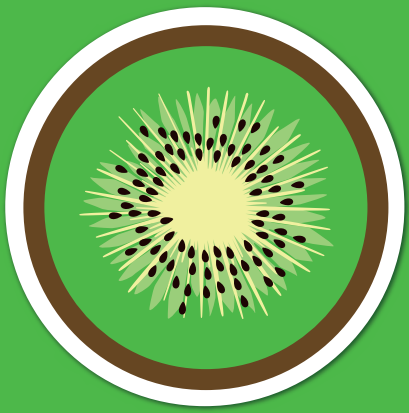
JORDAN HAWORTH

Gut Health Scientist

NO EXPENSIVE PROBIOTICS NEEDED

How to GUT HEALTH



Science-backed hacks for immunity, metabolism and better sleep

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Penguin Random House is committed to a sustainable future for our business, our readers and our planet. This book is made from Forest Stewardship Council® certified paper.

Everything in this book is designed to help guide you toward better gut health using evidence-based information. However, it is *not* medical advice and should not be used to diagnose, treat or cure any medical condition.

Your gut is as unique as your fingerprint. Therefore, health and nutritional needs vary from person to person. In today's world, it might seem easier to ask AI, or even a stranger on social media, about your health issues rather than going to see your doctor. But, if you are experiencing new, persistent or worsening digestive symptoms, then you should consult a doctor right away.

I hope you take away lots of tips from this book, but while it will help you better understand your gut and how it works – it should not replace professional medical care.

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INTRODUCTION

Welcome to *How to Gut Health*. My name is Jordan Haworth, but many people know me as Mr Gut Health from Instagram where I talk all things gut. So where did my obsession with this 8.5-metre digestive tube (that's as long as one of London's iconic Routemaster buses!) begin? Well, it might surprise you that I had no initial interest in gut health.

While studying Biomedical Sciences at university, I was especially interested in immune health or immunology. In my final year, I undertook a project on Car T therapy, a type of immunotherapy treatment used for certain cancers, where scientists take a patient's immune system cells, called T cells, and genetically modify them to target the cancer, before giving them back to the patient. I thought this was an exciting area to work in. However, the route to become a scientist was highly competitive and I didn't even get an interview. My plan was to get some leverage by doing a Master's degree in immunology and reapplying again in twelve months.

Perhaps it was fate, but the day after I finished my final undergraduate exam, I came across an advert for a graduate scientist position at the Functional Gut Clinic. I met with the clinical director who explained they were looking to train a new generation of gastrointestinal physiologists. Physiologists are scientists who specialise in the function, diagnosis and research of different body systems – so, immunology is the immune system, cardiology is the heart or cardiovascular system, and gastrointestinal physiology is the gut, from the mouth right through to the anus.

Although I had only completed a single module on gastrointestinal physiology during my degree, I was drawn to the idea of helping people get to the bottom (pun intended) of their digestive problems. Little did

I know just how central the gut is to almost every aspect of our health, from metabolism and mood to hormones and immunity. Let's look again at what I did my university project on – immunotherapy. We know that around one in two people with cancer do not respond to this treatment, but if you take the gut bacteria from someone who does respond and give it to someone who didn't respond via a *poo transplant* (more on this in chapter 5), the chances of immunotherapy working next time increase by up to 60%![1]

This starts to make more sense when you realise that around 70% of your immune system lives in the gut.[2] There is a layer of connective tissue just below the lining of your gut called the *lamina propria*, which is home to lots of different immune cells. They constantly sample everything from within your gut, such as foods and bacteria, scanning for danger – kind of like airport security. When something suspicious pops up, the immune cells take it to nearby immune hubs dotted throughout the gut, known as lymphoid organs. These are more like police stations. If the suspicious package (i.e. food or bacteria) is found to be dangerous, the immune cells are trained to fight any future encounters. But, if the foods you consume are constantly of poor quality, or your gut bacteria are out of balance, it can weaken the immune system response, rather than strengthen it.

I discovered the impact of diet on health first-hand when I was diagnosed with an autoimmune skin condition in my early twenties which ignited my interest in immune health. At the time, my diet was pretty normal for a student. A typical day of eating might include a bowl of cereal followed by a sandwich meal deal and finally chicken with pasta – plus snacks like crisps, biscuits, and the occasional piece of fruit. The main issues with this were a lack of fibre and only consuming a limited number of plants, as we now know that eating a variety of fruits, vegetables, wholegrains, nuts, seeds and legumes is fundamental to gut health. My diet was also high in ultra-processed foods (UPFs). Not all UPFs are bad, mind. Some examples of UPFs I still regularly consume are fish fingers, bread and ketchup (love a fish finger butty) and, of course, baked beans! The potential issue with a diet high in UPFs is what's been added to them to improve their taste, texture and shelf-life, and in chapter 3, I will provide you with a gut health guide to some of these food additives, notably artificial sweeteners and emulsifiers.

MY PERSONAL HEALTH JOURNEY

In my desperate search for the perfect diet, I ended up down a rabbit hole. This was a time before TikTok existed and back when Instagram was mostly selfies, and the original home of health misinformation was YouTube. That's where my own journey into the wild west of 'healthy eating' began. My quest for health led me to becoming fruitarian – a way of eating based almost entirely on fruit.

I was watching these creators all preach the same message: that humans are meant to live off fruit alone. One girl proudly ate thirty bananas a day and somehow I thought that was cool. Yikes. Most of these influencers lived in tropical countries where fruit was abundant and cheap, and there I was in Big Tesco spending £20 a day on mangoes and blueberries. Suffice to say, it didn't heal me. Rather, it progressed into something more serious – an eating disorder.

The misinformation that eating only fruit cleanses the body, including from several so-called doctors and health experts, pushed me into developing orthorexia nervosa – a relatively new eating disorder related to an obsession with eating only foods you consider 'clean' or 'pure'. It often shows up as constant label-checking and rigid food rules. It's shockingly common, yet massively under-recognised. One study found that nearly one in four university students meet the criteria for orthorexia,[3] and it's even more common among people studying nutrition or health-related degrees... like me.

This fixation on fruit started during my studies and snowballed into my early career, until I was finally able to break free of it. Sadly, in 2024 a young Polish woman named Karolina Krzyżak died in Bali from severe malnutrition after following a similar raw, fruit-based diet since her university days. I dread to think what would've happened to me without the help of my family and therapy. Also, becoming a better scientist really taught me to question harmful rules and to trust evidence over fear. Now, impressionable young boys at the same age as I was are exposed to a contrasting yet equally harmful way of eating called the animal-based or carnivore diet, which is high in meat and low in plants. These are two very strong risk factors for poor long-term heart and gut health (see page 81 for more about why I don't think this way of eating is a good idea). This type of misinformation, which promotes disordered eating and food avoidance, is

often spread by people with absolutely no scientific or nutritional qualifications – from chiropractors to Hollywood actors.

As I continued to develop as a scientist and completed my Master's in Clinical Research, I learned how to properly critique studies and spot BS (bad science) a mile off. That's why I started my Instagram account, @mrguthealth, to stop others from falling down the same rabbit holes I did. To help even more people navigate gut health misinformation, I also helped set up @TummyMOT, a free educational platform dedicated to cutting through the noise. Our motto is 'the truth will set your tummy free', because when you understand what your gut actually needs, everything becomes a whole lot less confusing. We love to carry out experiments, like Mediterranuary – where I followed the Mediterranean diet for one month, doing an array of tests before and after, to see if this revered way of eating really works. I'll tell you the results and how you can eat this way in chapter 6 – spoiler alert: since following a Mediterranean-style diet, my skin, gut and overall health have never been better.

When you prioritise your gut, you're really investing in your long-term health. While the deeper benefits unfold over time, many people notice profound changes surprisingly quickly. Here are some of the most immediate improvements people experience when they start eating (and living) for their gut:

- Better digestion – less bloating, discomfort and irregularity (and loo roll).
- Clearer skin – thanks to the constant communication between your gut, immune system and skin.
- Improved mood – driven by the gut–brain connection and calmer inflammatory signalling.
- Stronger immunity – fewer infections and quicker recovery after illness.
- Sharper metabolism – including healthier weight regulation, cholesterol levels and blood sugar control.
- Sounder sleep – as your gut microbes help produce compounds that influence circadian rhythm and sleep quality.
- Hormonal balance – a healthy gut supports the regulation of key hormones affecting mood, appetite and reproductive health.
- More energy – thanks to improved nutrient absorption and all of the above!

WHAT YOU CAN EXPECT FROM THIS BOOK

I wrote this book because gut health has become way more complicated than it needs to be. Between endless supplements, trends and fear-mongering about foods, people are left confused, overwhelmed and no closer to feeling better. It doesn't have to be like that. This book is for everyone – from total gut-health newbies to seasoned prebiotic connoisseurs (and if you don't know what prebiotics are yet, think of them as rocket fuel for your gut microbes – I'll show you the best ones and which foods contain them).

I'll be sharing the most useful gut health tips and tricks I've learned throughout my career so far as a gut health scientist. And trust me, there's a lot to share – like my secret formula on how to get a one-wipe guarantee or the reason why I poured my mouthwash down the sink! If you follow me on social media, you'll know I back everything up with scientific evidence and I make the science easy to digest (last gut pun, I promise). That way you'll know exactly how to gut health, including things such as how to reverse lactose intolerance – yes, you really can – and how to turbo charge your gut microbiome in two weeks. If you don't know what the gut microbiome is, we'll dive into that in chapter 1, so stay with me!

This book will also help you if you are struggling with digestive issues like bloating, constipation, nausea or problematic poos. In fact, in chapter 5 there's a whole section dedicated to my favourite tips for these tummy troubles. Don't skip there just yet though! You're going to want to read the book from start to finish. This is important because the first chapters lay the foundations for what gut health is and why you should care, so that when we get to the 'how to', it'll all make more sense.

We start by learning about how the gut works, and how to hack it so you can improve your digestion and metabolism (look out for my gut health hacks throughout the book). You'll also learn how your gut microbiome really does control your thoughts and feelings. Following on in chapter 2, I'll teach you the best ways to look after your gut and your microbes, with practical advice (all backed by science) that will have the added benefit of helping you to sleep more soundly and exercise more consciously. You see, sleep and exercise are a bit like Goldilocks and the Three Bears: too little or too much can throw your health off, but when you get it just right, you can feel at your best.

In chapter 3, I will uncover the truth about some popular gut health myths, like the scapegoats gluten and dairy, and why giving them up is not always a good idea for gut health. I'll also give you some guidance on food additives: which ones really do affect gut health, and which ones you don't need to worry about. Then in chapter 4, we get into the world of gut health supplements, like prebiotics and probiotics. I'll share my favourite ones and tips to help you spot the scammers of the supplement world. More practical gut health tips and tricks can be found in chapter 5, including how to protect yourself from messing up your gut health, and as I just mentioned, how to fix common digestive issues and how to save your gut from antibiotics or the holiday trots.

Finally, chapters 6 and 7 will reveal the simple steps you need to follow the best diet in the world (according to science) along with some of my go-to recipes that are quick, affordable and require minimal effort. I'm a scientist, not a chef, so if a recipe needs multiple pans or dozens of ingredients, it's not in here. Expect one-pan dishes, twenty-minute meals, and food that's good for your gut without taking up your whole evening.

Treat this book as a one-stop-shop for gut health that you can refer back to time and again. Read it from start to finish and feel free to make notes in the margin and highlight paragraphs. And you never know, you might want to tell your family or friends about it – in true Manchester fashion, let's get mad for gut health!

GUT HEALTH QUIZ

As everyone is at different stages of their gut-health journey, it is useful to find out where you are now. Before you dive in, remember this quiz isn't about being 'good' or 'bad' at gut health – it's simply a snapshot of where you're at currently. Think of it as checking your car dashboard before a road trip. It helps you understand which areas are running smoothly and which might need a little tune up!

Your gut is influenced by everything, from stress and sleep to what you eat, so this quiz gives you a big-picture view of how your daily habits may be supporting (or sabotaging) your gut health. Just answer honestly because this works best when you don't overthink it. No one is marking it, and there's no score that means your gut is broken. It simply shows you where the quick wins and biggest improvements are hiding. Once you've

finished the book and you've implemented the key tips and hacks for at least six weeks, come back and do the quiz again to see what's changed.

Let's get started!

1. **How often do you have a bowel movement?**
   A. More than three times per day
   B. One to three times per day
   C. Every other day
   D. Fewer than 3 times per week

2. **What does your poo usually look like?**
   A. Smooth and sausage-shaped
   B. Hard or lumps
   C. Soft or loose
   D. Like water

3. **How often do you struggle with digestive symptoms (e.g. bloating, abdominal pain, gas, acid reflux)?**
   A. Once per month or fewer
   B. A few times per month
   C. Once per week or more
   D. Daily

4. **How many times per week do you eat fermented foods (e.g. yoghurt, kefir, kimchi, sauerkraut)?**
   A. Every day
   B. Several times per week
   C. Once or twice per week
   D. Once or twice per month or fewer

5. **How many times per week do you eat legumes (e.g. beans, peas, lentils, chickpeas)?**
   A. Every day
   B. Several times per week
   C. Once or twice per week
   D. Once or twice per month or fewer

6. **How times per week do you eat processed meats (e.g. ham, bacon, sausage, pepperoni)?**
   A. Every day
   B. Several times per week
   C. Once or twice per week
   D. Once or twice per month or fewer

7. **How many hours of sleep do you get per night on average?**
   A. More than 9 hours
   B. 7–9 hours
   C. 5–6 hours
   D. Fewer than 5 hours

8. **How often do you get stressed?**
   A. Almost never
   B. Occasionally
   C. Quite often
   D. Almost always

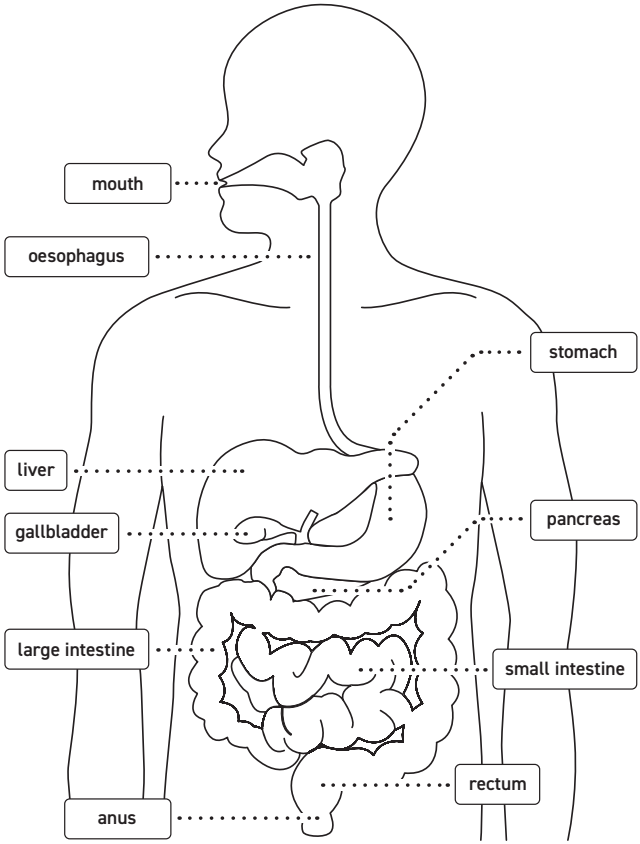
9. **How often do you get sick (e.g. colds, flu, tummy bugs)?**
   A. Almost never
   B. Occasionally
   C. Quite often
   D. Almost always

10. **Which of these do you struggle with (you can tick more than one)?**
   A. Low mood
   B. Brain fog
   C. Skin issues (e.g. acne, eczema, psoriasis or rosacea)
   D. Difficulty losing weight

Scoring

1. A) 1 point, B) 3 points, C) 1 point, D) 0 points
2. A) 3 points, B) 1 point, C) 1 point, D) 0 points
3. A) 3 points, B) 2 points, C) 1 point, D) 0 points
4. A) 3 points, B) 2 points, C) 1 point, D) 0 points
5. A) 3 points, B) 2 points, C) 1 point, D) 0 points
6. A) 0 points, B) 1 points, C) 2 points, D) 3 points
7. A) 1 point, B) 3 points, C) 1 point, D) 0 points
8. A) 3 points, B) 2 points, C) 1 point, D) 0 points
9. A) 3 points, B) 2 points, C) 1 point, D) 0 points
10. Minus 1 point for each option you ticked

- **>20 Advanced:** Nice! Your gut is probably in great shape already. There's still plenty of tips and tricks in this book for you though, like how to protect it in chapters 4, 5 and 6.
- **15–20 Intermediate:** Not bad! Your gut health is alright, but there is definitely room for improvement. Pay close attention to chapters 2 and 7.
- **<15 Novice:** Hmm! Your gut looks like it could do with a bit of a helping hand. Luckily there are lots of easy tips to follow for improving your gut health in this book!



CHAPTER 1

WELCOME TO THE INCREDIBLE WORLD OF YOUR GUT

Your gut does way more than just digest food – it regulates your immune system, your hormones and your mood. In this chapter, I'll show you why gut health matters and give you some simple, practical tips to level up your gut health – remember to look out for my 'gut health hacks'.

You'll get a clear picture of what the gut microbiome does and how to start taking steps to look after yours. I'll also share some eye-opening insights, like why I don't use mouthwash and how the popular new weight-loss medications affect your gut.

But first, let's start with what the gut is and how it works...

The gut is essentially a long, muscular tube that stretches from your mouth all the way to your anus. It is around 9m (25–30 ft) in adults, and its size depends on your weight, not height. It's not just a simple passageway for food; the gastrointestinal tract is an intricate system made up of specialised organs including the mouth, oesophagus, stomach, small intestine and large intestine or colon. Each section has a distinct role, working together to break down the food you eat, absorb nutrients and eliminate waste efficiently.

Digestion begins in the mouth

Your mouth really is the start of your gut. We kick things off with the chewing of food – a process called mastication. I love to masticate. Studies show the more you masticate, the more gut hormones you release that regulate blood sugar and satiety, the scientific term for fullness. The same goes for

how long it takes you to eat your meal. Researchers gave healthy adults a big bowl of ice cream, and asked them to eat it over five or thirty minutes, measuring their gut hormones afterwards.[4] They then repeated the experiment on a different day where the same adults ate the same amount of ice cream again (this is why I love science) but those who ate quickly last time ate more slowly this time, and vice versa. The researchers found that when people ate more slowly, they produced more of the satiety or fullness hormones afterwards like GLP-1 (more about this in a minute).

It's unclear the exact number of times you should chew. I say to aim for at least twenty, but this can vary depending on what you are eating; for example a spoonful of rice pudding may only require four, while an overcooked steak you were too nice to send back might take forty. Chewing until the food changes texture is a good way for you to tune into your eating behaviour and make sure you are taking your time. If you've got a soft meal, like spaghetti, add some crunch before or alongside – a piece of bread, a salad, something that will make you masticate. But the easiest thing you can do is to pause between each mouthful – to do this, place your cutlery down, and you're not allowed to pick it back up again until you have swallowed.

Gut health hack: slow down to balance blood sugar and improve fullness. Increase your chew by adding some crunch and put your cutlery down between bites.

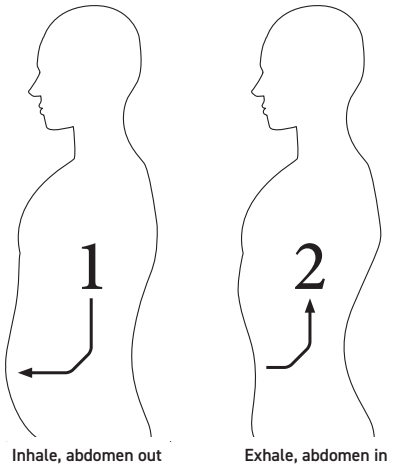
The food pipe aka the oesophagus

The oesophagus is a 20–30cm muscular tube that carries food from the mouth to the stomach. Food moves down the oesophagus and through the rest of the gut by a process called peristalsis – coordinated muscle contractions that push food forward. This is why you can technically swallow upside down (although I wouldn't recommend trying to eat like a bat).

At the bottom of the oesophagus is a valve called the lower oesophageal sphincter, which connects it to the stomach. This valve plays a crucial role – it should open to allow food and drink into the stomach, but close tightly to prevent acidic stomach contents from flowing back up, which can damage the oesophagus. The diaphragm, the main muscle used for breathing, also contributes to this valve mechanism.

If part of the stomach is pushed up through the diaphragm and into the chest, a hiatus hernia can develop. This can make you more susceptible

to heartburn and acid reflux. Acid reflux is more common in bodybuilders, people with obesity and during pregnancy, as increased pressure in the abdomen can force the stomach contents upwards. It's also more common with age as the diaphragm weakens. The good news is that, like any muscle, the diaphragm can be trained, and one effective way to do this is through diaphragmatic breathing.



Gut health hack: strengthen your valve. As you inhale, the diaphragm contracts down, and the abdomen comes out. As you exhale, the abdomen falls back in, and the diaphragm relaxes up.

The super strong stomach

Your stomach is basically a biochemical cauldron. Inside is gastric juice, a soup of digestive enzymes like pepsin, which chops up proteins, and gastric lipase, which starts breaking down fats. The stomach also produces hydrochloric acid, which has a pH of around 1.5 – that's almost as strong as battery acid.

The stomach needs to be this acidic for two reasons: first, to kill any nasty bugs we might accidentally ingest. We swallow 100 billion oral bacteria per day, so our bodies need to keep them in regular check! And secondly, to digest food properly. Pepsin, your main protein-digesting enzyme, only works in an acidic environment. When stomach acid runs low, in a condition called hypochlorhydria, people can experience bloating, early fullness, and that heavy feeling of food just sitting there.

One of the biggest clues that your stomach acid is low? A vitamin B12 deficiency, even in people who eat plenty of animal foods. Vitamin B12 is found almost exclusively in meat, eggs and dairy, but it doesn't come ready to use. Stomach acid has to liberate B12 from the protein it's attached to before your gut can absorb it. The same goes for key minerals like iron, calcium and magnesium. Low or no acid means poor absorption of these essential nutrients.

So, how do you ramp up this digestive process?

I said digestion starts in the mouth... but technically it starts in the brain. Just seeing or smelling food triggers the release of stomach acid or what's known as the cephalic phase of digestion. Chewing slowly and properly keeps that signal going – even more reason to stop rushing your meals. If you really want to get the gastric juices going though, you need something bitter. Research shows that tasting something bitter before, during or just after a meal can stimulate gastric acid production.

When bitter foods hit taste receptors in your mouth, it triggers the release of saliva. Turns out those same bitter receptors are also found in the stomach, triggering the release of stomach acid. Bitter-tasting foods include leafy greens like rocket and radicchio, herbs like dill and ginger, vinegars, red wine and coffee. Yes, the Italians really were onto something with a coffee after meals. Although, if I had an espresso at 8pm I'd be bouncing off the walls all night. Fortunately, even decaf coffee stimulates gastric acid production. The Italians, of course, also invented liqueurs called aperitifs and digestifs, to drink before or after meals to aid digestion. The likes of Aperol, Campari and Amari are made from bitter herbs and spices, and even though they were invented over 100 years ago, there is science to support their use. Obviously, I'm not saying that every meal should start or end with a Negroni. A tea would do the trick, made from bitter herbs like dandelion or chamomile. I've seen some people online argue that you shouldn't drink at all with your meal, even water, and that you should wait at least thirty minutes afterwards, otherwise it can dilute stomach acid. This is only true if you're drinking like a camel. A glass of water with your meal will not dilute stomach acid levels enough to affect digestion.

Gut health hack: improve digestion with bitters. Have something bitter with your meal, like a rocket salad with balsamic vinegar.

The (not so) small intestine

Believe it or not, the small intestine is anything but small. At around 4.5m (15 ft) long, it's three times the length of the large intestine, but because it's thin (about the width of your finger), it earned its misleading name. Its main job is absorbing nutrients to fuel our body. Big job, if you ask me.

The lining of your small intestine is covered in villi, tiny hair-like cells that crank up the surface area to about the size of a badminton court. More surface = more nutrients absorbed. To ensure everything gets absorbed quickly, the intestinal epithelium (gut lining) is only one cell thick. But before nutrients can be absorbed, everything you eat has to be broken down. The stomach does a great job of getting things started, but you need extra enzymes from the pancreas, and bile from the liver and gallbladder to break fats into bite-size pieces.

The small intestine has three neighbourhoods: duodenum (the start), jejunum (middle) and ileum (end). The duodenum and jejunum do most of the nutrient absorption, while the end of the small intestine, the ileum, has one main job – to reabsorb bile acids. These bile acids are made from cholesterol and eating fibre helps to soak up them up, which reduces the amount of bile our ileum absorbs. In turn, this lowers blood LDL (bad) cholesterol. In short, more fibre = lower cholesterol.

The small intestine is also where most of the gut's immune network resides – or what's called the GALT (gut associated lymphoid tissue). It's lined with immune hubs, called Peyer's patches, which are like immune police stations, responsible for producing cells that protect your gut. When danger calls, such as a food allergen or infectious bacteria, these stations train and release more immune cells to thwart it. You'll learn later in this chapter how this can play a role in immune health.

The large intestine aka the colon

Not everything can be absorbed by our small intestine. Some nutrients escape digestion and travel to the large intestine to be dumped, quite literally. The colon doesn't absorb nutrients, mostly just water and electrolytes, which helps to turn mushy leftovers into solid logs. Fibre is also important here; without it, you're looking at soft blobs or rabbit pellets. If that sounds like you, there's plenty of tips in the book to have you pooing like a champ.

The colon isn't just a waste pipe though! We now know it's home to a whole other world of microscopic living things – your gut microbiome. Just one centimetre of your colon, about the size of a Cheerio, houses

around 100 billion bacteria. If you think about this in population terms, that makes Tokyo look like Clitheroe. We'll get to meet your little neighbours in the next few pages, but one thing you should know is they love fibre, too. They turn fibre into tiny molecules called short-chain fatty acids, which feed your gut cells, strengthen your gut barrier, and help balance blood sugar while keeping you full.

Let's not forget the appendix, located near the start of the colon in a region called the cecum. The appendix was once written off as useless, but recent evidence suggests it's a microbe safe house. When antibiotics or infections wipe out your gut bugs, the appendix repopulates them, helping everything bounce back.

The final frontier

The rectum is basically a VIPoo lounge. Have you ever wondered how your rectum knows the difference between a poo and a fart? That's thanks to the recto-anal inhibitory reflex. When the rectum stretches due to the entry of gas or stool it tells your brain whether to let it slide, or stay inside.

There's also a second safety net, in case you guessed wrong. A muscular sling called the puborectalis, between the rectum and anus, keeps everything tight. In order to go, this elastic band muscle must relax, which is easiest when you squat. Modern toilet seats are terribly designed because our knees are too low, so we can't open the puborectalis fully, making it harder to go and increasing the risk of haemorrhoids.

> ***Gut health hack: knees up on the loo for a smoother poo.*** Put your feet on a small stool so your knees are above your hips, let your puborectalis do its thing and enjoy a faster and cleaner dump.

Remember this...

- **Upper gut:** mouth, oesophagus, stomach, pancreas, liver, gallbladder, duodenum
- **Lower gut:** jejunum, ileum, large intestine, rectum, anus

Glorious gut goo

The stomach and intestines have a shield – an extra layer of mucus (gut goo, if you will). This protects the stomach from its own harsh acid, and

the intestine from harmful things like microbes and toxins. When this mucus layer thins, the gut becomes more sensitive and vulnerable to attack.

The intestinal lining may only be one cell thick, but it is held tightly together by the aptly named tight junction proteins. If these proteins are damaged, the lining cells can pull apart, creating tiny gaps that make the gut more permeable, or 'leaky'. This lets certain molecules from the gut escape into the bloodstream, where they can travel around the body and trigger inflammation.

Is leaky gut real? Yes, but the term 'leaky gut' sounds scarier than it really is. If the gut was leaking bacteria into the blood, you would be very seriously unwell. What usually happens is the gut lining becomes a bit more permeable to bacterial products, like harmful proteins called endotoxins. The medical term is actually *intestinal hyperpermeability*, but since that's a mouthful, 'leaky gut' has stuck. I will refer to leaky gut throughout the book, including ways to prevent it, and you'll see in the next chapter how your choice of exercise might potentially be a problem!

Inflammation isn't always bad. It's your body's natural response to injury or infection. When you catch a bug or cut your finger, inflammation switches on to help you heal. This type is called acute inflammation – it's short-term and settles down once the problem is fixed.

Inflammation is initiated by your own immune system, not the bacteria themselves. When your immune system cells sense danger, they release molecules called cytokines to recruit more immune cells – an alarm that brings more immune cells to the fight.

The issue comes when the alarm doesn't switch off. An imbalance in the gut microbiome with more bad bacteria and less good bacteria can keep the immune system constantly activated or 'fighting'. This leads to chronic inflammation, a low-level, long-term state where the body is always on edge, even when there's no real threat.

A simple way to picture it:

Acute inflammation is like a small house fire. The alarm goes off, the fire brigade rushes in, the fire is put out, and everyone goes home.

Chronic inflammation is like a smouldering wildfire. There's no big blaze, but it never fully goes out, quietly causing damage over time.

HACK YOUR GUT HORMONES

Your gut is the body's largest hormone-producing (aka endocrine) organ, producing hormones that regulate appetite, blood sugar and energy balance, and which play a big role in how you feel after eating. Most gut hormones are derived from enteroendocrine cells in the gut lining, while the pancreas also releases insulin, which lowers blood sugar. The release of gut hormones is mostly controlled by what and how we eat, but your gut microbes play a role, too. There are many different gut hormones with different jobs, but here's a couple of key players I think you should know about – and how to hack them!

The weight-loss hormone: GLP-1 (glucagon-like peptide-1)

GLP-1 is a hormone produced by your gut after you eat. It tells your pancreas to release insulin to help lower blood sugar. GLP-1 also slows down how quickly food leaves your stomach, helping you feel full for longer. It peaks at three times: first, around fifteen minutes after you start eating. You'll notice this if you've ever wolfed down your meal and thought you were still hungry, but soon realised you were full. Second, when protein hits the small intestine, it triggers GLP-1 – so around an hour after your meal. Third, when fibre is fermented by bacteria in your large intestine, so around 8–12 hours after eating. This means the fibre you eat at breakfast really does keep you full for the rest of the day.

New weight-loss drugs like Ozempic (semaglutide) and Mounjaro (tirzepatide) work by copying GLP-1. They slow stomach emptying to keep the brain's 'fullness signal' switched on and help control blood sugar by boosting insulin release. But because they slow the stomach down so much, they often cause gut side effects like nausea, bloating or vomiting. This effect usually improves once the medication is stopped.

If you're taking a GLP-1 medication, smaller meals and avoiding hard exercise straight after eating can help. If you're not on these drugs and want the same natural effect, eating enough fibre and protein can boost your own GLP-1, helping you feel fuller for longer, without the injections.

Gut health hack: boost GLP-1 with oat-zempic. Oats are amazing for gut health, but if you want the biggest GLP-1 benefit to keep you full all day, go for steel cut oats at breakfast, as these are

more intact and they are slow digesting, so you really feel fuller for longer.

The hormone that makes you hungry: ghrelin

Ghrelin is often called the 'hunger hormone'. It's made mainly in the stomach and rises when it's time to eat, making you feel hungry, then drops again after a meal. Interestingly, studies show that even if you don't eat anything, ghrelin tends to peak three times a day at around 8am, 12pm and 7pm.[5] This helps explain why most of us naturally feel hungry at roughly the same times each day, which is funny because I've seen people on social media say that Dr John Kellogg invented breakfast so he could sell cereal, when really, he invented cereal because our bodies want breakfast. Personally, I'm more of a Weetabix guy.

These daily hunger peaks are controlled by your body clock – in what's known as the circadian rhythm. When that clock is disrupted, such as with shift work or jet lag, ghrelin levels can rise more sharply over the next day, making you feel hungrier and more likely to crave high-calorie foods.

If your routine is off, eating plenty of fibre at your next meal from foods like beans, brown pasta, and veggies can help to reset the hunger hormone clock. Fibre feeds the gut bacteria that produce those short-chain fatty acids, which reduce ghrelin release. So, fibre helps turn down the hunger hormone, while also boosting fullness hormones like GLP-1, which are both reasons why fibre is so useful for weight management.

WHY DOES EVERYONE KEEP BANGING ON ABOUT THE 'GUT MICROBIOME'?

Think of all the people on our planet: that's roughly eight billion. Now multiply that by one hundred thousand and you get 100,000,000,000,000, or one hundred trillion. That's the estimated number of microbes living in your gut – we have more microbes than human cells in our body – yet altogether, they only weigh about as much as a mango. This Milky Way of microorganisms is known collectively as the gut microbiome or gut microbiota. These terms are used interchangeably, but what's the difference? Well, the term 'gut microbiota' refers to all of the different kinds of microbes living within your gut. It's mostly made up of bacteria but also includes archaea (the oldest life forms on Earth), fungi (different types of yeast, like