squirt of dopamine, the brain's pleasure neurotransmitter. With this little "high," we ignore about the danger. But I would also argue that nutritional deficiencies short circuit our brains' ability to exercise good judgment and to avoid being impulsive.

Our behavior influences our eating habits, and our eating habits influence our behavior. It's important that we take the time to be mindful of both. We all can benefit from a little "down time" when we turn off or simply ignore our devices. —*JC*

Protein in Diet Influences Lean Body Mass and Metabolism

The bathroom scale doesn't tell you everything you need to know when it comes to gaining weight. A low-protein diet might help you lose weight, but a high-protein diet helps you maintain lean body mass (i.e., muscle), according to a new study.

George A. Bray, MD, of the Biomedical Research Center, Baton Rouge, Louisiana, and his colleagues placed 25 healthy men and women, ages 18 to 35 years, on a tightly controlled weight-stabilizing diet for 13 to 25 days. Next, the subjects were fed a low-protein, normal-protein, or high-protein diet for eight weeks. The diets, however, were packed with almost

1,000 extra calories each day – part of an effort to force the subjects to gain weight.

And gain weight they did, but with a twist.

Overeating led to less weight gain for people on the low-protein diet, compared with the normal- and high-protein diets. At first glance that might seem good, but it wasn't. That's because people on the low-protein diet lost more muscle, compared with people on the other diets.

People eating the normal- and high-protein diets benefited from better body composition and preservation of their muscle tissue. They also maintained a higher resting metabolic rate, meaning that they did a better job of burning calories.

Reference: Bray GA, Smith SR, de Jonge L, et al. Effect of dietary protein content on weight gain, energy expenditure, and body composition during overeating. *JAMA*, 2012;307:47-55. □

More Research Suggests that B Vitamins May Protect Brain

Several recent studies have found that high intake of some of the B-complex vitamins might reduce the risk of Alzheimer's disease. Now, Australian researchers have found that supplementation can lead to improvements in memory among seniors.

Janine G. Walker, PhD, of Australia National University, Canberra, and her colleagues asked 900 men and women, ages 60 to 74 years, to take either a combination of 400 mcg of folic acid and 100 mg of vitamin B12 or placebos daily for two years.

The B vitamins led to overall improvements in cognition, particularly memory. "Our findings suggest that there may be a role for combined folic acid and vitamin B-12 in lowering the risk of cognitive decline," wrote Walker and her colleagues. "Such an intervention is inexpensive, and at the population level the preventive effect may be considerable..."

Reference: Walker JG, Batterham PJ, Mackinnon AJ, et al. Oral folic acid and vitamin B-12 supplementation to prevent cognitive decline in community-dwelling older adults with depressive symptoms--the Beyond Ageing Project: a randomized controlled trial. *American Journal of Clinical Nutrition*, 2012; 95:194-203. □

Calcium and Vitamin D Reduce Visceral Fat, But Not Weight

Studies have linked calcium intake to weight reduction and vitamin D to a lower risk of type 2 diabetes. A new study has found that a combination of these two nutrients leads to a reduction in visceral fat but not weight.

Visceral fat is found in the abdomen and wraps around internal organs. It is considered the most

dangerous type of body fat because it is associated with a high risk of diabetes and heart disease.

Jennifer L. Rosenblum, MD, of Massachusetts General Hospital, Boston, and her colleagues studied 131 subjects who were divided into four groups: one consumed three daily glasses of orange juice fortified with calcium and vitamin D, while another group consumed the orange juice without added calcium and vitamin D. A third group consumed “lite” orange juice with added calcium and vitamin D, while the fourth group consumed unfortified lite orange juice.

The fortified orange juices provided 1,050 mg of calcium and 300 IU of vitamin D daily.

After 16 weeks, all of the subjects lost about the same amount of weight, an average of 5.4 pounds. However, people who consumed either the regular or lite juice with added calcium and vitamin D lost substantially more visceral fat, which was measured with computerized scans of the subjects.

Reference: Rosenblum JL, Castro VM, Moore CE, et al. Calcium and vitamin D supplementation is associated with decreased abdominal visceral adipose tissue in overweight and obese adults. *American Journal of Clinical Nutrition*, 2012;95:101-108. □

Researchers Discover Key Role of Vitamin E in the Body

Vitamin E has long been known as an antioxidant and for protecting cell membranes from damaging oxidation. But a series of experiments using muscle tissue and cells from mice has found that it is necessary for the repair of damaged cell membranes.

The finding may partly explain vitamin E’s benefits to the heart – a muscle – based on clinical reports and research dating back to the 1940s. The vitamin has also been shown to benefit people with amyotrophic lateral sclerosis, a wasting disease also known as Lou Gehrig disease.

Membranes form the outer boundary, or wall, of cells and are typically high in polyunsaturated fats. When a membrane is damaged, the cell will quickly die unless the damage is repaired.

Paul L. McNeil, PhD, and his colleagues at Georgia Health Sciences University, Augusta, conducted detailed studies on muscle cells. They found that alpha-tocopherol, the most common form of vitamin E, promoted the repair of cell membranes. However, oxidation (free-radical damage) inhibited this repair process.

Vitamin E also aids the membrane’s ability to regulate what goes in and out of cells.

Reference: Howard AC, McNeil AK, McNeil PL. Promotion of plasma membrane repair by vitamin E. *Nature Communications*, 2011: doi 10.1038/ncomms1594. □

Kiwifruit Reduces Severity and Length of Respiratory Infections

Eating kiwifruit can reduce the symptoms of upper respiratory tract infections, including the common cold, ear infections, sinusitis, and laryngitis.

Denis C. Hunter, PhD, of the New Zealand Institute for Plant and Food Research, Auckland, and her colleagues tracked the health of 32 people age 65 years and older. Over the winter and spring months, the subjects were asked to consume either four “gold” kiwifruit or two bananas daily for four weeks.

After a “washout” period, the subjects then switched fruits for another four weeks.

Eating gold kiwifruit did not reduce the incidence of infections, but it did significantly ease the severity and duration of head congestion and sore throat.

Among people consuming kiwifruit, the average length of a sore throat dropped from five and one-half to two days, and head congestion decreased from almost five days to about one day.

In addition, the subjects’ blood levels of several nutrients, including vitamins C and E, lutein, and zeaxanthin, increased substantially.

Reference: Hunter DC, Skinner MA, Wolber FM, et al. Consumption of gold kiwifruit reduces severity and duration of selected upper respiratory tract infection symptoms and increases plasma vitamin C concentration in healthy older adults. *British Journal of Nutrition*, 2011: epub ahead of print. □

High Vitamin D Levels Linked to Lower Risk of Depression

Maintaining high blood levels of vitamin D may reduce the risk of depression, according to a study by researchers at the University of Texas Southwest Medical Center and the Cooper Clinic in Dallas.

E. Sherwood Brown, MD, PhD, and his colleagues analyzed data from 12,594 men and women. Overall, people with relatively high blood levels of vitamin D had a statistically significant, 8 percent lower risk of depression. Among people with a history of depression, high levels of vitamin D reduced the subsequent risk of depression by 10 percent.

Brown noted that, conversely, depression might also be a risk factor for vitamin D deficiency, because depressed people may spend more time indoors, exercise less, and eat a less nutritious diet.

He added that vitamin D’s anti-inflammatory properties might protect against depression. “Emerging data suggest that elevated levels of proinflammatory cytokines in the brain may be associated with depression. In human studies, an inverse correlation was found between vitamin D

Quick Reviews of Recent Research

• **Why protein can counter fatty liver disease**

Fatty liver disease, technically known as hepatic steatosis, is a common complication of obesity and is often a factor in impaired glucose tolerance, insulin resistance, and high levels of blood fats. Researchers from Switzerland asked 11 obese, nondiabetic women to consume 60 grams of whey protein daily for four weeks. The women's body mass index ranged from 31 to 52 at the beginning of the study. Consuming whey protein, which is derived from dairy, led to a 21 percent reduction in the amount of fat in liver cells. In addition, blood triglyceride levels decreased by an average of 15 percent and total cholesterol by 7 percent.

Bortolotti M. *Clinical Nutrition*, 2011;30:494-498.

• **Inflammation and depression intertwined**

Researchers at Duke University Medical Center, Atlanta, investigated the relationship between inflammation and depression. They tracked 1,420 people from childhood through adulthood and found that high blood levels of C-reactive protein, a marker of inflammation, did not predict episodes of depression. However, they did find that elevated CRP levels were associated with a higher number of depressive episodes.

Copeland WE. *Biological Psychiatry*, 2011;71:15-21.

• **Fish intake protects young women**

Danish researchers studied almost 49,000 women with an average age of 30 years. Over eight years, 577 of the women died from cardiovascular disease. Women consuming little or no fish rich in the omega-3 fats had almost twice the risk of dying from cardiovascular disease.

Strom M. *Hypertension*, 2012;59:36-43.

• **Higher protein diets help women with PCOS**

Overweight and poor glucose tolerance are part of polycystic ovary syndrome (PCOS). Researchers in Denmark studied 27 women with PCOS. The women were placed on either a high-protein or normal

protein diet for six months. Women on the high-protein diet lost more weight and more body fat and had greater decreases in waist circumference and blood sugar.

Sorensen LB. *American Journal of Clinical Nutrition*, 2012;95:39-48.

• **Fewer carbs might lower breast cancer risk**

High blood levels of insulin may increase the risk of breast cancer as well as diabetes. Researchers at University Hospital, South Manchester, England, asked 115 women with a family history of breast cancer to follow one of three diets for four months. The diets were a calorie-restricted Mediterranean regimen, a low-carb plan, and a low-carb plan just two days each week. Both of the low-carb diets led to greater weight loss and reductions in insulin levels compared with the Mediterranean diet.

Harvie M. Presented at the San Antonio (Texas) Breast Cancer Symposium, December 2011.

• **Low vitamin C boosts risk of heart failure**

Korean researchers studied 212 patients, about half of whom had moderate to severe heart failure. Low vitamin C levels were associated with a greater risk of heart failure and elevated levels of C-reactive protein, a marker of inflammation. Patients who had low levels of vitamin C were almost twice as likely to die from heart disease within one year.

Song EK. Presented at the American Heart Association's Scientific Sessions, Orlando, Florida, November 2011.

• **Processed meats likely factor in diabetes**

Researchers at Harvard University analyzed data from ongoing studies of 37,083 men and 87,504 women. Consumption of red meat, especially processed red meat (e.g., "luncheon meats"), was associated with a greater risk of people developing type 2 diabetes.

Pan A. *American Journal of Clinical Nutrition*, 2011: doi 10.3945/ajcn111.018978.

Vitamin D and Depression...

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status and inflammation markers, and a positive correlation was found with anti-inflammatory cytokines... Inflammation caused by increased cytokines can affect glial cell [a type of brain cell] functions and damage neurons."

Reference: Hoang MT, DeFina LF, Willis BL, et al.

Association between low serum 25-hydroxyvitamin D and depression in a large sample of healthy adults: the Cooper Center longitudinal study. *Mayo Clinic Proceedings*, 2011; 86:1050-1055. □

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Post Office Box 30246 • Tucson AZ 85751-0246 USA

Editor and Publisher: Jack ChalleM

Copy Editor: Mary E. Larsen

Medical and Scientific Advisors

Ronald E. Hunninghake, MD Wichita, Kansas • Ralph K. Campbell, MD Polson, Montana

Peter Langsjoen, MD Tyler, Texas • Marcus Laux, ND San Francisco, Calif.

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