

The Athlete Gut Guide



Your handbook to maintaining a happy and healthy gut

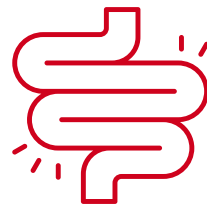
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Get to know the gut

Your gut keeps your whole body running smoothly. It's easy to take it for granted, but it's actually the part of your body that engages most with the outside world. It's home to the largest part of your immune system and communicates with the rest of your body, including the brain.



What is the gut?

- The gut refers to your whole gastrointestinal tract - from the mouth to the anus.
- The gut is where our digestion (and absorption) of food and nutrients occurs.
- Each section of the gut is perfectly engineered for its own part in processing food.



The mouth

This is where your body begins to break down food as it gets chewed and mixed with saliva. Saliva contains the enzyme amylase, which breaks down larger food molecules into smaller ones which your body can absorb easily.



The oesophagus

Food is pushed down the oesophagus by powerful muscular contractions known as peristalsis. These rhythmic contractions begin at the top of the oesophagus and travel through your entire gut to keep food moving.



The stomach

Food remains in the stomach for up to 4 hours. Here, it is mixed with gastric juices containing enzymes (which break down proteins) and acid (which kills most of the bacteria). The rest is passed into the small intestine.



The small intestine

Your "small" intestine consists of 10ft of tubing with folds on the inner surface (called villi and micro-villi) which increase the surface area for nutrients from broken down carbohydrates, fats, and proteins to be absorbed.



The large intestine (AKA: the colon)

This is where trillions of gut bacteria break down some of the undigested fibre from your diet. This is also where your faeces get compacted, and where water, minerals and some remaining nutrients are absorbed into the blood.

What is the gut microbiota?

This refers to the unique community of >100 trillion bacteria that inhabit our gastrointestinal tract and are vital for our health. It could be argued that we are more bacteria than we are human. This is because even though we have the same number of human cells and bacterial cells in the body, we have more bacterial genes than human genes. In other words, we have a lot of bacteria both in and on our bodies.



Functions of the gut microbiota

Gut bacteria do many things to help promote your overall health. From supporting immunity to breaking down the food that we eat, your gut bacteria play many important roles in your day-to-day health maintenance.



Maintenance of the immune system

Your gut health and your immune system are closely linked, as 70% of the immune system is located in the gut. Consequently, changes to one can impact the other. Your gut microbiota interacts with immune cells to regulate immune responses.



Fermentation of fibres

Gut bacteria break down plant fibres found in foods like fruits and veggies. This process creates energy-boosting short-chain fatty acids, enhances nutrient absorption, and supports a healthy gut and immune system.



Absorption and synthesis of key nutrients

The gut can be thought of as your body's nutrient factory. The gut microbiota assists with the breakdown and utilisation of key nutrients. This enables the body to produce essential nutrients and metabolites such as short-chain fatty acids, amino acids and key vitamins (e.g., B vitamins and vitamin K) required for various bodily functions.



Control of undesirable bacteria

The gut microbiota is made up of 3 types of bacteria: the good (symbionts), the bad (pathobionts) and the ugly (commensals). The 'ugly' bacteria play an important role in maintaining the balance of the gut microbiota. Just as weeds compete for space and nutrients in a garden - depriving healthy plants from flourishing - 'bad' bacteria can act similarly in the gut. Your 'good' and 'ugly' bacteria aim to outcompete the 'bad' bacteria to maintain balance in the gut microbiota.



Communication with the rest of the body

The gut can be thought of as a social butterfly, as it talks to many organs and systems in the body including the brain, skin, liver and the immune system. The gut-brain connection is particularly important as it is a two-way communication pathway, meaning that caring for your mental health can help your gut health, and vice versa.

Gut microbiota diversity

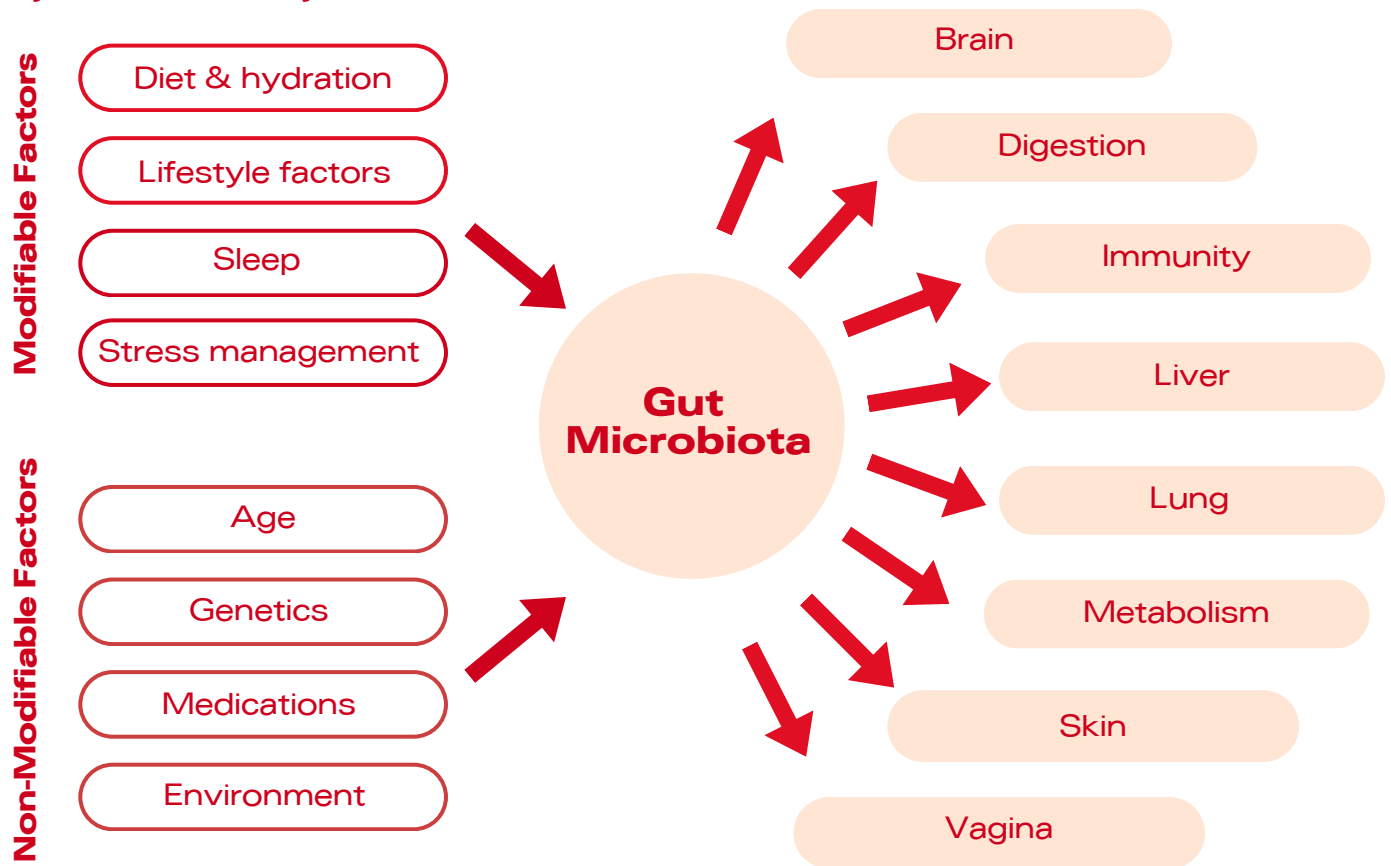
Gut microbiota diversity refers to the different types of bacteria residing in the gut. The greater the variety, the better the bacteria are at carrying out each of these functions.

Read on to discover how you can improve your gut microbiota diversity.



Factors affecting gut health

The composition of the gut microbiota is affected by a number of different factors, some that we can change (modifiable) and others that we cannot change (non-modifiable). These factors then influence the effect of the gut microbiota on different organs and systems in the body.



The 5 pillars of gut health

Small changes to your diet and lifestyle can have a big impact on your gut health. As you prepare for event day, there are certain habits that you can adopt to optimise your gut health. This guide will aim to explore the following 5 pillars of gut health, with expert tips from the team at the UK Sports Institute (UKSI).



Diet



Sleep



Stress management



Hydration



Exercise

Diet

Do you want a healthy gut? Then you'll need a healthy, diverse diet. Food not only keeps you fuelled but is also essential for keeping your digestive system running smoothly. The gut microbiota adapts according to the foods we eat. Consuming a high-fibre diet (aiming for 30g per day) which includes a variety of 'plants' will feed your gut bacteria. This can increase the number and types of 'good' bacteria (e.g., lactobacilli and bifidobacteria) that reside there.

Research spotlight

A landmark study showed that those who ate more than 30 different types of plants per week had a more diverse gut microbiota compared to those who ate less than 10 plants per week. Eating 30 different plants per week (including different types and colours of the same plant) is a great way to support your gut microbiota.

McDonald et al. (2018) mSystems 3(33): 10-128

What counts as a 'plant'?



Mike Naylor

Head of Performance Nutrition at UKSI

How can I overcome competing nutritional strategies?

Often, there are times when it is not practical or performance-focused to consume a large variety of high-fibre foods. This might be on competition day, or the day before, when we are prioritising quick-release carbohydrate intake for performance needs. Therefore, we should aim to increase the diversity of high-fibre foods (e.g., different fruits and vegetables, wholegrain rice and pasta, beans, lentils etc.) at times further away from competition. Closer to competition, it may be suitable to consume simple, fast-release carbohydrates (e.g., white bread, white rice and white pasta) for optimal performance. Fibre intake should also be reduced on the day before, and day of, high intensity events to prevent unwanted gastrointestinal symptoms e.g., bloating.

How can I ensure that I get variety in my diet whilst training/travelling?

At most competition events or training camps there is a variety of different high-fibre plants available to eat. Athletes should make the conscious efforts to consume these at the right times to support both health and performance. At times when specific dietary fuel plans are not relevant, you ought to seek variety. To do this, fully explore the menu first (even before getting to the restaurant) before making a decision or take a walk around the complete buffet with a view of how you can maximise the health and performance benefits at each meal. I also recommend having a conversation with the tour chef or tour nutritionist to fully understand how your diet can best support your performance.



Sleep

Not only is a broken night's sleep likely to leave you feeling tired and irritable, but irregular sleep patterns are also associated with poorer diet quality and reduced gut microbiota diversity. Disruption to your natural 24-hour sleep cycle (known as the circadian rhythm) may impact the balance of the bacteria in the gut. Aim for 7-9 hours of good quality sleep per night.



Dr Laura Needham

Co-Head of Physiology at UKSI

What are your top tips for a successful slumber?

Routine, routine, routine! If you can, this will be your sleep saviour. Be mindful that we don't all have the same routine - some people are early birds and others are night owls. This is known as your chronotype, and it is best to form your routine around your natural tendencies. However, regardless of when you fall asleep, there are some beneficial changes that we can all make. Read on to discover my top tips for improving your sleep.



Avoid caffeine before bed - the effects can last between 4-6 hours.



Avoid large quantities of fluid at least 2 hours before bed, as this will help mitigate frequent awakenings for the toilet in the night.



Minimise screen time at least 1 hour before bed as this is mentally stimulating and gives off light which can delay feelings of sleepiness.



As tempting as it may be, avoid reaching for your phone if you wake in the night. A lot of phones have 'do not disturb' and 'sleep' features that are a really good way to support sleeping routines.



Try and keep your bedroom associated with sleeping and calm by avoiding working, entertainment, and eating in it.



A calm, cool (16-18 degrees) and comfortable room is optimal.



Invest in a comfortable environment as the chances are you spend about 1/3 of your day in your bedroom so make it a place you want to be!



Avoid bright lights before bed.



Try using an eye mask and ear plugs to facilitate your sleep.

Stress Management



Mood and stress levels impact your gut health, and vice versa. This is because of the scientifically proven two-way communication between the gut and the brain, known as the gut-brain axis. The vagus nerve physically connects the gut and the brain together. This nerve is linked to our parasympathetic system which helps us to slow down. Having strategies to tap into this connection is key to stress management including helping to reduce performance anxiety.



The gut has its own nervous system called the enteric nervous system which allows the gut to function independently of the brain. This is why the gut is known as the 'second brain'. Additionally, the gut microbiota helps to control our gut-brain communication via different systems around the body, including the immune and nervous systems.



Sarah Cecil

Lead Sport Psychologist at UKSI

How can I prevent performance anxiety?

Performance anxiety is common for athletes. Uncomfortable thoughts and feelings are part of this anxiety. Being willing to experience these feelings is important, and wasting energy trying to get rid of uncomfortable thoughts and feelings is exhausting. Levels of tension and impatience often increase in the lead up to competition day. This is very normal. Leaning into any anxiety and having a plan in place to manage it is key. You will likely be training less on the few days before competition, so will have more down time.

During this time, consider my top tips for reducing performance anxiety:



Interact with coaches to run through pre-competition routines and goals.



Maintain your confidence by reflecting on good past performances, recent training achievements and personal strengths.



Engage in activities which distract you from the upcoming competition, such as reading, playing cards, watching a series etc.



Schedule calls with family and friends to stay connected to your support team.



Reach out to people and environments which make you feel safe to boost your parasympathetic system. Make sure you connect with these people and environments frequently. Helping other people feel safe is another way to stimulate your vagus nerve.



Be gentle on yourself. Talk to yourself in a kind and warm voice.



If anxiety symptoms persist, you should seek assistance from the medical team. Tailored solutions, drawing from various disciplines including nutrition, psychology, and medicine, can be explored to address individual needs effectively.

Hydration

As an athlete with a busy training schedule, it's easy to forget to drink enough water. Water does more than quench your thirst – it's essential to keep your body functioning as nearly all the major systems depend on it and helps you feel healthy. Staying hydrated also offers benefits such as helping your gut flush out waste, preventing constipation, keeping oral bacteria moving and leaving your mouth fresh. Read on to discover the importance of hydration for keeping your gut happy.



Mike Naylor

Head of Performance Nutrition at UKSI

How can I stay hydrated whilst travelling?

Whilst travelling, you should be regularly sipping on water or an electrolyte-based product to support your hydration. As a general rule, you should consume 2-3L of water per day plus an additional 200ml-1000ml of fluid per hour of training depending on sweat rate. These recommendations are often consistent for training days. It is always practical to carry a water bottle with you which you can refill at airports or service stations.

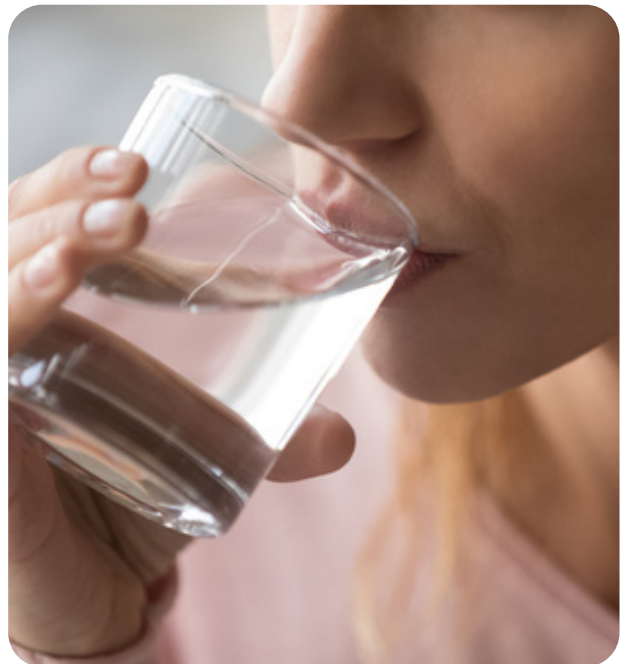
Research spotlight

Research shows that being hydrated is important for your gut health. Good hydration means that your gut lining is more hydrated. This is necessary for the protective gut barrier to function properly so it can assist in the immune response by keeping out any nasty bacteria and viruses.

Redondo et al. (2015) The FASEB Journal, 29, pp.593-1



Top tip: When increasing your fibre intake, increase your water intake too to prevent you from becoming dehydrated. This is because fibre draws water into the bowel which helps soften your stool, making it easier to pass. If you don't drink enough water, you're more likely to become constipated.



Exercise

As athletes, you know that regular exercise is not only a good lifestyle habit, but it is also great for both your physical and mental health. Exercise is also known to improve your gut health independently of other factors. It can increase the diversity and growth of beneficial bacteria in the gut.

The effects of exercise on your gut



Supports immune function



Eases digestive transit



Enhances gut microbiota diversity



Supports gut-brain communication

Research spotlight

Recent research revealed that there are considerable differences in gut microbiome composition between athletes and sedentary individuals. Athletes typically exhibit a more diverse gut microbiota, with higher levels of health-associated microbes such as lactobacilli and bifidobacteria.

Mohr et al. (2020). JISSN, 17, pp.1-33.



The importance of rest and recovery



Dr Laura Needham

Co-Head of Physiology at UKSI

Why is recovery essential for performance?



Recovery is essential for performance as this is when the magic happens! When we physically train we are actually damaging and stressing our bodies, it is only when we recover that our bodies have the opportunity to repair the damage done and adapt. So essentially we get fitter, faster, and stronger when we are recovering! Our bodies respond to the damage we cause by repairing them a little bit better than they were before - we call this adaptation. So if we do that training session again our bodies can manage it better. This is why over time we can run a little bit faster or longer, or lift a little more weight in the gym.

Tips for Travelling Athletes

How can travel affect your gut?

Travel often disrupts your usual routines, exposing you to dietary changes, altered sleep patterns, climate variations, and new microbes—all of which can impact your gut microbiota. However, there are precautions that you can take to minimise the effect that travel can have on your gut health.



1 Preventing sleep disruption

There are many tools you can use to optimise your sleep (see page 5). However, these can become more difficult to implement when travelling. Try the following:

- Maintain your usual wind-down routine – even in unfamiliar settings like airports and hotels
- Adjust your body-clock gradually when crossing time zones by syncing with your destination's time zone before leaving
- Limit food and caffeine intake 2 hours before bed
- Wear an eye mask and ear plugs to block out light and sound
- Pack items which will help you to sleep on modes of transport (e.g., blanket, pillow)

2 Managing dietary changes

Travelling to new locations can also mean changes to your diet. Here are some suggestions for managing these changes:

- Maintain your usual fibre intake during your travels to keep your gut functioning well
- Pack high-protein snacks (e.g., your favourite protein bars)
- Carry a refillable water bottle to stay hydrated, filling it up at petrol stations and airports.

3 Prioritise stretching

During long stints of travel, it is easy for our muscles to become stiff and achy. Prioritise stretching and mobility exercises to alleviate tension and aid digestion. Try out the following techniques:

- Keep mobile on long flights by walking up and down the aisle to stretch your legs
- Incorporate stretching in your evening routine in the hotel room
- Pack a foam roller to loosen up your muscles upon arrival to your destination

4 Pack the essentials

When travelling, things don't always go to plan; travel delays or missing luggage can happen. Plan and pack for these unexpected events by packing the essentials and any items that you may not be able to access in the location you are travelling to. For example, include electrolyte sachets, your favourite snacks, a neck pillow for long journeys, and any medications you may need. Additionally, consider bringing comforts from home, like a suitable pillow, to create a familiar environment and promote restful sleep.



Meet the Experts

We extend our thanks to UKSI for their expertise and support in the development of this resource. Yakult have had a close working relationship with the UKSI for many years and we appreciate the continued partnership. It is a great validation to see our dedication to science appreciated by top experts in the field of high performance nutrition.



Sarah Cecil is a Chartered Sport Psychologist who has worked in Olympic and Paralympic sport for over 20 years. She was the psychologist for the British Athletics at London 2012 and later worked at the Team GB Intensive Rehabilitation Unit. Sarah has also been at the UK Team psychologist at 4 Invictus Games and the Team GB psychologist in Beijing 2022 Winter Olympics. Sarah sits on the UK Sport Mental Health Steering Group. She currently works for the UKSI and the LTA alongside her private consultancy. Sarah uses her expertise to support coaches and athletes to deliver under pressure and fulfil their potential.

Michael Naylor is the Head of Nutrition for the UKSI where he works with over 20 nutritionists providing support to 20 Team GB Olympic and Paralympic sports. He served as the lead nutritionist for Team GB at the Rio 2016 Olympics. Michael has also provided nutrition support to England Rugby for over 8 years, working with both the Senior Men and Women teams, including the 2014 World Cup winning women's team. In football, he was the performance nutritionist at Southampton FC for 6 seasons and now works with the England Football Senior Men's team. He was part of the support team that travelled to the 2018 and 2022 World Cup and the 2020 European Championships.



Dr Laura Needham is a BASES accredited sport scientist who has provided applied physiology support to a number of high-performance sports in preparation for Olympic, World Championship and Commonwealth Games for over 10 years. Laura is currently Co-Head of Physiology at the UK Sports Institute (UKSI), alongside her leadership role, she delivers to the British Triathlon Federation, leading the physiology service for Paris 2024 Olympic Games.

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