

YOUR GUIDE TO

Digestion

A simple guide to help support your digestive health
so you can enjoy life at your best.



Index

Your gut, from top to tail	3	The scoop on your poop	18
The pillars of a healthy gut	4	Foods that make your gut sing	21
Balancing your bugs	5	You gotta nourish to flourish!	28
Trust your gut!	8	Your gut health tool kit	29
Well, ain't that a kick in the guts?	10	Hot tips for a smooth digestion	33
Got gut troubles?	12	Engaging the senses with mindful eating	34
Let's gut to the chase	16	Digestion symptom tracker	37



Your gut is one of the hardest working systems in your body. Meal after meal, it hustles to digest your food and extract the nutrients required to sustain you. Your gut health impacts every bodily system, therefore improving gut health will also improve general health.

Your gut, from top to tail

Your digestive system comprises of the gastrointestinal (GI) tract, made up of organs including the mouth, oesophagus, stomach, small intestine, large intestine, rectum, and anus, as well as accessory organs such as the liver, pancreas and gallbladder, which support digestive processes. As the food you eat travels through your GI tract, these organs work synergistically to digest it into smaller components so that vital nutrients and water can be absorbed, and waste products eliminated from the body.

This process begins in the mouth when food is chewed and mixed with enzymes present in saliva. As food moves into the stomach after swallowing, additional digestive enzymes and acids are produced by the stomach to further promote food breakdown. Specifically,:

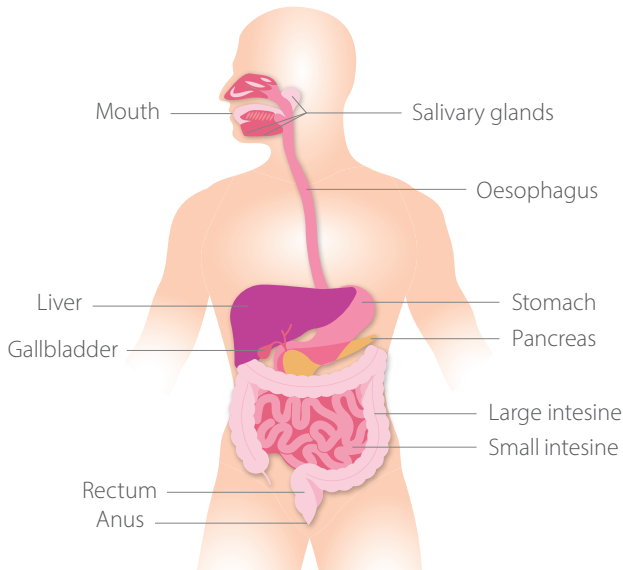
- Proteins break down into amino acids.
- Carbohydrates are reduced to simple sugars such as glucose.
- Fats are broken down into fatty acids.

Within two to four hours after eating a meal, the stomach contents move further down the GI tract into the small intestine, where they combine with additional enzymes and acids produced by the liver, gallbladder and pancreas, which facilitate nutrient absorption. From here, food waste is also pushed into the large intestine before it is eliminated with a bowel motion.

The nutrients and water absorbed during this process are distributed throughout your body, providing energy and supporting growth and repair of your body's cells. As your entire body relies on a consistent stream of nutrients to support its function, you can appreciate the importance of maintaining a healthy digestive system for optimal health.

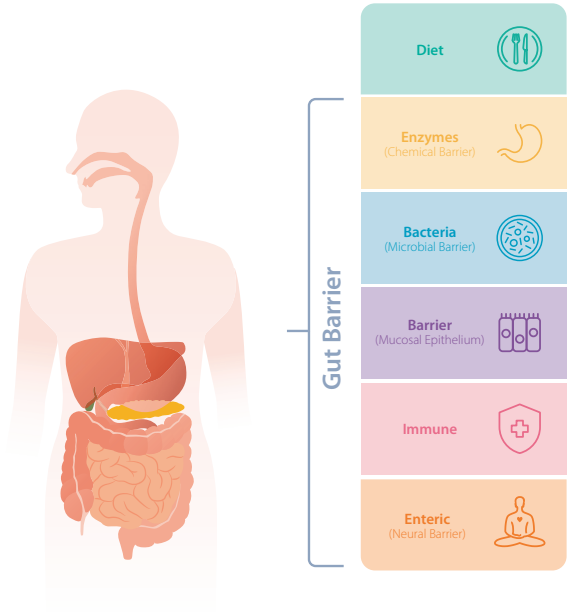
“The road to health is paved with good intestines”

The Digestive System



The pillars of a healthy gut

The gut is a complex system, influenced by many factors that either enhance GI health or impinge on digestive function. Disruptions to any of these components create imbalances that can compromise gut function and lead to disease development. Therefore, improving the function of these components may be the kickstart you need to strengthen your digestive health. No guts, no glory!



Diet: 'You are what you eat.' Our dietary habits have a profound effect on gut function, as well as your overall health. A nutritionally balanced Mediterranean-style diet (*detailed on page 28*) is linked to fewer gut presentations and reduced disease prevalence. Comparatively, increased gut symptoms and conditions such as obesity, type 2 diabetes, inflammatory disorders and cardiovascular disease are linked to Western-style diets.



Enzymes: Digestive enzymes are produced in the mouth by saliva glands, as well as in the stomach, pancreas and throughout the GI tract. As food travels through your gut, it combines with digestive enzymes, which speed up food breakdown. This is necessary for absorption of vital nutrients.



Bacteria: Trillions of microorganisms, collectively known as the gut microbiome, live within your gastrointestinal environment. Gut microbes play important roles in supporting many aspects of human health including digestive, immune, metabolic, hormonal, and nervous system processes.





Barrier: The gut barrier is the internal lining of the GI tract, composed of a mucus layer and specialised cells (gut epithelial cells). This lining facilitates the absorption of nutrients from your food, while also providing a physical barrier that separates the gut environment and its microbes from the rest of your body.



Immune: The digestive and immune systems are very closely related, with most of your immunity located in your gut. Immune cells and the gut microbiome work together to coordinate immune responses, including defence against infections.



Enteric: The gut has its own nervous system, known as the enteric nervous system (ENS), which regulates your digestive activity including the movement of food through the GI tract and production of enzymes and acids required for food breakdown and absorption. The ENS also interacts with the body's central nervous system (CNS), which processes stress, making the ENS sensitive to changes in your stress levels.

Balancing your bugs

Your gut plays host to trillions of microorganisms– 38 trillion, to be precise! Collectively, they make up the gut microbiome and include a variety of bacteria, viruses, protozoa, fungi and archaea that mostly reside in the large intestine. Together, these gut bugs form a community, working together to maintain a healthy gut environment.

Your gut microbiome is at its healthiest when you have abundant levels of beneficial gut microbes (known as commensal flora) and a large variety of different types of microorganisms (termed microbial diversity). Balanced levels of gut microbes benefit your body in many ways including the provision of health promoting nutrients such as vitamins B1, B2, B5, B12, vitamin K, folate and biotin, as well as enhancing digestive processes, preventing harmful microorganisms from causing disease and supporting overall immune function.

In addition to influencing your digestion and immunity, a balanced gut microbiome encourages optimal metabolic and nervous system function. Therefore, enhancing the function of your gut microbiome can promote health and prevent disease development. Ways to improve the health of your gut microbiome include:



Consuming a wide variety of fibre-rich foods and fermented foods, which nourish your commensal gut flora.

**DETAILED
ON PAGE 28**



Reducing your intake of foods that disrupt gut microbial balance including animal fat, sugar and alcohol.



Managing your stress levels. Uncontrolled stress has been shown to deplete levels of health promoting gut microbes.



Getting more zzzzz's. Studies have shown a link between sleep deprivation and detrimental changes to gut microbiome composition



Moving your body. Regular exercise has been found to increase the number of beneficial gut microbes and enhance microbial diversity.



Promoting growth of commensal gut flora populations using evidence-based probiotic strains such as *Lactobacillus rhamnosus* (LGG®), *Bifidobacterium animalis ssp lactis* (BB-12®) and *Saccharomyces cerevisiae* (boulardii).

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On the other hand, gut microbial imbalances can negatively impact health and lead to disease development. Known as dysbiosis, these imbalances occur when there are reduced quantities of beneficial gut microbes, decreased microbial diversity and increased concentrations of 'harmful' gut flora. Dysbiosis can lead to digestive symptoms including bloating, diarrhoea, constipation and gut pain, and has also been associated with several diseases including inflammatory bowel disease, type 2 diabetes, atherosclerosis, allergy, colorectal cancer, obesity and neurological disorders.

Factors that promote dysbiosis include:



Western-style diet



High stress



Physical inactivity



Poor sleep quality

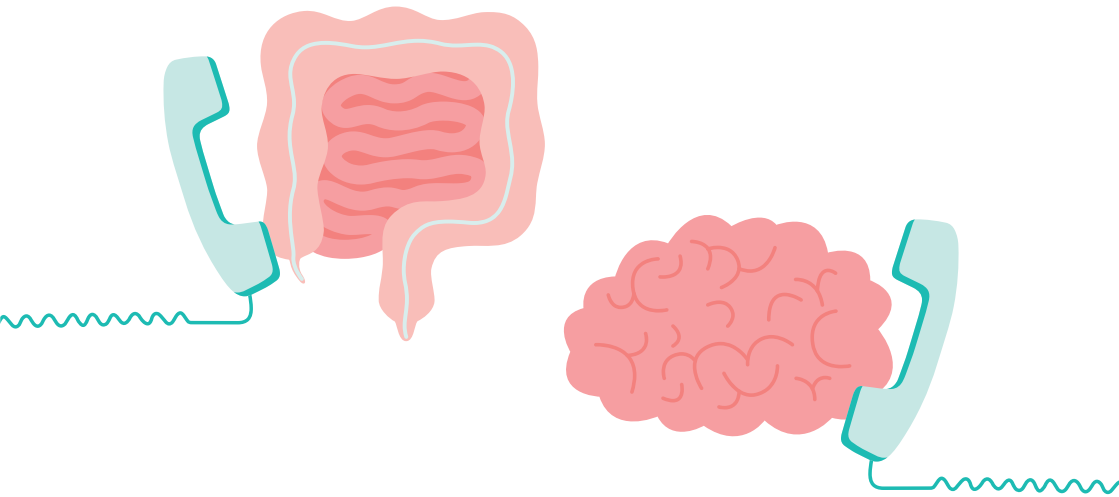


Pharmaceutical medications including antibiotics, reflux medication, antidepressants, oral contraceptives and laxatives.

Did you know?

The vagus nerve provides a direct telephone line between your gut and brain, allowing them to communicate regularly. The vagus nerve receives information from your gut microbes and communicates this from the gut to the CNS (i.e., the brain)– known as the gut-brain axis. This communication exchange is a two-way street, with the CNS also using the vagus nerve to relay information from the brain down to the gut. Collectively, this long-distance phone call (from the gut to the brain and back again) helps orchestrate your body's digestive, immune, hormonal and nervous system processes.

The gut-brain connection explains why a nervous brain can also lead to a nervous stomach, otherwise known as 'butterflies in your stomach', as well as stress-driven digestive conditions such as IBS. Likewise, your gut microbiome can impact the function of your brain's cognitive and emotional centres, influencing your mood and body's ability to adapt to stressful situations. Therefore, maintaining the health of your gut microbiome has benefits that extend well beyond your digestive tract.



Trust your gut!

Your digestive tract is an avid communicator, providing you with signs and symptoms to indicate when something is not quite right. Tell-tale signs that your gut requires some tender loving care include:



Bloating

Bloating is one of the most common (albeit annoying) digestive symptoms, caused by gas produced during the digestive process. Rich and fatty meals or foods that are more laborious to breakdown, including excess carbohydrates and fibre, place more burden on your digestive system, increasing gas production and bloating. While these symptoms may be transient, particularly after eating triggering foods, pronounced and uncomfortable bloating may also indicate gut microbial imbalances.



Flatulence

Gas is produced by normal digestive processes, and 'passed' at regular intervals. Passing wind up to 15 times per day is normal. However, excessive gas production with a pungent odour can signal imbalances in the levels of different gut microbes, which produce gas by fermenting the food you eat to help your digestion.



Constipation

Signs of constipation include the infrequent passage of hard stool (less than once daily), often accompanied by straining, discomfort and a sense of incompletely emptying the bowel. Common culprits include insufficient fibre or reduced fluid intake, which slow your transit time (the time it takes for your food to travel from your mouth through to the other end), making you less 'regular'. Chronic constipation may also be a sign of food intolerances or irritable bowel syndrome (IBS), a condition that affects the function of the bowel.



Diarrhoea

Loose or watery stools that occur more than three times daily may be a symptom of a bacterial or viral infection, such as gastroenteritis, or be related to certain medications, particularly antibiotics. Additionally, food intolerances, IBS and inflammatory bowel disease (IBD), a condition involving inflammation of the digestive tract, may cause diarrhoea.



Abdominal pain

Gut pain can include many sensations including sharp, dull, stabbing, cramp-like or twisting pain in your abdomen. Most people experience occasional gut discomfort, however severe gut pain that has become a pattern rather than a one-off incident requires assessment, particularly if accompanied by other symptoms such as fever, changes to your stool, nausea and/or vomiting.



Reflux or indigestion

Reflux, also known as heartburn, describes a burning sensation felt in the chest or stomach that occurs when the stomach's food contents flow backward into the oesophagus (the tube that connects the mouth to the stomach). Similarly, indigestion describes an uncomfortable sensation in the upper abdomen, as well as a feeling of fullness shortly after eating. Reflux and indigestion have many potential causes, however dietary and lifestyle factors known to aggravate these conditions include some pharmaceutical medications (e.g. anti-inflammatories, blood pressure medication and sedatives), food and drinks such as caffeine, alcohol, chocolate and onion, upper GI infections (e.g., *Helicobacter pylori*), pregnancy, and delayed food transit time.



Well, ain't that a kick in the guts?

Are you having trouble pinpointing what's (metaphorically) kicking you in the guts? While there are many factors that contribute to poor gut health, common culprits to consider include:



Dietary crimes

Processed foods, saturated fats and meat products (typical of a Western-style diet) require higher levels of digestive enzymes to enable their breakdown and absorption. Therefore, excessive consumption of these foods can overburden enzyme production. If your gut struggles to produce adequate amounts of enzymes, symptoms such as flatulence, abdominal cramping and pain, bloating, and altered bowel habits are more likely to occur.

High intake of animal fat, sugar and alcohol, which deplete levels of health promoting gut microbes, also contribute to gut bacteria imbalances. Additionally, a diet deficient in fibre and prebiotic foods (which provide energy to beneficial gut bacteria) can disrupt the transit of food through your digestive tract, altering how frequently you pass a bowel motion, as well as hindering the growth of certain beneficial bacteria that keep your gut healthy.



Guzzling food too quickly

Eating too quickly and not chewing your food thoroughly limits the digestive processes that begin in the mouth when food is chewed and mixed with enzymes present in saliva. Not taking the time to chew your food adequately places additional burden on the digestive processes that occur as food funnels further down the GI tract.



Reduced enzymes

Decreased production of digestive enzymes reduce your gut's ability to breakdown and absorb nutrients from the food you eat, leading to digestive symptoms including flatulence, abdominal cramping and pain, bloating, and altered bowel habits. Impaired enzyme production occurs naturally as you age (particularly after the fourth decade of life), as well as in inflammatory digestive conditions such as coeliac disease, and other chronic diseases including pancreatitis, pancreatic cancer, cystic fibrosis and diabetes (type 1 and 2).



Pathogenic pests

Gut infections (also known as gastroenteritis or gastro) can develop after consuming contaminated water or food, or through contact with a person who is already infected. Harmful pathogens (disease-causing microorganisms) including bacteria, viruses, parasites and fungi disrupt gut health by interacting with multiple gut barrier layers including gut epithelial cells (where they generate inflammation), beneficial gut bacteria (creating imbalanced bacteria levels) and the immune barrier (inducing an immune response). Additionally, injury to gut epithelial cells caused by harmful pathogens can disturb your ability to create enzymes and acids required to digest food properly. While many infections are self-limiting and

pass quickly, the injury to the affected gut layers may cause ongoing digestive discomfort such as chronic bloating or changes to bowel habits. If left untreated, in some people it may progress to chronic digestive disorders such as IBS.



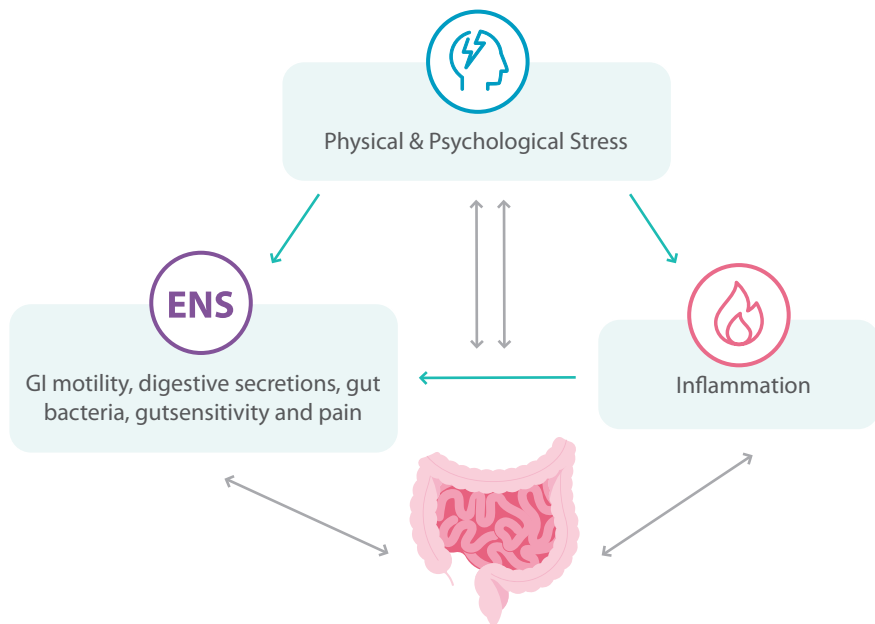
Uncontrolled inflammation

Severe and persistent gut inflammation can overwhelm the functional layers of the GI tract (enzymes, bacteria, barrier, immune, and enteric), resulting in digestive dysfunction. For instance, conditions such as IBS, IBD, gut infections and infestations (bacteria, parasites, viruses and fungi), gluten sensitivity, and autoimmune and metabolic diseases are known to instigate gut inflammation. Additionally, a high-fat diet has been found to drive gut-derived inflammation and disturb digestive health.



Stress

Communication between the ENS and the CNS is known as the gut-brain axis. This communication highway links the emotional and cognitive regions of the brain to your gut function. With this in mind, you can see how instances of severe and persistent stress or CNS disorders such as anxiety and depression can disrupt this relationship and influence activities of gut function. For example, negative emotions and stress disrupt gut motility (causing constipation or diarrhoea), alter gut bacteria levels, increase gut sensitivity and pain, and amplify inflammation, leading to poor digestive health. Perhaps you've experienced 'butterflies in your stomach', or felt nauseous before an event? These are all very real phenomena due to your mind-gut connection.





Medication use

Antibiotics kill off both harmful and beneficial gut bacteria, creating imbalances within the levels of different gut bacteria, particularly if taken regularly or for prolonged periods. In fact, studies indicate that antibiotics alter gut bacteria levels for up to four years after use. Additional medications that further affect bacteria composition include proton pump inhibitors (prescribed for reflux), selective serotonin reuptake inhibitors (used to manage depression and anxiety), oral contraceptives (birth control) and laxatives (used to stimulate bowel movements).



Irregular habits

The circadian rhythm (the body's internal clock, set to a 24-hour cycle, which governs daily rhythms across all body systems) regulates GI function including digestion, absorption and motility. While regular dietary habits promote robust gut function, irregular diet and lifestyle patterns, especially late-night activities and eating, imbalance circadian rhythm and promote GI dysfunction, gut symptoms and gut disorders.

Got gut troubles?

Given how hardworking your gut is, (constantly digesting food and absorbing and distributing nutrients), it's normal to experience the occasional performance hiccup and digestive symptom. However, recurrent or severe symptoms may indicate something more serious, such as a digestive disorder. Common GI disorders and symptoms to look out for include:



Dysbiosis

What is it?	Imbalanced gut bacteria levels caused by loss of beneficial bacterial species, creating a gut environment where 'bad' bacteria can flourish. Sub-categories of dysbiosis include Candidiasis, featuring overgrowth of the <i>Candida albicans</i> yeast, and small intestinal bacterial overgrowth (SIBO)
What are the symptoms?	Bloating, diarrhoea, constipation and gut pain.
What causes it?	A diet low in fibre and prebiotic foods, as well as high intake of animal fat, sugar and alcohol. Antibiotic use, which kills off both beneficial and harmful bacteria, in addition to reflux medication, antidepressants, oral contraceptives and laxatives. Dysbiosis may also occur when chronic inflammation damages intestinal cells, such as in IBS or IBD.



Coeliac disease or gluten sensitivity

What is it?	A chronic GI disorder that occurs when the immune system responds abnormally to gluten containing foods, causing inflammation and damage to intestinal cells that alter the absorption of nutrients from food.
What are the symptoms?	Digestive symptoms include diarrhoea, abdominal pain, bloating and flatulence. Non-digestive features caused by prolonged nutrient deficiencies include unexplained weight loss, anaemia, fatigue, muscle cramps and reduced bone density. .
What causes it?	Coeliac disease occurs in people with an underlying genetic susceptibility. A variety of triggers including GI infections, viral infections, medications and surgery initiate an immune response, causing an abnormal reaction to gluten.



Peptic ulcers

What is it?	Damage to the mucus lining of the stomach or the duodenum (the first part of the small intestine), causing ulcerations or erosions in the lining.
What are the symptoms?	Gnawing or burning pain in the stomach or chest, which can radiate to the back or other parts of the abdomen. Pain is more likely to occur at night and can improve with eating (especially ice-cream or milk). Additional symptoms include nausea and vomiting, and dark stool in extreme cases, which indicate GI bleeding.
What causes it?	Helicobacter pylori infection (a type of bacteria) is the most common cause of damage to the gut lining. Additional triggers include medications (particularly anti-inflammatories), GORD, smoking and alcohol intake.



Gastro-oesophageal reflux disorder (GORD)

What is it?	GORD is a motility disorder caused by the reflux (backward flow) of contents within the stomach including food, digestive secretions and stomach gas into the oesophagus.
What are the symptoms?	Heartburn and pain in your chest or sternum are most common, however symptoms beyond the gut include laryngitis (inflammation of your voice box), cough, asthma and dental erosions (loss of the surface of your teeth due to acid).
What causes it?	Weakness or damage to the muscle that connects the oesophagus to the stomach (known as the lower oesophageal sphincter), allowing the stomach contents to splash upwards. This can be a side effect of certain medications including blood pressure medication, sleeping pills and sedatives, antibiotics, antidepressants, or due to smoking, pregnancy or being overweight. Foods also known to weaken the oesophageal sphincter include onions, chocolate and peppermint, and drinks such as alcohol and coffee, as well as overeating in general.



Irritable bowel syndrome (IBS)

What is it?	IBS is a chronic GI disorder featuring abdominal pain and altered bowel habits that occur without any visible signs of damage to the digestive tract.
What are the symptoms?	Recurrent gut pain (usually colicky or cramping sensations) that is often relieved after you pass a bowel motion. Additional symptoms include altered bowel habits (diarrhoea, constipation or both), abdominal bloating and flatulence.
What causes it?	The precise cause is still a mystery; however, IBS has been linked to dietary triggers (such as lactose and fructose), gut inflammation, an imbalance in the number of 'good' and 'bad' gut bacteria and stress.



Inflammatory Bowel Disease (IBD)

What is it?	IBD is a chronic, recurring condition caused by an abnormal immune response that triggers inflammation to the GI lining and damage to the cells of the affected area. Ulcerative colitis, which affects the large intestine and the rectum, and Crohn's disease, which can affect any part of the GI tract, are two forms of IBD.
What are the symptoms?	Diarrhoea, abdominal pain and cramping, blood in stools, reduced appetite, unintentional weight loss and fatigue.
What causes it?	IBD develops in people with an underlying genetic susceptibility. A variety of triggers including GI infections, medications and emotional stress initiate an immune response, causing inflammation and damage to cells of the gut lining.



Diverticulitis

What is it?	Diverticulitis occurs when small, bulging pouches form in the lining of the GI tract, usually in the large intestine. These pouches can become inflamed or infected, resulting in diverticulitis symptoms.
What are the symptoms?	Severe abdominal pain, fever, nausea, altered bowel habits, and blood in stools (in severe cases).
What causes it?	Low intake of dietary fibre leading to constipation can put extra strain on the walls of the GI tract, causing weak points to form and subsequently, bulging pouches.

Let's gut to the chase

There's no doubt that the gut is a complex system and plays an important role in maintaining your overall health. So, when this system isn't functioning optimally to support your health, the effects can be widespread and extend beyond the gut itself. Conditions linked to poor gut health include:



Food allergies or intolerances

Changes in gut bacteria levels have been found to disrupt normal gut and immune processes, creating imbalances that influence disease development such as food allergies and intolerances. Food allergies occur when the immune system reacts abnormally to food, causing immediate allergic symptoms (within 20 minutes) that may affect numerous organs including the respiratory tract (sneezing, difficulty breathing), skin (itching, swelling, rash) or GI tract (nausea, vomiting, diarrhoea, cramping). Common food allergens include peanuts, tree nuts, shellfish, fish, eggs, soy, wheat, and milk.

Comparatively, food intolerances are not immune-driven and occur when the gut is unable to adequately digest certain food components, such as lactose present in dairy products. Symptoms of food intolerances are usually confined to the GI tract and include belching, bloating, cramping, flatulence and altered bowel habits.



Immune imbalances

Your immune system's main job is to defend you from pathogens. Since pathogens are typically inhaled or swallowed, it makes sense for the immune system to concentrate in your respiratory and digestive tracts. In fact, 70% of the immune system is housed in your gut. It lies beneath the lining of your intestines, ready to spring into action if a pathogen enters your gut, to try to prevent you getting sick. Healthy levels of gut bacteria interact with the intestinal immune system in ways that increase your body's immune defences. However, imbalanced gut bacteria, which does not contain high levels of beneficial bacteria, is less likely to help you resist infection, including colds and flu.

Another possible consequence of poor gut bacterial balance is inflammation, a key feature of autoimmune (e.g., rheumatoid arthritis) and allergic disease (e.g., hay fever). In these conditions, the immune system misidentifies harmless substances as threats and launches an immune response against them. The resulting inflammation creates the symptoms you associate with allergy (e.g., blocked nose and watery eyes) and autoimmunity (e.g., joint pain in rheumatoid arthritis).



Mood and nervous system disturbances

As you have already learned, the interaction between bad gut bacteria and the immune system can cause inflammation. However, did you know that the inflammatory chemicals released within your gut can also cause an inflammatory response in your brain, leading to imbalanced neurotransmitter levels (the body's chemical messengers involved in regulating mood)? Additionally, gut bacteria can influence the way your body adapts to stressful situations. As such, alterations to gut bacteria levels have been linked to a variety of mood disorders including depression, as well as neurological conditions such as autism spectrum disorder, schizophrenia and Parkinson's disease.



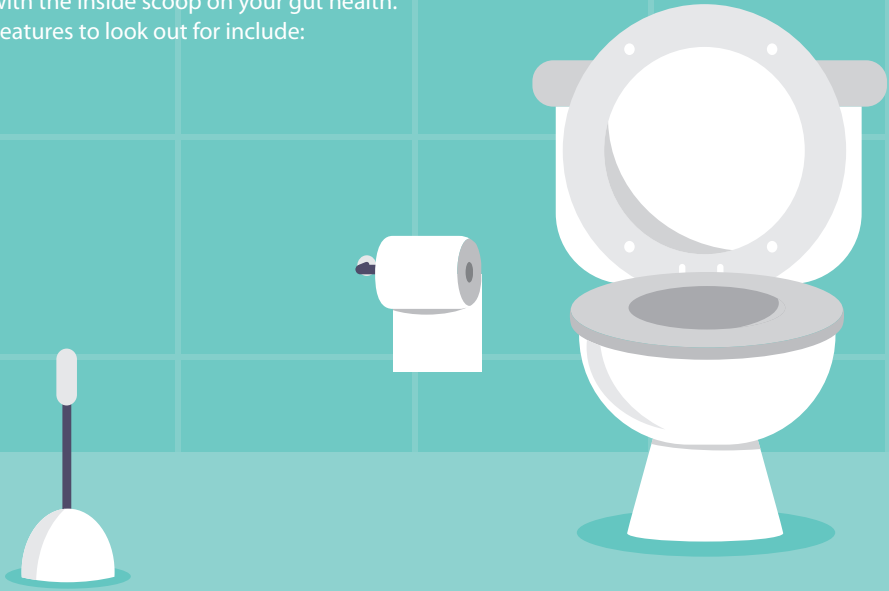
Chaotic hormones

Your gut bacteria play a role in maintaining hormonal balance, particularly oestrogen levels. Healthy gut bacteria levels help to metabolise your body's oestrogen, therefore regulating body oestrogen levels. However, this process is impaired when gut bacteria levels are imbalanced, causing oestrogen levels to increase, which can promote disease development. Altered gut bacteria levels have been found to contribute not only to oestrogen-driven diseases such as endometriosis, polycystic ovary syndrome (PCOS) and breast cancer, but also to metabolic syndrome, obesity, diabetes, cardiovascular disease, and reduced cognitive function.



The scoop on your poop

Who doesn't glance at their bowel motions from time-to-time? In fact, paying attention to your bowel habits, including stool frequency and appearance, can provide you with the inside scoop on your gut health. Features to look out for include:










Regular bowel habits

The term 'regular' describes the ideal frequency of bowel motions and is a sign of healthy bowel function. In saying this, 'regular' bowel habits vary from person to person. For instance, it's normal for some people to have one bowel movement each day, while others may empty their bowels less or more frequently. As such, regular bowel habits range anywhere between one to three movements daily or can be as few as three bowel motions per week. Additionally, soft yet formed stool that is easy to pass represents the gold standard of bowel health.

What does your stool say about you?

The Bristol Stool Chart is a visual guide that describes stool appearance and consistency, and what these may reveal about your bowel health. Which type are you?

Type 1		<p>Severe constipation Separate, hard lumps that resemble nuts or rabbit poop. Dark in colour. Often very difficult to pass and with straining present.</p> <p>Can indicate insufficient fibre, reduced fluid intake, food intolerances or IBS.</p>
Type 2		<p>Mild constipation Lumpy, hard and sausage-like. Dark in colour. Straining and discomfort may be present.</p>
Type 3		<p>Normal Sausage shaped with cracks on the surface. Easy to pass.</p> <p>A good poop!</p>
Type 4		<p>Normal A smooth sausage that resembles a snake. Soft and easy to pass.</p> <p>Another good poop!</p>
Type 5		<p>Lacking fibre Soft blobs with clear-cut edges that are easy to pass.</p>
Type 6		<p>Mild diarrhoea Mushy, fluffy consistency with ragged edges. Often lighter in colour.</p>
Type 7		<p>Severe diarrhoea Liquid consistency with no solid pieces. Often lighter in colour.</p> <p>This can be a symptom of a bacterial or viral infection, or a side effect of certain medications (e.g., antibiotics). Diarrhoea is also common in chronic conditions such as food intolerances, IBS and IBD.</p>

Colours of the poop rainbow and their meaning

Healthy bowel motions are shades of brown, however consuming colourful and vibrant foods (beetroot anyone?) can be reflected in the colour of your stool. Altered production of digestive enzymes and acids throughout the gut may also influence your stool colour. However, recurrent colour changes, particularly when paired with additional digestive symptoms (**detailed on page 8**), may indicate a more serious digestive disorder that requires professional medical advice.

 <p>Green stool</p>	<p>Green stool may be present when food travels through the GI tract too quickly (i.e., diarrhoea), resulting in incomplete breakdown of bile acid (involved in the digestion and absorption of fat from your diet).</p> <p>Consuming green leafy vegetables, green food colouring (found in processed foods such as lollies) or taking an iron supplement may also produce green-tinged stool.</p>
 <p>Light-coloured, white or clay coloured stool</p>	<p>May be caused by insufficient bile acid production, which can occur from a range of disorders that affect the function of the pancreas (e.g., pancreatitis), gallbladder (e.g., gallstones) or liver (e.g., cirrhosis).</p> <p>Medications used to treat diarrhoea, heartburn and digestive upset can also stimulate this colour change.</p>
 <p>Yellow and greasy looking</p>	<p>Excess dietary fat in your stool, as well as disorders of the liver, gallbladder and pancreas (that alter bile acid production), may trigger yellow stool. This presentation is also associated with malabsorption disorders such as coeliac disease.</p>
 <p>Black stool</p>	<p>Black stool can indicate bleeding within the upper GI tract such as the oesophagus or stomach, which can occur from a peptic ulcer.</p> <p>Supplementing with iron or eating black liquorice are also known to blacken stool</p>
 <p>Bright red or maroon stool</p>	<p>Bleeding from the lower GI tract including the large intestine or rectum can lead to bright red or maroon-tinged stool and may be a sign of constipation with straining, haemorrhoids (swollen veins in the lower rectum), IBD, diverticulitis or bowel cancer.</p> <p>Red food colouring or eating foods such as beetroot, cranberries and tomato juice or soup may also cause this colour change</p>

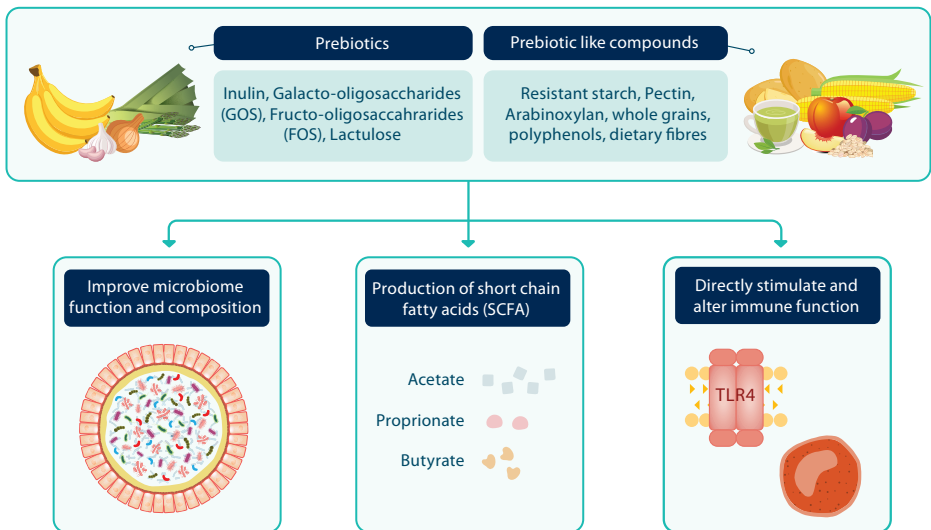


Foods that make your gut sing

Beneficial, diverse and health promoting gut microbes require a fibre-rich diet to thrive. There's nothing your gut bugs love more than consuming a wide variety of prebiotic foods and microbiome accessible carbohydrates (MACs), which provides them with the energy required to grow and flourish.

Prebiotics present in fruits, vegetables and wholegrains are a type of fibre that your digestive system cannot breakdown. Types of prebiotics include fructo-oligosaccharides (FOS), inulin and galacto-oligosaccharides (GOS). Additional foods that can be utilised by your microbiome include MACs, also known as resistant starches, such as rolled oats, lentils and beans.

Through a process known as fermentation, your gut microbes breakdown these food components and convert them into nutrients that can be used for nourishment and growth. For instance, compounds known as short chain fatty acids (SCFAs) are produced from microbial fermentation of prebiotic and MAC foods, which supply your microbiome with a healthy environment to flourish, as well as providing additional digestive, immune and metabolic health benefits.



Eating a diet rich in prebiotic and MAC foods plays a large role in shaping your microbial communities including increasing beneficial gut flora populations and microbial diversity, which are markers of a healthy gut microbiome. Prebiotic and MAC foods that improve microbiome health include:

FOS & Inulin	Resistant starch	Fibre	Polyphenols	Other Prebiotic foods
Chicory root Garlic Jerusalem artichoke Leek Onion Dandelion greens Asparagus Banana Barley Wheat Sugar beet Honey Tomato Rye	Potato, roasted, cooled Bananas Cashew nuts Rolled oats, uncooked Potato, steamed and cooled White beans Lentils cooked	Flax seeds Vegetables Fruit Whole grains	Blueberries Strawberries Peach Plum Grape seed extract Cranberry extract Resveratrol Tea Cocoa Chocolate	Kiwi fruit Beetroot Fennel bulb Green peas Snow peas Sweetcorn Savoy cabbage Chickpeas Red kidney beans Soybeans Cashews Pistachio nuts Peaches Watermelon Grapefruit Pomegranate Dried fruit (e.g. dates, figs)



Try out these recipes that'll make your gut sing!



Creamy Miso Soup with Tofu

Ingredients:

- 500 mL vegetable stock
- 6 cm stick kombu (or wakame), cut into thin strips with scissors
- 2 palm-sized portions of firm tofu
- 1 handful of shallots, chopped
- 1 tsp of miso paste
- 1 tbsp of tahini
- 1 tbsp of lemon juice
- 2 tsp of tamari
- 1 tbsp of water

Method

In a large saucepan add the vegetable stock and kombu (or wakame) and simmer until kombu expands. Add the tofu and shallots and simmer for 5 minutes.

Mix in miso paste, and bring back to a simmer (do not overheat) then remove from heat.

In a jar mix the tahini, lemon juice, tamari and 1 tablespoon of water. Serve miso soup into bowls then mix in 1 tablespoon of tahini mix.

Serve with 3 handfuls of steamed vegetables such as broccoli, green beans and/or bok choy dressed with a drizzle of sesame oil and tamari.



Brilliant Bone Broth

Ingredients:

- 12 cups of water
- 500g of pasture fed gravy beef
- 1.3kg of pasture fed beef soup bones
- 2 large carrots
- 1 large leek
- 2 large onions
- 3 cloves of garlic
- 2 stalks of celery
- 3 bay leaves
- 1 tablespoon of apple cider vinegar
- 3 teaspoons of black pepper (coarsely ground)
- 2-3 pinches of sea salt

SERVES 6

Method

Best done in a slow cooker on low for 8-24 hours but a large stock pot will work fine.

Roast soup bones on a baking sheet in a 200°C oven for 30-40 minutes. Add bones, marrow, and all fat drippings directly to the slow cooker or stock pot.

Be sure to collect the fat stuck to the baking sheet by adding a few drops of water to the pan to deglaze – this adds both colour and flavour to your finished broth.

Add chunky cut carrots, leek, onions, celery and garlic (chop each clove in to quarters) and the bay leaves.

Add water or fill slow cooker or pot to 2/3 with water, 2-3 pinches of sea salt, the pepper and 1 tablespoon of apple cider vinegar (the vinegar helps to draw minerals from the bones).

Set the cooker to low and cook for 12-24 hours. The longer you cook it, the richer the flavour will be.

For stove top: cover the pot and bring to a gentle boil. Reduce heat to a very low simmer and cook with lid slightly ajar, for at least 8 but up to 24 hours on the stovetop. The longer you simmer it, the better your broth will be. Add more water if necessary to ensure bones and vegetables are fully submerged.

Once finished, allow broth to slightly cool and strain out the bones.

When cooled the broth will contain a floating layer of fat. The actual amount of fat in your bone broth soup may vary. Stir through – may be refrigerated and reheated as you like.



Kick Starter Lentil Soup

Ingredients:

- 60g Brown Lentils
- ½ a large Tomato diced
- 1 medium celery stalk, chopped finely
- ½ a cup diced carrots, chopped finely
- ½ a cup fresh coriander
- ¼ of a large white onion, diced
- 2 whole fresh red chilies, chopped finely & de-seeded
- 2 cloves garlic, finely chopped
- 1 tsp olive oil
- 1 tsp ground black pepper
- 2 whole Bay leaves
- 1 pinch Salt
- 3 cups water

SERVES 1

Method

Rinse the lentils in cold water, drain and set aside. Place a large, heavy-based saucepan over medium heat. Add the oil, onion, garlic and celery and cook for 5 minutes, stirring regularly, until soft.

Add the tomato, bay leaves, half the coriander and the water. Season with salt and pepper and bring to the boil.

Add the lentils and carrots and half the chili. Stir well, reduce the heat and simmer for 40-45 minutes until the lentils are tender, adding an extra cup of water if the soup looks too thick.

Ladle the soup into bowls and top with the remaining chili and coriander.



Quinoa and Cannellini Salad

Ingredients:

Mix in the following ingredients together in a bowl:

½ to 1 cup cooked quinoa

A handful of mixed salad greens

Finely sliced purple onion

1 chopped tomato

Finely shredded purple cabbage

Cucumber julienne

Cooked organic cannellini beans

Wedges of avocado

For Mediterranean flavour: Add olives, parsley, basil, goat's cheese, olive oil and lemon juice.

For Asian Twist: Add peppermint and coriander leaves, watercress, sesame and olive oil, lime juice and chilli flakes.

Method

Simply rinse one cup quinoa (red or white or a combination) in a fine mesh strainer, then bring to a simmer in a pot with two cups of water, cover and cook on low heat for

10 to 15 minutes until liquid is absorbed. Presto!

Credit to Anna Zerafa



Banana Almond Cookies

Ingredients:

- ¾ cup almond meal
- ½ cup finely desiccated coconut
- 1 large ripe banana
- 1 to 2 tablespoons chia seeds (optional)
- 1 teaspoon cinnamon
- A few raw almonds for decoration

Method

Mash the banana with a fork in a bowl until it resembles a puree. Add cinnamon and chia seeds and mix well. Then add almond meal and dried coconut, mixing thoroughly. The mixture should form a dough with all ingredients binding together.

Take a tablespoon of the mixture and form into a ball, then flatten into a cookie shape. Place onto baking paper so the cookies don't stick. Press a whole raw almond on top and press down lightly.

No baking is required, keep in the fridge and enjoy!








Credit to Kate Walker

You gotta nourish to flourish!

What you consume is what fuels your body. Therefore, eating a wide variety of whole foods, consistent with a Mediterranean-style diet, will provide your body with essential nutrients for optimal function. As mentioned, supplying ample prebiotic and MAC food sources will also encourage healthy gut microbiome composition.

Current evidence suggests that the Mediterranean diet provides protection against several diseases associated with digestive dysfunction inflammation, poor immunity and psychological distress – giving you the best chance at supporting optimal health and wellbeing.

The Mediterranean diet includes high intake of fruits and vegetables, lean protein, quality essential fatty acids and wholegrains (limiting starchy grains and vegetables). *The Metagenics Wellness Diet* reflects the wholefood principles of the Mediterranean diet, while also providing a simple guide to moderate portion size and the overall balance of macronutrients. Following the Wellness Diet also ensures you are minimising intake of foods that exacerbate digestive symptoms, as well as encouraging regular movement and relaxation to promote digestive health.

METAGENICS WELLNESS DIET	
 Vegetables	Enjoy a minimum of three cups of fresh vegetables daily.
 Meat, poultry, fish, eggs and dairy	Include protein-rich foods in each meal or snack.
 Fruits	Enjoy a minimum of two pieces or one cup of fresh fruit daily.
 Starchy carbohydrates	Limit starchy carbohydrates to one to two small serves daily.
 Nuts and seeds	Include a handful of nuts and seeds and up to two tablespoon of healthy oils daily.
 Hydration	Drink a minimum of eight glasses of pure water daily.
 Lifestyle	Aim for a minimum of 30 minutes of moderate activity and 30 minutes of fun and relaxation on most days.

Below is an example of how to build a healthy meal based on these recommendations.



Your gut health tool kit

Are you looking to level up your gut health? If so, we've got you covered! Nutrients and herbs that your Practitioner may use to improve your digestive wellbeing include:

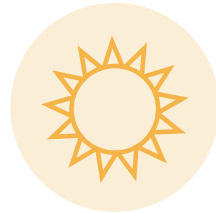


Glutamine

Glutamine is an amino acid that provides energy to the cells of your intestine, enabling them to remain healthy and maintain their functional integrity. Glutamine has also been found to increase gut immunity, therefore improving immune function and defence against harmful microbes, while also providing anti-inflammatory support. Food sources containing glutamine include meat, poultry, eggs, dairy and fish.

Vitamin D

Vitamin D optimises gut-associated immunity and regulates inflammation. Additionally, studies have shown vitamin D supplementation improves gut microbial diversity and microbiome health, with low vitamin D levels linked to dysbiosis. Dietary sources of vitamin D include calamari, cheese, chlorella, egg yolk, herring and sprouted seeds. Also known as the 'sunshine vitamin', vitamin D forms in the skin when it is exposed to UV from sunlight. Don't forget to use sun protection when the UV Index is 3 or above, or when spending extended periods of time outdoors.



Zinc

Zinc is a healing nutrient, helping to repair and protect gut epithelial cells (the internal lining of your GI tract) that are damaged or inflamed. Adequate zinc is also critical for the production of hydrochloric acid in gastric juices; essential for food breakdown in the stomach. Foods such as red meat, poultry, eggs, mushrooms, spinach and a variety of nuts and seeds provide rich sources of zinc.

BosPure® Boswellia

BosPure® Boswellia is a potent antimicrobial herb capable of defending against harmful gut microbes that perpetuate infection. Additionally, Boswellia's anti-inflammatory actions have been found to improve digestive conditions with marked inflammation including chronic ulcerative colitis and Crohn's disease.



Meadowsweet

Historically, meadowsweet has been used for its protective effects against inflammatory digestive conditions, with more recent evidence also supporting its ability to relieve inflammation-induced gut pain. As such, meadowsweet soothes an irritated gut and alleviates digestive discomfort.

Ginger

Ginger has been shown to decrease gut pain and spasm and promote optimal movement of food through your GI tract, therefore helping to reduce common digestive symptoms including nausea, flatulence and bloating.

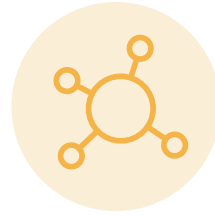


Liquorice

Liquorice is a powerful anti-inflammatory herb that promotes mucus production throughout the upper GI lining, therefore healing damage to the mucus layer and restoring the protective barrier it provides to underlying gut epithelial cells. GutGuard® Liquorice has been shown to assist with upper GI symptoms including indigestion and reflux.

Digestive enzymes

When consumed with a meal, supplemental enzymes enhance the digestion of carbohydrates, protein and fat from your food. Supplemental enzymes are particularly beneficial when enzyme production is reduced (such as in the presence of a digestive disorder), which can compromise your gut's ability to effectively breakdown food, leading to digestive symptoms such as bloating and burping.



Bitter herbs

Bitter herbal remedies have been used traditionally to promote digestion. For instance, the bitter constituents found in dandelion root may increase gastric acid secretion, promote bile acid production in the liver and stimulate release of stored bile from the gallbladder. Additionally, gentian contains several bitter compounds that have been shown to increase production of digestive secretions.

Probiotics

Probiotics are live, microorganisms that interact with your gut microbes and digestive tissue, such as the gut barrier, restoring levels of beneficial gut microbes and improving your digestive function as they travel through your gut. Strains including LGG®, BB-12® and *Saccharomyces cerevisiae* (boulardii) enhance the growth and function of your beneficial gut flora. Additionally, these strains suppress the growth of potentially harmful gut microbes and support healthy gut mucosal linings, essential to optimal wbowel function. This strain combination is particularly beneficial following antibiotic use.



LGG® and BB-12® are a registered trademark of Chr. Hansen A/S

Partially hydrolysed guar gum (PHGG)

PHGG is a unique prebiotic fibre that regulates the transit of food through your digestive tract, therefore preventing or reducing constipation while also supporting the growth and function of your beneficial gut microbes to enhance microbiome health. As well as reducing constipation, PHGG may alleviate bloating, gut pain and flatulence.



Larch arabinogalactans

Larch arabinogalactans provide an excellent source of prebiotic fibre for your gut microbes to ferment and promote their survival. More specifically, arabinogalactan fermentation creates butyrate, a SCFA that has that has been found to enhance the health of your intestinal cells. Dietary sources of arabinogalactans include carrot, radish, pear, maize, wheat and tomato.





Hot tips for a smooth digestion

Consume plenty of fibre-rich wholefoods

to regulate your bowel habits and provide your gut bacteria with their preferred food. Nourishing your gut bugs with a whole food diet can increase the concentration of beneficial gut microbes, which may strengthen your gut-brain connection and improve your digestion, balance your hormones and enhance your mood.

While it's perfectly normal to treat yourself from time-to-time, **limit your consumption of processed foods** that are high in sugar and saturated fat (think hamburgers, fried foods, lollies, soft drink, white bread, sweet biscuits etc), as well as moderating your alcohol consumption. These foods and drinks can be damaging to your gut microbiome when consumed regularly or in large amounts.

Make a meal plan for the week and buy all your ingredients in one dedicated shopping day. Planning is key to ensuring you stick to a healthy diet.

Eat mindfully. Mindful eating promotes digestive functions and modulates your body's stress response. This practice supports the 'rest and digest' philosophy, regulating the passage of food through your digestive tract, enhancing digestive enzyme and acid production, and ultimately improving nutrient absorption and assimilation. *Refer to page 34* for further information on mindful eating practices.

Stay hydrated. Maintaining consistent fluid intake including water and herbal teas can prevent constipation. Aim to drink 1.5 L to 2 L of fluid each day.

Eat on schedule. Remember that your body is set to a 24-hour cycle (the circadian rhythm), which governs daily rhythms across all body systems including your gut health. Implementing regular dietary habits will promote a robust gut function and regulate digestion, absorption and motility (i.e., your bowel habits).

Chill out. Having explored the connection between the gut and the brain, it's clear that uncontrolled stress can have a detrimental impact on your digestive tract and vice versa. Stress management techniques can be as simple as taking a moment out of each day to focus on your breathing, engaging in meditation or practicing gentle forms of exercise such as yoga or Pilates. For additional ways to support your body through times of stress, speak to your healthcare Practitioner.

Move your body. Regular physical activity has multiple health benefits including easing constipation, enhancing gut microbiome health, alleviating stress and improving your mood; all of which support gut health. Find activities that you enjoy and practice these on a regular basis. Joining an interest club (i.e., running club) or participating in group fitness classes can also be a fun way of remaining motivated and engaged in physical activity.

Give your body ample time to rest.

Remember, sleep quality is intricately linked to gut health. Therefore, improving your sleep quality and maintaining healthy sleep hygiene can improve your digestive function.

Engaging the senses with mindful eating

“Mindful eating is an awareness and appreciation that nourishes not only your body, but also our spirit, and opens the door to appreciating life”.

Stop and smell the roses...or in this case, your food. Mindful eating is a practice that encourages conscious awareness of the task at hand. In this instance, your relationship with food.

Mindful eating can provide an enjoyable food experience, allowing you to focus on the present moment, slow down and take the time to appreciate the flavours and experience of eating. Consider your current eating patterns:

Can you remember the last meal you ate that had your undivided attention, free of distractions such as electronic device use or work-related activities?

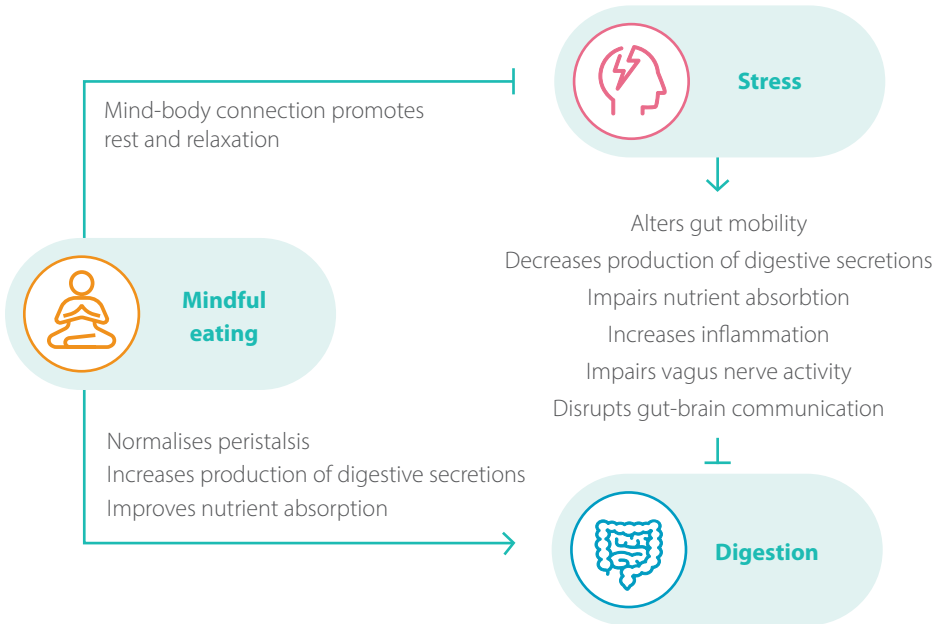
When was the last time you truly savoured the experience of eating food?

When was the last time you actually paid attention to what you were eating?



From an early age we are taught to respond to external food cues such as boredom, time of day, habit and reward rather than internal cues of hunger, which perpetuate stress-related eating patterns. Eating mindfully involves slowing down and bringing awareness to the experience of eating and the body's hunger and satiety signals.

As well as creating an enjoyable eating experience, studies have shown mind-body connection established during mindful eating can mitigate the negative effects of chronic stress on gut function, therefore enhancing digestive health.



Techniques to incorporate into your mindful eating practice include:

- Before eating ask: Am I hungry? Am I thirsty?
- While eating, pay attention to the colours, smells, flavours and textures of food.
- Chew slowly – this allows the body time to catch up, reducing the likelihood of overeating.
- Put utensils or food down between mouthfuls.
- Avoid multitasking. Remove distractions such as TV, phones, computers and books while eating. If a meal is consumed at work, take meal breaks away from the desk.
- Take note of when food cravings occur and what emotions or stimuli trigger these cravings. It can be helpful to keep a craving journal.
- Observe the feeling of hunger and satiety throughout the day.

Are you looking to take your mindful approach one step further?

If so, this activity may be for you:

- Step 1** Choose one piece of food. It might be a berry or a small slice of fruit.
- Step 2** Begin by observing the food, taking note of its shape, colour and texture.
- Step 3** Bring the food to your nose and smell it.
- Step 4** Place the food on your tongue, noticing the initial taste and the response of the salivary gland, producing saliva in preparation to eat
- Step 5** Take a bite, noticing the sounds in your mouth and the feel of the food on your tongue.
- Step 6** As you chew, observe how the texture of the food changes.
- Step 7** Now swallow, paying attention as the food travels down your throat to your stomach.
- Step 8** Finally, say the name of the food silently to yourself.




Digestion symptom tracker

Completing the symptom tracker each week allows you and your Practitioner to assess your digestive health, identify patterns that may aggravate your digestive function and monitor your response to treatment.

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Digestive symptoms							
Bloating							
Flatulence (with odour?)							
Gut pain (<i>sharp, dull, stabbing, cramping, twisting</i>)							
Reflux/indigestion							
Bowel Motions							
Bristol stool type							
Stool colour							
Number of bowel motions							
Urgency present							

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Straining present							
Additional symptoms							
Dietary factors							
Dietary crimes <i>(suspected food aggravants)</i>							
Prebiotic and MAC intake <i>(note down foods eaten)</i>							
Lifestyle factors							
Stress levels <i>(1=low stress, 10=high stress)</i>							
Stress relief activity <i>(e.g. deep breathing, meditation, yoga)</i>							
Energy levels <i>(1=low energy, 10=high energy)</i>							
Physical activity <i>(note down activity type and duration)</i>							
Health supplements <i>(note down any taken)</i>							

Bristol stool chart

Type 1	Type 2	Type 3	Type 4
			

Type 5	Type 6	Type 7
		





Your Practitioner Contact Details:



Genetic Potential Through Nutrition

MET7158 - 07/21

The Metagenics products selected for you in this clinic have been prescribed for your specific health needs. Metagenics is a Practitioner only range. Please return to your Practitioner for a new prescription.

Metagenics acknowledges and pays respects to the past, present and future Traditional Custodians and Elders of this nation. We acknowledge the Yuggera, Turrbal and Jagera people, the Traditional Custodians of the land on which this resource was created.

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