GutWell

Gut Microbiome Analysis Report

Before getting to the results

The human gut is home to a wide variety of different microorganisms. Most of them are bacteria, but there are also archaea, protozoa, fungi, and viruses. This mix of microbes makes up the gut microbiota, which is determined by a microbiome analysis. The microbiome is the sum of all the genomes of all the microorganisms living in the human body.

With GutWell analysis, we focus on the bacteria in the gut. A study of the gut microbiome allows us to identify which bacteria are present, how abundant they are, and how they affect the body. Bacterial DNA is analysed in the laboratory using state-of-the-art technology that gives a fast and accurate answer. The test shows whether the bacterial composition is balanced or whether dietary and lifestyle changes are needed to achieve the desired gut microbiome composition.

The analysis of the gut microbiome and the interpretation of the results are science-based and come from authoritative scientific and medical journals. The various sections of the results describe the composition of your gut microbiome and its relationship to your health.

Keep in mind that only persistent healthy eating and lifestyle habits can lead to an improved gut microbiome composition.

This assay is based on the sequencing of the V3-V4 regions of the 16S rRNA genes. This technology enables us to classify bacterial taxonomies up to the species level. At the species level, the accuracy and sensitivity of the classification is lower than in the case of higher taxonomy levels.

It should be taken into consideration that the result of a microbiome test and its interpretation may be incomplete. The amount of detected microorganisms is not conclusive and other microorganisms, that are not detected by this test may be present in the microbiome. The current interpretation of the microbiome test may be subject to change in the future due to the publication of new scientific studies. Any inaccurate or missing information, likewise any action that does not comply with the manual, may result in a misleading interpretation.

This report is provided to you for informational and educational purposes only, and does not replace a visit to a physician, nor does it replace the advice or services of a physician.

Contents

Test

Person

Gender:	**Female**
Age:	**33 years**
Sample code:	**Testing_report_1**
Sample taken:	**01.05.2024**
Date:	**04.06.2024**

Composition of the microbiome

Microbiome and nutrition

Microbiome and health

Your results are within the norm

Your results need attention.

In this test, your microbiome composition has been compared with a reference group of healthy adults of the same sex and age.

Composition of the microbiome

The microbiome is the collection of genomes of all microorganisms living in the human body.

Most microbes in the gut are beneficial and necessary for health. Diversity of the microbiome, species richness, and composition are important for the gut and overall health. An out-of-balance microbiome can lead to a variety of health problems, such as obesity, digestive problems, and autoimmune diseases.

The composition of the gut microbiome depends on different factors.

Factors beyond our control are gender, age, heredity, diseases, and the medications used.

Factors that we can influence are diet, physical activity, sleep, and living environment.

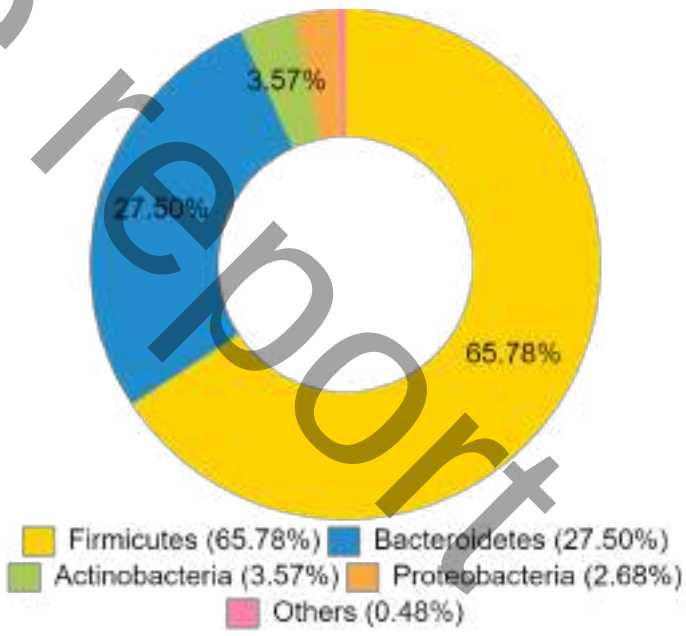
In this test, your microbiome composition has been compared with a reference group of healthy adults of the same sex and age.

Phyla

The phylum is the highest level of bacterial classification. The bacteria in the human gut belong mainly to five phyla, of which the first two are usually the most numerous.

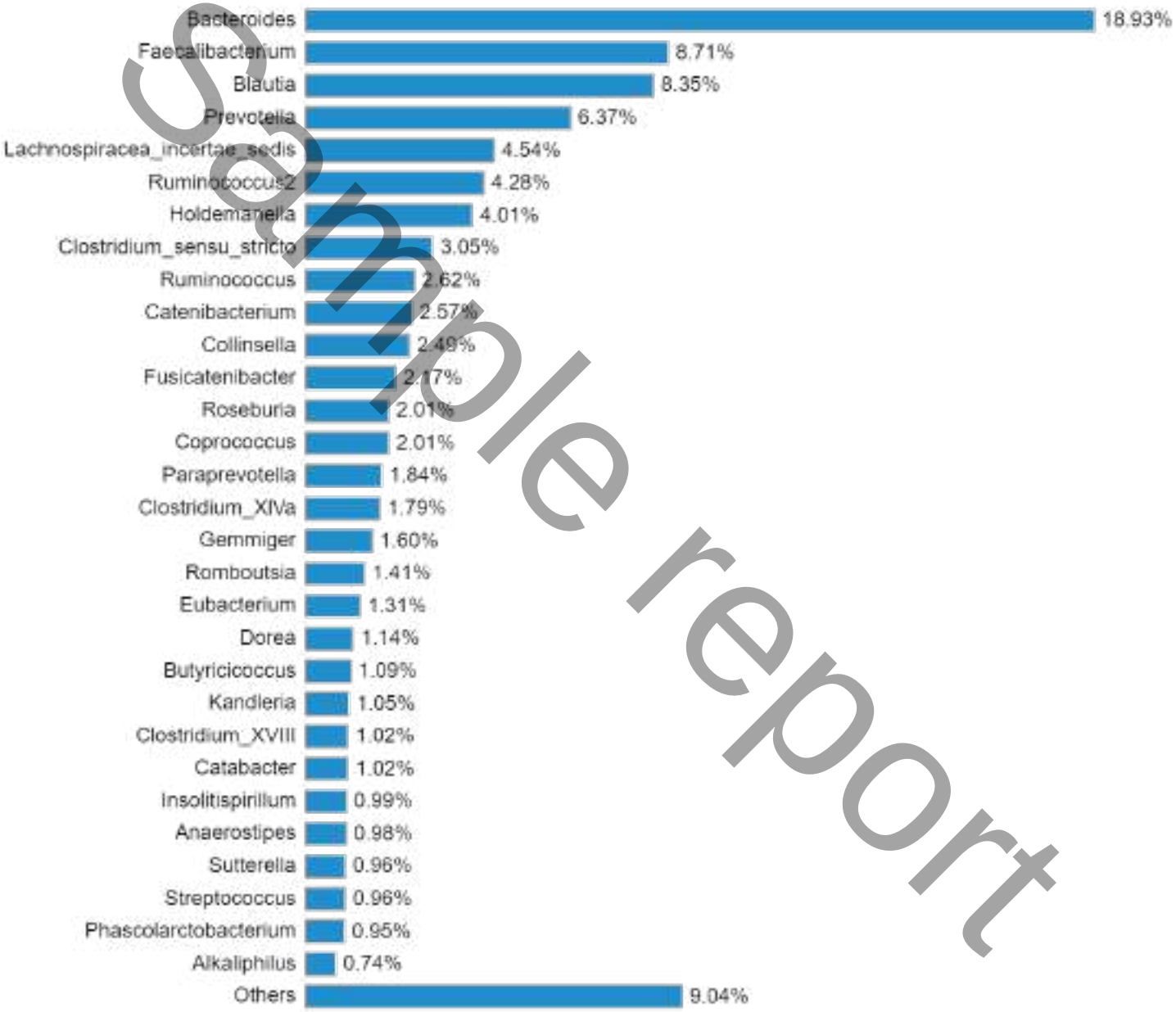
The figure shows the abundance of bacterial phyla in your microbiome. Bacterial communities with a frequency of less than 2% are summed up in the "Other" column.

1. *Bacteroidetes* (*Bacteroidota*)
2. *Firmicutes* (*Bacillota*)
3. *Actinobacteroides* (*Actinobacteriota*)
4. *Proteobacteria* (*Pseudomonadota*)
5. *Verrumicrobia* (*Verrumicrobiota*)



Genera

The 30 most abundant bacterial genera in your gut microbiome are shown in the figure.
The remaining abundances are summed up in the "Other" column.



Microbiome enterotype

Your microbiome enterotype: *Bacteroides*

The enterotype is a signature composition of microbes in the gut based on the dominant bacterial genera. The Bacteroides and Prevotella enterotypes are the most common. The enterotype of the microbiome depends on long-term dietary and lifestyle habits and is relatively resistant to perturbation. Given current knowledge, no single enterotype is superior to the other.

Your microbiome is dominated by bacteria of the Bacteroides genus. Prevotella bacteria are present in low numbers or absent.

- This type of microbiome has a better enzymatic capacity to digest animal carbohydrates and proteins.
- Associated with a high intake of animal foods and a protein- and fat-rich diet.
- More prevalent in developed countries.
- Frequently this microbiome has less different species and lower bacterial diversity
- People with this enterotype are more likely to have low levels of chronic inflammation, immune disorders, non-alcoholic fatty liver disease, colorectal cancer, celiac disease, and inflammatory bowel disease.

RECOMMENDATIONS FOR *BACTEROIDES* ENTEROTYPE:

- Encourage the growth of fibre-degrading Bifidobacteria. They produce compounds that, in turn, support the activity of butyrate-producing bacteria.
- Use bifidogenic fibre, such as inulin, and fructooligosaccharides (FOS), which contribute to the growth of Bifidobacteria.
- Foods rich in inulin are, for example, Jerusalem artichokes, onions, chicory root, leeks, and bananas. FOS can also be consumed in powder form as a food supplement. Fibre should be consumed with caution, and rather in smaller amounts at a time when you are not used to it, as it can cause stomach gases.
- Add bifidobacteria-containing foods to your daily diet, such as yogurt. You can also use bifidobacteria-containing probiotics.
- Make sure you consume enough plant foods and fibre every day. Many bacteria of the Bacteroides family are able to break down fibre and thereby produce important beneficial compounds.

Microbiome species richness

Your gut microbiome is rich in species.

We identified **244** different species of bacteria in your gut microbiome.
Healthy adults usually have more than 219 different bacterial species in their gut.

The greater the bacterial species richness, the greater the variety of functions your microbiome can perform. This means a better ability for you to break down different compounds, use them, and withstand stress and disturbances.

Test	Result	Reference
Species richness	244	>219

Microbiome diversity

Your gut microbiome diversity is too low!

Your microbiome diversity index is **2.874**.
Healthy adults usually have a diversity index higher than 2.99.

The diversity assessment takes into account the bacterial species richness and evenness, i.e., the number of different types of bacteria in your microbiome and the abundance and distribution of these species. The more different species and the more evenly distributed they are, the higher the diversity index.

High diversity means that your gut environment supports a wide variety of bacteria. This can result from

- a varied diet;
- slower intestinal transit (including constipation);
- the living environment;
- the use of medications;
- the body's immune responses.

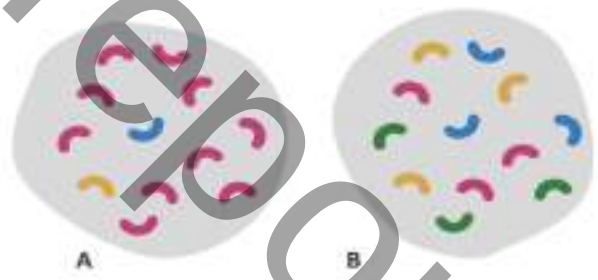
Low diversity indicates that your gut environment supports the activity of a few specialised bacteria. This can result from:

- a monotonous diet that lacks variety;
- frequent and rapid intestinal transit, which may flush out slower-growing bacteria;
- your body's immune response;
- the use of antibiotics.

People with a more diverse microbiome tend to have better digestive health and overall health. A more diverse microbiome supplies the body with the compounds it needs, protects the gut from pathogens, and is more resistant to different kinds of disturbances. Low diversity of the gut microbiome is associated with various diseases, such as obesity and inflammatory bowel diseases.

HOW TO IMPROVE YOUR MICROBIOME DIVERSITY?

- Eat a variety of plant foods every day: fruits, vegetables, berries, various wholegrain products, leafy greens, nuts, seeds, and herbs. A varied diet supports a varied microbiome.
- Eat fermented foods regularly, both fermented vegetables (sauerkraut, kimchi, pickled cucumber) and fermented dairy products without added sugar (yoghurt, kefir).
- Eat more foods rich in omega-3 fatty acids, such as oily fish (salmon, herring), nuts and seeds (flaxseeds, chia seeds, walnuts).
- Be physically active every day.
- Spend time in nature regularly.



A - Low diversity: the variety of bacteria is low, and their abundance is not evenly distributed.

B - High diversity: bacterial diversity is high, and bacterial abundance is evenly distributed.

Test	Result	Reference
Microbiome diversity	2.874	>2.99

Butyrate producing bacteria

Your gut microbiome has enough butyrate-producing bacteria.

The abundance of butyrate-producing bacteria in your gut microbiome is **25.79 %**.
Optimal abundance of butyrate-producing bacteria is higher than 19.29 %.

Butyric acid, or butyrate, is an important compound produced by certain intestinal bacteria. A higher proportion of butyrate-producing bacteria is considered beneficial to health, as butyrate has many positive roles in our body.

- Butyrate is the main source of energy for intestinal mucosal cells. It improves the intestinal barrier and prevents intestinal inflammation.
- Butyrate regulates blood sugar levels and supports the body's sensitivity to insulin, thus reducing the risk of type 2 diabetes and obesity.
- Butyrate regulates the levels of hunger hormones (GLP-1, PYY), reducing the risk of metabolic and heart disease.

HOW CAN YOU INCREASE THE AMOUNT OF BUTYRATE PRODUCING BACTERIA?

There are two ways to increase the abundance of butyrate-producing bacteria:

1. Stimulate the growth of butyric acid-producing bacteria by consuming the fibres they prefer:

- Fructans (inulin, fructo-oligosaccharides), found, for example, in whole grain wheat and rye, Jerusalem artichokes, onions, garlic, leeks, and chicory root.
- Resistant starch, found in raw green bananas, pulses, maize, cooked and then cooled rice and potatoes.
- Arabinoxylan, found in whole grain products (wheat, rye, oats, barley, and rice).

2. Support cross-feeding between bacteria. This is a phenomenon where compounds produced by one bacterium provide energy for another bacterium and promote its growth.

- Lactic acid and acetic acid produced by lactic acid bacteria can be used by some bacteria to produce butyric acid.
- *Ruminococcus bromii*, a bacterium that specialises in degrading resistant starch, converts it into smaller molecules that are food for bacteria that produce butyric acid.

Test	Result	Unit	Reference
Butyric acid producing bacteria	25.79	%	>19.29

Lactic acid bacteria

There is a sufficient amount of lactic acid-producing bacteria in your gut microbiome.

The abundance of lactic acid bacteria in your gut microbiome is **1.62 %**.
Optimal lactic acid bacterial abundance is higher than 0.28 %.

Lactic acid bacteria are bacteria that produce lactic acid. Lactic acid can be a food source for other beneficial bacteria. It acidifies the pH of the intestine, which improves the intestinal barrier and prevents the growth of pathogenic bacteria.

Depending on the bacterium and its strain, lactic acid bacteria have different potential beneficial effects:

- they help break down lactose;
- they reduce oxidative stress (produce antioxidants);
- they lower cholesterol, reducing the risk of heart disease;
- they affect the immune system, reducing the risk of allergic diseases;
- they produce neurotransmitters such as gamma-aminobutyric acid (GABA), which helps to lower blood pressure and relax muscles;
- they produce a variety of B-group vitamins.

While several genera of bacteria belong to the lactic acid bacteria group, *Lactobacillus* and *Bifidobacterium* bacteria are the most important and most studied in the context of human health. Among them, several probiotic bacterial species and strains are known.

Probiotics are live microorganisms that, when consumed in sufficient quantities, have beneficial effects on human health. Their benefits may also derive from the metabolites they produce, and therefore, it is not always necessary for probiotics to permanently colonise the intestine.

WHERE TO GET LACTIC ACID BACTERIA?

- Lactic acid bacteria are abundant in **fermented foods**: yoghurts (preferably without added sugar), kefir, buttermilk, cheeses, fermented vegetables (sauerkraut, fresh pickles, kimchi, tempeh, and miso), kombucha, and fermented meat products (salami, chorizo, pepperoni). In addition to bacteria, these foods also contain beneficial compounds produced by the microbes.
- **Taking** lactic acid-producing **probiotics** in capsule or powder form. Probiotic bacterial strains have been carefully studied. Each strain of probiotic bacteria has strain-specific properties, i.e., an effect on alleviating symptoms or reducing the risk of a particular condition. This information should be found on the packaging of the product containing probiotics.
- Prebiotics also help to increase the abundance of lactic acid bacteria. Prebiotics are non-digestable food components that promote growth of beneficial bacteria. For example, fibre, inulin, fructo-oligosaccharides, and xylo-oligosaccharides found in fruit and vegetables, and galacto-oligosaccharides found in milk.

Test	Result	Unit	Reference
Bifidobacterium	1.34	%	>0.1
Lactobacillus	0.27	%	>0.01

H_2S-producing bacteria

There are too many H_2S-producing bacteria in your gut microbiome!

The abundance of H_2S-producing bacteria in your gut microbiome is **5.27 %**.
The optimal abundance of H_2S-producing bacteria is less than 3.48 %.

Hydrogen sulphide (H_2S) is a gas produced in the gut by our own cells and by certain bacteria. Bacteria produce hydrogen sulphide either by reducing sulphates or by fermenting sulphur-containing amino acids.

- In small amounts, H_2S supports the maintenance of the intestine's protective lining and helps prevent inflammation.
- However, in large quantities (when the bacteria that produce it are abundant), H_2S is actually pro-inflammatory; it breaks down the protective lining of the intestinal wall and prevents the absorption of butyric acid into the intestinal cells. Therefore, high concentrations of H_2S can promote the development of intestinal cancer and other digestive diseases.

HOW CAN YOU REDUCE THE ABUNDANCE OF H_2S-PRODUCING BACTERIA?

- Reduce your intake of animal proteins, especially processed meats.
- Replace meat with plant protein sources (beans, lentils), which are also high in fibre. Fibre promotes the growth of other good bacteria.

Test	Result	Unit	Reference
H_2S producing bacteria	5.27	%	<3.48

Vitamin-producing bacteria

The abundance of vitamin-producing bacteria in your gut microbiome is optimal.

The abundance of vitamiin-producing bacteria in your microbiome is **52.3 %**.
The optimal abundance of vitamin-producing bacteria is higher than 25.35 %.

The main source of vitamins for humans is food, which is also where we get the majority of the required K and B vitamins. Vitamin deficiencies in the diet also affect the composition of the gut microbiota. To encourage the growth of beneficial bacteria, it is worth ensuring that your diet is varied.
Bacteria living in the gut produce some of the K and B vitamins our body uses.

There are two types of vitamin K:

- **Vitamin K_1**, or phylloquinone, is obtained mainly from green plants and is essential for normal blood clotting.
- **Vitamin K_2**, or menaquinone, is produced by bacteria. Vitamin K_2 helps to prevent narrowing of the blood vessels, reduces the risk of cardiovascular disease, helps to keep bones strong, and supports kidney function. Vitamin K_2 is found in foods fermented by bacteria.

B-group vitamins are important in cellular energy production, immune function, neurotransmitter synthesis, carbon metabolism, cell-cell communication, and DNA biosynthesis. These are water-soluble compounds that are not stored in the body and therefore need to be constantly replenished. B-group vitamins are found in meat, eggs, dairy products, liver, green leafy vegetables, whole grains, nutritional yeast, legumes, nuts, and seeds. Vitamin B_{12} does not occur naturally in plant foods.

B-group vitamins are:

- B_1 (thiamine)
- B_2 (riboflavin)
- B_3 (niacin)
- B_5 (pantothenic acid)
- B_6 (pyridoxine)
- B_7 (biotin)
- B_9 (folate)
- B_{12} (cobalamin)

Test	Result	Unit	Reference
Anaerostipes	0.82	%	>0.41
Genus *Bacteroides*	25.11	%	6.54-27.08
Bifidobacterium	1.34	%	>0.1
Eubacterium hallii	1.81	%	>0.62
Eubacterium rectale	0.37	%	>0.02
Faecalibacterium	13.7	%	>2.78
Lactobacillus	0.27	%	>0.01
Lactococcus	1.01	%	>0.01
Parabacteroides	4.03	%	<4.33
Prevotella	0.01	%	>0.05
Roseburia	4.18	%	>0.63

Microbiome and nutrition

Bacteria associated with healthy eating habits

Nutrition-related bacteria are balanced in your microbiome.

Food is one of the biggest influencers on the composition of the gut microbiome. Nutrients consumed by humans also reach the bacteria living in the gut; what you eat, your bacteria eat. When we eat a diet rich in plant foods containing fibre and a range of vitamins, minerals, and polyphenols, we encourage the microbes that love these compounds to thrive.

Fibre is a carbohydrate found in plants that cannot be broken down by the human body but is a staple food for many bacteria living in the gut. When bacteria ferment fibre, they produce a number of compounds that are essential and useful to humans, such as short-chain fatty acids (butyrate, acetate, propionate). These compounds help to regulate the feeling of fullness and prevent metabolic syndrome, obesity, cardiovascular diseases, and type 2 diabetes. In addition, fibre ensures normal intestinal transit and helps to eliminate toxic compounds and excess cholesterol.

A healthy and balanced diet is characterised by:

- plenty of varied plant foods. It is recommended to consume at least 30 different plant foods per week (vegetables, fruits, whole grains, legumes, berries, nuts, seeds, and spices);
- small amounts of processed and convenience foods;
- limited amount of processed red meat and more fish, poultry, and plant protein sources;
- lots of fermented foods;
- limited amount of sweet treats (cakes, pastries, biscuits, sweets, chocolate);
- limited amount of salty snacks (savoury biscuits, crisps, crackers, popcorn);
- a limited quantity of sweet soft drinks;
- limited alcohol.

HOW TO EAT HEALTHILY?

- Prefer whole-meal pasta and bread to white-wheat flour products.
- Add vegetables and a fresh salad to every meal. Half of your plate should be plant-based foods.
- Include more plant protein sources, such as beans, lentils, and tofu.
- Opt for poultry and fish. Limit your intake of fatty pork and beef.
- Limit your intake of processed meat products (sausages, hams, ready-made cutlets, etc.).
- Prefer fruit, nuts, and vegetables with dipping sauce as snacks. Limit the intake of sweet and salty snacks (sweet and savoury biscuits, cakes, sweets, chocolates, etc.).
- For drinking, prefer water. Limit sweetened beverages (sodas, flavoured waters, and energy drinks).
- Try to cook your own food as much as possible.

Women should consume at least **25 g** and men at least **38 g** of fibre every day.

The abundance of these bacteria is linked to the consumption of a diet rich in fibre and micronutrients (vitamins and minerals).

Test	Result	Unit	Reference
Acetivibrio	0.2	%	>0.03
Akkermansia muciniphila	0	%	>0.01
Alistipes	2.04	%	>0.41
Bacteroides ovatus	0.1	%	>0.14
Bacteroides xylanisolvens	1.2	%	>0.03
Bifidobacterium	1.34	%	>0.1
Butyrivibrio	0.03	%	>0.02
Eubacterium eligens	0.05	%	>0.19
Eubacterium rectale	0.37	%	>0.02
Faecalibacterium	13.7	%	>2.78
Oscillibacter	0.27	%	>0.25
Roseburia	4.18	%	>0.63
Ruminococcus bromii	0.01	%	>0.43
Microbiome diversity	2.874		>2.99

These bacteria can also thrive in environments low in fibre. They are able to consume simple carbohydrates, proteins, and fats and sugars present in the intestinal mucus as an energy source.

Test	Result	Unit	Reference
Anaerotruncus colihominis	0.04	%	<0.05
Bacteroides faecis	0.09	%	<0.29
Bacteroides fragilis	1.92	%	<0.42
Bilophila	0.11	%	<0.52
Clostridium bolteae	0.07	%	<0.06
Clostridium innocuum	0.08	%	<0.04
Clostridium leptum	0.08	%	<0.29
Clostridium saccharolyticum	0	%	<0.01
Clostridium spiroforme	0.27	%	<0.16
Clostridium symbiosum	0.02	%	<0.02
Collinsella	4.67	%	<4.25
Desulfovibrio	0.04	%	<0.27
Dorea	0.73	%	<1.52
Erysipelotrichaceae	1.23	%	<7.82
Escherichia/Shigella	0	%	<0.25
Flavonifractor plautii	0.16	%	<0.29
Parabacteroides merdae	4.37	%	<1.90
Ruminococcus gnavus	0.37	%	<0.06
Sutterella wadsworthensis	0	%	<1.16

Microbiome and health

Body weight

Weight-related bacteria in your microbiome are balanced.

Many studies have found that composition of the gut microbiome differs in overweight and lean individuals. Although there is still a lot of unknown about the relationship between the microbiome and body weight, it is clear that the compounds produced by bacteria influence our appetite, our feeling of fullness, and our energy availability from food.

It is worth remembering that weight regulation is a complex process in which several factors play a role, such as heredity, diet, physical activity, lifestyle, and medication.

HOW CAN YOU MANAGE YOUR WEIGHT?

- Make sure your daily diet is packed with a variety of vegetables, fruits, berries, and pulses.
- Avoid eating over-processed cereal products: white bread and pastries, white pasta, etc. Prefer whole-grain products and enrich your diet with cereals other than wheat (oats, barley, rye, buckwheat, quinoa, millet, and brown rice).
- Avoid processed foods, which are high in fat, sugar, and salt but low in fibre. Examples include sausages, instant soups and noodles, potato crisps, breakfast cereals, ice cream, biscuits, chocolate and muesli bars, lemonades, energy drinks, etc. Instead, prepare as much of your own food as possible, using fresh ingredients.
- Keep an eye on the size of your food portions. To regulate your appetite, try to eat more slowly and with concentration.
- Exercise regularly: it is recommended that you do at least 150 min of moderate-intensity or 75 min of high-intensity aerobic exercise per week. In addition, muscle-strengthening exercises are recommended at least twice a week.
- Get enough sleep every day - at least 7-8 hours.
- Control your stress. Constant stress can affect your eating habits and weight. Find healthy ways to relieve stress, such as exercise, meditation, or therapy.

Bacteria associated with lower body weight:

Test	Result	Unit	Reference	
Akkermansia muciniphila	0	%	>0.01	
Alistipes	2.04	%	>0.41	
Christensenellaceae	0.05	%	>0.06	
Faecalibacterium	13.7	%	>2.78	
Oscillibacter	0.27	%	>0.25	
Butyric acid producing bacteria	25.79	%	>19.29	

Bacteria associated with higher body weight:

Test	Result	Unit	Reference	
Anaerococcus	0	%	<0.01	
Catenibacterium	0	%	<2.06	
Collinsella aerofaciens	4.91	%	<4.57	
Dialister	0	%	<2.71	
Dorea formicigenerans	0.63	%	<0.37	
Dorea longicatena	0.17	%	<1.51	
Fusobacterium	0	%	<0.01	
Intestinimonas	0.25	%	<1.38	
Ruminococcus gnavus	0.37	%	<0.06	
Streptococcus	4.44	%	<1.54	
Sutterella	0	%	<1.97	

Intestinal barrier strength

Bacteria linked to the strength of the intestinal barrier need attention!

The mucus layer covering the intestinal walls is an important protective barrier for the digestive system. It helps fluids and nutrients to be absorbed and protects against harmful compounds. In addition, the mucus layer separates intestinal bacteria from the intestinal cells. Otherwise, the bacteria would overly irritate the immune cells in the gut, causing unnecessary inflammatory reactions and disrupting the normal functioning of the intestinal barrier.

Bacteria play an important role in the thickness of the mucus layer; some bacteria break down the mucus layer and others stimulate its production. If these bacteria are imbalanced, the protective mucus layer can be very thin, leading to chronic inflammation in the gut. Chronic inflammation, in turn, can lead to loosening of the intestinal epithelial cell junctions and excessive permeability of the intestinal wall. A thin mucosal layer also makes it easier for pathogenic bacteria to penetrate the protective barrier and cause infection.

Bacteria that overly break down the intestinal lining usually become abundant when there is not enough fibre in the diet. In this case, many beneficial intestinal bacteria are "starved", and those that feed on alternative compounds (e.g. mucin) can thrive.

HOW CAN INTESTINAL BARRIER STRENGTH BE INCREASED?

- Eat more fibre-rich foods, such as vegetables, fruits, and pulses.
- Eat less fatty, overprocessed foods.
- Limit your intake of foods containing certain emulsifiers (carboxymethyl cellulose (E466), polysorbate (E433), and carrageenan (E407)) that can also disrupt the intestinal barrier.
- Avoid drinking alcohol.
- Make sure your vitamin D levels are normal. Use vitamin D supplements if necessary.
- Get enough sleep every day and maintain a consistent sleep pattern.

Bacteria that weaken the intestinal barrier:

Test	Result	Unit	Reference
Bacteroides caccae	2.08	%	<1.88
Enterobacteriaceae	0	%	<0.52
Ruminococcus gnavus	0.37	%	<0.06
Ruminococcus torques	0.14	%	<0.74
H_2S producing bacteria	5.27	%	<3.48

Bacteria support the integrity of the intestinal barrier:

Test	Result	Unit	Reference
Akkermansia muciniphila	0	%	>0.01
Faecalibacterium	13.7	%	>2.78
Roseburia	4.18	%	>0.63
Butyric acid producing bacteria	25.79	%	>19.29
Microbiome diversity	2.874		>2.99
Lactic acid bacteria	1.62	%	>0.28

Risk of inflammatory bowel disease (IBD)

Bacteria associated with inflammatory bowel disease in your microbiome need attention!

In inflammatory bowel disease (IBD), the mucous membrane that covers and protects the large intestine is damaged, making the intestinal lining inflamed and ulcerated. There are two forms of the disease: Crohn's disease and ulcerative colitis. The exact cause of IBD is still unclear, but an abnormal functioning of the intestinal immune system, triggered by the environment, plays a major role. There is often a genetic predisposition to the disease.

The role of bacteria in the development of the disease is also suspected, as a different microbiome composition has been observed in IBD. IBD is most prevalent in Western countries, and its development and progression are strongly associated with Western diets and high meat consumption.

HOW CAN YOU SUPPORT YOUR MICROBIOME IN THE EVENT OF IBD?

- For both forms of IBD, studies have found that a diet rich in fibre, fruit, and vegetables and low in fat can help reduce symptoms.
- Reduce your intake of ready meals, snacks, soft drinks, and ready-made sauces. A greater intake of these is associated with a higher risk of Crohn's disease.
- Reduce your intake of red meat, poultry, and processed meat products. A high proportion of these in the diet is associated with a greater risk of ulcerative colitis. Work with a dietitian who can help you design a menu that suits your condition.
- Certain probiotics can bring relief. Studies have shown the positive effects of certain strains of *Lactobacillus, Bifidobacterium,* and *Saccharomyces boulardii* on IBD.

Bacteria with increased abundance in IBD:

Test	Result	Unit	Reference
Bacteroides caccae	2.08	%	<1.88
Bacteroides fragilis	1.92	%	<0.42
Bacteroides vulgatus	1.4	%	<8.31
Enterobacteriaceae	0	%	<0.52
Erysipelotrichaceae	1.23	%	<7.82
Ruminococcus gnavus	0.37	%	<0.06
Ruminococcus torques	0.14	%	<0.74
Streptococcus	4.44	%	<1.54

Bacteria with reduced abundance in IBD:

Test	Result	Unit	Reference
Akkermansia muciniphila	0	%	>0.01
Faecalibacterium	13.7	%	>2.78
Lactic acid bacteria	1.62	%	>0.28
Microbiome diversity	2.874		>2.99
Butyric acid producing bacteria	25.79	%	>19.29

References: 56, 62, 63, 64, 65, 66, 67, 68, 69, 70

Colorectal cancer risk

The bacteria associated with colorectal cancer are balanced in your microbiome.

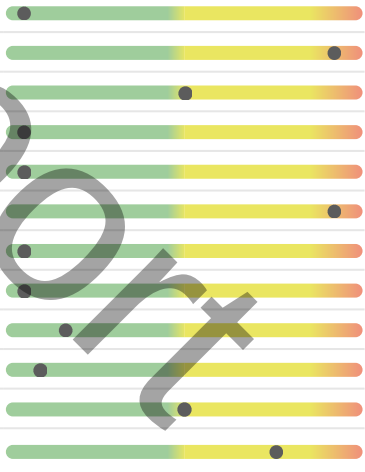
Colorectal cancer, or bowel cancer, is a disease that depends on many factors (heredity, environment). The microbial composition of the intestinal tract may also be a contributing factor. The microbiome associated with colorectal cancer is more specialised in the degradation of proteins and the mucosal lining of the intestinal wall. The ability to break down fibre is lower.

HOW TO PREVENT BOWEL CANCER?

- Make sure you consume enough fibre every day.
- Limit the proportion of red meat and processed meat products (sausages, cutlets, hams, etc.) in your daily diet.
- Limit salt intake.
- Avoid drinking alcohol and smoking.
- Be physically active.
- Keep your body weight within the recommended range.
- Monitor changes in stools.
- Take part in colorectal cancer screenings.

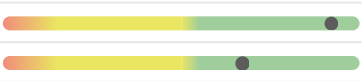
Bacteria with increased abundance in colorectal cancer:

Test	Result	Unit	Reference
Atopobium	0	%	<0.02
Bacteroides fragilis	1.92	%	<0.42
Clostridium symbiosum	0.02	%	<0.02
Escherichia/Shigella	0	%	<0.25
Fusobacterium nucleatum	0	%	0
Gemella	0.03	%	<0.01
Parvimonas	0	%	<0.01
Peptostreptococcus	0	%	<0.01
Porphyromonas	0.01	%	<0.03
Ruminococcus torques	0.14	%	<0.74
Solobacterium	0.01	%	<0.01
H_2S producing bacteria	5.27	%	<3.48



Bacteria with reduced abundance in colorectal cancer:

Test	Result	Unit	Referece
Faecalibacterium	13.7	%	>2.78
Butyric acid producing bacteria	25.79	%	>19.29



Gut-heart axis

The bacteria associated with heart disease are balanced in your microbiome.

Cardiovascular diseases are the biggest cause of death worldwide. Compounds produced by microbes living in the gut have been found to play a role in the onset and development of these diseases.

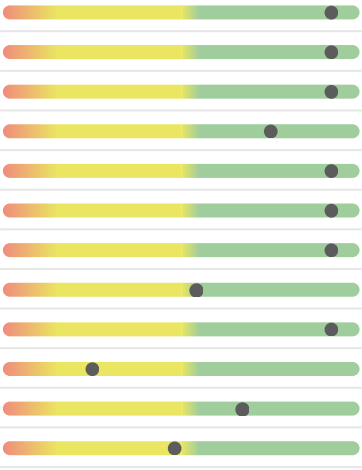
Certain intestinal bacteria produce the compound trimethylamine (TMA) during the breakdown of red meat, eggs, and dairy products, which is converted in the liver to the compound TMAO (trimethylamine-N-oxide). Elevated blood levels of TMAO are associated with an increased risk of heart disease. In addition, a person's genetic background, comorbidities, and environment also play an important role in the development of disease.

WHAT CAN YOU DO TO KEEP YOUR HEART HEALTHY?

- Put more emphasis on plant-based foods in your diet (vegetables, fruits, whole grains, pulses, seeds, and nuts). Plant foods are rich in vitamins, minerals, and fibre. These are important for heart health, for the diversity of the microbiome, and for promoting beneficial bacteria. Fibre helps to remove excess cholesterol.
- Limit your intake of red meat, eggs, processed meat products, butter, and margarine. Prefer lean poultry, fish, or plant proteins.
- Limit your intake of highly processed foods and added sugars. They are often high in calories but low in nutrients.
- Limit your intake of saturated and trans fats. Healthy sources of fat include oily fish (herring, salmon), nuts and seeds (flaxseeds, hemp seeds), avocado, and olive oil.
- Limit your daily salt intake. Too much salt can lead to high blood pressure, which is a risk factor for cardiovascular disease. Hidden salt is particularly high in highly processed convenience foods.
- Avoid drinking alcohol.
- Drink enough fluids, preferrably plain water. This will help prevent blood clots.
- Don't smoke.
- Be physically active regularly.
- Regularly check your blood pressure, cholesterol, and blood sugar levels.
- Certain probiotic strains of *Lactobacillus* and *Saccharamyces boulardii* have been shown to have positive effects on heart health.

Bacteria with reduced abundance in heart disease:

Test	Result	Unit	Reference
Alistipes	2.04	%	>0.41
Bacteroides thetaiotaomicron	0.97	%	>0.06
Bifidobacterium	1.34	%	>0.1
Butyrivibrio	0.03	%	>0.02
Eubacterium hallii	1.81	%	>0.62
Eubacterium rectale	0.37	%	>0.02
Faecalibacterium	13.7	%	>2.78
Oscillibacter	0.27	%	>0.25
Roseburia	4.18	%	>0.63
Ruminococcus gauvreauii	0.01	%	>0.02
Butyric acid producing bacteria	25.79	%	>19.29
Microbiome diversity	2.874		>2.99



Bacteria with increased abundance in heart disease:

Test	Result	Unit	Reference
Clostridium bolteae	0.07	%	<0.06
Clostridium sensu stricto	0.17	%	<3.73
Collinsella	4.67	%	<4.25
Desulfovibrio	0.04	%	<0.27
Enterobacteriaceae	0	%	<0.52
Escherichia/Shigella	0	%	<0.25
Eubacterium siraeum	0.3	%	<1.32
Klebsiella	0	%	<0.02
Parabacteroides	4.03	%	<4.33
Porphyromonas	0.01	%	<0.03
Ruminococcus gnavus	0.37	%	<0.06
Ruminococcus torques	0.14	%	<0.74
Streptococcus	4.44	%	<1.54

Nutrients in foods

“Slow” carbohydrates	g/100g	"Fast" carbohydrates	g/100g	Fibre	g/100g
Whole cereals (wheat, oats, barley, rye, buckwheat, etc.)	60-70	White sugar	99,8	Carob powder	40
Sour dough bread	56	Corn	77	Wheat bran, rye bran	38
Rye bread	46	Candies	56-80	Flax seeds	28
Brown rice (boiled)	28	White wheat flour	64	Oat bran	17
Whole wheat pasta (boiled)	20	Deep fried chips	50	Nuts, seeds and almonds	5-15
Fruits (apple, pear, etc.)	8-15	White bread	45	Cereals (quinoa, oats, brown rice, barley, buckwheat, rye)	5-10
Berries (strawberry, raspberry, etc.)	7-14	White rice	27	Dark chocolate	8
Vegetables (carrot, tomato, etc.)	4-10	Pasta	20	Legumes (lentil, pea, red bean, chick pea, black bean, field bean, etc.)	6-8
		Soft drinks	10	Berries (strawberry, raspberry, blueberry, blackcurrant, etc.)	2-7
Vegetable protein	**g/100g**	**Animal protein**	**g/100g**	Jerusalem artichoke	3
Algae products (Spirulina)	57	Meat (beef, pork, chicken, turkey, etc.)	23-27	Vegetables (carrot, beet, broccoli, artichoke, Brussels sprout, spinach, tomato, etc.)	1-5
Hemp seeds	25	Fish (tuna, salmon, etc.)	20-30	Fruits (pear, avocado, apple, banana, etc.)	1-3
Soybean products (tofu, tempeh, edamame, etc.)	15-18	Cheese (cream cheese, ricotta, cottage cheese, feta, mozzarella, etc.)	17-26		
Quinoa	13	Curd	13		
Lentils	9	Egg	12		
Peas (green pea, chick pea, etc.)	8	Yogurt	3-7		
Beans (red, black, pinto bean, etc.)	7-8	Milk	3		
Unsaturated fats	**g/100g**	**Saturated fats**	**g/100g**		
Olive oil	81	Coconut oil	86		
Nuts (walnut, pistachio, cashew, pecan, etc.)	40-50	Butter	48		
Almonds	45	Cheese	17-32		
Seeds (pumpkin, sesame, sunflower, etc.)	35-40	Salami	15		
Flax and chia seeds	25-27	Chicken skin	14		
Avocado	11	Fatty meat (pork, sheep, etc.)	6-9		
Fish (tuna, salmon, etc.)	2-4	Processed meat products (sausage, frankfurter, etc.)	7-8		

Recommended amounts of food

Vegetables	Recommended serving	1 portion contains
Carrot, turnip, beet, cucumber, tomato, cabbage, broccoli, zucchini, Jerusalem artichoke, etc. Lettuce, spinach, rucola, iceberg, etc.	3-5 servings a day	½ glass of vegetables ½ glass fresh vegetable juice 1 glass of leafy vegetables
Fruits and berries		
Fruits (pear, avocado, apple, banana, etc.) Berries (strawberries, raspberries, blueberries, blackcurrants, etc.)	4-5 servings a day	½ glass of chopped fruits or berries½ glass of freshly squeezed juice
Legumes and germs		
Lentils, peas, red beans, chick peas, black beans, field beans, beans, etc.	1 serving at least 3x a week	½ glass of beans, peas or lentils 30 g broad bean 30 g of germs
Whole grain products and potatoes		
Cereals (quinoa, oats, rice, millet, barley, buckwheat, rye, wheat, etc.)	4-7 servings a day	1 slice of bread ½ glass cooked cereals 1 tbs of flour
Bran (wheat, rye, oats)	1 serving a day	1 tbs
Potatoes, sweet potatoes, corn	1 serving a day	1 small corn cob 1 medium potato 70 g sweet potatoes
Milk and dairy		
Milk, kefir, sour milk, buttermilk Plain yogurt Cheese (cream cheese, feta, mozzarella, parmesan) Sour cream Curd, cottage cheese, ricotta	1-3 servings a day	1 glass of milk, kefir, yougurt 30-40g cheese 30-40g sour cream 100-130g curd, cottage cheese
Meat and fish		
Meat (beef, pork, lamb, wild animal) Poultry (chicken, turkey, duck)	1-2 servings a day	35 g fatty meat 60 g lean meat
Light fish (zander, pike, cod, silver hake, etc.) Fatty fish (salmon, trout, herring, Baltic herring, sprat, mackerel, sardine, eel, etc.)	1 serving at least 3x a week	75 g light fish 30-35 g fatty fish
Eggs		
Eggs	1 serving at least 3x a week	1 chicken egg 5 quail eggs
Nuts, seeds and almonds		
Pistachio, cashew nut, coconut, etc. Flaxseeds, chia seeds, pumpkin seeds, etc.	1 serving a day	10 g or 1 tbsp
Fats		
Cold-pressed oils (olive oil, rapeseed oil, camelina oil) Butter, lard, coconut fat	1 serving a day	5 g