A Teen's Guide to GUT HEALTH

The LOW-FODMAP Way TO TAME IBS, CROHN'S, COLITIS, and OTHER DIGESTIVE DISORDERS

- FIGURE OUT WHAT'S WRONG
- PINPOINT YOUR PROBLEM FOODS
- END THE CAFETERIA STRESS
- GET YOUR LIFE BACK!

Plus 30 recipes you can make—and share!

RACHEL MELTZER WARREN, MS, RDN

Foreword by WILLIAM D. CHEY, MD, Professor of Gastroenterology and Nutrition Sciences, University of Michigan

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To my parents, who gave me my guts

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FOREWORD

Gastrointestinal (GI) problems are remarkably common, disruptive, and embarrassing. Let's face it: It can be pretty awkward to talk about your own or hear about other's problems with stomach gurgling, farting, or pooping. Perhaps the most common and best-known GI problem is irritable bowel syndrome or IBS—a condition characterized by symptoms such as abdominal pain, bloating, and altered bowel habits (diarrhea and/or constipation). Doctors will tell you that the good news is that IBS won't kill you. Patients will tell you that the bad news is that IBS won't kill you….

Because IBS is considered a nonlethal "lifestyle condition," it often isn't taken seriously by doctors, teachers, coaches, friends, or even family. But fun everyday activities for most teens—like participating in or attending sporting events, dating, or eating out at a restaurant—can become sources of fear, frustration, anxiety, and isolation for those with IBS.

By the way, the common denominator for many social activities is *food*. Consider how the role of food in everyday life has changed over the roughly two-hundred-thousand-year existence of humankind. For most of history, food has predominantly been viewed as a source of sustenance and nutrition. In the past, if someone wanted food to eat, they had to grow or hunt it (even in less developed parts of the world today, food is not always easily available). If someone got a headache or a cut, they couldn't go to the corner drugstore to pick up some acetaminophen or antibiotic ointment. Rather, they counted upon the healing properties of plant and animal products. Now fast-forward to modern times in developed areas. Food can

sometimes be less about sustenance and nutrition and more about pleasure and entertainment. So many things that we do involve food as a major part of the overall experience, and in some ways, food can be readily available with little effort. Think about how you planned your days the last time you went on vacation with your family—I bet it was around mealtimes! For Americans, it isn't unusual to talk about where you're going to eat dinner while you're eating lunch. Whether you view that as comical or just plain sad, there can be no denying that we have strayed quite far from the words of the ancient philosopher and physician Hippocrates, who said, "Let food be your medicine and medicine be your food."

Increasingly, health care providers are waking up to the fact that the majority of GI problems are related to what we eat. For example, it has long been known that two thirds of IBS patients link eating a meal with their GI symptoms. Yet despite this fact, meaningful research to identify scientifically proven dietary treatments for conditions like IBS has been hard to find. This lack of scientific evidence, along with patients' urgent need for relief, has created an environment that is ripe for unfounded and, in some cases, even dangerous diet treatments. It is precisely for that reason that *A Teen's Guide to Gut Health* is so important. Over the past eight years or so, there has been an explosion of scientific research dedicated to unraveling the role of diet in causing and treating GI symptoms. There is now credible evidence that supports the benefits of the low-FODMAP diet in patients with IBS. This book does a great job of weaving the available scientific evidence, common sense, and the invaluable experience of author Rachel Meltzer Warren to create an informative, medically responsible, and entertaining journey to Dietary Nirvana for teens with GI conditions. By using this book, teens with IBS, inflammatory bowel disease (IBD), or other GI disorders can gain the knowledge and tools necessary to enjoy the parts of life involving food that they have been missing.

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INTRODUCTION

It can be hard enough to feel comfortable in your own skin as a teenager in this Instagram-perfect, status-updated world we're living in. And if you have chronic digestive problems or have been diagnosed with a gut disorder like irritable bowel syndrome (IBS), Crohn's disease, ulcerative colitis, or another condition that forces you to become better than Google Maps when it comes to finding a toilet (and fast!), that challenge is even greater.

Maybe you've lost your focus during an important exam because the teacher wouldn't let you get out to the bathroom. Or declined an invitation for a sleepover or school trip because you're worried your stomach will make embarrassing noises when you least expect it. Perhaps you've wandered the cafeteria, wondering which of the limited food options won't make your symptoms act up, or wished there were something else you could do to find relief but don't know where to turn. And while loads of adults have the same digestive problems, they also typically have more control when it comes to using the restroom, choosing the right foods, and getting help.

That's exactly why I wanted to write this book. Roughly 14 percent of high school students in the United States have the symptoms of IBS; even more young people are affected when you consider those with diagnoses of the inflammatory bowel diseases (Crohn's disease and ulcerative colitis), and other less common issues. If you're one of those millions of young people affected, you may not know where to turn.

My first goal with this book is to help you figure out what's going on with your insides—giving you an easy-to-understand primer on gut health so you have the vocabulary you need to discuss digestion without reverting to words you learned in preschool, and so you know what to expect from doctors' visits and any medical testing you might need. I made sure it's packed with real-life advice and tips from teens who've been there, so you know you're not alone and so you can learn from their experiences.

The second goal is to spread the word about the low-FODMAP plan, an amazing, effective diet that helps diminish or eliminate symptoms in as many as 86 percent of people with IBS—as well as those with Crohn's disease, ulcerative colitis, and celiac disease—and make it not a total snooze fest for young people to read about. As a registered dietitian nutritionist (RDN), I've seen clients of all ages struggle with digestive troubles, with few remedies that work. When I started recommending the low-FODMAP plan, I was simply blown away. The name is funny (I'll explain it later), but for the majority of people with IBS and plenty of folks with other digestive disorders, it works. Follow this plan and you'll up your chances of living a normal, healthy life. I've broken it down in a way that you can easily implement—at home, at school, and on the go.

I hope you enjoy the stories, the information, and the recipes. But most of all, I hope you feel well.

From the bottom of my gut,
Rachel

What Is a Registered Dietitian Nutritionist?

A registered dietitian nutritionist (RDN), also sometimes known as a registered dietitian (RD), is a health professional who specializes in using food and nutrition to promote wellness. People with the letters *RDN* after their names have, at a minimum, a bachelor's degree or the equivalent courses in nutrition and dietetics, have completed a roughly

yearlong supervised practice or internship program to learn from registered dietitian nutritionists in hospitals and other settings, have passed a national certifying exam (sort of like the bar exams lawyers take, but with a whole lot of chemistry instead of legal stuff), and constantly earn continuing education credits to keep up on the latest in the field. It’s true: We’re nerds. But we’re nerds who love good food and helping people feel their best.

CHAPTER 1

Getting to Know Your Gut

Before you can understand what might be wrong with your digestion and how to fix it, you need to understand what happens when things are working well: how food makes the epic journey from your plate to the parts of your body that use it, and how you get rid of the foodstuffs you don't need along the way.

The GI or gastrointestinal tract begins with your mouth and ends with your rectum. Whether you're a Kourtney or Khloé height-wise, your GI tract clocks in at up to thirty feet long as you approach adult size—when it's spread out from one end to the other, that is. This winding tube is lined with smooth muscle that helps any food you eat travel from your mouth to your stomach and intestines, and out the other side. We'll get into the specifics of the role that each part plays soon—but for now, think about it as one long tube.

The craziest thing you may ever learn about your digestive tract: It's technically located outside of your body. Sure, you've never glanced down in the middle of history class and seen it looking up at you. But any part of your body that has contact with the world around you is considered ever so technically by medical professionals to be outside the body. Your bones, for instance, protected by skin, muscle, and more, are inside. Your brain,

protected by your skull and skin, is inside. Your lips mostly keep your mouth covered … but open that doorway to let some food or drink in and *bam*—your digestive tract is up close and personal with the outside world. And technically, anything that passes through your digestive tract remains outside of your body until it's broken down and absorbed by the small intestine into the bloodstream (stay tuned for details on how that works).

THE JOURNEY TO POOP

So how does food make the epic journey from your mouth through this winding tube called the digestive tract, sending important nutrients out to your body and anything that's left over out the other end? When I ask my clients what the first step of the digestion process is, they usually tell me that it's when you swallow food or when it reaches your stomach. Most are surprised to hear that digestion begins before you've eaten a single thing.

The First Step

Have you ever felt your mouth water when you're waiting for a hot slice of pizza to come out of the oven? This process—technically called *salivation*—is part of your body readying itself for incoming food. (This is also why you might feel the urge to tackle your brother when he pops the last tater tot—which you were totally just about to eat—into his mouth.)

When you finally do take that first bite of food, the saliva you've already produced is at the ready to help soften what you've eaten so your teeth can break it down into an easy-to-swallow mush. In addition to turning food into a mass that can effortlessly slide down your throat, saliva contains digestive enzymes that work chemically to start turning nutrients into smaller components. One enzyme, called *salivary amylase*, chemically helps break down long chains of carbohydrates. If you put a piece of a carbohydrate-rich food like bread in your mouth and let it sit there, you can actually taste it becoming sweeter as the salivary amylase breaks the carbohydrate down into simple starches, the smaller building blocks that

make up carbohydrates. While that happens, another enzyme, called *salivary lipase*, kicks off the process of digesting fats.

Next, you chew, turning your meal from, well, food, into what's called a *bolus*—a word that's Greek and Latin for "lump," and in the case of digestion, refers specifically to a ball of food. Chewing is probably not something you've thought much about since you were an infant learning how to eat solid food and your parents were standing over you making exaggerated chompy faces to remind you not to swallow your banana whole. But the simple, mindless act of chewing your food deserves some attention even at your advanced age—and here's why: Chewing does more than just ensure you don't choke (though that is, admittedly, pretty important). When you chew, you increase the surface area of your food so that the enzymes produced by your saliva can reach more of what you've eaten and be more effective in breaking it down into smaller pieces. Chewing also signals your stomach to prepare for the food's arrival by releasing acid that will help with digestion. What's more, research shows that chewing for longer can help you feel more satisfied when you eat, and can even help your body absorb more nutrients from food.

FACTS

Open, Shut Them

Everything in your body is connected, and your mouth, airway, and nose are no exception. Whether or not you've noticed it, every time you eat something, your nose and throat essentially close their doors so that food stays in your mouth while you chew and break it down. If you've ever had food "go down the wrong pipe" or had a cruel friend make you laugh as you took a swig of lemonade, you know how important it is for everything to cooperate so you don't breathe in (*aspirate*) food, or experience the pleasure of OJ shooting out of your nose. Ew.

As soon as you're ready to swallow, your tongue propels the bolus of food back into your esophagus. The first door (called the *upper esophageal sphincter*, or UES) opens, welcoming the bolus into your esophagus, where a wave known as *peristalsis* carries it downward (with the help of gravity) and through a second door, called the *lower esophageal sphincter* (or LES). The LES separates your esophagus from your stomach.

The Stomach Scene

Next, the bolus of food finally arrives at the stomach, which can hold as much as four cups (about a liter) of chewed food or liquid, expanding as you eat or drink to accommodate whatever you've taken in. The top part of your stomach serves as a waiting room, where the bolus rests as the lower stomach (called the *antrum*) begins to contract and mix the food with enzymes and acids. Hydrochloric acid creates conditions that are at just the right pH (or acidity level) for the digestion of protein as well as the killing off of bacteria, while the enzyme pepsin starts the process of breaking the

protein down. The enzyme lipase continues to break down fats. As that happens, the lining of the stomach produces mucus, which will protect it from being harmed by all of that damaging acidity.

How Many Times Should I Chew?

There's no official number for how many times you should chew to adequately break down food (even though rumors about this seem to circulate the Internet all the time). But chances are, if you live in the same on-the-run, hold-on-while-I-just-send-this-one-Snap world I do, you're eating in a hurry—and not chewing nearly enough. In an effort toward getting the most out of your food, try this exercise:

1. Sit down for a meal or snack with as few distractions as possible. No friends or family to chat with, no apps, no TV. Try to be home so that you can even limit background noise like music or chatter.
2. Take a bite of your food. Chew it thirty times. Notice when you first have the urge to swallow, and whether or not it's difficult to chew so much. Do you have to remind yourself not to swallow?
3. Notice how the food in your mouth has changed. What is the texture like now? What about the flavor?
4. Do the same for the next three mouthfuls. Is chewing thirty times uncomfortable? Why or why not?
5. On the next bite, chew until you feel you've chewed thoroughly—you don't need to reach thirty. What number seems like enough for this particular food?
6. Resume eating normally, with an increased attention to adequate chewing. Revisit this exercise often, preferably at the start of each meal, so that you can reset the speed at which you eat and begin to make chewing thoroughly second nature.

Once the bolus has been pummeled by the hydrochloric acid and pepsin, it's now considered *chyme*—a liquefied mass of partially digested food, water, and more. Peristaltic waves continue to move the chyme downward toward the pyloric sphincter (also known as the *pyloric valve*), a ring of muscle that controls the flow of chyme from the lower stomach into the upper small intestine, called the *duodenum*. (It also prevents chyme from bouncing back up into the stomach.) You can think of the pyloric sphincter like the security at the entrance to the Apple Store the day a new iPhone comes out. If the duodenum is at capacity, it's not letting any more food in. As food enters the duodenum, a little opening called the *sphincter of Oddi* funnels in digestive juices from the pancreas and bile from the gallbladder (the latter is produced in the liver). Bile emulsifies fat into smaller pieces, making it available for digestion and absorption, while the enzymes use chemicals to further break down protein, fat, and carbohydrates.

Beyond the Breakdown

Up until this point, digestion has consisted of taking apart the nutrients in food and turning them into smaller and smaller pieces. We've now reached the stage of digestion in which things begin to get exciting. *Exciting?* you're asking? Yes, exciting! Because, full disclosure, the small intestine is my absolute favorite digestive organ. It is. (Doesn't everyone have one? No? Oh. Right. Well, I'm going to own this anyway.) The reason I love the small intestine? At its beginning, the process of breaking down food into smaller components is continuing, but by its end, you're actually absorbing nutrients—real, live nutrients!—into your bloodstream, where they are then delivered to the various parts of your body to do the important things that nutrients do, like give you energy, repair your cells, make your bones strong, and so, so much more. The small intestine, in fact, is where most nutrients are absorbed into the bloodstream so that they can move on to do their jobs throughout your body. How cool is that?!

Where was I? Oh yes. So after the chyme passes through the duodenum, peristalsis continues, which helps it stay on its journey. The walls of the

small intestine start out as smooth as a bedsheet, but farther along they develop folds called *villi* and *microvilli*, which make them resemble your grandparents' 1970s-era shag carpet that's sorely in need of a makeover. These microscopic hairlike projections increase the surface area of the intestinal lining, which allows for more and better absorption of nutrients. Villi and microvilli line the walls of the remaining two sections of the small intestine, the jejunum and ileum. The walls of these parts of the intestine absorb fats and other nutrients; then blood vessels transport those nutrients through the portal vein to the liver. By the time your food reaches the end of the small intestine, most of its nutrients, as well as all but about one liter of fluid, have been absorbed. Another sphincter, called the *ileocecal valve*, separates the small intestine from the large intestine and also keeps chyme from splashing back into the ileum.

FACTS

Turn Digestion on Its Head

Beginning in your esophagus when you first swallow food, a system of muscular contractions called *peristalsis* works like waves to squeeze the bolus along, moving it through the different parts of your digestive tract. Peristalsis works so well that if you're upside-down doing an handstand and a friend decides to feed you a smoothie through a straw, the drink would still move down your esophagus, through the lower esophageal sphincter, into your stomach, and beyond—and you'd actually feel the GI tract gently contracting to push it along. And then you'd tell your friend to take a hike, because, really, who does that?! But anyway, it's a cool science experiment that will help you never forget what peristalsis is. (Fun fact: We did this exercise in my ninth-grade biology class, and apparently it was a life-altering nerd moment for me, because here I am telling you about it today. And I, too, thought I would never use the things I learned in school!)

The large intestine is also known as the *colon* or the *large bowel*. In healthy people, the chyme is mostly liquid when it enters the large intestine, and mostly solid when it exits the large intestine. So can you guess what the role of the large intestine is? You got it—removing all of that fluid through absorption, which occurs as what's left over from the small intestine makes its journey through the various parts of the colon (from the cecum to the ascending colon to the transverse colon to the descending colon to the sigmoid colon and into the rectum). The large intestine also contains bacteria that, in addition to producing nutrients like vitamin K—the blood-clotting vitamin—further digest any remaining bits of carbohydrate and protein. The balance of bacteria throughout the digestive tract (known as

the *gut microbiome*), and in the large intestine in particular, may hold the key to understanding and managing your symptoms; we'll talk about this in great detail throughout the book. Stick with me, friends—before long, you, too, will have your very own fan-favorite digestive organ and tell tales of peristalses past.

So Long, Number 2

The rectum and anus are where food ends its journey through the digestive tract. The rectum is typically empty, since your sigmoid colon holds on to poop until it's ready to come out. Once the area above the sigmoid colon becomes full, you feel the urge to go—and under the best of healthy circumstances, you can control that urge until you've reached a bathroom. When you're ready, the rectum pushes out the poop through the anus, the opening through which waste exits your body, controlled by a ring of muscle called the anal sphincter.

DIGESTION: THE MOVIE

Processing and using food depends on much more than the parts of the body that are at the center of the action, however. Digestion is somewhat like the process of making a film. Have you ever watched the credits roll after a big blockbuster? There are thousands of people involved, many with jobs you never knew existed. Digestion, like making a movie, is an uber-collaborative effort that goes way beyond the mouth, stomach, and small and large intestines, which as you now know all play starring roles. The liver, pancreas, and gallbladder are supporting actors, supplying important enzymes and other compounds that help break down food. And behind the scenes, the nervous system is the producer/director, calling the shots and getting everyone to do his job—like stimulating production coordinators saliva and peristalsis, nudging the cleaning team to tidy up with the migrating motor complex (see "Why Grazing Isn't Great" on p. 10). The whole time, bacteria work as the crew to keep things humming along; and

like any group working together, some members do the heavy lifting while others kind of get in the way, which you'll learn more about later because it's at the crux of the low-FODMAP plan. Finally, the circulatory system gets those nutrients out to the parts of the body that will use them, much like the film distributor who puts the ready-to-watch movie in theaters for people to go and enjoy.

No doubt, digestion is a major motion picture that involves many players. This is why gut disorders are incredibly common; so many different parts need to align just right for healthy digestion to occur. Now that you have a good understanding of how this happens, we can take a look at what might be up with your body and prepare you for how a doctor might investigate.

FACTS

Why Grazing Isn't Great

If you're more of a "nosh all day" person than a "three square meals" one, your eating schedule may be contributing to your gut problems. When you haven't eaten in one and half to two hours, a wave of electrical activity called a migrating motor complex (MMC) sweeps through your digestive tract. This action cleans up any leftovers that are still in your gut. It may also make your stomach growl—a rumbling tummy doesn't always mean that you're hungry! If you're constantly snacking, you'll never give your body a chance to activate the MMC, potentially leaving fuel for not-so-good bacteria to grow and thrive on. Stress can also affect the MMC. To ensure regular MMC clean sweeps, work on keeping tension to a minimum (see Chapter 8) and waiting three to five hours between snacks and meals.