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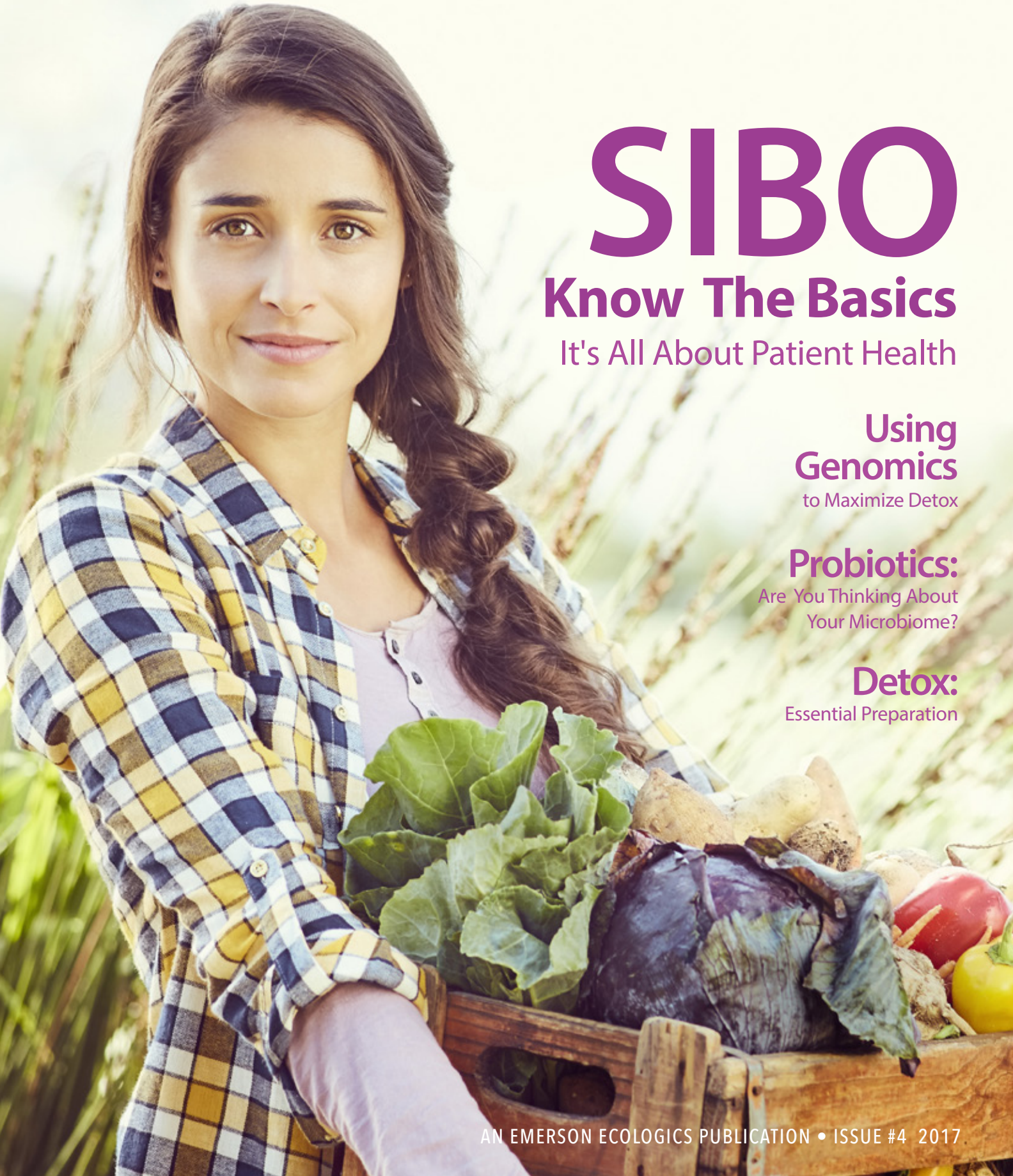

SIBO

Know The Basics

It's All About Patient Health

Using Genomics

to Maximize Detox

Probiotics:

Are You Thinking About Your Microbiome?

Detox:

Essential Preparation

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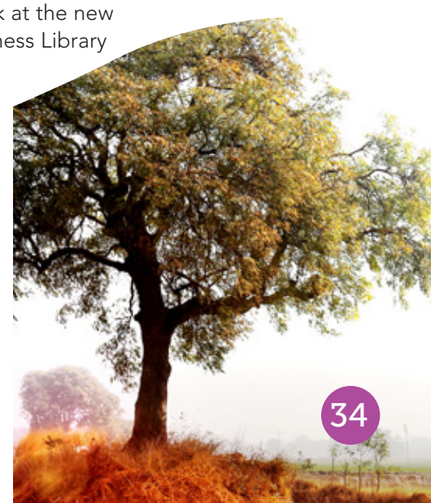

LETTER FROM THE DOCTOR

Meredith Murray, ND
Medical Educator

When I was in naturopathic medical school, I frequently heard the adage "always treat the gut" from my teachers and mentors for basically all chronic concerns. In working with patients and with keeping up with as much scientific research as I can, it is always pleasant to see how much that advice is supported both clinically and in the literature.

The digestive system is central to the body—both literally and functionally. It is the primary means for our body to process and eliminate toxins. It is where we digest our food and absorb our nutrients. And now the research is exploding with how much the bacteria in our digestive tract influences how well our body functions from brain signaling to skin disorders to weight gain.

This issue of the Element focuses on some of the amazing intricacies of the digestive system. It contains information on: the emerging common disorder SIBO; epigenetics and how that influences detoxification; and probiotics and its influence on the gut microbiome. It will be interesting to look back on these articles in 5-10 years to see how this information has evolved, but I am fairly sure "treating the gut" will still be a guiding principle for promoting health and wellness.

Sincerely,

Meredith Murray, ND

FDA STATEMENT

The information provided in this publication is the opinion of the authors based upon the latest evidence available. We hope that this issue provides health care practitioners with useful information to apply in their clinical practices. As with all scientific information on dietary supplements, the statements made within this issue are not reviewed, verified or approved by the FDA.

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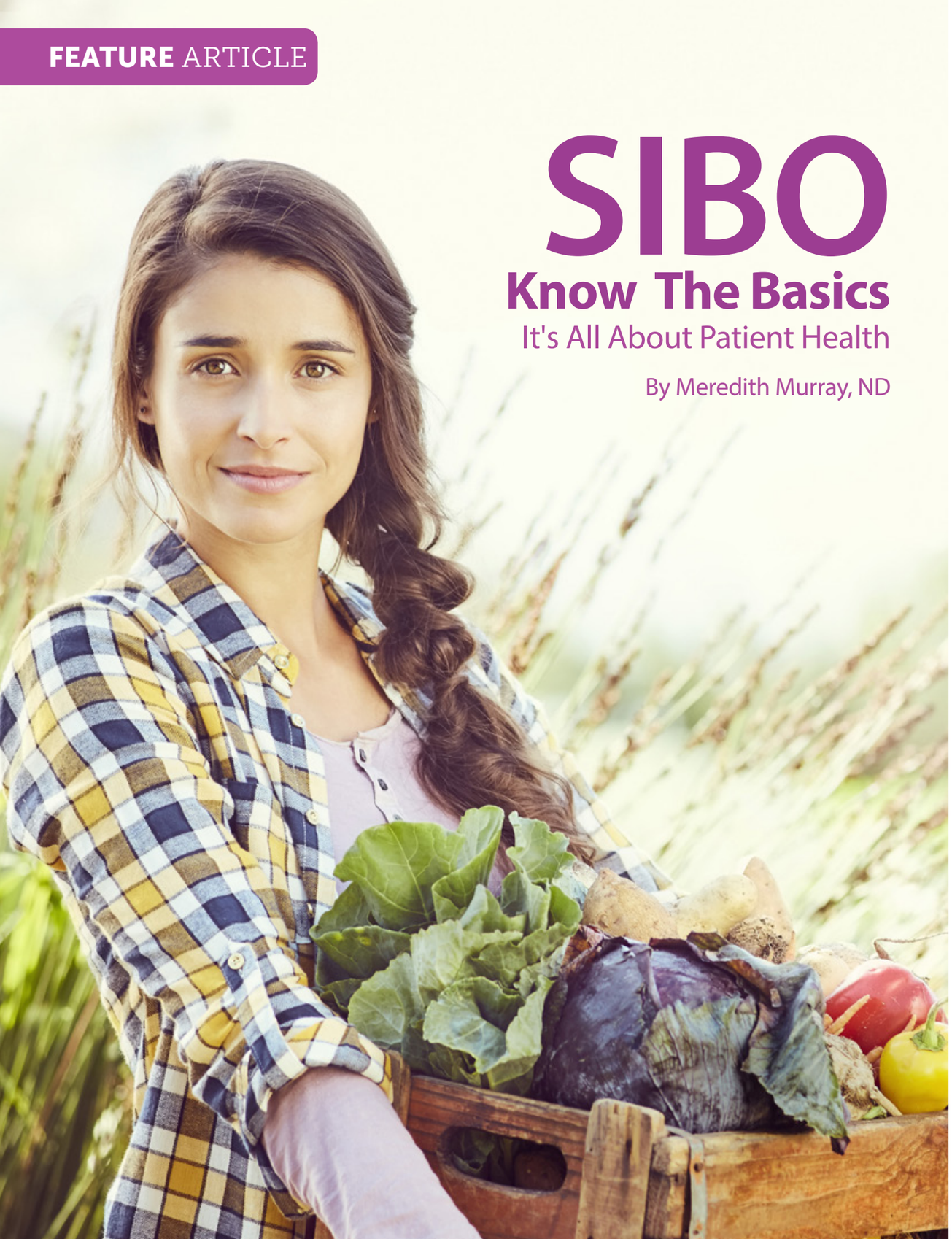

SIBO

Know The Basics

It's All About Patient Health

By Meredith Murray, ND

Small intestinal bacterial overgrowth (SIBO) has been documented in the literature for over 50 years, yet the focus on this condition seems to have increased considerably over the last 10 years. Many patients are looking towards SIBO as a name for their chronic, often dismissed functional digestive complaints and as a result, practitioners are searching for more information on how to understand, diagnose and treat SIBO in clinical practice. This article aims to give a brief overview of SIBO for those who are new to working with this condition and perhaps may offer new pieces of information to those who are experienced.

SIBO: Definition

It is well known that the amount of microbial growth varies in the different parts of the gastrointestinal tract, with the stomach having the lowest microbial level and the colon having the highest (exceeding approximately 10^{14} CFU/mL). While the consensus of the diagnostic criteria for SIBO has yet to be determined, the standard and most often used definition of SIBO is that the quantity of the bacteria in the duodenum exceeds 105 CFU/mL (though this number may differ depending on the paper you read). It should also be noted that GI symptoms can be present with less than 10^5 CFU/mL of bacteria in the small intestine.

Unfortunately, there is no typical presentation for SIBO.[1] It is likely SIBO is underdiagnosed and therefore, the accurate rate of occurrence is not known. It has been shown to be more common as people age, which may be due to the decrease in natural defenses to SIBO (for example, a decrease in gastric HCL acid production).[2] The most common symptoms are shown in figure 1 on this page. As SIBO can be asymptomatic or often mimic other disease states, defining SIBO by symptoms is not recommended. There is no validated symptom questionnaire currently for SIBO and it is not recommended to diagnose on clinical symptoms alone. SIBO should be suspected in anyone who has a malabsorption syndrome or has one of the predisposing conditions or presents with IBS-type symptoms.[2]

In the last 20 years, there have been many studies looking at the correlation between IBS (irritable bowel syndrome) and SIBO.[3] However, these results have been called into question. Another meta-analysis concluded that the presence of SIBO in those who also met criteria for IBS ranged from 4-64% depending on which diagnostic parameters were used.[4] The Rome consensus believes that breath testing for people with IBS is unwarranted.[5] SIBO often presents as abdominal bloating, abdominal pain, constipation and/or diarrhea, which can also be found in patients with IBS, leading clinicians to wonder if SIBO may be the diagnosis many of their IBS patients need. However, not all IBS patients have SIBO and therefore, evaluating for SIBO may be a means for differential diagnosis.

Diagnosis

Currently there is no consensus on the diagnostic criteria for SIBO.[1] This has offered obstacles to clinicians with the various options all having certain limitations. The three main ways SIBO is diagnosed clinically are: (1) jejunal aspirate, (2) breath testing and (3) response to treatment with antibiotics. It is thought that combining two of these methods offers a more robust approach.[1]

The gold standard for diagnosing SIBO is the jejunal aspirate. This method is rarely performed as it is invasive, costly and will only sample one part of the small intestine—not evaluating distal small intestine overgrowth. Also, the removal and culturing of bacterial samples from this part of the intestine, which contains both anaerobic and aerobic bacteria, is difficult.

SIBO Symptoms

Digestive Tract

- Abdominal bloating (gas)
- Belching/flatulence
- Abdominal pain
- Abdominal cramping
- Change in bowel movements: constipation, diarrhea or both
- Nausea
- Heartburn (reflux or GERD)
- Steatorrhea (fat in stool)
- Nutritional deficiencies: B12, iron

Outside of Digestive Tract

- Fatigue
- Weight loss
- Headache
- Joint pain
- Skin issues: rashes, eczema
- Mood symptoms
- Brain fog

The "response to antibiotic treatment" method of diagnosis is not recommended due to inherent risk with antibiotic use (i.e., the rise in antibiotic resistance and possible negative outcomes of antibiotic use such as C. difficile). Also, the fact that the symptoms are very non-specific means they may not warrant an antibiotic at all.[6]

The breath test is the most common and widely used test to determine if SIBO is present. There are two main forms of this

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test—glucose or lactulose—depending on the substrate used. The patient consumes the substrate and then hydrogen (and often methane) is measured in the expiration. The use of this for diagnosing SIBO is based on the fact that the human body does not produce these gases in high amounts normally. Having bacterial overgrowth in the small intestine results in fermentation of carbohydrates and production of hydrogen and/or methane gas. The difference in use between glucose and lactulose as a substrate is a debatable topic. Glucose has been shown to have higher specificity and sensitivity: 62.5 and 81.7%, respectively.[1] The drawback to using glucose that it is absorbed higher up in the small intestine and therefore, possibly not detecting overgrowth in the distal small intestine. Lactulose is chosen by some to avoid the early absorption. However, lactulose has a lower sensitivity and specificity and may lead to higher false positives. One test compared lactulose breath test to the jejunal aspirate and the sensitivity was 52.4% with a specificity of 85.7%.

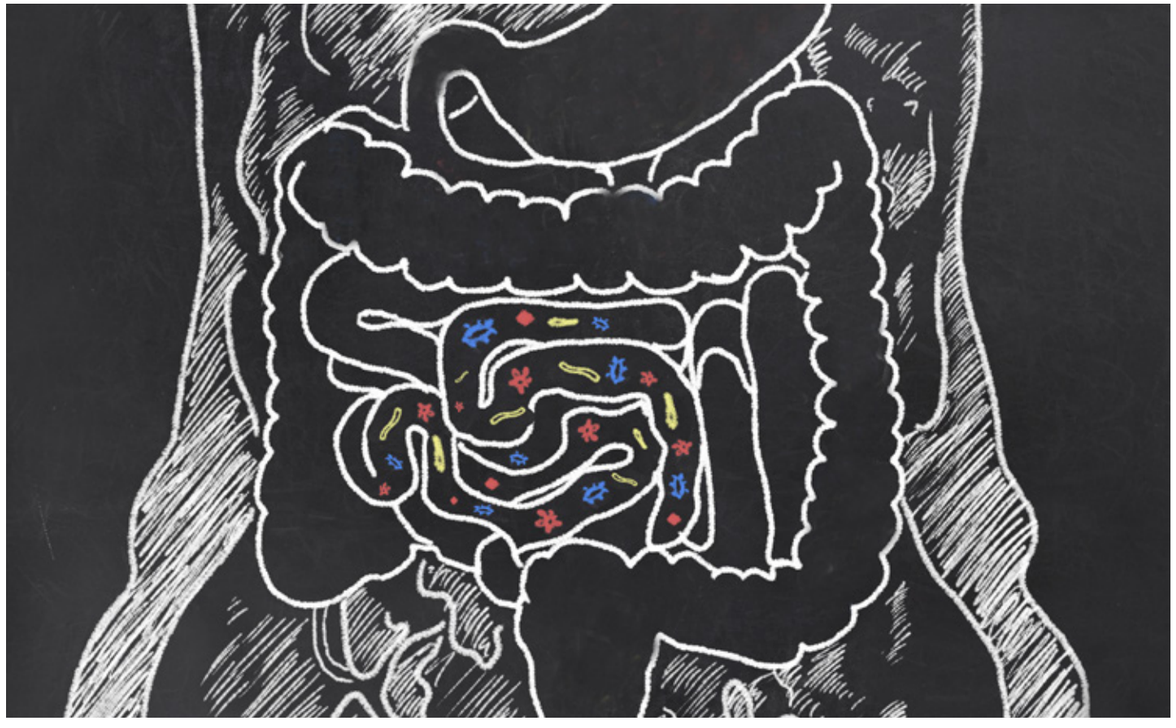
At this time, the breath test is the most economical and least invasive and is the go-to for most clinicians diagnosing SIBO. In the future, there hopefully will be more clarification and improvement in SIBO diagnosis.

The Rome consensus on hydrogen breath testing came to the conclusion that it is safe and economical with the glucose test providing fairly good diagnostic accuracy.[5] They do, however, also recommend breath tests be interpreted with caution and always take into account the patient's history. It is in the patient's best interest that the person interpreting SIBO breath tests be experienced in the combination of evaluating symptoms in connection with the gas levels.

The current consensus on cutoff for SIBO diagnosis via breath testing is: >10-12 ppm of hydrogen gas within 90 minutes or greater than 15 minutes before the prolonged peak when the substrate enters the colon.[4] Although the Rome consensus does not support the testing of methane gas for diagnosis of SIBO, other authors and clinicians find this helpful and logical as not all bacteria ferments and produces hydrogen gas (such as Staph aureus, strep viridans, enterococci, serratia and pseudomonas)1. The current recommendation for identifying a positive methane test is > 3 ppm of methane gas at any point in the test or an elevated baseline of methane.[7]

According to a review by Gabrielli, most authors show >15 ppm of hydrogen at the 120 minute-cutoff for the glucose breath test and a methane criteria is >5 ppm or 10 ppm above baseline.[2]

SIBO can be hydrogen dominant, methane dominant or mixed. Hydrogen dominant SIBO is most associated with diarrhea, while methane dominant is most associated with constipation. It has been shown that methanobacterium archaea actually slows motility, which can explain this phenomenon. Based on the types of gases present, treatment of SIBO does change.



Treatment of SIBO

Ultimately, when treating SIBO, attention should focus on addressing the underlying cause which brought on the SIBO. There are times this cannot be done in terms of structural issues, such as short bowel or scleroderma, which can predispose to SIBO indefinitely.

The body has many innate mechanisms that prevent the overgrowth of bacteria in the small intestine. These include: gastric acid, biliary and pancreatic secretions, peristalsis and the migrating motor complex and the ileo-cecal valve. The disruption of these activities is thought to allow for SIBO to occur and therefore, restoring them to proper functioning is one goal of treatment.

Issues such as weight loss, fat soluble vitamin deficiency, B12 deficiency, iron deficiency and low levels of serum bile acids and RBC folate have all be found to be consequences of SIBO.[1] It is imperative to supplement with appropriate nutrients until SIBO has been controlled.

The treatment of SIBO can be broken down into various components: reduction of the overgrowth, implementation of diet changes to control overgrowth, improvement of gastrointestinal motility and replenishing/healing the gastrointestinal tract.

Reducing Overgrowth

The conventional treatment of SIBO is the use of antibiotic pharmaceuticals. The most recent reviews indicate rifaximin as the safest and most effective.[6] Many patients respond to this medication if they are hydrogen dominant. The dose is 550 mg three times daily for two weeks. It is a locally absorbed antibiotic and therefore has less occurrence of systemic effects. That being said, it still can disrupt the gastrointestinal microbiota and has been documented to have caused, albeit rarely, issues such as C. diff. One deterrent to this choice is that if insurance does not cover this medication, it can be thousands of dollars out of pocket. Currently the FDA only approves rifaximin for hepatic encephalopathy or IBS-Diarrhea type.

If the patient has both hydrogen and methane gas present, then a second antibiotic has been shown to be more effective.[8] The one most often used in conjunction with rifaximin is neomycin at 500 mg twice daily. Though shown to have minimal adverse events in the SIBO studies, this medication has various side effects which should be considered prior to prescribing. There are other options for a second antibiotic, such as metronidazole.

Siebecker and Sandberg-Lewis, naturopathic doctors out of Portland Oregon's SIBO Center, determined a course of antimicrobial herbs to address SIBO. According to their 2013 Townsend letter article[9], the herbal anti-microbial option includes Berberine, allicin (an antimicrobial extract from garlic), oregano oil and/or neem. These are used for a longer course than the pharmaceuticals, but are reported to have similar efficacy in reducing gas levels.

There was one study that looked at the comparison of herbal antimicrobials (in combination formulas) to rifaximin in the eradication of SIBO.[10] It was found they were as effective as rifaximin and even some non-rifaximin responders had SIBO resolution after starting the herbal protocol. There was no significant statistical difference between rifaximin and herbs. Side effects were not statistically significant between the two treatment groups, but the types of side effects were more severe with rifaximin.

The limits to this study include that:

1) Diet was not controlled
2) It was retrospective
3) There was no formal standardized questionnaire to look at symptom resolution

Overall, this does indicate that SIBO may be able to be targeted by herbal antimicrobials.

There has been discussions on whether eradicating a biofilm can help improve SIBO treatment and according to discussions at recent SIBO Symposiums, this has not been seen clinically. Theoretically, it may be helpful with methane dominant cases as those archaea do form biofilms.

In terms of different treatments, allicin has been reported as being more effective for methane cases, which likely stems from studies on rumen using allicin products to reduce methanogenesis.[11]

One dietary therapy to reduce bacterial levels is a liquid elemental diet followed for 2-3 weeks. This provides all the essential nutrients and amino acids, but is absorbed within the first few feet of the intestine, essentially starving the fermenting bacteria in the small intestine. Clinical success is seen with this method,[6] but should be considered on a case-by-case basis. It should not be considered in those who are already low in weight or have blood sugar stability issues.

After the bacteria have been reduced, a repeat breath test or symptom evaluation will determine how successful treatment has been. If symptoms are 90% better, the next step will be prevention of recurrent SIBO. If symptoms are still present after the appropriate time on antimicrobials, a repeat breath test may be helpful to determine how much the levels have changed and then influence the prognosis and length of treatment.

Dietary Approaches

Diet alone is not sufficient to treat SIBO initially and needs to be paired with antimicrobial treatment. SIBO has a high rate of recurrence, as much as a 40% recurrence even after successful treatment,[1] but there are ways to manage SIBO symptoms and control bacterial growth with diet. There is no diet that is 100% effective at managing symptoms of SIBO and diet needs to be tailored to the individual. Low-carbohydrate diets commonly used for SIBO include Specific Carbohydrate Diet (SCD), SIBO

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Specific Diet (by Dr. Siebecker), Low FODMAP, GAPS, Cedar Sinai and Fast Tract Diet. However, none of these diets have been studied for effectiveness with SIBO. These diets are all low carbohydrate and should be used with caution in people at low weight.

Highly restricted, low-carbohydrate diets such as those listed above can help in the short term during and after the treatment phase to help prevent recurrence but should not be continued indefinitely.

Enhancing Motility

The next aspect that can contribute to the onset of SIBO, as well as recurrence, is an issue with intestinal motility. The migrating motor complex (MMC) is the movement of the small intestine, which sweeps bacteria through and prevents buildup of bacteria. Since it was discovered that humans have an MMC like animals, its dysregulation has been implicated in the overgrowth of bacteria in the small intestine.[12] Using prokinetic agents can be very important in treating SIBO. Pharmaceutical prokinetic agents, such as very low dose erythromycin, are available as well as herbal options. Ginger, which has prokinetic qualities, can also help reduce some of the uncomfortable symptoms of SIBO.

The MMC is active during fasting states and is stopped by feedings. Encouraging meal spacing every 4-5 hours is recommended.

When SIBO is present, it is thought this disrupts the lining of the small intestine, which then minimizes absorption of certain nutrients. After the bacterial overgrowth has been resolved, the small intestinal lining should heal itself. However, additional support with glutamine can be helpful. Be aware that when SIBO is still present, the use of gut healing mucilaginous herbs may not be advantageous as they contain complex polysaccharides that can feed the offending bacteria.

Stress and Adrenal Balance

The last aspect I have seen necessary clinically has been working with patients to reduce stress and adrenal imbalance as SIBO can take a toll on the body both physically and emotionally.

I often utilize adaptogen herbs here, after completing a salivary cortisol test. People who have SIBO do not feel well and frequently are told there is nothing concrete to be done. For these people, addressing stress and the gut-brain connection can be quite important and enhance their healing process.

Conditions Associated with SIBO

As SIBO became a more prominent differential diagnosis for functional gastrointestinal disorders, more and more studies started to shed light on the correlation of small intestinal bacterial overgrowth and other conditions. Dr. Allison Siebecker's informational website, siboinfo.com, lists conditions being studied as having a correlation with SIBO along with direct links to the studies. Some of the conditions listed include: rosacea, nonalcoholic steatohepatitis, restless leg syndrome, inflammatory bowel disease and scleroderma.[13]

Therefore, SIBO may also be worth evaluating with those conditions. As more information is unveiled regarding the connection between the gut microbiota and systemic health issues, SIBO will likely be further implicated.

SIBO is a complex condition to treat with new information being uncovered regularly. Treatment should be individualized to take into account the person's symptoms and mental/emotional state and include a diet that is therapeutic but not nutritionally deficient.

Where to Learn More

SIBOinfo.com has studies related to SIBO in all capacities organized by the year they were published.

There are many conferences and symposiums dedicated to SIBO as well. The SIBO Symposium is held at National University of Natural Medicine yearly, and there are more being created regularly in order to discuss this complex and emerging issue.

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Detox:
Essential Preparation

By Tina Beaudoin, ND

While detox has become much more popular in the last decade and it's likely that some of your patients have come to you asking for a 'good detox', it's not generally advisable to have that be your starting point if you want to effectively detoxify the body and decrease one's total body burden of toxins and toxicants. It would be like putting in a new whole-house water filtration system in your basement and not replacing the old, grime-covered lead pipes that deliver the filtered water to your kitchen, shower and faucet. Preparing your body to handle the sharp increase of toxins mobilized during a detox requires a bit of preparation: decrease exposures and optimize gastrointestinal function.

Decreasing Exposures

Educate Your Patients on How to Reduce Toxicants from Food

Start with educating your patient on how to reduce toxicants (synthetic toxins) from their food supply. An easy place to start is to have your patients avoid the "Dirty Dozen" foods (found on www.ewg.org; there is also a free smartphone app) and only eat organic, free-range animal products. A simple way to reduce some of these exposures is to talk to your patients about seafood and lowering or eliminating exposure to farmed and high mercury-content fish. Polychlorinated bisphenyls/PCBs (ubiquitous and highly elevated in farmed salmon), with a half-life in the blood of 10-15 years, are associated with breast cancer[1], ADHD[2], diabetes[3] and myocardial infarction.[4] Mercury (found in tuna and other large fish) can bioaccumulate in your tissues with a half-life ranging from 10-50 years! A potential tool to share with your patients as a reference is the Environmental Working Group (EWG)'s online Consumer Guide to Seafood, which identifies fish with a high risk of toxicants versus sustainably harvested options.

Encourage Healthy Food Preparation and Storage

Healthy food preparation and storage is an important part of the discussion as the non-stick pans, microwaves and plastic utensils and containers are the norm in most households. Non-stick pans add Perfluorooctanoic acid/PFOA's to the food when heated and are associated with developmental toxicity, immunotoxicity and hepatotoxicity.[5] It is best to use stainless steel or cast iron when cooking on the stove. Reducing exposure to bisphenol A/BPA is a great way to reduce toxicant body burden. Limit your overall exposure to plastics (food containers, canned foods, plastic packaging, etc.). You might be surprised how many of your patients still put their food in plastic containers in the microwave at home and at work. If they don't want to let go of the microwave, have them switch to only using glass containers when using the microwave as this will reduce their exposure to toxic plasticizers.

Explain the Dangers of Conventional Personal Care Products

Personal care products are a significant source of toxicant exposure as the average American woman and man uses six and two personal care products, respectively, every day of their lives. It takes about 23 seconds for the skin to absorb the chemicals in each product, have them surface in the blood supply and be sent off to the liver for processing. Having patients avoid parabens and anything with "fragrance" (source of numerous toxicants with phthalates being a primary concern) are good basic starting points to help them reduce their total body burden exposure from personal care products. The harmful effects of these classes of chemicals are very well established. Parabens found in deodorants, moisturizers, hair products and body washes act as estrogen agonists and androgen receptor antagonists, disrupt mitochondrial function and damage DNA.[6] Parabens have been measured in 99% of breast tissue samples and can stimulate sustained proliferation of human breast cancer cells.[7] Phthalates, also found in many personal care products, specifically in fragrances and perfumes in shampoos, detergents, etc., have been shown to have the following impacts: estrogenic activity, decreased male fertility[8], elevated levels found in autism spectrum disorder[9], endometriosis[10] and pro-artherogenic and pro-senescence effects via severe lipoprotein modification[11].

Water Quality Is a Significant Source of Exposure

Water purity and adequate hydration are central to health, let alone preparing to detox. The rationale for including water in the discussion is not that hydration is a new concept; it's that water quality is not often addressed and is a significant source of toxicant exposure. So when you encourage your patients to drink up, are you inadvertently asking them to increase their intake of arsenic, PFOAs, fluoride, hexavalent chromium and a host of other chemicals? Contaminated water is not just an issue for people who live in Flint, Michigan. With the water contamination problems in this country, it is highly advisable to install water filtration systems in the home with notable exceptions being those who have very clean, local water supplies that have been thoroughly tested. EWG offers a great resource that you can use to look up the common contaminants by zip code for yourself and each of your patients: http://www.ewg.org/tap-water/whats-in-yourwater.php. There is also a page that discusses water filtration options, noting that the list is not expansive and primarily focuses on reverse osmosis/RO options (intense environmental impact with very high water waste). Be aware that there are also effective non-RO options. With access to purified water, you can now encourage your patients to maximize their hydration (at least 1/2 to 3/4 their body weight in ounces) as it is essential to flushing out waste not only at the cellular level but in supporting the GI tract and kidneys as they flush out toxins.

Healing the Gut

Healing the Digestive Tract is Central to Preparing for an Effective Detox

The gut serves as a barrier for keeping out toxicants (synthetics chemicals that harm the body), food antigens and endotoxins (toxins released by bacteria) and minimizing the immense job the liver has to do on a daily basis. When the digestive tract is over-burdened by inflammatory foods, pathogenic microbes, chronic stress, medications and the wide array of chemicals in processed foods, the gut walls become permeable. These undesirable substances then enter the bloodstream, to be transported to the liver for processing…aka detoxification. The goal in preparing the gut for detox is to decrease the daily burden on the liver so a deeper level of detoxification can be achieved.

Identify Which Diet and Foods Work Well for Your Patient's Individual Needs

Depending on the starting point for your patient, eliminating the most common inflammatory foods (gluten, dairy, soy, corn and sugar) is essential to improving digestive health and reducing the burden on the liver. Having a patient invest in food sensitivity testing is often the easiest path to discerning which foods are creating the most inflammation and optimizing patient compliance, as they are more likely adhere to a dietary protocol when they see exactly how their immune system reacts to different foods. In addition, consider referencing a previous article, *"Tools for Weight Loss"*, that looks at the variety of diets (FODSMAPS, SCD, Mediterranean, Metabolic Effect, etc.) to help you discern which type of diet might best meet your patient's individual needs.

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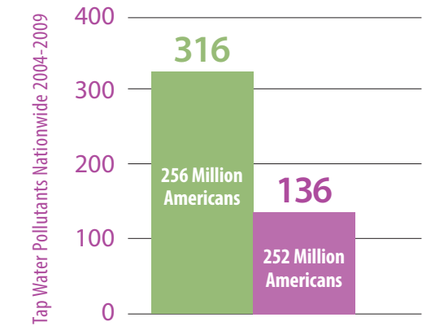
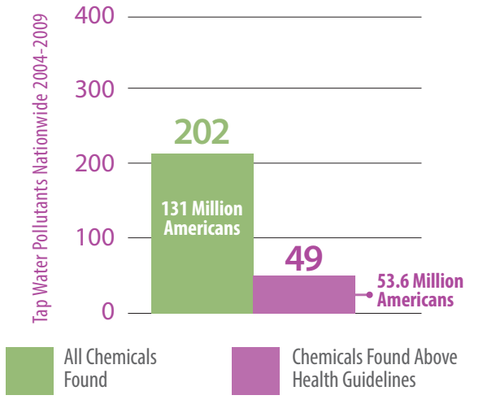
Tap Water Contaminants

Since 2004, at least 131 million Americans received tap water polluted with unregulated contaminants.

All Chemicals In Tap Water



Unregulated Chemicals in Tap Water



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Balance the Digestive Flora

If your patient has eaten a standard American diet, been exposed to multiple rounds of antibiotics, chronic stress and/or chronic NSAID use, etc., they likely has some levels of dysbiosis. Another way to gauge whether or not your patient might have excess pathogenic or opportunistic flora is if they have IBS, IBD, autoimmune disease, diabetes, cardiovascular disease, asthma or food sensitivities, as these all have increased rates of dysbiosis. You have nearly 10 pounds of bacteria in your gut that serves to support digestion of your foods, synthesize B vitamins and vitamin K, produce ATP from non-digestible carbohydrates, inhibit intestinal pathogens, deconjugate bile acids, enhance lactose tolerance and glucose balance, stimulate and modulate the immune system (balance TH1/TH2 responses), produce anti-microbial substances, maintain mucosal barrier integrity and metabolize xenobiotics. These are just some of the activities of healthy gut flora.

Pathogenic bacteria release endotoxins (particularly the lipopolysaccharides from gram-negative bacteria) that have multiple effects: impairing optimal immune function, impeding nutrient absorption (and even turn nutrients into toxins), damaging mitochondria, increasing systemic inflammation, weakening the gut barrier and central to this discussion, significantly increasing the toxic load that the liver must metabolize. Elevated lipopolysaccharides/LPS levels leads to a reduction in glutathione production as well as a significant reduction in function of cytochrome P450 enzymes, reducing Phase 1 detoxification.[12] Phase 2 detox is also compromised with elevated LPS as it down-regulates glutamate-cysteine ligase and reduces synthesis of SAMe and the methyl groups available for methylation.[13]

You can chose to treat based on symptomatology and clinical presentation or opt for laboratory testing to help identify the specific culprits. The Indican test is a urine test that gives a simple screening tool for generalized dysbiosis. Breath testing is also available to help identify small intestinal bacterial overgrowth/SIBO. Another option is blood testing that measures LPS IgM, IgG and IgA antibodies levels, which are elevated in dysbiosis. There are also a variety of stool tests available that not only test for pathogenic or opportunistic overgrowths of bacteria, yeast and parasites but also some functional testing to give one an idea of pancreatic function, absorption and inflammation. Some tests also provide sensitivity testing that will guide you to exactly which therapeutics (both antibiotics and nutraceuticals) will be effective for the specific pathogenic overgrowths found on testing.

Rebalancing and Healing the Digestive Tract Requires a Multi-prong Approach

In my opinion this should include: weeding the pathogenic microbes; agents to bind the sharp increase in endotoxins released during the weeding/killing process; the addition of beneficial flora to help repopulate the gut; and finally, therapeutics that promote healing the epithelial cells lining the GI tract. Designing a regimen that works well might include weeding and binding agents during the day and reseeding and healing the digestive tract in the evenings. Here are a just a few examples in each category to consider. This is by no means an exhaustive list of options. Keep in mind that it is often helpful to start slowly and work up to optimal dosing.

Beneficial Flora Functions	Endotoxins from Dysbiosis
Digestion of Food	Impair Immune Function
Synthesis of B Vitamins & Vitamin K	Impede Nutrient Absorption
Produce ATP	Damage Mitochondria
Inhibit Intestinal Pathogens	Increase Inflammation
Deconjucate Bile Acids	Weaken Gut Barrier
Enhance Lactose Tolerance & Glucose Balance	Reduce Gluthathione Production
Stimulate Immune Function Modulate	Impair Cytochrome p450 Enzymes
Th1/Th2 Responses	Reduce SAMe Synthesis
Maintain Mucosal Integrity	Down-regulate Glutamate-Cysteine Ligase
Metabolize Xenobiotics	Impair Methylation

Weed with Antimicrobials

- Oregano oil: 300-600 mg, twice daily (with food)
- Berberine/hydrastis/gentian combo: 2-4 caps, twice daily (with food)
- Artemesinin: 5 ml at 40 mg, twice daily (with food)
- Garlic or Allicin: 500 mg, twice daily

Bind the Endotoxins

- Fiber: 2 grams, three times daily
- Charcoal, clay combo: 2 caps, three times daily (1 hour away from medications)

Reseed with Probiotics

- *Lactobacillus* species: ~ 20-40 billion daily
- *Bifidobacterium* species: ~ 40 billion daily
- *Saccharomyces boulardii*: 5-10 billion (if indicated)

Feed with Prebiotics

- Whole food diet—high vegetable intake
- Chicory, asparagus, artichokes
- Raw dandelion greens, raw garlic & unripe bananas

Healing the GI tract

- Butyrate: 3-4 grams daily, in divided doses
- DGL: 250 to 500 mg, three times a day
- Glutamine: 2 grams, three times a day
- Vitamin A: 25,000 IU daily (with food)
- Curcumin: 600 mg, twice daily (with food)

Additional Considerations

- Optimal HCL and pancreatic enzymes

Length of treatment will vary depending on the individual's level of dysbiosis, effectiveness of therapeutics and dosing, compliance to treatment protocols, stress management, medications, nutrient status, length of symptoms/illness, etc. The cells of the GI tract turn over very quickly and length of treatment might be weeks while for others it may take many months to achieve healthy GI function. It is also be helpful to rotate antimicrobials with lengthy treatments. Repeating tests will help you discern progress and guide length of treatment.

Once the digestive tract is functioning optimally, you can then move forward with a robust detoxification plan. Part of the beauty of using a 'preparing to detox' strategy is that it reduces the risk of mobilizing toxins that the body can't safely metabolize (which would cause more harm), leading to a much more effective detox. This gives the patient time to become more savvy on reducing environmental exposures prior to the actual detox. Luck favors the prepared.

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For more on Detox read
Using Genomics to Maximize Detox **in**
Hot Topics on page 18 in this issue!

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Using Genomics to **Maximize Detox**

By Bonnie Nedrow, ND

The field of genomics is launching medicine into a new era where an individual's genetic code is used to create unique treatments. Drug companies are developing designer drugs and patients are tracking personal health risks. Soon all health care professionals will either be versed in genetic applications or will be prompted to be knowledgeable by their patients.

One fascinating area in the interface of genetics and medicine is single nucleotide polymorphisms (SNPs). SNPs are solitary nucleotide substitutions that alter the function of specific genes. They provide powerful clues as to why people may experience varied reactions to the same nutritional and chemical exposures.[1] These clues can help refine our choice of therapeutics to epigenetically alter gene expression and restore balance in our patient's health.

Depuration is one of the cornerstones of naturopathic medicine. In our modern world of ever-increasing exposure to man-made chemicals, the need for avoidance and removal of toxicants has never been greater. Knowledge of how SNPs impact biotransformation of chemical compounds allows us to create individualized detoxification (also referred to as depuration) treatment plans.

While all cells have the capacity to process toxic compounds and eliminate waste, hepatic biotransformation is the hub of chemical metabolism. In the liver, lipophilic compounds are first degraded in phase I via the cytochrome p450 system. Phase I produces intermediates that are more reactive and therefore more damaging than the original toxin. Phase II conjugates these toxic intermediates into hydrophilic compounds. Phase III is the removal of end products to the extracellular environment via efflux pumps and ultimately their excretion in urine and bile.

To avoid flooding the system with toxic intermediates, it is essential to balance phase I and II enzymes. One fascinating pattern of SNPs in biotransformation is that polymorphisms in phase I tend to speed up the enzyme while polymorphisms in phase II tend to slow down transformation. Combinations of key SNPs may increase an individual's susceptibility to chemicals through overproduction of toxic intermediates.

There is an abundance of research on the health impacts of specific SNPs. In addition, many chemical and nutrient substances have been identified that induce, suppress or are substrates for hepatic enzymes. A foray into the research can begin with enzymes that meet the following criteria: They are known to be key players in depuration, there is a plentiful body of research and they are compounds that are reported on available tests.

CYP1B1 is one of the key players that currently meets the above criteria. It is overexpressed in a wide range of human cancers, including breast, colon, lung, esophagus, skin, lymph node, brain and testis. This enzyme is involved in estrogen metabolism and primarily hydroxylates E2 at the C-4 position, producing a carcinogenic estrogen intermediate[2]. CYP1B1 is also an important metabolizer of chemically diverse carcinogenic compounds. It is inducible by cigarettes, BPA and dioxin.[3] Induction speeds up enzymatic activity and contributes to increased toxic intermediates, especially when a person is also exposed to the compounds metabolized by CYP1B1.

In estrogen metabolism, CYP1B1 catalyzes 17-beta-estradiol to the catechol estrogens 2-OHE2 and 4-OHE2. The phase II enzyme, catechol-O-Methyltransferase (COMT), methylates these carcinogenic intermediates and produces the less toxic compounds methoxylated estrogens[4]. Individuals with the wild type COMT Val/Val genotype have a three- to four-fold higher activity of the COMT enzyme than those with Met/Met genotype. Heterozygous Val/Met exhibit intermediate enzyme activity.

Many phytonutrients can be used to modify the imbalance of a genetic pattern that accelerates phase I estrogen metabolism via CYP1B1 SNPs, combined with COMT Met/Met genotype that slows phase II metabolism. By manipulating epigenetic triggers, we can shift estrogen metabolism in an individual to reduce risk of overproduction of carcinogenic intermediates.

However, it is crucial to remember that SNPs are clues not formulas. As has been stated by many astute clinicians versed in the analysis of SNPs and disease, "treat the person not the SNP". Tests providing the genomic pattern must be coupled with tests showing phenotypic outcomes. An extensive environmental history, with a timeline that illustrates nutrition habits and chemical exposures over the patient's lifespan, will also be useful.

There are many excellent tests to consider. An affordable option for SNP testing is 23andMe. There are several free sites, such as Genetic Genie and StrateGene to analyze the results. Next choose functional tests to assess current areas of concern based on the patient's chief complaint and presenting symptoms. You may also want to order toxicant panels, such as urine toxic metal test or an extensive serum test that looks at a variety of toxicants. Panel choice can be determined based on the history of exposure, both current and past, and your patient's presentation.

My favorite functional test is a hepatic panel including AST, ALT, GGT and bilirubin. While there are more sensitive and specific liver function tests available, its affordability allows for repeat testing to assess treatment. GGT in particular has been suggested to be a biomarker for xenobiotic exposures and body burden. Moderate elevation of GGT, within its normal range, has been linked to various chemicals including lead, cadmium, organochlorine pesticides, dioxin[5] and PCBs[6] .

Lab	Optimal Range
AST	16-24 U/L
ALT	16-24 U/L
GGT	8-12 U/L
Bilirubin	< 1.0 mg/dL

Many foods, herbs and supplements traditionally found in naturopathic depuration protocols can epigenetically alter SNPs. For example, cruciferous vegetables are an excellent substrate for glutathione metabolism and also induce CYP1A2. For individuals with a CYP1A2 SNP, cruciferous vegetables could lead to a net increase in carcinogenesis. However, adding apiaceous vegetables and herbs (carrots, celery, parsnips, dill, fennel, cumin, caraway & coriander) which block CYP1A2, allows for a net reduction in CYP1A2 with an induction of glutathione metabolism.[7]

Antioxidants of all types have an impact on glutathione metabolism. For individuals with null GSTT1 and/or GSTM1, higher doses of vitamin C can help compensate. Even a modest amount of supplemental vitamin C, such as found in a multivitamin, was shown to compensate for these SNPs.[8] In an elegant study of smokers, 8-week grape juice supplementation significantly decreased DNA damage, even in individuals with GSTM1 and GSTM2 null genotypes.[9]

Many other phytochemicals from foods and herbs have the capacity to slow down phase I while speeding up phase II. These compounds have long been recognized as healing substances with powerful phytochemicals. It is exciting to explore their genetic impact at the enzyme level. Some familiar players in this category are resveratrol, genistein, quercetin, naringenin, and extracts from green tea, black tea, apples, blueberries and chokeberries.[10]

In 2017, we are in the infancy stage of understanding how xenobiotics and phytonutrients interact with the human genome.[11] New research is being conducted daily, expanding this database and sometimes refuting what we thought we knew. At other times, this line of research gives greater weight to historic depuration practices. In the end, there is no gong back; the future is here to stay.

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Probiotics: Are You Thinking About Your Microbiome?

By Lisa Murray, RDN, LD

Known as our microbiome, a wide variety of microorganisms inhabit almost every part of the human body, living on the skin, in the gut and in the nose. Most of the time, these microbes live in harmony with us, providing vital functions essential for our survival. Having normal healthy gastrointestinal bacteria is important in maintaining good health and through extensive research, we now have a very good idea of what is normal for a healthy Western population. It has become known that there are many factors that change the composition of our gut microbiome, including the foods we eat, how we cook them, the drugs we take, our environment and even stress, which alters our body chemistry and thus, our microbiome. We are beginning to understand how changes in the microbiome correlate with health and disease.

Research has shown that there is even a link between our mood and our gut bacteria, but like the chicken and egg, it has not yet been definitively discovered which has the first effect. The bacteria that comprise our microbiome are in us but not of us. We are in relationship with our microbiome and while this may cause a few people to take pause, it may be the most intimate relationship we can possibly have. Our microbiome is affected by our thoughts, our feelings, our breath, our movements, what we eat, what we drink and our state of health. Research has shown that our microbiome reacts and responds and affects us in return, but despite its important effects, the mechanisms by which the gut microbial community influences the host's biology remain fairly unknown. Unfortunately, we are typically unaware of how our microbiome is responding, changing and affecting us nor do we think much about it unless we experience unpleasant GI symptoms.

The composition of our gut flora is constantly changing. Toxins, drugs (like antibiotics or antacids), poor diet and various traumas can seriously disrupt the normal healthy balance of gut bacteria and end up favoring the overgrowth of species which have negative health effects. Probiotics can help to "rehab the community" by boosting the population of "beneficial" bacteria and help restore a healthier balance.

Researchers currently define a probiotic as a live microorganism, which when ingested in adequate amounts confers a SPECIFIC health benefit. Researchers seek to relate a SPECIFIC health benefit to a SPECIFIC strain of microorganism to better understand and utilize probiotics in a scientifically and medically meaningful way, that is, to treat a symptom, illness or disorder/disease. It has been found that different strains of bacteria in a given species, say *Lactobacillus plantarum*, do not always share the same properties, characteristics and actions. This means that although one strain of bacteria has a proven action or characteristic, it does not mean that all other strains within that species will too, even if they are closely related. When identifying new probiotics for medical use, researchers are looking to answer these three questions:

1) What is the specific organism (strain)?
2) What is the "adequate amount" to take?
3) What is the health benefit?

For example, *Lactobacillus rhamnosus gg*, also known as *Lactobacillus gg*, is an extremely well researched probiotic strain. It was patented in 1985 and there have been numerous studies proving more than 44 health benefits. *Lactobacillus gg* has extremely good intestinal wall adhesion, promoting the colonization of other beneficial strains which "play well together" in the microbial community. *Lactobacillus gg* is best known for helping resolve diarrhea either from illness or from antibiotic use and is used extensively in pediatric as well as adult populations.[1]

There are thousands of different probiotic products on the market today. Researchers and experts in this field encourage people to use specific strains that have been researched and found to confer a specific benefit or action. The vast majority of probiotic products contain strains of bacteria normally found in a healthy GI system or frequently found in fermented foods, though each strain may not be individually researched. Does that mean they are ineffective? Not necessarily.

As any clinician will tell you, there are many benefits to taking a high-quality diverse probiotic to boost the population of normal, good bacteria in your GI system, and patients experience and report beneficial outcomes. But each person will have their own unique response to any given product and it may be helpful to try different products when looking for the greatest benefit. Also, it may be worth including in the treatment plan those strains which have been researched and have shown clinical effectiveness for particular health issues. We plan to write more about this topic in upcoming issues of *The Element*.

General research consensus is that probiotics are very safe and currently there is no evidence that you can take "too much". However, there are exceptions as researchers believe that probiotics are contraindicated for immunocompromised individuals, including those undergoing cancer treatment.

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Other sources for this article:

- *Probiotic Advisor: https://www.probioticadvisor.com/*
- *International Scientific Association for Probiotics and Prebiotics: http://isappscience.org/*

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Natural Personal Care

The Top 3 Reasons You Should Offer it in Your Dispensary

By Sarah Cook, ND

Most integrative practitioners sell dietary supplements to patients, but very few sell personal care products. Why is this? Is it because we are trained to treat illness from the inside out? Is it because we believe that personal care products do not affect human health? Is it because we don't think our patients will buy them? I would challenge all of these questions. A truly holistic approach to medicine treats not only from the inside out but also from the outside in. Following are three compelling reasons why all integrative practitioners should offer personal care products in their patient dispensaries.

#1 Body Burden

Contaminated soil, pesticide-laden foods and total body burden are not new concepts to integrative practitioners. Some test patients for exposure to heavy metals or environmental pollutants. Some prescribe detoxification protocols. Some follow the 4 R's protocol, beginning with removal of irritants. Most agree that toxic exposure interferes with healing—it is an obstacle to cure. Minimizing exposure to environmental toxins is foundational to naturopathic medicine, functional medicine and any other therapeutic approach that treats the underlying cause of disease.

Toxins are present in our air, water, soil, food and yes—even our personal care products. More than 10,000 chemical ingredients are used in personal care products, none of which require premarket approval or safety testing by the FDA. The average adult uses nine personal care products each day, containing 126 unique ingredients.[1] Babies and children are routinely slathered with diaper creams, lotions and sunscreen.

Personal care products are applied topically, but the ingredients cross the skin barrier—and many of these ingredients are suspected carcinogens or endocrine disruptors. Parabens, the most widely used preservatives in cosmetics, shampoos, lotions, deodorants and toothpaste, have estrogenic effects in human breast cancer cells.[2] Phthalates, used in hair sprays, lotions, soaps and perfumes, may have developmental and endocrine disrupting effects.[3,4] Triclosan, an antibacterial in hand sanitizers, is present in the urine of 75% of Americans and can disrupt thyroid and other hormones.[5,6] Chemical exposure from personal care products is a pervasive problem and may have unforeseeable effects on human health.

#2 Consumer Demand

I have worked on the front lines of retail, selling health and beauty products in an integrative pharmacy. Companies know that impulse buys mean a greater bottom line at the end of the day, so we were encouraged to suggest products for customers to add to their cart. Lotions, lip balms, hand wipes and breath fresheners were common add-on products. I was continually amazed at the willingness of customers to add things to their order as well as the amount of money they would spend on things like facial creams, baby lotion, mouthwash and lipstick.

According to a report by the *Business Insider,* personal care products are a $300 billion dollar industry in the United States, making these products second only to groceries in total annual retail sales.[7] When retail sales of personal care products are analyzed by segment, consumers spend the most money on cosmetics and oral care, followed by shampoos, soaps and skin care.[8]

Natural and environmentally friendly products make up a significant share of the market. A 2016 survey found that consumers purchase natural beauty products because they are cruelty free, eco-friendly or free of artificial ingredients.[9] Buzzwords like cruelty-free, animal-friendly, earth-friendly, eco-friendly and organic speak to the deeply held beliefs of people who value natural products.

One interesting trend related to personal care product sales is that more and more Americans are purchasing these items online. About 36 million US consumers shopped online for health and beauty products during the spring of 2014, which was an increase from 20 million in 2010.[10] Of these online shoppers, 38% said they signed up for a subscription service. The trend toward online and subscription sales opens a unique opportunity for practitioners who have a virtual dispensary—particularly if that dispensary allows for automatic reorder of products.

#3 Value-Added Service

"The art of medicine consists in amusing the patient while nature cures the disease." Originally stated by Voltaire, this has become a popular sentiment among integrative clinicians.

You may prescribe a homeopathic remedy, a therapeutic diet and nutritional supplements, but patients want to feel that they are actively and directly treating their symptoms. You can add to these protocols (and amuse the patient) with salves for a rash, spritzers for acne or creams for sore knuckles. Offering nontoxic and therapeutic personal care products adds value to your service. Consider the following case examples.

Parents are quick to purchase products that will ensure the health and safety of their babies, making them some of the most committed consumers of natural products. A child with ADHD might calm down more easily at night with a lavender bubble bath that is free of artificial fragrances or dyes. A baby with diaper rash may heal more quickly with a zinc oxide cream that is fortified with organic calendula and chamomile extracts. A child with eczema might be soothed by a milk and oat bath with organic essential oils. The family that just received notification about lice at school may be thrilled that they can purchase an anti-lice hair mist.

For adults, personal care options are endless. You might offer a probiotic soap bar, a neem lip balm, a Manuka honey body lotion or a fragrance-free hand sanitizer. You can support oral health with probiotic lozenges and natural toothpastes. Patients with high stress and anxiety will appreciate portable packets of cleansing wipes scented with a variety of essential oils: lavender for calming, mint for energy and rosemary for focus. Women concerned about aging may want a sun repair night cream with chicory and mango extract or an exfoliating adzuki bean and rose polishing powder.

Offering personal care products in a patient dispensary reduces toxic body burden, boosts sales and adds value to the services you already provide. Choose products that fit your patient population. Display them in your dispensary, offer samples or simply sell the products through your virtual storefront.

An Add-On That Adds Up

See the financial benefits for your practice when your patients add quality personal care items to their cart:

25 patients per week
x 2 items per order (average)
@ $35 per item @ 20% profit margin
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Over $1,400 per month in added practice revenue!

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Vitamin D

Effects On Gross Motor Development of Healthy Term Infants

By Alan Gaby, MD

Reviewed by: Alan Gaby, MD

Author: Wicklow B, et al

Reference: Impact of vitamin D supplementation on gross motor development of healthy term infants: a randomized dose-response trial. Phys Occup Ther Pediatr 2016;36:300-342.

Design: Randomized, double-blind, placebo-controlled trial.

Participants: Fifty-five healthy, term breastfed infants in Montreal, Canada.

Study Medication and Dosage: Vitamin D_3 at a dosage of 400, 800 or 1,200 IU per day, starting at 1 month of age and continuing until 12 months of age.

Primary Outcome Measure: Motor performance at 3 and 6 months of age as assessed by the Alberta Infant Motor Scale (AIMS).

Key Findings: AIMS scores did not differ at 3 months. However, total AIMS scores and sitting sub-scores were significantly higher (better) at 6 months in infants receiving 400 IU per day of vitamin D than in those receiving 800 and 1,200 IU per day ($p < 0.05$).

Practice Implications: Breast milk usually contains inadequate amounts of vitamin D to meet the needs of the infant, even when the mother is taking a moderate dose of supplemental vitamin D. For that reason, the American Academy of Pediatrics recommends that all breastfed infants, regardless of whether they are being supplemented with formula, receive 400 IU per day of vitamin D, beginning within the first few days of life and continuing for the duration of breastfeeding. That dose of vitamin D has a long history of safe use in infants and children and has been associated with improved bone mineral status. However, the results of the present study suggest that doses greater than 400 IU per day may be undesirable for infants. In this study, dosages of 800 or 1,200 IU per day, as compared with 400 IU per day, were associated with subtle impairments in motor development.

Reviewed by: Alan Gaby, MD

Author: Atsukawa M, et al

Reference: Effect of native vitamin D_3 supplementation on refractory chronic hepatitis C patients in simeprevir with pegylated interferon/ribavirin. Hepatol Res 2016;46:450-458.

Design: Randomized controlled trial.

Participants: One hundred fifteen patients with chronic hepatitis C genotype 1b and the non-TT variant of the IL28B gene (i.e., the GG or TG variant).

Study Medication and Dosage: All patients received pegylated interferon alpha-2a (PEG IFN), ribavirin and 100 mg per day of simeprevir for 12 weeks followed by PEG IFN and ribavirin for 12 weeks. Patients were also randomly assigned to receive vitamin D or no vitamin D (control group). The vitamin D group received 2,000 IU per day of vitamin D for 4 weeks prior to the start of drug therapy; this was continued during the first 12 weeks of drug therapy.

Primary Outcome Measure: Sustained virological response, which was defined as the absence of detectable hepatitis C virus RNA at 24 weeks after the end of treatment.

Key Findings: The sustained virological response rate was significantly higher in the vitamin D group than in the control group (70.2% vs. 37.9%; $p < 0.001$).

Practice Implications: Protease inhibitors such as simeprevir, when used in combination with PEG IFN and ribavirin, produce a sustained virological response rate of about 90% in patients with chronic hepatitis C genotype 1b who have the rs8099917 genotype TT of the IL28B gene. However, the sustained virological response rate is only about 50% in patients with chronic hepatitis C genotype 1b who have the non-TT genotype of rs8099917. The results of the present study indicate that vitamin D supplementation increased the success rate of conventional drug therapy in the latter subset of patients.

When genetic testing is available, vitamin D should be administered to patients with hepatitis C who fit the appropriate criteria described above. Whether vitamin D should be included as a component of all hepatitis C treatment regimens is less clear. In previous research, vitamin D at a dose of 1,000-2,000 IU per day increased the response rate to PEG IFN and ribavirin in patients with hepatitis C virus genotypes 1, 2 or 3. In contrast, vitamin D tended to interfere with the response to PEG-IFN and RBV in patients with hepatitis C virus genotype 4 (which occurs primarily in the Middle East and Africa).[1] Protease inhibitors, which have recently revolutionized the treatment of hepatitis C, were not administered in those studies.

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Dr. Alan Gaby is internationally recognized as an expert in nutritional therapies. He is the author of the textbook *Nutritional Medicine*.

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Neem:
Medicinal Uses and Contraindications

By Lisa Murray, RDN, LD

Neem *(Azadirachta indica)* is a large evergreen tree endemic to the Indian subcontinent, which is prized for its medicinal value. Introduced to many areas in the tropics, the neem tree has been a mainstay in Ayurvedic, Siddha and Unani medicine for thousands of years.

Every part of the tree—its roots, bark, resin, gum, twigs, leaves, seeds, flowers and fruit—contain chemical compounds with extensive therapeutic qualities, including antimicrobial (antiviral, antifungal, antibacterial), anti-inflammatory, antihelminthic, immunomodulatory , hepato-nephro-neuro protective and even anticancer properties.

Traditionally, slender neem twigs (called datun) are chewed as a toothbrush and then used as a tongue cleaner, which has been a daily practice in India, Africa and the Middle East for centuries. Most of India's rural population still start their day with the chewing stick, while in urban areas neem toothpaste is preferred. Neem twigs are still collected and sold in markets for this use and in rural India one often sees youngsters in the streets chewing on neem twigs. It has been found to be as effective as a toothbrush in reducing plaque and gingival inflammation.[1]

Neem leaf extract is a potent antioxidant used internally as an antimicrobial as well as an anti-inflammatory and antipyretic. There are many studies evaluating its use as a cancer preventive.[2]

Neem oil (or neem seed oil) is cold pressed or extracted from the seeds of the olive-like fruit. It is a thick oil which can vary in color; it can be golden yellow, yellowish brown, reddish brown, dark brown, greenish brown or bright red. It has a strong and somewhat unpleasant odor. Neem oil is antibacterial, antifungal and antiviral as well as anti-inflammatory and antioxidant. It is composed mainly of triglycerides and contains many triterpenoid compounds. Because it is a natural substance, the composition varies, though it is usually between 25-55% oleic acid, which is an omega-9 fatty acid, and between 6-16% linoleic acid, which is an omega-6. Research suggests that the high fatty acid content may be responsible for its effectiveness in treating skin disorders. Eighty percent of India's supply of neem oil is used by neem oil soap manufacturers (soaps can be made with up to 40% neem oil). Not only antimicrobial, it's also very soothing and moisturizing.

Neem oil has a wide spectrum of preventive and curative uses. It can be applied topically to fungal and bacterial skin infections as well as used to heal skin disorders of every type. Neem may have a positive effect on chronic skin conditions that have not been successfully helped through conventional medical treatments. Acne, dry skin, dandruff, psoriasis, eczema, herpes and ringworm have all been shown to respond to neem oil salves and lotions. Because Ayurveda is a health practice which stresses prevention as much as treatment, neem oil is also incorporated into soaps, shampoos for maintaining healthy scalp and hair, balms, creams, cosmetics and oral hygiene products like toothpaste (due to its potent antimicrobial properties). Neem oil is an insecticide and insect repellant, useful in shampoo and body care products to repel fleas, lice and mites for both people and pets, which is very important in tropical climates where pests thrive.

Contraindications

Neem extracts and neem oil have been found to prevent implantation and may even have an abortifacient effect.[3,4] Neem oil has traditional use in India as a spermicide. Neem oil and other neem products, such as neem leaf extract, capsules and tea, should not be consumed by pregnant women, women trying to conceive or children. Internal use of neem seed oil can be potentially toxic and should not be used internally in large doses or for long periods of time. In India, where neem oil is widely used, there are case reports of neem oil poisoning in infants who were a given single doses of neem oil (few drops to 5 ml) as well as adults presenting with features of toxic encephalopathy, metabolic acidosis and hepatic toxicity.[5,6] Both infants and adults recovered completely with supportive treatment. Sundaravalli et al., in a case series of 12 children with neem oil poisoning, who were given a single dose of neem oil (25-60 ml), reported fatality in 10 cases with features of toxic encephalopathy and metabolic acidosis.[3] In adults, short-term use of neem oil in minute quantities is safe, but high doses may cause toxic encephalopathy.

The bottom line is that neem provides extremely useful, safe and versatile plant medicine. However, it is also very potent and it's important that practitioners know and understand what part of the plant they are using and how to properly use it.

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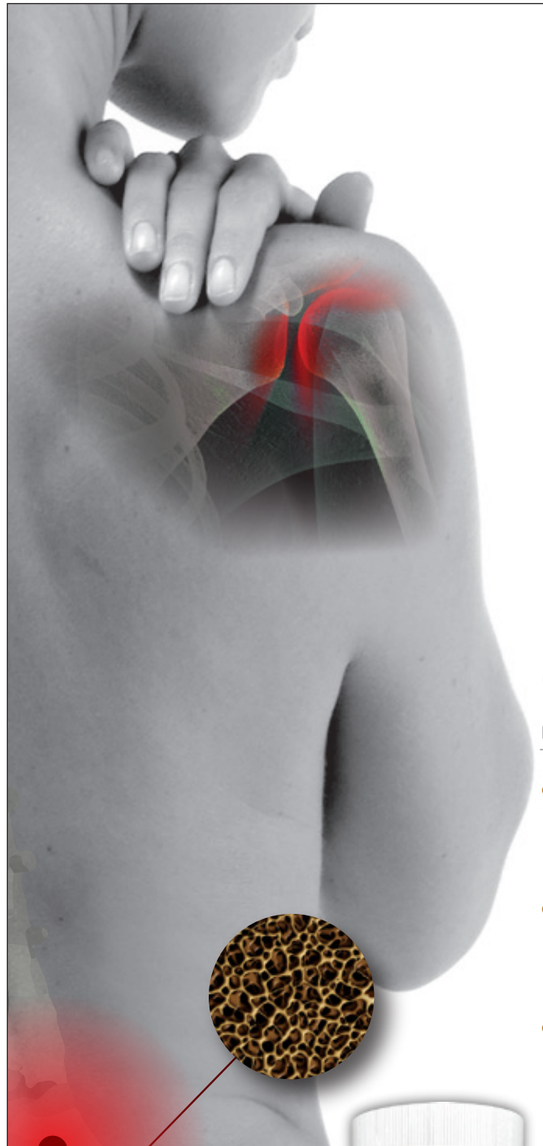

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What is a **Supplement Owl?**

By Lisa Murray, RDN, LD

Consumers and regulatory agencies alike are concerned about supplement quality. So, there's a new kid on the block called the Supplement OWL, which stands for "Online Wellness Library". The OWL is a new registry of dietary supplements, intended primarily as a tool for regulators and other stakeholders who want to know more about the products being manufactured in the dietary supplement industry. It is an industry-wide voluntary and self-regulatory initiative, spearheaded by the Council for Responsible Nutrition (CRN), which is a leading trade association for the dietary supplement industry. Self-regulation shows that the industry is willing to ensure its products comply with the law and demonstrates a desire to improve the industry from within.

CRN is bringing companies and industry trade associations together to create a comprehensive product registry which will help increase transparency and demonstrate accountability within the supplement industry. Regulators, in the interest of the consumer, want and should know about the products and ingredients currently available in the marketplace, and this new program offers access to information on specific dietary supplement products available in the U.S. The new program also helps fill the same need for researchers, industry members, health professionals, retailers and other consumers.

The Supplement OWL has received support from the Consumer Healthcare Products Association (CHPA), the Natural Products Association (NPA) and the American Botanical Council. The way it works is companies that manufacture dietary supplements upload the labels for their products into the registry database. Companies submitting their labels are required to provide manufacturing and packaging facility contact information, which will be accessible only to the FDA. This information is generally considered confidential and will not be made public.

The Supplement OWL will eventually have two tiers of information. Tier 1 includes the product label and information about the product, such as ingredients, dosage, product claims and contact information. Tier 1 is available online for viewing by anyone who wants to search the database. Eventually there will be a Tier 2, which will allow companies to include information and supporting documentation about their quality practices.

This information will be controlled by the product marketer and only those with permission will be able to view those materials.

Dependable, high-quality supplements are not only good for the end user, it's best for the continued freedom and survival of the supplement industry. Although intended primarily as a tool for regulators, it is anticipated that retailers and other stakeholders will also find great value in the Supplement OWL. For more information, you can visit http://www.supplementowl.org.

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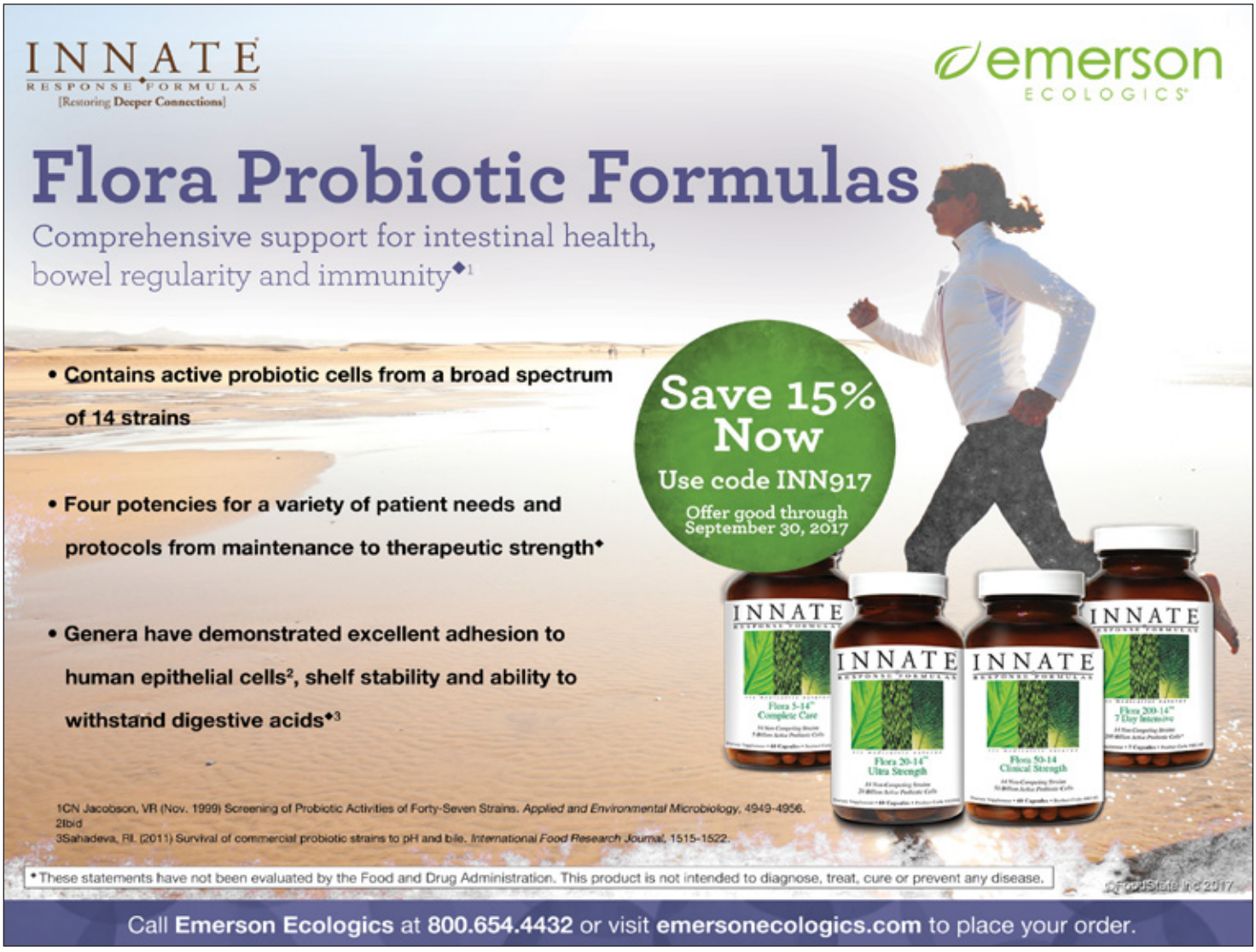

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