

## September 2011 Issue | Gerard Mullin, MD & Kathie Swift, RD Authors, The Inside Tract

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Welcome to *Functional Medicine Update* for September 2011. Functional gastroenterology. Oh boy, there's a long, polysyllabic term. What is this all about? What does it mean? How does it differ from traditional views of gastroenterology? What role does it have to play in the management of a variety of chronic, age-related diseases or dysfunctions? How does it complement traditional gastrointestinal pathology and pharmacology? What might be the future of the field of gastroenterology as it relates to the emergent view of functional disturbances? That's a lot of questions and that's what we're going to be discussing in this issue.

### **Functional Gastroenterology: A Clear Example of Applied Systems Biology**

From my experience in this field, I would say the topic of functional gastroenterology incorporates more of a unique understanding of systems biology at an applied level than any other single area that one might choose. Cardiology, or neurology, or obstetrics/gynecology, or any other subspecialty in medicine does cut across organ systems and all have a systems biology underpinning, but I think the gastrointestinal system is uniquely framed and a good starting point in our journey into systems biology as it relates to functional medicine.

#### *The Gastrointestinal System Has Many Roles*

We know that the gastrointestinal system has a very strong mechanical role as a digestive organ: it breaks big stuff into small stuff. We also know that the gastrointestinal system is the seat of the associative immune system. Fifty percent of the immune system is clustered around the GI tract. In his book titled *The Second Brain*, Michael Gershon told us the gastrointestinal system represents the second brain due to the enteric nervous system and its production of various neurotransmitters and neuromodulators and how it may interact with the neurotransmitters from the brain.<sup>[1]</sup> This conceptual framework--that the GI system has multiple roles to place across multiple organ systems--is a model for a systems biology approach to thinking. It may present, in the patient in the exam room, as a GI problem, but it connects to all these other aspects of function in the organism.

That will be the theme that we'll be discussing over the course of our interview with our two thought leaders—key opinion leaders—who have (cumulatively) more than 60 years experience in this field. With that in mind, let's move into the heart of the matter—actually, it's the gastrointestinal digestion of the matter—with our clinicians/ researchers of the month.

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INTERVIEW TRANSCRIPT

## Clinicians/Researchers of the Month

Gerard Mullin, MD

Kathie Swift, MS, RD, LDN

September 2011

This portion of Functional Medicine Update is the cornerstone of each issue, and that's our interview with our clinician and/or researcher of the month. I'm going to interview two luminaries this month and have kind of a round-robin discussion with them. They are experts in gastrointestinal physiology and the functional medicine approach, and also the interrelationship of that to diet, nutrition, and this whole intercommunication of the gut to nutrition. Who am I speaking about? I'm speaking about two luminaries that have been in this field for 30-plus years each: Dr. Gerry Mullin, who, as many of you know if you have been following the functional medicine field for some time, is considered one of the cornerstone gastroenterologists. He is an associate professor of medicine and Director of Integrated GI Nutrition Services and Capsule Endoscopy at Johns Hopkins Medical School. Gerry and I go back, actually, to probably the early 80s. I think he might have been a medical student at the time we first met. He finished his medical training at New Jersey Medical College. He went on Mount Sinai for his residency and Johns Hopkins for his fellowship.

Kathie Swift is our other expert. Kathie is a registered dietitian. I would say Kathie's is probably the principal premier background in dietetics and functional medicine anywhere in the world. Kathie has been a leader in developing functional medicine applied to nutrition at the clinical level. Kathie was head of nutrition services at Canyon Ranch. She has also worked with Dr. Mark Hyman for many years in clinical practice. And Kathie is also the person who has been in charge of the very, very interesting program that I think most of you are familiar with called Food as Medicine, sponsored by the Center for Mind-Body Medicine. She is just a national leader in dietetics and nutrition as it applies to integrative functional medicine.

These two are, I think, extraordinary prospectors of the yet-to-be-fully understood and found. They are constantly learning and helping guide us in new ideas. Both Gerry and Kathie, welcome to Functional Medicine Update.

GM & KS: Thank you. Thanks for inviting us.

JB: Gerry, let's start with you. We're going to be speaking today about functional nutrition and functional medicine. I think it might be helpful for the listeners if we could start with a review of some of the conditions that a gastroenterologist deals with on a routine basis. This is more than just a piece of plumbing in the body. Could you start with gastroesophageal reflux disease (GERD) and then work down and tell us a little bit about the types of pathologies that a gastroenterologist is concerned about?

Gastroesophageal Reflux Disease (GERD) is the Most Common GI Disorder

GM: Yes, thank you. GERD is the most common GI disorder that we know of, at least in this country. It has been estimated that at any point in time, half the population develop some symptoms of GERD over the course of a year. That's pretty impactful in terms of the number of people who experience these problems. Gastroesophageal reflux disease, as the name implies, is a reflux of gastric contents up into the

esophagus. That can be a combination of acid and also bio- and pancreatic enzymes, all of which can degrade the esophageal mucosa and create symptoms and also complications. When we think about how to approach people with GERD, we think of ways to help coat and protect the lining of the esophagus, and also promote the motility of the stomach and the esophagus to keep the forward flow of enzymes and acid (keep that away from the esophagus). Those are some of the things that we think about when we approach these people. There are certainly natural ways to do that with herbs which promote motility of the stomach, such as ginger, licorice root, and slippery elm.

### GERD and Barrett's Esophagus

JB: I learned recently that GERD has a connection—when it is chronic and long term, and depending upon the severity and the genetic uniqueness of the person—to a condition called Barrett's esophagus. Barrett's esophagus, I found out from some work ongoing at Fred Hutchinson Cancer Research Center in Seattle, is a condition that is associated with the greatest genomic instability in cells that are affected within that tissue type of any known condition. It has huge adverse impact upon the integrity and the patency of our book of life (our genes), which is why it probably has such a high incidence to risk to cancer, and ultimately, then, metastatic cancer that can be very, very life-threatening. It's interesting. It must be something about that caustic environment that leads to this very significant risk to genomic stability. Do you have any thoughts about that?

GM: I think it's a combination of something in the genes, because not everybody develops Barrett's, and not everybody with Barrett's goes on to cancer, so there is something there that is the interaction of the environment (that we are discussing here) in combination with the genes. It could also be that some individuals have greater cytoprotection. Maybe those who don't develop cancer are the ones that have greater antioxidant capacities, or maybe their diets are healthier, so there are a lot of different things that haven't been looked at yet that may have impact on the outcome of that particular condition.

How it develops, interestingly enough, is there is a noxious stimuli through the irritation of the lining by degradative enzymes, which causes an inflammatory response underneath the epithelium. Perhaps that chronic proinflammatory response plays a role in turning on those genes.

JB: I've also heard that GERD is called a "functional gastrointestinal problem" because it doesn't seem to have a specific pathognomic indicator. From a gastroenterological perspective, is that a true statement? That it is more functional than it is tied to a single histopathological origin?

GM: Well, according to classic definitions GERD is a separate entity, but it is also connected to (and very common with) functional gastrointestinal disorders that can include gastroparesis, irritable bowel, and those types of syndromes. Those all seem to connect with poor motility, and any part of the upper GI tract will put you at greater risk for gastroesophageal reflux disease.

JB: So Kathie I'd like to shift over to you. Given what Dr. Mullin just said about the prevalence of GERD, clearly in your experience as a clinical nutritionist/dietitian you've seen many patients who have come in with that as one of the presenting symptoms or part of their symptom profile. What, in your experience, has been the nutritional connection to this kind of a problem?

### Nutritional Approaches to Treating GERD

KS: Well, Jeff, I found that that is highly individualized, and as Dr. Mullin mentioned, often connected to many other things that are going on in the gut. Traditionally we may have a GERD-type diet that eliminates spicy foods, tomatoes, citrus, and certainly we're finding that for a certain individual it varies and this is why creating nutritional plans that really are individualized is important. There are some common gastric irritants. I find that alcohol can certainly be the most incriminating factor. Coffee—you know, we have a lot of people who love their morning brew. Sometimes you can experiment with peppermint. I find that other food antagonists could be dairy products or gluten, and this is really a holistic approach to the nutritional protocol.

#### Atopic Gastritis

JB: Let's move downstream a little bit to the stomach and talk about a condition that is often brought up, atopic gastritis (ARB), which is associated with poor acid secretion from the parietal cells and then that has a downstream effect on absorption. Could you, Dr. Mullin, tell us a little bit about your experience with the prevalence of hypochlorhydria and its association with atopic gastritis?

GM: We do see it on occasion, in particular in those who are elderly, because the older you are unfortunately the capacity to make stomach acid is weaker, and also there are individuals who are afflicted with an autoimmune condition, such as pernicious anemia, where antibodies are attacking the parietal cells and thus rendering an individual less able to make stomach acid. What happens over a period of time is that there will be malabsorption, or an impairment, in the absorption of minerals (iron), which leads to anemia, and also over a period of time the individual may have poor bone development or osteoporosis. So these are concerns that happen long term, and also something I see very commonly is that if you don't have the acid present you need to kill bacteria in the stomach, individuals develop a condition called small intestinal bacterial overgrowth, and that itself runs a whole gamut of symptoms and problems, which now we are finding many different connections to.

JB: Kathie, I know that many people that come in with the GERD condition are on various types of acid-suppressing medications. It could be antacids, or proton pump inhibitors, or something that is blocking the parietal cell production of acid. Have you found that that has any correlation, then, with inability (or let's call it altered digestive capabilities) in some of these things that Dr. Mullin is talking about?

KS: Absolutely. Part of the process as a nutritionist is for me to help uncover some of the dietary triggers that might be aggravating the problem, and also providing the nutritional support with respect to the nutrients that are compromised—protein, for example. They may not be able to break down and absorb the protein as they should when there is a compromised acid problem. Dr. Mullin mentioned small intestinal bacterial overgrowth, and another approach we may employ is limiting foods that may be contributing to the bacterial overgrowth and some of the short-chain carbohydrates that the bugs can be feeding on and such.

#### H. pylori and Peptic Ulcer

JB: Let's move from there down a little bit farther south into the duodenum and talk a little bit about peptic ulcer. Of course, Barry Marshall was iconic (maybe iconoclast that later became iconic) in his recognition of H. pylori. It always seems interesting to me, however, that there are places within the world where H. pylori infection is high but peptic ulcer disease is low. There must be something beyond

that of *H. pylori* infection itself. Gerry, could you tell us a little bit about the emerging view of the peptic ulcer-related conditions in physiology?

GM: It's interesting because up until the discovery of *H. pylori* we didn't really know much about how peptic ulcers developed except for, of course, the noxious stimuli of alcohol, and aspirin, and non-steroidal medications, etc. With the treatments now available, we've seen a decline in some of the peptic ulcers, but unfortunately we still see people who develop complications once they get peptic ulcers. As you know, non-steroidals are very commonly used in this day and age for treatment of pain as front lines of therapy, and that is creating a large market spill for people who need to be medicated for peptic ulcers.

The *H. pylori* itself is readily treatable. It is interesting that half the world's population has *H. pylori*, but only a fraction of them develop problems. So there is something really unique within the host—perhaps even genetic—that we haven't discovered, as to why some develop complications of *H. pylori* and others don't, or perhaps other environmental factors that are triggers or cofactors in disease development.

JB: Kathie, as we take what Dr. Mullin just shared with us and move it over to the nutrition side, let's look at non-steroidal anti-inflammatory drugs (NSAIDs). You undoubtedly have many patients who come in for nutritional counsel that are taking routine doses of NSAIDs for various types of osteoarthritis or other pain-related issues (chronic pain). What does one do if you've got this problem of gastric erosion and you're trying to form a diet and you're trying to manage the chronic pain-related issues?

KS: First off, what we can share is the ability of the body to heal and repair, that the GI tract is resilient, and that food is the ideal medicine and to embark on an anti-inflammatory nutritional protocol that really is plant-centered, that is removing some of the incitants that are fueling the inflammatory cascade. These can be varied depending on the dietary assessment and learning what the person has been eating. It may be that they are fueling the inflammatory process with the wrong types of fats. It may be that they are not eating enough of the antioxidant-rich vegetables and fruits; this is a very, very common deficiency. So by exploring an anti-inflammatory path through the vehicle of food, it really can inspire someone to get on track.

## Irritable Bowel Syndrome

JB: Let's move from there, on our journey heading south, down into the small intestine now and start looking at what I know, as you have already mentioned, Dr. Mullin, is one of the most prevalent functional GI disorders: irritable bowel syndrome (IBS). I think IBS is a term that encompasses many different things: constipation, diarrheal disorders, alternating constipation/diarrhea, gut pain. What's the status of our understanding of IBS these days?

GM: It's very complex. The gut in and of itself is complex, but IBS is just really complex as an entity. It appears that it is a syndrome that develops as an interaction between alterations in our emotional motor system or mind/body processes, but also there seems to be an infectious component. For some people who have been traveling or developing a post-infectious syndrome from food poisoning, that's about 25% of the IBS patients who develop in that manner, while many others have what I described before as small intestinal bacterial overgrowth as one of the lead causes of their symptoms. Once they are treated for their small intestinal bacterial overgrowth and go into remission of that, their IBS symptomatology improves. I have to say that

within the last five years, the two major advances are the discovery of a post-infectious IBS that happens after some type of acquired infection (bacterial in nature, most commonly) or the harboring or misplacement of that bacteria in the small bowel.

JB: From your experience, Gerry, what role, therapeutically, do antibiotics have to play and what role do probiotic and prebiotic supplements have to play with IBS?

GM: Great question. For the treatment of the small intestinal bacterial overgrowth, the gold standard presently is antibiotics, most commonly rifaximin. Here at Johns Hopkins I finished a study that we're in the process of writing up for publication, where we compared some herbs (mainly oregano oil and berberin extract) for the treatment of individual small bowel overgrowth, and we found remission rates comparable to rifaximin. Everybody has different proprietary herbs on the market, and it's something they consider in the treatment of small bowel overgrowth.

Probiotics in and of themselves have been shown in meta-analysis to be helpful for irritable bowel syndrome.[2] Again, as you readdress the microflora and as you balance it out, it appears that you can help people with irritable bowel syndrome.

JB: So, Kathie, let's move to you for a minute for a nutrition perspective. Again, this is one of those big animals in the corner, this IBS issue. I'm sure you see many patients that come in with this as a complaining symptom. Tell us a little bit about how you approach this nutritionally.

Fermentable Oligosaccharides, Disaccharides, Monosaccharides, and Polyols (FODMAPs)

KS: Again, it is looking at all the possible influencing factors. I have found that an emerging dietary approach that has been very, very helpful is limiting the short-chain carbohydrates, referred to as the FODMAPs (fermentable oligosaccharides, disaccharides, monosaccharides and polyols [sugar alcohol]), so foods that are high in fructose: lactose, fructans (wheat is certainly a major source of fructans in the American diet), and, again, sugar alcohols that are commonly found in sugar-free gums and mints. This is an emerging protocol that I've been using and by limiting some of these types of foods, some of the symptoms--pain, and gas, and bloat--can certainly be improved. Uncovering unique food triggers and also exploring a limited FODMAPs approach is important.

JB: That's very good news to use. And by the way, I should mention your collaborative book, which has recent been published: *The Inside Tract, the Good Gut Guide to Great Digestive Health*, which you—Gerry—and Kathie have authored, and which is available now from Amazon.[3] It is really a great publication that takes a lot of these concepts we're talking about and puts it into user-friendly language. I want to refer our listeners to this wonderful resource to follow-up and amplify some of the things we're discussing here. *The Inside Tract* is a great addition to the literature, so thank you both.

Crohn's Disease and Ulcerative Colitis

Let me ask Gerry now, as we move south even a little bit farther into the large intestine and ultimately to the colon: What about these conditions that seem to be increasing in prevalence (at least in the news they are)—Crohn's disease, which has some small and large bowel implications, and inflammatory bowel disease? Can you differentiate between those two for us and how they are seen in traditional

gastroenterological circles in terms of their pathophysiology?

GM: Crohn's is a disease that can affect any part of the gut, from mouth to anus, and ulcerative colitis is a disease that is limited to the colon. That particular disease tends to be very continuous along the colon, whereas Crohn's disease tends to be patchy (in different places). The immunopathologies of the two diseases have differences and similarities. The treatments of those (as least from the immune-biological point of view) have been targeted towards specific cytokines and different signaling pathways that they share in common (at least in pathophysiology).

How one would approach an individual who has those syndromes from a natural medicine point of view would mainly include diet and lifestyle, which are chronic triggers for these diseases. Also looking to make sure they have enough anti-inflammatory nutrients, whether through foods (food-based approaches we'll talk about) or even from a nutraceutical point of view. There are many different inhibitors of a signal transduction pathway called NFkappaB that are available naturally, like vitamin D, and curcumin, and green tea extract. These can suppress the inflammation and some of these have been studied in clinical trials to be quite beneficial for inflammatory bowel disease.

Fish oils have been found to be quite effective for both diseases, and also for ulcerative colitis because those patients appear to be deficient in the short-chain fatty acid, butyrate. Individuals who receive butyrate by enema can go on to remission when they fail other medical therapies, so there is a big link between nutrition and inflammatory bowel disease.

JB: I want to follow on with a question that seems to have been emerging in the literature related to the use of TNFalpha blocking agents like Remicade or Enbrel for the treatment of these types of acute inflammatory conditions of the digestive tract. At one time I thought that it was felt that Crohn's disease was not a TNFalpha-mediated process, yet now there is literature suggesting that you can use these TNFalpha blocking agents for its treatment as well. Is the standard of care now, in an acute case, using these blocking agents, and if so, what kind of relative risk does a patient experience over time on these medications?

#### Debate About Use of TNFalpha Blocking Agents

GM: A very good question. The use of these blocking agents for TNFalpha has been around for awhile. When to use them seemed to be the question. More recently, I guess, many academic individuals and certainly others used this approach for top-down therapy. So they used the heavy biological first in the approach to therapy rather than the "step-up" therapy in terms of stepping up with lifestyle, and diet, and some lighter medications and supplements, and working up to the heavier biologicals when needed. There is debate in our community as to which to use first. Some can argue that in the case of more aggressive disease the biological makes more sense because if their diseases aren't controlled then you need to step up to the highest therapy, whereas for others who have very mild symptoms and are very functional, you may not want to go in that direction right away. We have our own little controversy within our field as to when to use these biological agents.

JB: And what's the relative risk if a patient was to be placed on those over the long term? Are there things that have emerged from your experience that are kind of the risk/benefit part of our decision making?

GM: Yes, I rarely use those medications in my own practice, but what I have seen and what I know of is that patients can develop all kinds of infections. These can range from bacterial infections to the most concerning, which would be tuberculosis, because you are really surveilling and shutting down the immune system. Others have concerns about lymphoma or malignancies. There have been many studies. Some studies show there is a marginal increase in lymphomas and other studies show there is no increase, but we're aware that there may be something out there with malignancies because you are certainly suppressing immune surveillance with this biological-type of approach.[4],[5]

JB: Kathie, let's shift to you and pass the ball over to your court. What kind of diet and nutrition counseling do you discuss with patients that have the ulcerative colitis/inflammatory bowel/Crohn's kind of presentation?

KS: Jeff, this is where a therapeutic, comprehensive elimination diet can be extremely powerful. I usually start with finding out from the individual what they suspect most. What I have also found from years of working with patients with inflammatory bowel conditions is that common aggravating foods are dairy, gluten-containing grains, and FODMAPs, so I typically will limit the FODMAPs, remove dairy and gluten, and I'll support the healing with a medical food that is also providing some targeted nutraceuticals, like glutamine. I just had a patient recently and, not too long ago, her C-reactive protein and other markers were extremely elevated. Interestingly, within one month of dedicated adherence to this type of elimination diet, her gastroenterologist was really kind of shocked at the results. It's quite encouraging that once we uncover the food triggers and support the healing process with nutraceuticals, it can be very, very dramatic.

JB: Gerry, let's bounce the ball back to you. You authored a book that was recently released titled Integrative Gastroenterology, which is a very powerful review of many of the things that you have been touching upon in answering my questions.[6] Undoubtedly, your colleagues in—I'm going to call it—the traditional pathophysiological-based gastroenterology may have looked at this with some jaundiced eye, or may have looked at it with inquiry. How has your work been reviewed by your colleagues and do you think there is some traction that is happening within the field of gastroenterology to look at GI issues from a more functional perspective?

GM: Well, you know Jeff, I meet many individuals in my own field and in the community who are looking for other options in terms of getting people better. But despite their best efforts, there are still challenges in overcoming that onus. The book was just released so I really haven't had much feedback within my own particular field or within the academic community, but many have given me positive feedback about how helpful this book is in their own practices. So I think there could be a paradigm shift in terms of how we can approach these illnesses and how we can change them from a functional perspective and in how we approach people as a whole (a more holistic point of view).

JB: Kathy, let's shift over to you. I think just as physicians often have some pushback on things that are outside their circle of learning, so do patients who often have some preconceptual view about the role that diet plays. How do you get patients to actually respond to these things you are talking about, like an elimination diet, when that may be very different than the way they have viewed their diet in the past?

KS: The first thing I attempt to do is help them understand how this can be helpful, what benefits will they see, what benefits will they gain by perhaps giving up foods that they may have a special



relationship with—foods that may be providing them emotional comfort, or special memories, foods that are linked to social events, really foods that you may revere. I always try to keep in mind that when we are asking a patient to give something up, they need to understand what they are going to gain. If we take away a particular food, for some people we may be taking away some of the meaning of their life. I think to expand their understanding, to share success stories, can be very motivating. To share research that expands their understanding of how this nutritional prescription can help them is important.

I also have to mention that I work often with patients who come to me and are already very motivated. They may have tried other things. They may have had other dietary trials and tribulations, but they are really ready for another lens. They need to know what the process is, what it includes. A common question I get is, “What can I eat?” Having menus and shopping lists—some of these tools—is very, very useful for them. They also need to know what this is going to take. They want to know, “What’s the timeline here—the beginning, the process—of perhaps food reintroduction, and challenge, and eventually the transition to an integrated eating plan?”

I think another really, really important aspect is that I try to help them understand the other ingredients in this recipe for healing, so to speak: the mind-body practices that are going to help them relax their enteric nervous system, whether it is something like yoga, or soft belly breathing, or a guided imagery tape/DVD that has been designed for individuals suffering with GI symptoms. I think all of those things are important in troubleshooting some of the challenges an individual may have (time being often the number one thing that I hear). Environmental challenges: eating out, travel, support from friends and family. I encourage their expression of anxiety and fears—for them to be able to voice concerns like, “I’m not sure if this will work either” or “What happens if I eat something that I know is bad for me?” As a clinician, I try to troubleshoot and provide assurance that it’s a journey, and one dietary indiscretion doesn’t thus break or blow a healing process, and use all of these things as teachable moments and opportunities for nutritional skill-building and empowerment. I also have found that groups can be really very, very helpful, which is one of the reasons I started a digestive health and healing program at Kripalo, a center for yoga. The group experience has been especially helpful because then they form a community, together, of individuals for ongoing support.

JB: I can tell you, your book—the book that you and Dr. Mullin have authored and has recently been released, *The Inside Tract*, really does a beautiful job of describing what you are talking about. It is really about a relationship to food and how that gets translated through our gut.

I’d like to now kind of pass the ball back to Dr. Mullin for a second. Gerry, it seems that if you say “gastroenterology,” many people will think of—if they think about it at all—a model of a digestive conduit, a piece of plumbing, something that connects the mouth to the southern hemisphere of the body, breaking big stuff down to small stuff and excreting stuff we don’t want. So it’s a very mechanical-type of view. In your books (both *Integrative Gastroenterology* and *The Inside Tract*), that you describe a different kind of understanding that is now emerging around the GI tract, which has to do with the enteric nervous system that Kathie was speaking to, the second brain that Michael Gershon talked about; that there is all this plexus of nervous system activity and neurotransmitters that are signaling from the gut to the brain, and the brain to the gut. This is kind of a network view of the immune system (50{56bf393340a09bbcd8c5d79756c8cbc94d8742c1127c19152f4230341a67fc36} of the immune system being clustered around the gut). Could you tell us a little bit about how that concept is emerging in gastroenterology and how it relates to patient management?

## Obesity and Gut Microbiota

GM: Very good point. I mean, it really is the inner tube of life. It is not just junk in/junk out and it's a piece of plumbing. We're finding out that there are so many different roles of the digestive tract in overall health and well being, and particularly the gut microbiota, which are continually being developed and explored and discovered. At one point it was 500 organisms, and now I'm hearing up to a thousand organisms that we harbor within our gut. These organisms have a role in terms of our overall metabolic function, but also they affect different areas of the body. For example, they control our appetite. Researchers are looking at ways of manipulating the gut's microbiota to deal with obesity, as an example. If your microbiota are not well developed, you may be at more risk for heart disease. We're finding that the gut, in health, really has an impact on other areas of our body, and even our brain—with depression, and anxiety, and mood disorders—may be secondary to different enteric passages in our gut microbiota. The gut microbiota is just one piece of the puzzle, but it is a large piece of the puzzle. When we have a healthy gut flora and a healthy gut, chances are we'll have much better health than if we don't.

JB: I think that's a really great insight. You know, I've had the privilege of sharing the podium with a psychiatrist who is also an immunologist by the name of Michael Maes, from Belgium. His studies (he has published a number of papers) have tied together aspects of GI function to chronic fatigue syndrome, fibromyalgia, and dysphoria and mood disorders.[7],[8] It seems like there is a very interesting interconnection that's being made among different medical specialties now and the GI system. Certainly your books really start to get us to think in a very different way about gastrointestinal function than maybe in the past, where it was more of an isolated, siloed view of this as a piece of plumbing.

Kathie, let me shift to you. I know that you have been a pioneer. It goes back so many years that you and I have known one another—all the physicians you have trained, what you've done in terms of education of nutritionists and dietitians, your leadership role in getting the concept of functional nutrition to really be seen as a major theme in the advancing field of clinical nutrition. What kinds of things are you seeing, from your lens, as it relates to the evolution of the field and the role that GI function plays in this whole diet/health connection?

KS: It is absolutely as we discussed—the inner tube that connects all systems of the body—and an area that I am particularly fascinated with is that of the whole mind-body/gut-brain conditions, such as depression and anxiety. This isn't all in peoples' heads. I think in my work at the College of Mind-Body Medicine (Saybrook University) that for these doctoral students and MDs this was a real “ah-ha” for them—that actually food can make a difference in conditions like depression and such. I think that we will continue to see forward movement in that area, and nutrition becoming absolutely foundational for all those working in the field of mental health.

JB: There are so many interesting subtopics of topics in this field, but for the sake of time let me ask one last question. Gerry, we'll start with you (it's the same question for both of you). As you look forward in your crystal ball, where do you see medicine going as it relates to these concepts that we've been describing and the increasing burden of various chronic diseases? How do you see this playing out, say, over the next 10 years?

GM: If I had a crystal ball, I guess I would say that I see medicine becoming a little more personalized (first of all, more personal). Hopefully, at some point, we'll spend more time with our patients and be

able to really deliver more effective doctor/patient relationships, which have been shown in many studies to have better outcomes (just as a result of those relationships). I think we'll have more of a personalized approach to medicine. Some of that can come from genomics, such as nutrigenomics, so we can characterize an individual's response to food and food-based nutrients and supplements.

Secondly, I think we're going to find that the more we study the gut, and particularly the gut microbiota, we're going to find how impactful that is to the rest of the body, and I think we'll go back to the old adage that "a lot of things start in the gut." I think we'll find more and more of that over the years. And I think largely it's about gut microbiota, and that's going to really bring that to our attention. I think at the end we're going to be treating people a little bit more with foods and food-based therapies and probably with probiotics as well. And even those probiotics may be individualized for different people, so that can be personalized as well.

JB: A very interesting kind of perspective. Kathie, how about you? This is your shot at looking in your crystal ball.

Moving Medicine into the Kitchen

KS: Quite simply, I see medicine moving into the kitchen. I see this on all fronts: in our home, which can be our healing center, with the patient in the driver seat; I see hospitals developing sustainable food systems; more demonstration kitchens in schools and in all arenas; I perhaps even see the return of something that is a long-lost art, and that is home economics (and hopefully gym class along with that too). We need partnerships and networks—more partnerships with, I hope, gastroenterologists, and dietitians, nutritionists, and more social groups forming that really can make an impact. I think that it is, on all fronts, moving into a food as medicine approach.

JB: I want to thank you both. I think this has been one of those very, very remarkable moments in Functional Medicine Update's 30-year history—to have two luminaries bring two very complementary perspectives together on a topic, and it shows, really, the advancing evolution of this whole concept: functional medicine, functional nutrition, functional physiology and how different backgrounds can complement and enhance, in a synergistic way, the approaches towards the management of very complex chronic health problems. Again, I want to compliment you both on your authorship of *The Inside Tract*, this good guide for great digestive health. I think it is a tremendous contribution to the literature, and thank you for your leadership in the field all these three decades. It's pretty remarkable. Thank you for both your friendship and for all your contributions.

KS: Thank you so much, Jeff. It's been a pleasure.

GM: Yes, thank you very much, Jeff.

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